Water Use Efficiency Master Plan

Vol. 1: Implementation Blueprint &
Vol. 2: Technical Analysis

November 2008

WESTERN MUNICIPAL WATER DISTRICT

Prepared for:

Western Municipal Water District

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Introduction

Growing concerns regarding the reliability of import water supplies, increasing demand for quality water due to remarkable regional growth and uncertain climate change are driving the need for increased water-use efficiency in all water-use sectors. These long-term trends will continue to challenge the efforts of arid California water agencies to supply increasing water demands. In order to meet the future demand for water in the Western Municipal Water District's (Western; District) service area, supply projects identified in the District's Integrated Regional Water Management Plan must be coupled with an expectation of greater water use efficiency by all customers within the District.

Due to an untimely concert of judicial actions in the Sacramento-San Joaquin River Delta, prolonged drought on the Colorado River, and record low precipitation and subsequent sierra snow-pack, the probability of State and Regional agencies implementing a variety of water use restrictions, cut-backs and/or allocations in order to meet demand is exceptionally high. In the short-term, a dynamic water-use efficiency program, as described here-in, will help Western and its customers respond to local drought and the potential "interruption" of imported water deliveries. In the long-term, cost-effective investments in water-use efficiency will reduce dependence on imported supplies, enhance local control, expand existing water supplies, and sustain economic vitality.

The Western Municipal Water District Water-use Efficiency Master Plan Implementation Strategy will assist customers in the service area become water efficient. It will also address short-term drought restrictions and imbed water-use efficiency into District policies and customer ethics. Water-use efficiency will become a core business component in the District-customer partnership, with the understanding that water efficiency enables continued economic development and maintenance of the local living environment.

The Western water-use efficiency strategy is intended to start immediately with select customer groups. Implementation of the actions outlined will ramp-up over the next two and a half years. Actions may be programmatic in nature or may simply entail local financial contributions to existing Metropolitan Water District (Metropolitan) incentives to drive decisive and immediate response. The first items to be implemented will rely on contract management. As the implementation timeline accelerates, additional in-house staffing will be necessary to coordinate specific projects for specific water use sectors. Western's Water-use Efficiency Master Plan is designed to remain flexible to accommodate changing supply conditions, take advantage of evolving technologies and

to capitalize on available third-party funding. This master plan will be subject to review and revision following completion of the District's Urban Water Management Plans at five year intervals.

Strategic Vision

Western Municipal Water District's twofold role as a regional water wholesaler and local water retailer means that unique marketing efforts and program strategies need to be developed to achieve specific results within each customer group and to reach the ultimate end-users of water.

At the wholesale level, Western will focus on the following primary principles to achieve regional water efficiency:

1. **Support the local efforts and unique programs of each retail water agency** through strategic partnerships, sustained regional water efficiency outreach campaigns, financial incentives for water conservation activities, and technical assistance for the development and/or implementation of new demand management programs.

2. **Deliver regionally cost-effective demand management programs for the end-use customer** in order to procure long-term water savings. Regional programs will be developed where a larger scope yields greater economic and water saving benefits than localized programs.

3. **Solicit third-party grant funding for regional programs** and, if advantageous, for unique localized programs that may immediately benefit a regional audience or may have future potential for larger-scale implementation.

4. **Encourage each water agency to develop water budget allocations** for their end-use customers. Ideally, water budgets should be site/use specific and include mechanisms to distinguish between indoor and outdoor water consumption targets. Landscape and agricultural water use should consider irrigated square footage and the measurement of daily evapotranspiration rates.

5. **Advocate for cost-effective and regionally appropriate rules, regulations and ordinances for the efficient use of water.**

At the retail level, Western's tasks are specifically focused to reduce the use of import water by its direct customers. The localized strategies seek to leverage the programs developed in support of the wholesale tenets outlined above. Western's retail plan blends the following principles:

1. **Regular and sustained outreach to all of Western's direct retail customers.** This action may include seasonal messaging through bill inserts, direct mail, electronic media, and tactical marketing to specific water use sector. The messages will be timely and designed to induce action and behavioral change.

2. **Development of site/use specific water budget allocations and a conservation-based tiered water rate structure.** Western retail customers will have an allocation of water calculated to meet their needs while providing an economic incentive to use water efficiently. The rate structure will have tiers. The tiers define efficient use and wasteful use, and allow for the direct application of an economic "signal" to water users regarding their own water use efficiency. Appropriate water rates are charged for efficient water use. Inefficient water use, use that results in the need to increase production or import additional supplies, triggers a geometric increase in the rate charged.

3. **Enhancing Western's established commitment to water use efficiency through the *Landscapes Southern California Style* program and other water education and public information activities.**

4. **Providing sector-specific customer efficiency assistance and implement strategic conservation programs designed to yield sustainable water savings.** Execute advanced efficiency evaluation and audit programs to serve as the foundation of all product and technology based incentive programs. Offer these efficiency services free-of-charges to all retail customers to pinpoint opportunities for increased efficiency, to advocate change, to ensure equity in the water budget rate structure, and to directly inform the customer of financial incentives and programmatic options designed to achieve efficiencies.

5. **Utilizing the water efficiency programs as a vehicle to further educate customers about equity in the tiered rate structure, their ability to control monthly water charges and the true value of water.** Have customers take full advantage of the water efficiency programs to reduce water consumption and align usage with their water budget.

6. **Creation of financing mechanisms that allow customer to extend and make regular payments for the implementation and/or purchase of water saving technologies and devices on their monthly water service bill.**

Programmatic Objectives

In creating Western's portfolio of water use efficiency programs, it is essential that the program designs hit the principal objectives of Western and its retail agencies. These objectives are to:

- Target markets with the ***Highest Water Savings*** opportunity, both in immediate savings and long-term sustainability;
- Select technologies that yield the ***Greatest Bang for the Buck;***
- Pursue all available ***External Funding*** to defray costs and allow for a higher number of program participants;
- Develop focused programs that, over time, can be ***Expanded with New Product Offerings or with Increased Production.***

Highest Water Savings Opportunities

The residential market, comprising 70% of Western's total demand, is the key market to address. Residential landscape water usage, at roughly 60% of total residential consumption, is clearly the prime opportunity for water savings.

Landscape water reduction for the commercial market is another viable prospect as well. This includes homeowners associations and commercial properties with large landscapes. These customers are harder to reach and more difficult to secure their participation in programs because of the multiple levels of people involved. There are sometimes Boards of Directors and often property owners and site managers involved in the decision process. Additionally, the project will involve landscape maintenance and irrigation contractors as well. All parties need to be educated and invested in water efficiency in order to achieve persistent savings. Although programs to this sector are more complex to reach and manage, if done successfully the savings results are significant.

Indoor water use is not the major focus of programs implemented by Western at this time; however there are niche markets and select products and technologies that will be employed to increase indoor efficiencies. Metropolitan has many existing incentives for residential and commercial measures. Instead of duplicating Metropolitan's programs, Western will seek to more actively draw customers into these programs. This can be done by increasing the financial incentives and developing a targeted marketing campaign that yields higher participation and ultimately water savings.

Another key area for Western focus is the public sector (schools, city facilities, etc…); a market that historically was difficult to reach and extract water savings. Metropolitan currently has a highly valuable Public Sector Program (PSP) which Western plans to

enhance even further. This water-use sector offers significant opportunity for immediate and sustainable water savings.

Greatest Bang for the Buck

With the residential and commercial landscape water-use sector identified as a key saving opportunity, new programs and services need to be employed. Currently, "smart" weather and soil-moisture based irrigation controllers; rain shut-off sensors; and high efficiency sprinkler nozzles are the most likely and most cost effective products to yield water savings in landscaped areas. Since these products are unknown to most customers, they must be persuaded to participate by the offer of free products and, whenever cost effective, free installation. When the products are well established in the market, it will no longer be necessary to provide them at agency expense. Today, however, the customer is not likely to invest in unknown technologies unless the offer is "too good to pass up."

Turf replacement is another measure that has yielded significant water savings for many agencies in the arid southwest – most notably in southern Nevada. Both large and small turf area customers can participate and gain positive results. Due to the extensive work entailed in the turf replacement process, these programs yield a lower response rate than "smart" controllers and nozzle retrofit programs, but can be a valuable addition to the overall program portfolio.

In addition to capitalizing on the well-established notoriety of *Landscapes Southern California Style,* Western's Landscape Education Center*,* the District will leverage regional funding as it becomes available to implement a more cost effective turf replacement program.

External Funding

There are many funding sources available to the proactive and prepared water agency. Funding sources may include Federal grants regularly offered through the Bureau of Reclamation and occasionally through the Environmental Protection Agency; efficiency grants offered through State agencies such as the Department of Water Resources and the State Water Resources Control Board; and regional grants and incentives offered by the Metropolitan Water District of Southern California (Metropolitan).

Western, in addition to applying for the competitive offerings of State and Federal agencies, should leverage all Metropolitan incentives and programs including:

- SoCal Water$mart Program for single-family residential water efficient measures.
- The Save Water – Save A Buck Program for multi-family and commercial water efficient measures.

- The Water Savings Performance Program for industrial process and irrigation system improvements.
- The Public Sector Program offering public agencies four components: water audits, enhanced incentives, pay for performance incentives and recycled water hook up incentives.
- The California Friendly Homes Program offering developers incentives for water efficient measures.
- The Turf Replacement Program for removal of high water use turf and replacement with low water using plants and low precipitation irrigation systems.

By maximizing program funding, Western can expand the number of program participants, open up to smaller customers, or penetrate deeper into niche markets that might have otherwise been excluded.

Successful Implementation and Expansion of Programs Over time

When designing programs, it's important to identify both the success and the failures within the industry. With much discussion about best opportunities, it is necessary to recognize and remedy reasons for failure.

The major reason for program failure, by far, is inadequate or misdirected marketing. Time and again utilities design highly attractive offers but underestimate the need for a *direct-to-customer* marketing budget. Most utilities post their programs on their website and list the program on water efficiency brochures. These are in essence passive marketing attempts. Self-motivated customers will seek these programs and take the initiative to participate. Unfortunately, self-motivated customers are more often a rarity and, as a result, the participation rate for the program is less than optimal.

Successful water agencies conduct marketing campaigns that are much more aggressive in nature. They identify the ideal customers and outreach directly by phone, direct mail and site visits. This requires marketing staff, training, and perseverance. Most customers require multiple contacts prior to committing to participate in the program. Once on board, they often need time-consuming support from program staff to follow through all the steps of the program. The additional price tag for the marketing team is more than offset by water savings, if done tactfully and professionally. Organizations that are not marketing focused often find better success by outsourcing to firms with marketing expertise.

During the initial stages of a program, efficiencies run low and costs run high. With proper management, the program operations gradually smooth out and costs are

reduced, thereby boosting overall project cost-effectiveness. As programs become more cost effective, it allows staff to add, test and track new and developing measures that would be too expensive to offer alone.

Additionally, once the program operations are running efficiently, it is easier to ramp production up to higher volumes should the water supply outlook warrant or product market conditions change. The operational controls will be in place and the optimum marketing formulas will be refined to their highest level of effectiveness.

Strategic Plan

Affecting a sustainable decrease in customers' water consumption is not a single action process. Each customer group has unique needs and motivations that, if tapped into correctly, can provide a positive situation for all involved. Western will reduce overall water consumption and customers will benefit economically.

To this end, Western has put together an aggressive collection of customer-tailored solutions designed to achieve long-term water efficiency and change customer water-use behaviors as we move into the future. These solutions fall into three key tactical approaches to effecting change.

These three key tactics are:

1. **Sustained Outreach -** In order for Western to effect change, the District must be *know* the target customers and understand how to enlist a customer's support for and participation in conservation ordinances and programs.

   Informative and sustained outreach is the foundational tactic…it is the primary means in which the customer learns about the severity of the water supply problem ***and*** the proposed solutions.

   Western will implement initiatives including general customer education and training, school education, and mass market communication.

   Western will craft and deliver the message that;

   1) Import water supplies are unreliable at times;
   2) Demand for quality water has increased over time;
   3) Conservation efforts and efficient use are highly effective means to stretch and extend water resources;
   4) Western has incentive programs and support mechanisms that will increase water efficiency and benefit customers.

   These messages will be broadcasted through a number of communication vehicles and done so consistently, not as a one-time blitz.

   In addition to general outreach, Western will build a results-oriented team within the organization. Personnel will be charged with the responsibility to ramp up customer response rates for programs in a systematic manner when higher water savings volumes are needed and to do so in the most cost-effective manner feasible. Should water shortages advance in severity, the team will increase the customer response in existing programs, as well as outreach to new customer groups that offer water savings opportunities albeit for a higher cost per acre-foot of water saved.

2. **Rules and Regulations-** When executed properly, ordinances are powerful vehicles from which high volume, cost effective water savings can be secured. There are several steps that need to occur in order to make this happen:

    a) The ordinance must be well designed and reasonable. For example, a new construction ordinance, if implemented, must be designed to be both builder and buyer-friendly.

    b) District staff must assist the agencies in the complex and lengthy process to obtain ordinance.

    c) The ordinance requirements need to be communicated to the parties affected by the ordinance.

    d) There must be enforcement of the ordinance to ensure that requirements are being properly implemented.

    Western will form strategic alliances and actively work to recommend and assist municipalities with the approval and implementation of new ordinances or updating their existing ordinances. Through small group and one-on-one meetings, Western will help each agency design effective ordinances and walk them through the various steps required for the board approval within their organizations.

    Example Ordinances include:

    - No Water Waste
    - Landscape Model
    - New Construction

    Note: Metropolitan sponsored programs costing more than $195 per acre-foot, such as the Public Sector Program and the Turf Replacement Program, may in the near future, require a local agency or City to have an enforceable "No Water Waste Ordinance" in order for an individual customer to be eligible to receive financial incentives and participate in these higher cost programs.

3. **Conservation Programs-** Unlike outreach and ordinances, programs are the means to secure predictable and quantifiable water savings. The majority of the conservation measures being utilized in Western's programs have a well-documented history of high-yield water savings and positive customer satisfaction.

    Western's proposed programs are crafted to obtain the highest volume of water savings for the minimum cost per acre-foot. These objectives are best

met by “targeting” customers and implementing well-established conservation technologies.

If and when water supply shortage increases in severity, Western will need to “drill deeper” for additional savings. At such time, Western will pursue water savings from customer markets that are less cost effective yet still offer firm opportunity for savings. Western may also test newer water savings technologies that have promising results, but a less proven market history.

Program Fundamentals

There are three primary fundamentals driving program tactics:

1. *Develop a clear pricing signal for efficient use*
2. *Aggressively target high water use and pursue program participation*
3. *Find niche markets and conduct Pilot Programs directed at these markets*

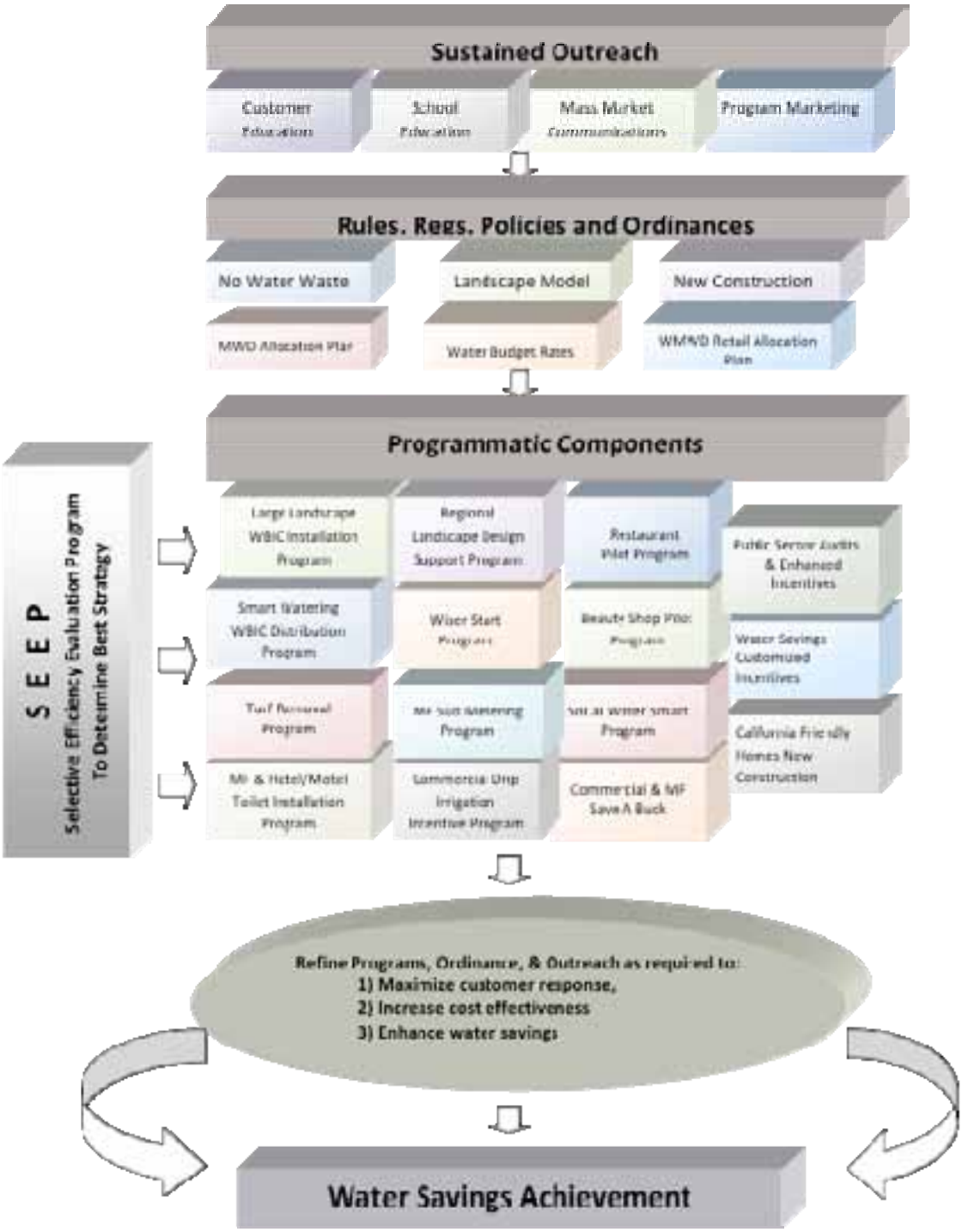
The cornerstone program for Western is the Selective Efficiency Evaluation Program, to become known as “SEEP”. This assessment audit will determine the appropriate programs and measures for each customer. Customers with irrigated landscape will be offered free water use evaluations. The focus of these evaluations will be outdoor water use however; an inventory of indoor devices and recommendations will also be addressed. In addition, the Program will include generation of a water budget allocation for the site and educating the customer about water budgets and billing procedures.

There are currently fifteen programs, in addition to SEEP, that will be offered by the District pending funding and staffing. The programs are designed to provide cost-effective water saving measures for customers with high savings potential. The program measures include landscape technologies as well as indoor devices. Western will tap into a full array of customer markets ranging from large multi-national commercial customers all the way down to neighborhood beauty shops.

The programs are essentially building blocks that can be forged and re-worked as necessary to maximize customer response and water savings and to lower costs per acre-foot saved. Despite the assortment of water-use sectors, each program design must meet basic cost-effectiveness requirements. Program building blocks can be ramped up or down according to the water supply situation and in order to stay on target and meet water saving goals.

The following flow chart provides an overview of Western’s Water use Efficiency Strategy to meeting savings targets.

Western's Strategy



Water Use Efficiency Programs Overview

The programs selected for implementation are below:

1. ***Selective Efficiency Evaluation Program***

Customers will be offered free water audits, customized equipment incentives, and water budgeting. At the onset the key targets will be single family residential customers in Western's retail territory. Later the program will be offered to commercial sites throughout Western's wholesale territory.

2. ***Large Landscape WBIC Direct Installation Program***

Residential customers with greater than 1 acre of irrigated landscape will be offered for free product and installation of smart controller(s) and high efficiency rotary nozzles.

3. ***Smart Watering Free WBIC Distribution Program***

Trained and program approved landscape contractors will provide free smart controllers and free nozzles to their residential customers with less than one acre of irrigated landscape.

4. ***Turf Replacement Program***

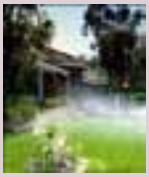
Residential and commercial customers will be offered an incentive of $1.00 per square foot for the removal of turf and replacement with low water using landscape and low precipitation irrigation systems.

5. *Multi-family & Hotel/Motel Toilet Installation Program*

Pre-1992 properties will be targeted for replacement of high volume toilets with high efficiency toilets. In order to achieve a strong response, the product and installation will be free. Program may include high efficiency showerheads and aerators paid for by the Gas Company.

6. *Regional Landscape Design Support Program*

New construction and customers retrofitting their existing landscape will have access to resources that include: technical advisement, landscape templates, resource guides, sample homes, water use efficient tags at local nursery & home improvement stores, personal support & plan review.



7. *Wiser Start Program*

For single family residences applying to change accounts, Western will offer a FREE on site evaluation. In addition, customers will be offered FREE product & installation of conservation measures. During the evaluation landscape measurement would be taken, a water budgeted would be calculated & explained to the customer.

8. *Multi-family Sub Metering Pilot Program*

Western would install submeters in master metered multi-family buildings to promote conservation.

9. Commercial Drip Irrigation Incentive Program

Western will offer commercial customers significant incentives to retrofit their existing irrigation systems with drip irrigation equipment for watering trees and shrubs.

10. Restaurant Pilot Program

Western will implement pilot programs for promising niche markets. One market that offers possibility is the Restaurant market with 1,500 in Western's general service area alone. Measures would include toilets, urinals, ice machines and food steamers.

11. Beauty Shop Pilot Program

Another pilot will be conducted for the Beauty Shop Market, with 960 shops in Riverside. Measures will include toilets, faucets, laundry and new-to-market high efficiency hair wash sprayers.

Metropolitan Water District Sponsored Program #1

Residential SoCal Water Smart Program

MWD sponsors a region-wide program that offers single family residents rebates for HEWs, HETs, WBICs, Rotating Nozzles, and Synthetic Turf.

Metropolitan Water District Sponsored Program #2

Commercial and Multi-family Save A Buck Program

MWD provides rebates from $30 to $3,120 for water saving technologies for indoor and outdoor use.

	***Metropolitan Water District Sponsored Program #3***	**Public Sector Audits & Enhanced Incentives Program** MWD offers four water and money saving products and services exclusively for public agencies including: indoor/outdoor water audits, enhanced incentives and recycled water hook-up incentives.
	***Metropolitan Water District Sponsored Program #4***	**Water Savings Performance Customized Incentives Program** Targeted for the Industrial and large landscape customers, MWD will pay incentives based upon customized water process and irrigation system improvements.
	***Metropolitan Water District Sponsored Program #5***	**California Friendly Homes for New Construction** MWD provides water conservation equipment rebates for indoor and outdoor measures to builders of single family and multi-family homes.

Organization and Staffing

Water conservation has become an important component of the supply equation. The proposed programs offer a potential of over 18,000 acre-feet savings over their collective lifetimes.

To effectively implement and oversee this sizeable number of initiatives, an expanded organization will be required. The expanded organization will manage outsourced program implementation to consultants and companies that carry specific expertise.

Internal oversight requires knowledge and proficiency in four unique disciplines:

1. Indoor technology and plumbing codes
2. Landscape efficiency, and plant-soil-water relationships
3. Marketing and customer communication
4. Programmatic tracking, analysis and reporting

Aligned with these requirements, the water conservation organization will include the following positions:

Conservation Manager

- Integration of water efficiency and demand management with the District's supply planning and strategic objectives
- Management and performance of conservation program portfolio
- Strategic planning, program design and budgeting
- Liaison to retail agencies, Metropolitan and member agencies, as well as State and Federal interests

Conservation Specialist – Commercial/Indoor

- Indoor residential/business program coordination
- CII audits and incentives
- Public sector program coordination
- BMP reporting and tracking (program specific)
- Plumbing codes

Conservation Specialist – AG/Landscape (outdoor)

- Outdoor program coordination
- Landscape audits and irrigation
- Water budgets and allocations
- Agricultural efficiencies
- BMP reporting and tracking, program specific
- Outdoor landscape planning
- New construction ordinance
- Recycled water conversions

Conservation Specialist – Technical Outreach

- Direct "sales" to customers for all CII and large landscape programs
- Coordinate information line/email messaging (toll-free help)

- For residential programs create and manage marketing campaigns.
- Generate specific program marketing kits and deliver
- Generate web site content including: web tips, web training, articles, irrigation schedules
- Develop technical content for media releases with Public Affairs
- Develop technical messaging (inserts/articles) with Public Affairs
- Coordinate workshops to educate customers, vendors, etc on conservation and available program
- Conduct presentations to HOAs, industry groups, home shows, etc.

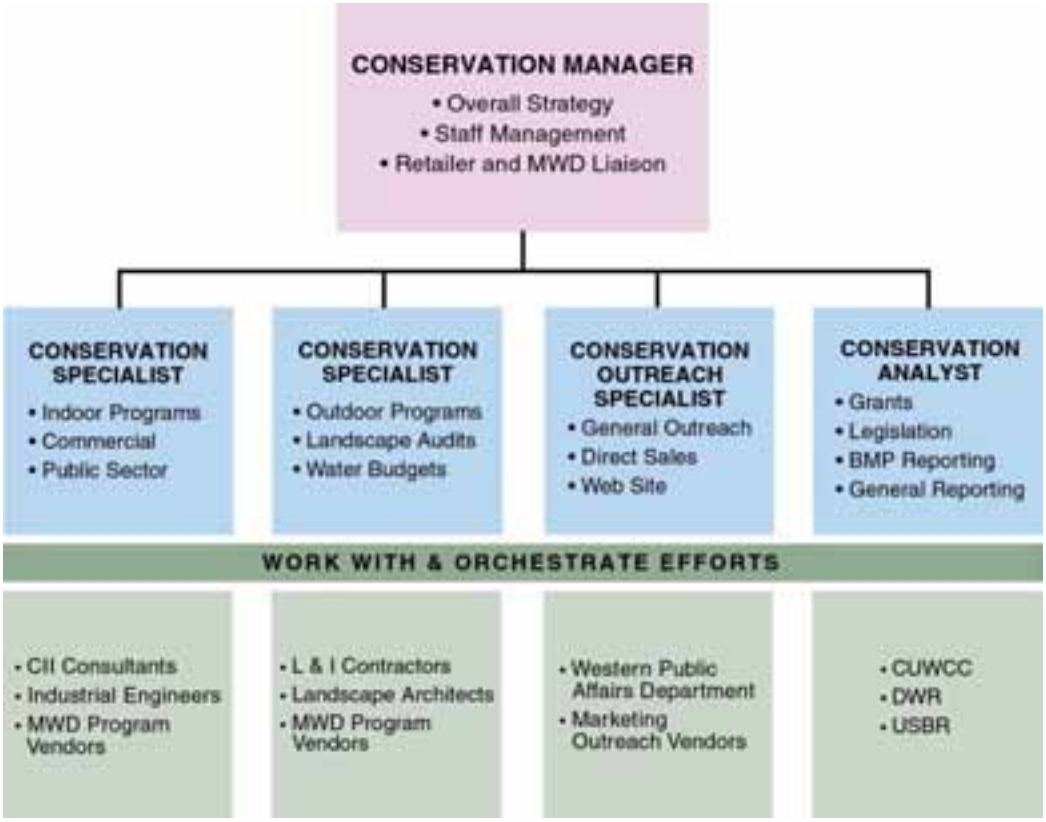
Conservation/Management Analyst

- Grant research, writing and reporting
- Legislation tracking and communication
- Ordinance research and implementation
- Cost benefit analysis
- ALAGAA exemptions
- BMP Tracking and Reporting
- Urban water management plan

Contract Support

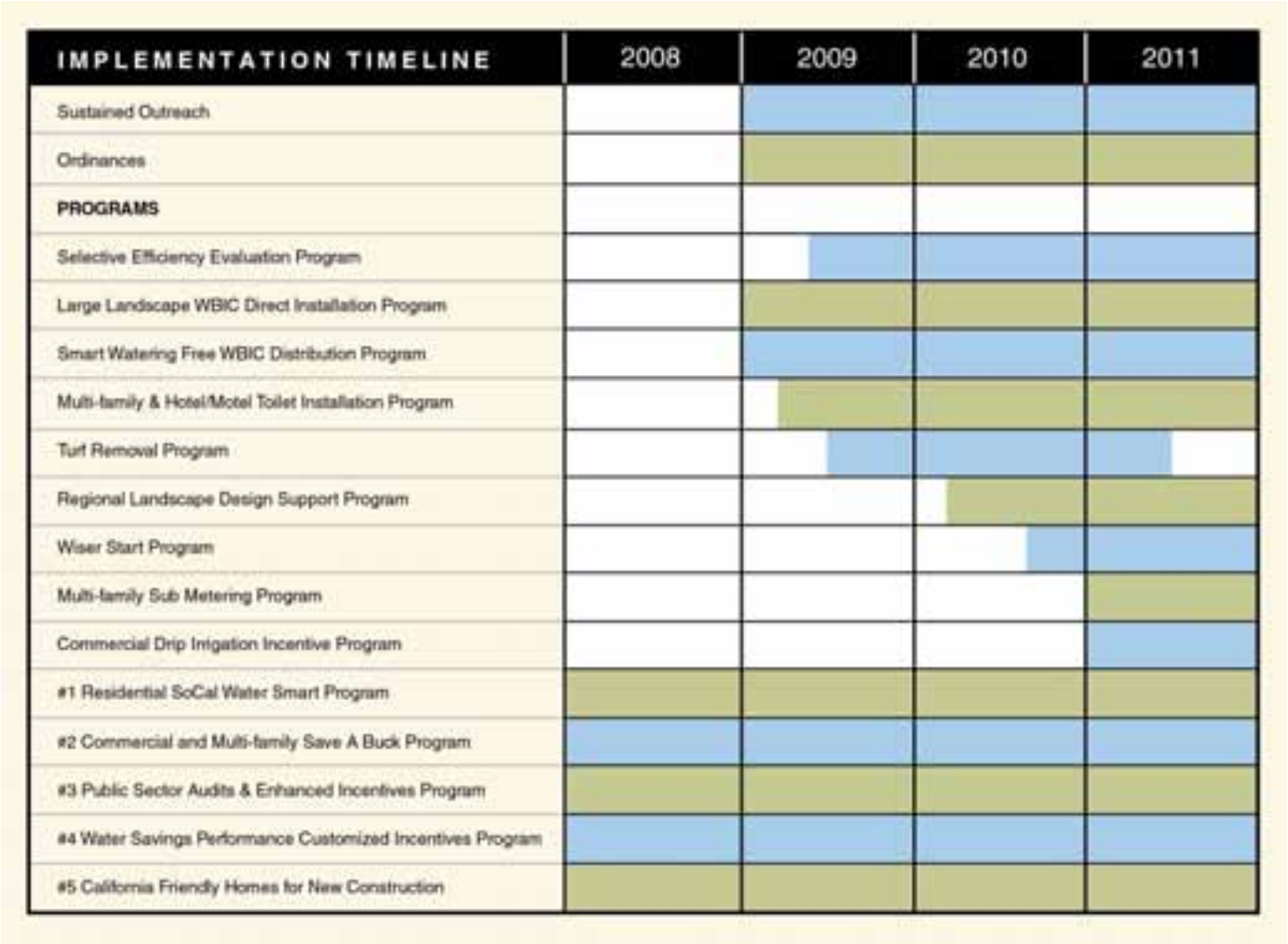
- Outsource implementation and day-to-day project management for the following programs:
    - Large Landscape WBIC Direct Installation Program
    - Smart Watering WBIC Distribution Program
    - Landscape Audit and Customized Incentive Program
    - Multi-family and Hotel/Motel HET Direct Installation Program

Organizational Chart



Implementation Timeline

Program implementation is forecast for three years based upon current grant and regional funding and available technologies. Each line item below is a building block of the plan and carry with them, varied levels of cost effectiveness and overall savings estimates. Some of these components are well established and easily measurable, while others are pilot initiatives with savings results that are not yet fully established. Western will track performance and, as necessary, will make modifications along the way in order to maximize effectiveness. At the conclusion of each calendar year, Western will conduct a comprehensive assessment of the plan and overhaul or replace any underperforming elements in advance of the prior fiscal year budget process.



Water Savings

Details of the programs and their respective annual life-time water savings are presented on the following chart.

Water Savings (acre-feet)	*Year 1*		*Year 2*		*Year 3*	
	Annual	**Lifetime**	**Annual**	**Lifetime**	**Annual**	**Lifetime**
Sustained Outreach						
Ordinances						
Programs:						
Selective Efficiency Evaluation Program	114	277	114	277	114	277
Large Landscape WBIC Direct Installation Program	218	1575	218	1575	218	1575
Smart Watering Free WBIC Distribution Program	52	324	52	324	52	324
Multi-family & Hotel/Motel Toilet Installation Program	43	851	43	851	43	851
Turf Removal Program	7	72	14	143	14	143
Regional Landscape Design Support Program	NA	NA	NA	NA	NA	NA
Wiser Start Program	NA	NA	NA	NA	NA	NA
Multi-family Sub Metering Program	NA	NA	NA	NA	NA	NA
Restaurant Pilot Program	NA	NA	8.5	170	8.5	170
Beauty Shop Pilot Program	NA	NA	NA	NA	NA	NA
Commercial Drip Irrigation Incentive Program	NA	NA	NA	NA	NA	NA
Residential SoCal Water Smart Program	20	304	34	545	34	545
Commercial and Multi-family Save A Buck Program	144	1993	179	2348	214	2684
Public Sector Audits & Enhanced Incentives Program	0	0	0	0	0	0
Water Savings Performance Customized Incentives Program	0	0	0	0	7	37
California Friendly Homes for New Construction	NA	NA	NA	NA	NA	NA
Total	597	5,346	663	6,184	704	6,557

Budget

Details of the programs and their respective three-year budget numbers are presented on the following chart.

Budget	Three Year Budget	MWD Incentives & Grants	Western Budget	Western Cost per AF
Sustained Outreach				
Ordinances				
Programs:				
Selective Efficiency Evaluation Program	$588,480	$159,375	$429,105	$630
Large Landscape WBIC Direct Installation Program	$1,346,112	$1,169,250	$176,860	$60
Smart Watering Free WBIC Distribution Program	$448,764	$410,250	$38,514	$40
Multi-family & Hotel/Motel Toilet Installation Program	$825,000	$495,000	$330,000	$129
Turf Replacement Program	$560,000	$500,000	$60,000	$167
Regional Landscape Design Support Program	$33,840	$0	$33,840	$1574
Wiser Start Program	$14,400	$0	$14,400	NA
Multi-family Sub Metering Program	NA	NA	NA	NA
Restaurant Pilot Program	$280,000	$66,000	$214,000	$629
Beauty Shop Pilot Program	NA	NA	NA	NA
Commercial Drip Irrigation Incentive Program	NA	NA	NA	NA
Residential SoCal Water Smart Program	$426,325	$400,700	$25,625	$18
Commercial and Multi-family Save A Buck	$1,265,485	$1,212,185	$53,300	$8
Public Sector Audits & Enhanced Incentives	$0	$0	$0	NA
Water Savings Performance Customized Incentives	$81,010	$36,150	$45,059	$1,218
California Friendly Homes for New Development	NA	NA	NA	NA
TOTAL	$5,869,615	$4,448,910	$1,420,704	$78

Linkage to Drought Allocation Planning

At the time of this writing, Western Municipal Water District (Western) was in the process of developing a Retail Customer Water Conservation/Shortage Contingency Plan (WCSC Plan) in accordance with California Water Code Sections 350 through 359 and 375 through 378. Chapter 3, Division 1 of the Water Code, commencing with section 350 authorizes local water suppliers to declare a water shortage emergency, and to take appropriate steps, including denial of applications for new or additional connections, for the duration of the emergency. Water Code Section 375 authorizes water suppliers to adopt and enforce a comprehensive water conservation program to reduce water consumption and conserve supplies.

The adoption and enforcement of a water conservation and shortage contingency plan is necessary to manage Western's potable water supply in the short and long-term and to avoid or minimize the effects of drought and shortage within Western's retail service area. The guiding principle of Western's WCSC Plan is to reliably meet water demands including during shortages caused by droughts, supply reductions, and emergency conditions. The WCSC Plan recognizes the following priorities for potable water:

1. Public safety, health and welfare
2. Economic sustainability
3. Quality of life for customers

Careful water management, that includes active water conservation measures not only in times of drought, but at all times, is essential to ensure a reliable minimum supply of water to meet current and future water needs. Article X, Section 2 of the California Constitution declares that the general welfare requires that water resources be put to beneficial use, waste or unreasonable use or unreasonable method of use of water be prevented, and conservation of water be fully exercised with a view to the reasonable and beneficial use thereof.

The purpose of the WCSC Plan is to establish a water conservation and shortage contingency plan that will reduce water consumption within Western's retail service area through immediate and effective conservation; enable water supply planning; assure reasonable and beneficial use of water; prevent waste of water; and maximize the efficient use of water within the service area to avoid and minimize the effect and hardship of a water supply shortage to the greatest extent possible.

Western has prepared a 6 stage shortage contingency plan. At the time of this writing a Board of Director work session is planned for January 2009 to further discuss the WCSC Plan and the strategy for implementation. Adoption is expected to occur in the weeks following the Board's January work session. Western's shortage contingency plan will be closely synchronized to Metropolitan's Water Surplus and Drought Management

(WSDM) as well as the Metropolitan Allocation Plan. Western will implement and enforce strategic demand management measures designed to reduce customer water use in step with restricted supplies.

As mentioned earlier, Western's water use efficiency plan will utilize three key tactics in order to achieve water use efficiency goals:

- **Sustained Outreach and Programmatic Marketing**
- **Rules, Regulations and Ordinances**
- **Conservation Incentives and Demand Management Programs**

Utilizing these tactics to achieve water reduction goals, in periods of declared shortage; Western will implement increasingly aggressive efficiency measures in response to stages of supply shortage. The following table serves only as an example. Specific measures and actions found in Western's Water Conservation / Shortage Contingency Plan may be enhanced or implemented in a manner that is designed to decrease the demand for water at specific stages of shortage.

Potential Drought Response Plan for Advanced Stages

WMWD Shortage Level	Outreach Adjustments	Ordinance Changes	Program Changes
Level 1	Level 1 is considered a "non-shortage" stage. Western will continue to encourage efficient use of water and implement measures as prescribed in the Implementation Blueprint.		
Level 2 **Less than a 10% shortage**	Media Releases to announce shortage and requirements.		
Level 3 **10 - 20% shortage**	Direct mailing of conservation tips to all SFR customers	Consider additional indoor plumbing requirements (in new construction)	Consider increased incentives for outdoor measures.
Level 4 **20 - 30% shortage**	Aggressive targeting of high-water use customers.		Consider increased incentives for indoor measures.
Level 5 **30 - 40% shortage**	Direct mail of sector-specific program brochures to all customers.	No landscape irrigation.	
Level 6 **A supply shortage greater than 40%**			Consider direct install fixture programs for SFR customers.

Program Details

Proposed New Ordinances

Water conservation ordinances, when administered properly, are a powerful mechanism to achieve passive water efficiency. Ordinances are implemented at a municipal level which means that Western will take a leadership role and facilitate implementation of ordinances by local municipalities within its service area.

The three types of ordinances upon which Western will focus are:

1. **Water Waste-**

Metropolitan has generated a model no water waste ordinance. Metropolitan will present the ordinance, to the Member Agencies.

Western will need to craft a version of the ordinance that aligns with their objectives. Once the appropriate ordinance is in hand, Western will then meet with each of its wholesale customers that lack a water waste ordinance and support them through the steps necessary to enact the no water waster ordinance.

Metropolitan sponsored programs costing more that $195 per acre-foot, such as the Public Sector Program and the Turf Replacement Program, may require a municipality have a No Water Waste Ordinance implemented in order for an individual customer to be eligible to participate in these higher cost programs.

2. **Landscape Model-**

DWR is currently in the process of generating a landscape model ordinance. A draft is expected to be completed in January 2009. The ordinance would then go into effect in January 2010. Once completed, Western will work with each municipality to facilitate the implementation process.

3. **New Construction-**

While early in the planning stages, the new construction ordinance will most likely include mandates above current plumbing codes for fixtures, requirement for dedicated irrigation meters, and required use of recycled water. This ordinance has a longer timeline due to the current reduction in housing starts and in the general building industry.

One of the preliminary steps is for Western to catalog the existing ordinances for each of the municipalities within its territory as they align with No Water Waste, Landscape and New Construction regulations. Once the overview of ordinances is fully known, Western will move forwards on the highest priority ordinances.

Selective Efficiency Evaluation Program (SEEP)
"Let the Savings Seep In"

Program Description and Objectives

Customers with irrigated landscape will be offered free water use evaluations. The focus of these evaluations will be outdoor water use; however an inventory of indoor devices and recommendations will also be addressed. In addition, the Program will include generation of a water budget for the site and educating the customer about water budgets and billing. At the outset, the key targets will be single family residential customers in Western's retail territory. Many of these sites will be customers that did not pass the telephone qualification for the Large Landscape Weather Based Irrigation Controller Direct Installation Program described on the following program template. Later the program will be offered to commercial sites throughout Western's wholesale territory.

Program Design

The program will offer:

- Irrigation system evaluation,
- Indoor device inventory,
- Customized incentives for equipment replacements with low precipitation and drip irrigation systems,
- Incentives for water using devices offered under Metropolitan's residential and commercial programs,
- Custom report with evaluation findings, recommendation and cost/benefit analysis,
- Water budgeting and education.

Customers applying to participate in the Large Landscape WBIC Direct Installation Program that are disqualified because they do not meet Program criteria will be offered an evaluation to verify ineligibility as well as identify any potential opportunities. In addition, other targeted customers will be contacted via phone to solicit participation. They will be asked to invite their landscape service company to the evaluation.

To start the program, contractors implementing the Large Landscape WBIC Direct Installation and Smart Watering WBIC Distribution Programs, will conduct the evaluations. As demand and customer classes (i.e. hospitals or other businesses that have more sophisticated technologies) expand additional evaluation resources will be added.

The evaluators will survey the home (and later commercial building) and landscape area to identify key water saving opportunities. There are two portions to the service; indoor and outdoor.

The outdoor evaluation will include a comprehensive assessment of the irrigation system. The evaluator will turn on each valve and document all problems with the system including sprinkler heads in need of repair and/or replacement, low pressure, and broken irrigation lines. The auditor will also measure off the landscape area.

Selective Efficiency Evaluation Program (SEEP)
"Let the Savings Seep In"

The indoor evaluation will create an equipment inventory list and location of high water use devices that should be retrofitted with more efficient models. For single family homes this will include toilets, clothes washers and dishwashers. As the Program expands to include commercial sites the list of devices will expand to include all devices offered under Metropolitan's menu of incentives including: HVAC system (cooling towers), food service, medical equipment, cleaning equipment and plumbing fixtures.

Following the site visit, an analysis of the irrigation system findings will be conducted and a water budget will be developed based upon the size of their landscape. Using the information from the site visit and the analysis, a clear and concise report will be generated with upgrade recommendations, available incentives, a water budget and a cost/benefit analysis. The report will be mailed to the customer with a letter explaining the results. For commercial sites and homeowner associations, it is recommended to deliver the report in person to further educate the customer. In addition customers will be provided with regular communication regarding their performance to budget.

Included in the report will be an application for available incentives, free product or the installation programs.

The available incentives will include all incentives offered through Metropolitan's commercial and residential programs. Full lists of these incentives are documented on the Metropolitan program information sheets provided later in the document.

In addition customized incentives will be offered for savings achieved from irrigation system replacements with drip irrigation or low precipitation systems. In order to maximum the incentive, it will be based upon the customer's site and will be paid at a per acre-foot saved value. Currently, Metropolitan offers $3.00 per 1,000 gallons saved. Western may consider adding to this incentive based on customer payback values and response rates. Using the report as back up documentation, the customer would submit the application for incentive reimbursement to Metropolitan's Water Saving Performance Program.

Measures and Per Unit Water Savings

Measure	Annual Savings	Measure Life	Lifetime Savings
Usage Reduction Due to Water Budget Information	.32 af	2 years	.64

Annual Production Estimates

Measure	Production
Landscape Evaluations with Water Budgets	352
Single Family Indoor Evaluations	250
Small Commercial Indoor Evaluations	50
Commercial Indoor Evaluations	50
Industrial Audits	2

	***Selective Efficiency Evaluation Program (SEEP)*** ***"Let the Savings Seep In"***
Other Benefits	• Reduced runoff • Education regarding water budgeting and billing
Services Provided	• Irrigation system assessment • Indoor water use evaluation • Water budget generation and educations • Incentives and installation as appropriate
Target Customer	• Single family residential • Commercial sites • Homeowner's Associations
Marketing Method	• Through other Western programs • Direct solicitation (telephone and mailing) • Trade ally outreach and promotions • New accounts
Implementation Schedule	• January 2009 – December 2011 • Offer to customers disqualified from WBIC installation program • Open to all customers in July 2009 • Will be extended past 2011
Job Creation	The audits and water budget generation/education will be contracted through outside vendors. The program will start with the vendors implementing the WBIC direct install and distribution programs.
Installation Verification	Verification inspection will be done through the respective incentive program.
Pros/Cons	<u>Pros</u> • Do not lose water savings opportunities from customers disqualified from WBIC installation program • Leverage on-site opportunity to create an accurate water budget and educate customer • Market full portfolio of programs and incentives • Leverage Metropolitan incentives <u>Cons</u> • Water savings from the actual evaluation are highly variable

Selective Efficiency Evaluation Program (SEEP)
"Let the Savings Seep In"

Alternative Funding Sources

Metropolitan Incentives
- ✓ Commercial Landscape Survey Incentives
- ✓ Single Family Survey Incentives
- ✓ Residential SoCal Water Smart Incentives
- ✓ Save a Buck Incentives
- ✓ Water Savings Performance Incentives

Costs

	Year 1	Year 2	Year 3	Total
Total Budget	$196,160	$196,160	$196,160	$588,480
MWD Incentives	$53,125	$53,125	$53,125	$159,375
Western Budget	$143,035	$143,035	$143,035	$429,105

Lifetime Water Savings

Year 1	Year 2	Year 3	Total
227 acre-feet	227 acre-feet	227 acre-feet	681 acre-feet

Cost per Acre-feet Avoided

Total Budget	$864 per acre-foot
MWD Incentives	$234 per acre-foot
Western Budget	$630 per acre-foot

Large Landscape Weather Based Irrigation Controller (WBIC) Direct Installation Program

Program Description and Objectives

The largest water consumption sector in Western's service territory is single-family residential (SFR), which accounts for 77% of the total retail water provided by Western. Within SFR water-use, approximately 50-60% of the water is used outdoors. The ultimate goal of the Large Landscape WBIC Direct Installation Program is to reduce water consumption by improving water-use efficiency in landscape irrigation. The Program will utilize a contractor to Western for direct installation of smart controllers and rotator spray nozzles for irrigated landscapes greater than 1 acre. This component will target Western's highest SFR water use customers through use of GIS mapping to identify parcels. The program will result in installation of 400 controllers and an estimated 60,000 high efficiency nozzles over two years. The program will provide free product and installation services. The Program Contractor will market the program to targeted customers, audit the irrigated landscape, and install the product. A follow-up site visit by The Program Contractor or Western would verify the installation to ensure water savings are maximized and customer issues reduced.

Measures and Per Unit Water Savings

Measure	Annual Savings	Measure Life	Lifetime Savings
Weather Based Irrigation Controllers	.325 acre-feet per acre	10	3.25 acre-feet per acre
Rain Sensors	None available		
High Efficiency Nozzles	0.004 acre-feet per nozzle	5	0.02 acre-feet per nozzle

Annual Production Estimates

Weather Based Irrigation Controllers	200 per year
Rain Sensors	200 per year
High Efficiency Nozzles	30,000 per year

Other Benefits

- Reduced runoff

Services Provided

- Irrigation System Assessment
- Free Product & Free Installation

	***Large Landscape Weather Based Irrigation Controller (WBIC) Direct Installation Program***
Target Customer	• Residential customers within Western's retail and wholesale territory with 1 acre or more. • Use GIS mapping to identify parcels that are 1.5 acres or more. • Eliminate mobile homes. • Compare parcel size with water usage information. • Target top users. • Send initial mailer. The mailer will have a program flyer on one site with basic program information and a professional/serious letter from Western on the other side requesting their assistance with water use efficiency during this time of water shortage. • The mailer will be followed up by a telephone call. During the phone call the customer's eligibly and interest will be verified and they will be enrolled in the program and a site visit will be scheduled. • Typical response rate on direct install program has been 20-30%.
Marketing Method	• Initial mailer • Telesales
Implementation Schedule	• January 2009 – December 2011 • 3 year implementation with grant • DWR grant funding only available for years 1 and 2, but could be extended • Program could be extended past 2011
Job Creation	The program management and product installation would be outsourced to a local landscape contractor. The contractor would need to hire installers to conduct the installation.
Product Distribution and Installation	The program contractor will purchase product as agreed by Western. The program contractor will bill Western for product at cost with no mark up. The program contractor will install the product. Customer will have no costs.
Installation	The program contractor will conduct follow up with each customer to ensure they

Large Landscape Weather Based Irrigation Controller (WBIC) Direct Installation Program

Verification

maintain the water savings features, specifically that they or their contractor do not override the irrigation scheduling. This follow will consist of both phone calls and site visits. It is estimated that all customer will require a phone call and 50% of customers will require a second site visit.

In addition, Western or its agent will conduct a percentage of installation verification inspections. During this time it will be verified that the products reported installed were in fact installed and operating as anticipated.

Pros/Cons

Pros

- Extremely high water savings per site.
- The ability to quickly implement utilizing a known contractor to provide turn-key services and outsourcing program management.

Cons

- Limited number of large residential customers.
- Program model doesn't transform the market…only one contractor (directly hired by Western) has changed his business model to focus on WBICs and high efficiency nozzles.
- Customers and/or their contractors do override the schedule thereby losing some of the savings.

Alternative Funding Sources

Metropolitan will pay standard incentives of:
$630 per acre for WBICs
$4 per MP rotator

Western received a Prop 50 grant from DWR, which will pay approximately $75,000 over two years for the program.

Costs

	Year 1	Year 2	Year 3	Total
Total Budget	$448,704	$448,704	$448,704	$1,346,112
Metropolitan Incentives & DWR Grant	$389,750	$389,750	$389,750	$1,169,250
Western Budget	$58,954	$58,954	$58,954	$176,862

Lifetime Water	Year 1	Year 2	Year 3	Total

	***Large Landscape Weather Based Irrigation Controller (WBIC) Direct Installation Program***			
Savings	1,575 acre-feet	1,575 acre-feet	1,575 acre-feet	4,725 acre-feet
Cost per Acre-feet Avoided	Total Budget	$285 per acre-foot		
	MWD Incentives & DWR Grant	$247 per acre-foot		
	Western Budget	$37 per acre-foot		

**DWR grant funding secured for years 1 and 2. Western will apply for additional grant funds, specifically after the program has been deemed successful.*

Smart Watering Free WBIC Distribution Program

Program Description and Objectives

The largest water consumption sector in Western's service territory is single-family residential landscape and within that sector the greatest pool of customers is the single family customer under 1 acre of irrigated landscape. The goal of the program is to, not only reduce water consumption at the targeted 400 sites, but to engage and train local landscape contractors for the program. The end goal is that the contractors change their business model and begin offering water efficiency products and services as part of their base business… with correct product installation so that full savings are realized and customers are satisfied.

For this program Western will provide both weather based irrigation and high efficiency spray nozzles for free. Contractors will receive free training on proper installation and maintenance. They will then be offered free product that they can provide to their existing customers for free or use to solicit new customers. The program will result in installation of 400 controllers and an estimated 20,000 high efficiency nozzles over two years.

The Program will utilize a program management firm to solicit and train the contractors, distribute and track product as well as conduct quality control inspections on the contractors work. If possible 100% of sites would receive a follow up inspection to make sure the products were installed properly and are functioning at their full water savings capacity. Inspecting 100% of the sites will give Western market intelligence on where the break down occurs in maintaining the ensuring the controllers are installed and programmed correctly at the onset and the water savings features are maintained over time.

The program will provide free product and customers will pay contractors for installation services. Contractors will market the program to their customers. Additional marketing can be done by Western to top users in the territory that are less than 1 acre.

Trained contractors will then be approved to receive free product and conduct installations in association with the program. An approved list will be generated and provided to customers per their request. Contractors will be given marketing materials to use to solicit customers.

<table>
<tr><td>  </td><td colspan="4">Smart Watering Free WBIC Distribution Program</td></tr>
<tr><td rowspan="3">Measures and Per Unit Water Savings</td><td>Measure</td><td>Annual Savings</td><td>Measure Life</td><td>Lifetime Savings</td></tr>
<tr><td>Weather Based Irrigation Controllers</td><td>.0414 acre-feet per year</td><td>10</td><td>.414 acre-feet</td></tr>
<tr><td>High Efficiency Nozzles</td><td>0.004 acre-feet per nozzle</td><td>5</td><td>0.02 acre-feet per nozzle</td></tr>
<tr><td rowspan="2">Annual Production Estimates</td><td colspan="2">Weather Based Irrigation Controllers</td><td colspan="2">200 per year</td></tr>
<tr><td colspan="2">High Efficiency Nozzles</td><td colspan="2">10,000 per year</td></tr>
<tr><td>Other Benefits</td><td colspan="4">• Reduced runoff
• Market transformation for WBICs and high efficiency nozzles</td></tr>
<tr><td>Services Provided</td><td colspan="4">• Contractor market transformation
• Contractor training
• Free Product
• Quality Checked Installations</td></tr>
<tr><td>Target Customer</td><td colspan="4">Residential customers within Western’s retail and wholesale territory with less than 1 acre of irrigated landscape.</td></tr>
<tr><td>Marketing Method</td><td colspan="4">Contractors will market their customer base and possibly use a tool to secure new customers. If necessary, Western will send mailers to their top users under 1 acre of irrigated landscape. The mailer will have a program flyer on one site with basic program information and a professional/serious letter from Western on the other side requesting their assistance with water use efficiency during this time of water shortage. Interested customers will call the program phone line and will be given the list of approved contractors.</td></tr>
<tr><td>Implementation Schedule</td><td colspan="4">• January 2009 – December 2011
• DWR grant funding only available for years 1 and 2, but could be extended</td></tr>
</table>

	***Smart Watering Free WBIC Distribution Program***
Job Creation	The program management, contractor training and product distribution would be outsourced through a conservation program management firm. Jobs will be created to administer the program and conduct training. In addition local contractors would be trained and given free product in order to generate additional revenue through existing and new customers.
Product Distribution and Installation	Western will purchase the products. The program management firm will store the product and distribute to approved contractors. Approved contractors will be given the product for free (as long as they maintain quality installations and high customer service). Contractors will provide the product for free to their customers and customer will pay contractors for installations.
Installation Verification	The program management firm will conduct follow up with each customer to ensure they maintain the water savings features, specifically that they or their contractor do not override the irrigation scheduling. This follow will consist of both phone calls and site visits.
Pros/Cons	<u>Pros</u> • The large volume of single family customers in Western's territory. • The Program model provides market transformation. Thereby at some time Western can provide a lesser incentive instead of free product and ultimately get away from any incentive. <u>Cons</u> • Having contractors understand the business model. • Getting contractors to install the products correctly and educate their customers so that water savings don't erode. • At this point in time direct installation has been the only successful model for realizing the full savings with WBICs.
Alternative Funding Sources	Metropolitan will pay standard incentives of: $80 per WBICs $4 per MP rotator

Smart Watering Free WBIC Distribution Program

Western received a Prop 50 grant from DWR, which will pay approximately $75,000 over two years for the program.

Costs

	Year 1	Year 2	Year 3	Total
Total Budget	$149,588	$149,588	$149,588	$448,764
Metropolitan Incentives & DWR Grant	$136,750	$136,750	$136,750	$410,250
Western Budget	$12,838	$12,838	$12,838	$38,514

Lifetime Water Savings

Year 1	Year 2	Year 3	Total
324 acre-feet	324 acre-feet	324 acre-feet	973 acre-feet

Acre-feet Avoided

Total Budget	$461 per acre-foot
MWD Incentives & DWR Grant	$421 per acre-foot
Western Budget	$40 per acre-foot

**DWR grant funding not secured for year 3. Western will be requesting additional funds through a future round of grants, specifically after the program has been deemed successful.*

Multi-family & Hotel/Motel Toilet Installation Program

Program Description and Objectives

There are still multi-family buildings, as well has hotels and motels that have high volume water use toilets. These properties have high volume per site fixtures and respond well to direct install programs. They also tend to be cash-strapped operations where the owners do not have the necessary money and staff to purchase and install high efficiency devices.

This program will target pre-1992 properties for replacement of high volume toilets with high efficiency toilets. In order to achieve a healthy response to the program, the product and installation will need to be free. In addition the Southern California Gas Company is offering to pay for the product and installation costs for high efficiency showerheads, kitchen aerators and bathroom aerators.

The Multi-family and Hotel/Motel Toilet Installation Program would provide:

- Free High Efficiency Toilets
- Free Installation
- Free Haul Away of old fixtures
- Possible coordination with The Gas Company for Free showerhead and aerators installations.

Western would hire a vendor to market the program and purchase and install the toilets. Marketing would be done through business-to—business phone calls made to property owners and hotel/motel owners and operators.

Measures and Per Unit Water Savings

Measure	Annual Savings	Measure Life	Lifetime Savings
High Efficiency Toilets	38 gallons per day	20 years	.85 acre-feet

Annual Production Estimates

1,000 High Efficiency Toilets per Year

Other Benefits

- Reduced Wastewater
- Gas Therm Savings

Services Provided

- Delivery and installation of FREE HETs and possibly gas measures
- Removal of old fixtures

Target Customer

- Multi-family and hotels/motels with high water consumption toilets

Multi-family & Hotel/Motel Toilet Installation Program

Marketing Method

- Creation of data base with pre-1992 buildings
- Business calls to owners and operators to explain benefits of program participation
- Some on site face-to-face sales calls

Implementation Schedule

February/March 2009 – December 2011

Job Creation

The program management and product installation would be outsources. A conservation management vendor would be hired to administer and market the program as well as install the toilers and other products. Western may leverage companies already implementing the Gas Company's program in order to reduce costs.

Installation Verification

QC staff will randomly inspect 10% of sites to insure proper installation of products.

Pros/Cons

Pros

- High volume installation of high efficiency toilets
- High response rate
- Insurance the replacement of non-1.6 toilets
- Ability to partner with Southern California Gas Company for showerheads and aerators

Cons

- Higher costs due to paying for installation
- Lower water savings for in-room toilets at hotels

Alternative Funding Sources

- Metropolitan high efficiency toilet incentive of $165 or $100 (may be lowered to address replacement of 1.6 gallon toilets)
- Free showerheads, kitchen and faucet aerators from Southern California Gas Company

Costs

	Year 1	Year 2	Year 3	Total
Total Budget	$275,000	$275,000	$275,000	$825,000
MWD Incentives	$165,000	$165,000	$165,000	$495,000
Western Budget	$110,000	$110,000	$110,000	$330,000

Multi-family & Hotel/Motel Toilet Installation Program

Lifetime Water Savings	Year 1	Year 2	Year 3	Total
	851 acre-feet	851 acre-feet	851 acre-feet	2,554 acre-feet

Cost per Acre-feet Avoided	Total Budget	$323 per acre-foot
	MWD Incentives	$194 per acre-foot
	Western Budget	$129 per acre-foot

Turf Replacement Program

Program Description and Objectives

A significant portion of Western's water consumption is for residential and business outdoor water use. A major amount of that water is used to irrigate water-thirsty turf grasses. In recent years, water agencies including Southern Nevada Water Authority and the City of Scottsdale have had success with turf removal programs. Southern Nevada Water District, for example, states that their customers have removed and replace over 117 million square feet of grass with water efficient landscape saving over 5 billion gallons per day.

Metropolitan recently received a grant from DWR for a two year program to pilot turf removal. Western should leverage their program including incentives and operations. If Metropolitan offers $1.00 per square foot and they are conducting the pre- and post-inspections as well as generating the incentive check, Western should focus on additional marketing and incentives to maximize response. Marketing would include direct to customer and trade ally outreach. There is currently one obstacle to implementation, the Program costs $800 per acre-foot and this may impact Metropolitan Board approval. The Program is on the November Board agenda for approval. If Metropolitan does not implement the program Western may consider going after other grants such as Prop 84. SBSS1 is also an option to require implementation.

For this program, Western customers would be offered an incentive of $1.00 per square foot for the removal of turf and replacement with low water using landscape and efficient or low precipitation irrigation systems. Synthetic turf would be allowed as a replacement option. $1.00 would pay for roughly 20% of the average cost to remove turf and replace it with low water using plant material and an efficient irrigation system which averages $5.00 per square foot.

The program would target both residential and commercial turf areas, with heavy emphasis on the most inefficient or non-functional al turf applications such as median strips. This however causes the per acre-foot price to go up. Commercial sites, golf courses and homeowner associations are the most cost effective sites. Metropolitan is considering only offering the program to front yards.

Customers would be able to download a program application and guidelines from the Western or Metropolitan websites. Preliminary site inspection by Western program staff will take place, prior to turf modifications, in order to confirm customer eligibility and verify square footage. Many of these will be handled under the SEEP operations. Exposed soil, where turf has been removed, must be covered with mulch, rock, synthetic turf, or approved low water use plant material. When the landscape renovation is finished, a final inspection will be conducted. Upon final approval a rebate check will be generated and sent to the customer by the Metropolitan vendors.

<table>
<tr><td>  </td><td colspan="4">Turf Replacement Program</td></tr>
<tr><td rowspan="4">Measures and Per Unit Water Savings</td><td>Measure</td><td>Annual Savings</td><td>Measure Life</td><td>Lifetime Savings</td></tr>
<tr><td>Turf Removal</td><td>23.36 gpy/sq. ft.
or
.1434 acre-feet per site</td><td>10 years</td><td>233 gallons per sq. ft.
1.434 acre-feet per site</td></tr>
<tr><td>Low Precipitation Irrigation Systems</td><td>Included in turf removal</td><td></td><td></td></tr>
<tr><td>Regional Low Water Use Plants</td><td>Included in turf removal</td><td></td><td></td></tr>
<tr><td>Annual Production Estimates</td><td colspan="4">• 200,000 square feet of Turf Removed per year
• 100 sites at 2,000 square feet each</td></tr>
<tr><td>Other Benefits</td><td colspan="4">• Reduced runoff</td></tr>
<tr><td>Services Provided</td><td colspan="4">• Guidance on regional plant palettes and water efficiency design
• Promotion of regional plants and low precipitation irrigation systems</td></tr>
<tr><td>Target Customer</td><td colspan="4">Residential and commercial customers within Western’s retail and wholesale territory with a focus on the most inefficient applications of turf such median strips, slopes, and other low efficiency areas.</td></tr>
<tr><td>Marketing Method</td><td colspan="4">• Direct mail
• Trade ally outreach and promotions</td></tr>
<tr><td>Implementation Schedule</td><td colspan="4">• Pilot in Fall of 2009
• Full implementation in 2010
• September 2009 - June 2011</td></tr>
<tr><td>Job Creation</td><td colspan="4">The goal would be to leverage Metropolitan’s pilot to reduce costs. Local vendors could increase their business through marketing turf replacement options.</td></tr>
<tr><td>Product</td><td colspan="4">Customer purchases service from contractor or does it themselves including turf and</td></tr>
</table>

Turf Replacement Program

Distribution and Installation

irrigation system removal, new plant establishment, installation of new efficiency irrigation system.

Installation Verification

Western or Metropolitan's vendor conducts 100% pre- and post- inspection to verify eligibility (size of turf being removed) and correct installation (plant types and irrigation system).

Pros/Cons

Pros

- Move market toward low water using plants away from turf.
- Promote low precipitation irrigation.
- Create/increase business in industry.

Cons

- Many customers want their turf.
- Contractors want business as usual selling and installing what they always have.
- Program is not traditionally cost effective when paying market rate for the incentive.

Alternative Funding Sources

Metropolitan may pay standard incentive listed below as well as cover admin costs.
$1 per square foot of turf removed. DWR is providing 50% contribution

Costs

	Year 1	Year 2	Year 3	Total
Total Budget	$112,000	$224,000	$224,000	$560,000
MWD Incentives	$100,000	$200,000	$200,000	$500,000
Western Budget	$12,000	$24,000	$24,000	$60,000

Lifetime Water Savings

Year 1	Year 2	Year 3	Total
72 acre-feet	143 acre-feet	143 acre-feet	359 acre-feet

Acre-feet Avoided

Total Budget	$1,559 per acre-foot
MWD Incentives	$1,393 per acre-foot
Western Budget	$167 per acre-foot

California Design
Regional Landscape Design Support

Program Description and Objectives

Most customers are overwhelmed when installing new landscaping for their new home or retrofit project. Customers don't know which plants are low water using and what the options are for efficient irrigation. Many customers believe that water efficient landscapes mean "cactus" gardens. Customers need education and support through this process. Once established, these efficiently designed and maintained landscape areas will provide Western with long-term savings.

The Regional Landscape Design Support would provide:

- Technical Advisement
- Landscape Templates
- Resource Guides
- Sample Homes
- Water Use Efficient Tags at Local Nursery and Home Improvement Stores
- Personal Support to Review Plans and Offer Advice

Interested customers would register on-line. There they would have access to design templates, plant lists and irrigation lists.

Western would also hire a landscape architect that would provide customers with an initial consultation. The initial consult is expected to last 2 hours on average.

Western will solicit grants for implementation of this program.

Measures and Per Unit Water Savings

Measure	Annual Savings Measure Life	Device Lifetime
Low Water Using Plants	16-30% of annual water use	
Correct Design		
Efficient Irrigation Systems		10 years
High Efficiency Nozzles		10 years
Weather Based Irrigation Controllers		10 years

Annual Production Estimates

24 sites per year

	***California Design*** ***Regional Landscape Design Support***
Other Benefits	• Reduced runoff • Market transformation for "California Desgin"
Services Provided	• Landscape templates and resource guides • Water use efficiency tags at local stores • Review of plans • General support through design and installation process • Water budgeting and customer communication on performance • Marketing of WBICs and High Efficiency Nozzles for Save A Buck Program
Target Customer	• Single family residential
Marketing Method	• General outreach • Through local nurseries and home improvement centers • Web site • City and County permitting departments
Implementation Schedule	June 2009 – December 2011
Job Creation	Western would hire a local landscape architect to review plans. In addition Western would hire other experts to create program materials and landscape templates. Local nurseries and landscape contractor will see a small increase in business.
Product Distribution and Installation	Customer purchases and installs plants, irrigation system and WBICs
Installation Verification	Western would require photos of each site before and after to verify installations as well as conduct a percentage of site inspections.
Pros/Cons	

California Design
Regional Landscape Design Support

Pros

- Customer and landscape contractor education through entire process
- Prepares customer for upcoming water budget allocation rate
- Addresses landscape water use beyond WBICs and high efficiency nozzles

Cons

- Unknown water savings

Alternative Funding Sources

Customers would be eligible for Metropolitan's standard commercial incentives for :

- Weather Based Irrigation Controllers at $80 for single family homes and $630 per acre for sites with over 1 acre
- High efficiency nozzles at $4 per nozzle
- Possibly $1 per square foot to replace their turf

Total Costs

	Year 1	Year 2	Year 3	Total
Total Budget	$0	$16,920	$16,920	$33,840
MWD Incentives	$0	$0	$0	$0
Western Budget	$0	$16,920	$16,920	$33,840

Wiser Start Program

Program Description and Objectives

When a single family residential site changes account holder, there is a prime opportunity to implement water efficiency improvements before the new residents settle in.

Western would offer to install, free of charge, weather based irrigation controllers and high efficiency nozzles. In addition program field personnel would provide the new account holder recommendations for high efficiency appliance retrofits. Western will determine if a financing component, to aid customers in purchasing new appliances, makes sense under this program.

Also while on site, field personnel would collect measurement data required for water budgeting and educate the customer on water budgets.

This program could be a prime opportunity to implement the water budget allocation rates. Customers would be educated about the new rates and offered a list of measures and services to get ensure compliance with the budget. First, customers would be offered a landscape evaluation where their water budget would be created. They would also be offered:

- WBIC and high efficiency nozzle programs
- High efficiency toilet programs

Measures and Per Unit Water Savings

Measure	Annual Savings	Measure Life	Lifetime Savings
Weather Based Irrigation Controllers	.0414 acre-feet per year	10	.414 acre-feet
High Efficiency Nozzles	0.004 acre-feet per nozzle	5	0.02 acre-feet per nozzle
High Efficiency Toilets	.0425 acre-feet per toilet	20	.85 acre-feet per toilet

Other Benefits

- Reduced runoff
- Wastewater reduction

	***Wiser Start Program***
Services Provided	• Free Product and installation for WBICs and nozzles • Free appliance audit recommendations • Measurement and education for Water Budgeting
Target Customer	Residential customers within Western's retail and wholesale territory
Marketing Method	Database created from flagged customer change at premise. Program staff call new customer to solicit participation and set up appointment for site visit.
Implementation Schedule	• September 2009 – December 2011 • Ongoing implementation
Product Distribution and Installation	Handled under programs
Installation Verification	Program staff will conduct follow up with each customer to ensure they maintain the water savings features, specifically that they or their contractor do not override the irrigation scheduling. This follow will consist of both phone calls and site visits.
Pros/Cons	<u>Pros</u> • Identify of customers during account turn over • Large volume of single family account turn over's in Western's territory. <u>Cons</u> • Lower rates of housing starts in Western's territory • High costs for direct installation • Getting contractors to install the products correctly and educate their customers so that water savings don't erode.

Metropolitan Water District Sponsored Program #1

Residential SoCal Water Smart Program

Metropolitan sponsors a region-wide program that offers single family residents rebates for high efficiency toilets, high efficiency washers, weather based irrigation controllers, high efficiency spray nozzles and synthetic turf.

Currently high efficiency toilets and washers appear to be moving without extra incentive dollars or effort from Western. Metropolitan's vendor is working with local retailers and big box stores to market the program. Marketing includes, point of purchase displays, sales rep education and co-op advertising.
However weather based controllers and nozzles are moving slower. In order to increase production Western should:

- Increase the incentive amount to attract higher participation
- Work closing with irrigation manufacturers, distributors and contractors

Western can also maximize the results of the other measures in the following ways:

- Supplement general marketing activities through Western's website, newsletters and other existing communication vehicles
- Utilize Metropolitan's marketing materials to further promote the program
- Verify local retailers and distributors have program materials and sales reps are trained

SoCal Water Smart Residential Rebate Program Overview

Measure	MWD Incentive	Annual Water Savings	Measure Life	Lifetime Savings
High Efficiency Toilets (replacing 1.6 gpd or greater)	$100	.0425 af	20 years	.85 af
High Efficiency Clothes Washer	$135.00	.0157 af	15 years	.235 af
High Efficiency Rotary Nozzles	$4.00	.0045 af	5 years	.0224 af
Weather Based Irrigation Controller 6 station <1 acre	$80.00	.0414 af	10 years	.415 af
Weather Based Irrigation Controller 6 station >1 acre	$630.00	.325 af per acre	10 years	3.25 af per acre
Weather Based Irrigation Controller 15 station <1 acre	$86.50			
Weather Based Irrigation Controller 15 station >1 acre	$951.50			
Synthetic Turf	$0.30	.00011 af per sq ft	10 years	.0011 af per sq ft

Metropolitan Water District Sponsored Program #1

Residential SoCal Water Smart Program

Costs		Year 1	Year 2	Year 3	Total
	Total Budget	$109,025	$158,650	$158,650	$426,325
	MWD Incentives	$105,900	$147,400	$147,400	$400,700
	Western Budget	$3,125	$11,250	$11,250	$25,625

Lifetime Water Savings	Year 1	Year 2	Year 3	Total
	304 acre-feet	545 acre-feet	545 acre-feet	1,394 acre-feet

Acre-feet Avoided	Total Budget	$306 per acre-foot
	MWD Incentives	$287 per acre-foot
	Western Budget	$18 per acre-foot

Metropolitan Water District Sponsored Program #2

Commercial and Multi-family Save A Buck Program

Metropolitan also offers incentives for commercial and multi-family customers that retrofit their plumbing fixtures, HVAC systems, food service equipment, cleaning equipment and medical equipment. A full list if provided below.

To better maximize water savings, Western should consider the following:

- Select high volume customer markets and create specific marketing strategies.
- Conduct direct sales to these customers.
- Utilize Metropolitan's marketing materials to further promote the program.
- Verify local retailers and distributors have program materials and sales reps are trained.
- For select measures, (to be identified), increase the incentive amount to attract higher participation.

The Save A Buck Program has been an effective program over the years. However, the program production has been dominated by urinal retrofits. Additionally, the customer response has come predominantly from one retail water agency.

Western intends to continue participating in the Save A Buck Program, but will focus on an expansion of the marketing in order to better reach customers and will broaden the list of measure incentives requested by the customer. Western has secured market data through Dunn and Bradstreet which will allow marketing staff to more effectively outreach to the customer. A couple key customer segments that show promise are restaurants and beauty shops. Western will address these markets through pilots:

First, Western will increase the HET and food service equipment incentives for restaurants to see if that alone will increase production. If that does not show immediate results Western will evaluate implementing a direct installation program for the toilets and more direct marketing for the food service equipment.

Currently hair wash sprayers are been evaluated for their water savings opportunity as well as their performance. If the results prove successful, Western will consider implementing a beauty shop pilot where sprayers and toilets would be installed for free.

Metropolitan Water District Sponsored Program #2

Commercial and Multi-family Save A Buck Program

Commercial and Multi-family Save A Buck Rebate Program Overview

Measure	MWD Incentive	Annual Water Savings	Measure Life	Lifetime Savings
High Efficiency Dual Flush Toilet	$165	.0425 af	20 years	.85 af
HET 1.28 gpf or less toilet	$165	.0425 af	20 years	.85 af
HET Upgrade/New Construction	$30	.0078 af	20 years	.156 af
HEU Urinal (0.26 to 0.5 gpf)	$200	.0614 af	20 years	1.228 af
HEU Upgrade/New Construction (0.26 to 0.5 gpf)	$60	.0154 af	20 years	.308 af
ZWU Zero Water Urinal & Ultra Low Water Urinal (0 to .25 gpf)	$400	.1225 af	20 years	2.45 af
ZWU Upgrade/New Construction Urinal (0 to .25 gpf)	$120	.0307 af	20 years	.614 af
HEW Commercial Clothes Washer	$210	.1075 af	10 years	1.075 af
Conductivity Controller	$625	.644 af	5 years	3.22 af
pH Controller	$1900	1.944 af	5 years	9.72 af
Water Broom	$150	.1534 af	5 years	.767 af
Connectionless Food Steamers	$485 per compartment	.25 af	10 years	2.5 af
Steam Sterilizer	$1900	1.3 af	15 years	19.5 af
High Efficiency Rotating Nozzles	$4	.004 af	5 years	.0224 af
Weather Based Irrigation Controllers	$630 per acre	.325 af per acre	10 years	3.25 af per acre
Dry Vacuum Pumps	$125 per 0.5 HP	.0916 af	7 years	.641 af
Large Rotary Nozzles	$13 per set	.018 af	10 years	.18 af
Synthetic Turf	$0.30 per sq ft	.00014 af per sq ft	10 years	.0014 af per sq ft
Ice Machine	TBD	TBD	TBD	TBD
Multi-Family HET	$165	.0425 af	20 years	.85 af
Multi-Family HET Upgrade/New Construction	$30	.0078 af	20 years	.156 af
Multi-Family HEW	$135	.0311 af	14 years	.436 af
Pre-rinse Spray Valves	$60	.153 af	5 years	.765 af

Please note that ULFTs and x-ray recirculation systems are being eliminated from the program in July 2009, therefore are not included in marketing strategy.

Metropolitan Water District Sponsored Program #2

Commercial and Multi-family Save A Buck Program

Below is a snapshot of the key classifications of Western's customers and the number within each category:

Business Type	Total Of All Zip Codes
Manufacturing	
Food Products	113
Textile Mill	35
Apparel	109
Lumber, Wood	137
Furniture, Fixtures	85
Paper & Allied Products	34
Printing & Publishing	297
Chemicals	84
Rubber & Plastic	116
Leather	19
Stone, Clay, Glass, Concrete	106
Primary & Fabricated Metal	295
Industrial / Commercial Equipment	390
Electronics / Electrical Equipment	130
Transportation Equipment	145
Instruments	88
Misc Manufacturing	234
Grocery	100
Plastic / Chemicals / Petroleum	58
Beverages	12
Nurseries	65
Retail	
Grocery Stores & Markets	719
Restaurants, Eating Establishments, & Bars	1648
Services	
Hotels / Rooming / Lodging	134
Industrial Laundry	142
Dry Cleaners	18
Laundromat	37
Beauty Shops	958
Carwashes	99
Public Golf Courses	13
Amusement Parks / Recreation	219
Institutions	
Hospitals	46
Elementary and secondary schools	344
Colleges and Universities	61

Metropolitan Water District Sponsored Program #2

Commercial and Multi-family Save A Buck Program

Costs		Year 1	Year 2	Year 3	Total
	Total Budget	$354,145	$422,170	$489,170	$1,265,485
	MWD Incentives	$337,845	$404,670	$469,670	$1,212,185
	Western Budget	$16,300	$17,500	$19,500	$53,300

Lifetime Water Savings	Year 1	Year 2	Year 3	Total
	1,993 acre-feet	2,348 acre-feet	2,684 acre-feet	7,025 acre-feet

Acre-feet Avoided	Total Budget	$180 per acre-foot
	MWD Incentives	$172 per acre-foot
	Western Budget	$8 per acre-foot

Metropolitan Water District Sponsored Program #3

Public Sector Program

In August 2007, Metropolitan created a program to provide funding for public agencies in its service area which use more than 50 acre-feet of water a year to increase water use efficiency in buildings and landscapes. The program was offered on a one-time basis, with total funding of $15 million.

As a result of the immediate water supply challenges, Metropolitan created the program to ensure public agencies demonstrated good water stewardship in light of possibly water allocations and requests to end use customers to reduce their use.

Metropolitan has allocated the entire first year budget and is requesting another round of funding at the November Board meeting. The program is more costly than traditional programs. Services such as audits and incentives funded at $500 per acre-foot avoided translate into a program 3 times the costs of Metropolitan's standard programs. This may be a reason the program in not funded. As of November 18, 2008, the program only received $5 million in annual funding. This funding is already promised to customers through July 2010. For the purposes of this plan no costs or savings were included. In addition program components, policies and incentive levels may change. Described below is the current program.

Cities, counties, state and federal facilities may participate through any of four services offered:

1. Free water audits
2. Enhanced incentives
3. Pay-for-performance
4. Recycled water hook-up

Western can maximize water savings and participation by:

- Following up on audits conducted to ensure retrofits happen
- Conduct direct sales to target customers
- Provide additional support through purchasing and installation process again to ensure retrofits happen.

Overview of Programs:

1. Free Indoor/Outdoor Water Efficiency Audit. The audit assesses current water use and provides detailed recommendations for practical solutions and improvements for public facilities and landscape areas. The indoor audit creates an equipment inventory list and the location of high water use fixtures that should be retrofitted with more efficient models. The outdoor audit includes a comprehensive assessment of the

irrigation system and specific recommendations for system upgrades. The complete audit report is presented in an easy-to-read format, making it your guide to initiating equipment upgrades.

2. Upfront enhanced Incentives to purchase and install water saving devices. The Program may cover the total equipment cost, making these devices free. There is little to no out of pocket expense for the devices to a public agency. The incentives are limited to the MSRP of the product including taxes and shipping up to the incentive cap. Incentive amounts are based upon $500 per acre-foot of water saved. Upfront incentives are offered for the following equipment:

   - High Efficiency Toilets (Dual Flush, or 1.28 gpf or less)…….Cost of the device up to $425
   - High Efficiency Urinals (0.26 – 0.9 gpf)……Cost of the device up to $610
   - Ultra Low Water Urinals (0 – 0.25 gpf)……Cost of the device up to $1,225
   - Cooling Tower Conductivity Controllers……..Cost of the device up to $1,610
   - Cooling Tower pH Conductivity……Cost of the device up to $4,860
   - Pressurized Water Brooms……..Cost of the device up to $380
   - Smart Irrigation Controllers (Weather Based)……Cost of the device up to $1,625 per acre
   - Central Irrigation Controllers (Weather Based)……Cost of the device up to $1,625 per acre
   - Rotating Spray Nozzles for Pop-Up Spray Heads……..Cost of the device up to $10 per nozzle
   - High Efficiency Nozzles for Large Rotary Sprinklers…….Cost of the device up to$90 per set
   - Synthetic Turf……Cost up to $0.75 per square foot

   The public agency would install and maintain the equipment as your contribution to this partnership.

3. Incentives for reducing public facility's annual water usage at least 10 percent over a one-year period. Public agencies sign up with Metropolitan for the Pay for Performance Program and get paid $3.00 for every 1,000 gallons saved over last year's usage. This would not involve changing equipment, but does require a savings of at least 10 percent.

4. Hook Up to Recycled Water Supply – Metropolitan and several local water agencies have thousands of miles of pipe supplying recycled water in various locations throughout the service territory. If available in a water agencies area, public agencies can receive a reduction in the cost of water by connecting into recycled water supply of up to $500 per acre-foot.

It is important to fully explain the importance of the Public Sector Program and its key role in the overall portfolio of programs being offered.

The Metropolitan Public Sector Program has been in operation for less than a year yet, has yielded extremely high customer response and water savings. The Metropolitan program team has already gone back to their board to

Metropolitan Water District Sponsored Program #3

Public Sector Program

request an additional $15 million due to the overwhelming customer installation rate for both indoor and outdoor measures.

A brief snapshot of the program results are below:

- 36.2% of Audits were moved forward to actual Incentives and Retrofits. This is a previously unheard of installation rate for the Public Sector Market.
- 44% of incentive applications are for weather based irrigation controllers. WBICs are an extremely difficult water efficiency measure to promote. A 44% incentive mix for this device is considered a market breakthrough for WBICs.
- Many public agencies are first time customers that stated that participation was due to high incentive amounts and pre-payment of incentive dollars.
- Public Agency feedback showed that public agencies participated because;
    1) The service was extremely customer-friendly
    2) The audit report was highly useful and easy to read
    3) The incentive amounts were high
    4) Incentives were pre-paid
- 44% of incentive applications are for weather based irrigation controllers. WBICs are an extremely difficult water efficiency measure to promote. A 44% incentive mix for this device is considered a market breakthrough for WBICs.
- Additionally, Metropolitan has 114 sites within their territory sign up for recycled water.

Western will leverage this typically hard to reach market to a maximum level through the Public Sector Program by accomplishing the following:

1. Pursue participation from every school within the territory
2. Aggressively market audits
3. Create a strong RFP process to aid customers with purchase and installation of measures
4. Increase program incentives
5. Provide a program support team that walks customers through each step of the program

Until funding has been approved at a higher level for this program, costs and savings are not included in the plan.

Metropolitan Water District Sponsored Program #4

Water Savings Performance Customized Incentives Program

Metropolitan Water District provides financial assistance to local businesses and industries to encourage investment in water-saving process improvements and large irrigation system upgrades.

The Program is open to all public and private, commercial and industrial users within Metropolitan's service area. Financial assistance is provided for documented water savings derived from projects implemented under the program that meet the minimum qualifying criteria. This includes industrial process water use reduction and landscape efficiency improvement.

Metropolitan is also in the process of creating an audit program where customers' operations would be evaluated for water savings opportunities. Customers would be presented with project options and cost/benefit analysis.

Western can maximize participation and water savings by:

- Conducting target research to identify the optimal Industries and large Irrigation customers within their territory.
- Provide audits of customer sites to determine and present opportunities and provide cost/benefit analysis.
- Consider increasing incentives to those customers identified as prime opportunity customers.
- Conduct follow up with customers and provide support after audit is conducted to ensure project occurs. This could include vendor research, engineering support and general prodding.

Example of Industrial Process Incentive:

Project Cost:	$25,000
Annual Water Savings	1,500,000 gallons
A) $3.00 x (1,500,000 gal./1,000 gal.)=*$4,500	
B) 100% of $25,000 = $25,000	
* Incentive provided by Metropolitan is $4,500	

What types of improvements qualify?
Equipment for the proposed improvement may be purchased or leased. Typical process improvements that qualify include:

- Installation of equipment to capture, treat and reuse water that would otherwise be discharged to the sewer.
- Replacement of existing equipment with more efficient process improvements resulting in reduced water demand.

Metropolitan Water District Sponsored Program #4

Water Savings Performance Customized Incentives Program

Metropolitan Water District provides financial assistance to upgrade existing commercial, multi-family, and homeowner association landscapes (and single-family residences one acre or larger) with more efficient irrigation equipment. Incentives are based on documented water savings. Sites irrigated with recycled water or mixed-use meters are considered on a case-by-case basis.

Example of Large Irrigation Customer Incentive:

Project Cost:	$50,000
Annual Water Savings	12,000,000 gallons
A) $3.00 x (12,000,000 gal./1,000 gal.)=*$36,000	
B) 100% of $50,000 = $50,000	
* Incentive provided by Metropolitan is $36,000	

What types of improvements qualify?
Irrigation system improvements that qualify include upgrading existing irrigation system equipment with more efficient hardware resulting in reduced water demand.

Typical components include rotating nozzles, spray heads, valves, piping, sensors, controllers, etc.

Costs		Year 1	Year 2	Year 3	Total
	Total Budget	$15,020	$15,020	$51,170	$81,210
	MWD Incentives	$0	$0	$36,150	$36,150
	Western Budget	$15,020	$15,020	$15,020	$45,060

Lifetime Water Savings	Year 1	Year 2	Year 3	Total
	0 acre-feet	0 acre-feet	37 acre-feet	37 acre-feet

Acre-feet Avoided	Total Budget	$2,190 per acre-foot
	MWD Incentives	$977 per acre-foot
	Western Budget	$1,218 per acre-foot

Metropolitan Water District Sponsored Program #5

California Friendly Homes for New Construction

Incentives are available for newly constructed single-family detached homes and multifamily common landscaped areas.

Below is a list of incentives available:

Device	Incentive/Single-family	Incentive/Multifamily
High-efficiency Toilet	$100	$100
High-efficiency Washer	$175	$175
Smart Controller	$200	$25 per station
Rotating Nozzle	$4 per nozzle, up to 50	$4 per nozzle, up to 300

Western can maximize participation and water savings by:

- Conducting target research to identify the developers and potential development within their territory.
- Potentially increase incentives for select developments and measures.

Restaurant Pilot Program

Program Description and Objectives	Riverside has 1,500 restaurants within the county, offering a healthy number of sites to target for a pilot program. Restaurant restrooms have extremely high foot traffic, making toilets and faucets key measures to target. Western will conduct a two-phase pilot program for this market. Initially, Western will increase measure incentives for toilets, ice machines, and food steamer measures to secure high participation rates. If participation rates do not dramatically increase, Western will then market direct installation of high efficiency toilets. The Program would also include direct marketing for the food service measures.

	***Beauty Shop Pilot Program***
Program Description and Objectives	There are 960 beauty shops in western Riverside County. Many of these small businesses are operated on a shoe string and have never been upgraded to newer water saving technologies. This presents an opportunity to market directly to these shops for high efficiency toilets, faucets, and washers. Additionally, new high efficiency hair wash sprayers will be promoted.

	***Multi-family Submetering Pilot***
Program Description and Objectives	A longer term goal for Western MWD is to implement a multi-family sub metering program to eliminate master metered water usage in apartment buildings within the territory. It is well documented that residents with master metered water supply use more water and have little motivation to initiate water efficiency retrofits within their home. By reconfiguring the metering set up to remove the master meter and install individual meters, the end-user will now have a vested interest in reducing their usage. Initial results from Santa Clara Valley Water District's program shows savings of 23%. Costs will ultimately be the largest obstacle. Metropolitan will be studying the savings in the near future.

	***Commercial Drip Irrigation Pilot Program***
Program Description and Objectives	A longer term goal of Western MWD is to offer commercial customers incentives for the installation of drip irrigation equipment for watering trees, shrubs and flowers on the property.

Water Use Efficiency Master Plan

Vol. 1: Implementation Blueprint &
Vol. 2: Technical Analysis

November 2008

WESTERN MUNICIPAL WATER DISTRICT

Prepared for:

Western Municipal Water District

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Water Use Efficiency Master Plan
Volume 2: Technical Analysis

November 2008

Prepared for

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Riverside, CA 92517

K/J Project No. 0787128*03

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List of Abbreviations and Acronyms

AB	Assembly Bill
AF	acre-feet
AFY	acre-feet per year
BMP	Best Management Practice
BSMWC	Box Springs Mutual Water Company
CIMIS	California Irrigation Management Information System
Corona	City of Corona
CPUC	California Public Utilities Commission
CUWCC	California Urban Water Conservation Council
DMM	Demand Management Measure
DPH	Department of Public Health
DWR	California Department of Water Resources
EMWD	Eastern Municipal Water District
EPAct	Energy Policy Act
ETo	Evapotranspiration
EWD	Elsinore Water District
EVMWC	Eagle Valley Mutual Water Company
EVMWD	Elsinore Valley Municipal Water District
gpcd	gallons per capita per day
gpd	gallons per day
gpf	gallons per flush
gpm	gallons per minute
HECW	High-Efficiency Clothes Washer
HET	High-Efficiency Toilet
HEU	High-Efficiency Urinal
HGCWD	Home Gardens County Water District
HOA	Homeowners Association
IRS	Internal Revenue Service
IRWMP	Integrated Regional Water Management Plan
JCSD	Jurupa Community Services District
LLWD	Lee Lake Water District
LLWRF	Lee Lake Water Reclamation Facility
MGD	million gallons per day
MFR	Multi-Family Residential
mm	millimeter
MOU	Memorandum of Understanding
Metropolitan	Metropolitan Water District of Southern California
Norco	City of Norco
PG&E	Pacific Gas and Electric
Plan	Water Use Efficiency Master Plan
PSP	Proposal Solicitation Package
RCSD	Rubidoux Community Services District
RCWD	Rancho California Water District
RHWC	Riverside Highland Water Company
Riverside	City of Riverside
RPU	Riverside Public Utilities
SAWPA	Santa Ana Watershed Project Authority
SCE	Southern California Edison
SFR	Single Family Residential
SoCalGas	Southern California Gas Company
SWRCB	State Water Resources Control Board
TBD	To Be Determined
ULFT	Ultra-Low-Flush Toilet

Urban MOU	Memorandum of Understanding Regarding Urban Water Conservation in California
USBR	United States Bureau of Reclamation
USDOE	United States Department of Energy
USEPA	United States Environmental Protection Agency
UWMP	Urban Water Management Plan
WBICs	Weather Based Irrigation Controllers
Western MWD	Western Municipal Water District
WF	Water Factor
WUE	Water Use Efficiency
WVWD	West Valley Water District

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Executive Summary

As water shortages and increasing demands upon infrastructure occur throughout the country, water conservation planning, technologies and practices are evolving today at an unprecedented rate. In concert with the growing emphasis on water use efficiency programs, Western Municipal Water District (Western MWD) has commissioned the preparation of a Water Use Efficiency Master Plan (Plan). The purpose of the Plan is to prepare a comprehensive long term plan for the Western MWD service area by adopting objectives, policies and programs designed to promote innovative emerging technologies and practices, as well as proven and cost-effective conservation measures. The Plan consists of two volumes; Volume 1 is the Implementation Blueprint, and Volume 2 is the Technical Analysis.

Western MWD was formed in 1954 to bring supplemental water to growing western Riverside County. Today, Western MWD serves more than 24,000 retail customers and 130 irrigation customers with water from both the Colorado River and the State Water Project. Supplemental water (groundwater) is also received from the City of Riverside. The retail service area covers about 73 square miles, including the unincorporated and non-water-bearing areas around Lake Matthews and portions of the cities of Riverside and Murrieta.

Western MWD's wholesale service area consists of a 527 square mile area of western Riverside County with a population of over 600,000. Western MWD currently sells over 100,000 acre-feet (AF) of water annually.

ES.1 Water Use Within Western MWD Service Area

Single Family Residential (SFR) demands account for approximately 70 percent of the total potable water demand within Western MWD's wholesale service area, as shown in Figure ES-1 and ES-2. Further, almost 60 percent of the water used in this sector is for landscape irrigation. High irrigation water use is not uncommon in warm, dry climates, such as that of the "Inland Empire," and accordingly water use per capita is very high in the region. On average, the SFR sector in Western MWD's service area uses 200 gallons per capita per day (gpcd), which is significantly greater than the typically seen planning values of 80 to 120 gpcd. This would indicate that landscape water use in the SFR sector would be an appropriate, key target for Western MWD's water use efficiency strategy (see Figure ES-3). Water use within the Commercial, Industrial, and Institutional (CII) sector also comprises a significant component of Western MWD's overall water consumption (approximately 20 percent). Similar to the SFR sector, outdoor water use within the CII sector appears to be the most appropriate target area for reducing water use and improving system efficiencies.

FIGURE ES-1
POTABLE WATER CONSUMPTION
WITHIN WESTERN MWD WHOLESALE SERVICE AREA

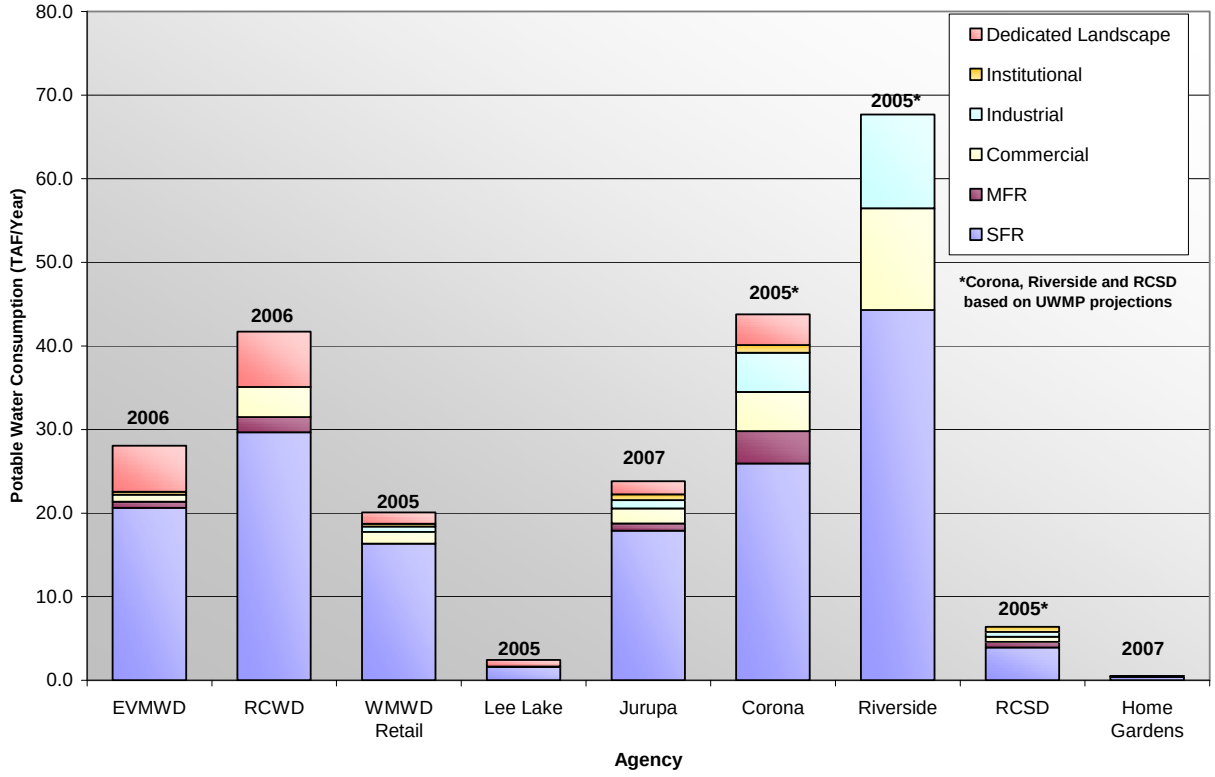


FIGURE ES-2
POTABLE WATER CONSUMPTION
BY WATER USE SECTOR

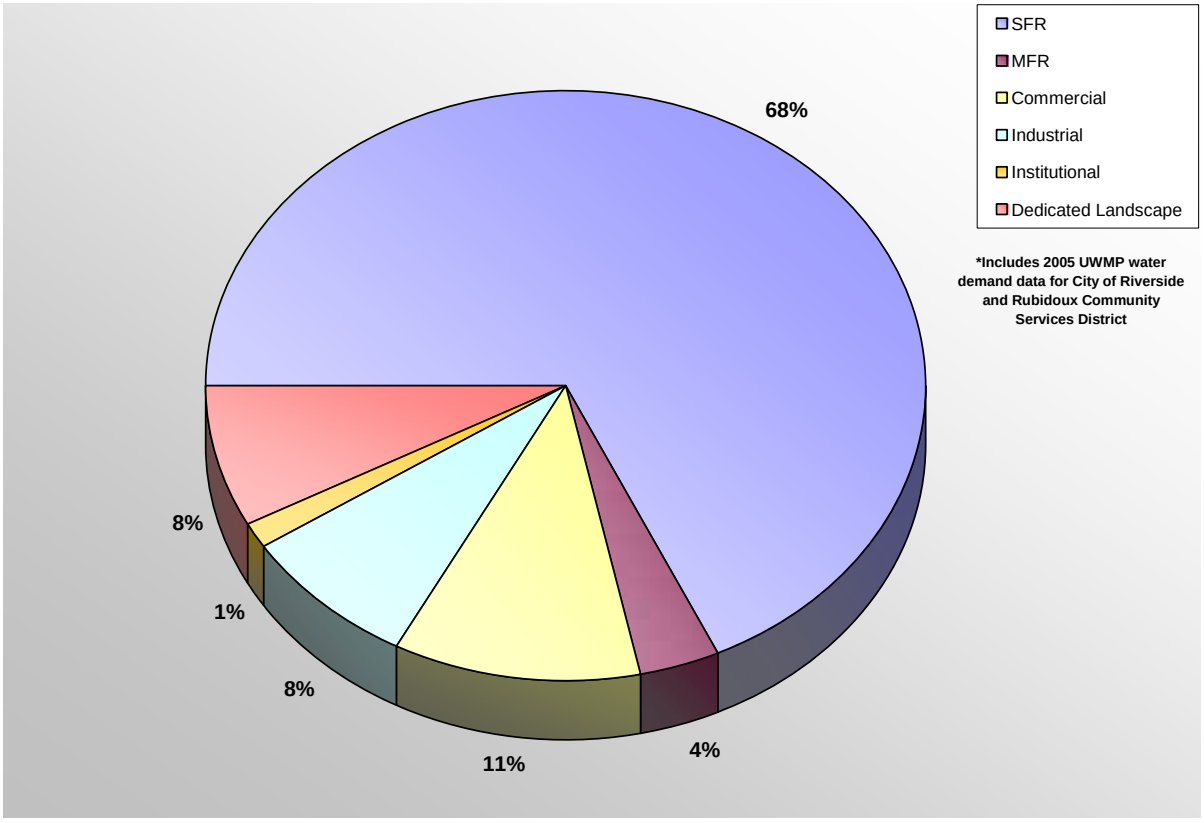
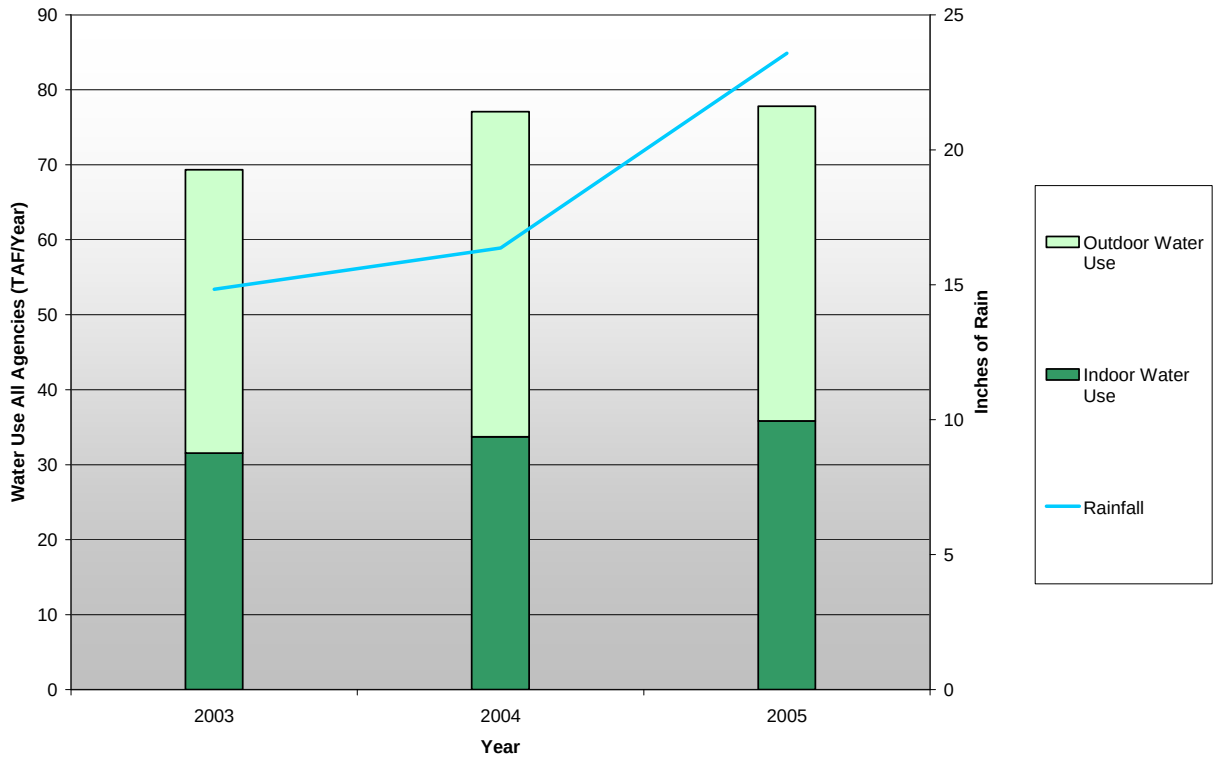


FIGURE ES-3
OUTDOOR VS. INDOOR WATER CONSUMPTION (SFR CUSTOMERS)



ES.2 Current Conservation Programs (BMPs)

Across Western MWD's wholesale service area, overall implementation levels of the 14 Best Management Practices (BMPs) identified within the Memorandum of Understanding Regarding Urban Water Conservation in California (Urban MOU) could be increased. Table ES-1 summarizes current BMP implementation efforts for Western MWD and its retailers. It is estimated that the seven Urban MOU signatory agencies alone could achieve water savings on the order of 30,000 AFY by reaching long-term implementation goals as shown in Table ES-2.

This suggests that Western MWD and its retailers may benefit by focusing more on implementing proven technologies contained in existing BMPs rather than initially adopting new emerging technologies. A combination of existing BMPs and new technologies may prove fruitful, especially with the proposed Urban MOU revision approach.

The potential for future water savings varies significantly among the BMPs and across the agencies. Potential water savings are typically the highest for BMPs with low levels of implementation. BMPs that target residential customers (BMPs 1 and 14), large landscapes (BMP 5), incentives for HECWs (BMP 6), and CII accounts (BMP 9) show the most potential for water savings.

TABLE ES-1
SUMMARY OF IMPLEMENTATION OF CONSERVATION PROGRAMS (BMPS)

	Box Springs Mutual Water Company	Elsinore Valley Municipal Water District	City of Norco	City of Corona Department of Water and Power	Lee Lake Water District	Rancho California Water District	Home Gardens County Water District	Jurupa Community Services District	City of Riverside Public Utilities	Riverside Highland Water Company	Rubidoux Community Services District	Western Municipal Water District (Retail)
Urban MOU Signatory		✓		✓		✓		✓	✓		✓	✓
BMPs												
BMP 1: Residential Survey Programs (SFR)[a]		✓		✓		✓			✓			
BMP 1: Residential Survey Programs (MFR)[a]		✓		✓		✓						
BMP 2: Residential Plumbing Retrofit – Low-flow Showerheads[b]		✓		✓		✓			✓			
BMP 2: Residential Plumbing Retrofit – Toilet Flappers[b]		✓		✓								
BMP 2: Residential Plumbing Retrofit – Faucet Aerators[b]		✓		✓		✓						
BMP 3: System Water Audits[c]		✓		✓		✓			✓			✓
BMP 4: Metering with Commodity Rates[d]		✓				✓		✓	✓		✓	✓
BMP 5: Large Landscape Conservation Programs and Incentives – Surveys[a]		✓		✓		✓			✓			✓
BMP 5: Large Landscape Conservation and Incentives - Dedicated Irrigation Meter Accounts with Water Budgets[e]		✓		✓		✓			✓			✓
BMP 6: High Efficiency Washing Machine Rebate Programs[f]		✓		✓		✓			✓			✓
BMP 7: Public Information Programs[g]		✓		✓		✓			✓		✓	✓
BMP 8: School Education Programs[g]		✓		✓		✓			✓		✓	✓
BMP 9: Conservation Programs for CII Accounts - Water Use Surveys[a]		✓							✓			
BMP 9: Conservation Programs for CII Accounts - ULFTs and Pre-rinse Spray Valves[b]						✓						✓

	Box Springs Mutual Water Company	Elsinore Valley Municipal Water District	City of Norco	City of Corona Department of Water and Power	Lee Lake Water District	Rancho California Water District	Home Gardens County Water District	Jurupa Community Services District	City of Riverside Public Utilities	Riverside Highland Water Company	Rubidoux Community Services District	Western Municipal Water District (Retail)
BMP 10: Wholesaler Agency Assistance Programs	Not applicable to retailers.											
BMP 11: Retail Conservation Pricing - Water Service for Residential[(h)]		✓		✓		✓		✓	✓		✓	✓
BMP 11: Retail Conservation Pricing - Water Service for CII[(h)]		✓		✓		✓		✓	✓		✓	✓
BMP 11: Retail Conservation Pricing – Water Service for Irrigation[(h)]				✓		✓		✓	NA		NA	✓
BMP 11: Retail Conservation Pricing - Sewer Service for Residential[(h)]		✓						✓	✓		✓	✓
BMP 11: Retail Conservation Pricing - Sewer Service for CII[(h)]		✓						✓	✓		✓	✓
BMP 11: Retail Conservation Pricing – Sewer Service for Irrigation[(h)]		✓				NA		✓	NA		NA	NA
BMP 12: Conservation Coordinator[(i)]		✓		✓		✓			✓			✓
BMP 13: Water Waste Prohibition[(j)]		✓		✓		✓		✓	✓			✓
BMP 14: Residential Ultra-Low-Flush Toilet Replacement Programs – SFR[(b)]		✓		✓		✓			✓			✓
BMP 14: Residential Ultra-Low-Flush Toilet Replacement Programs – MFR[(b)]		✓		✓								✓

Notes:
CII: Commercial, Institutional, and Industrial; ULFT: Ultra-low-flush toilet; NA : Service not available by the agency; SFR : Single Family Residential;
MFR: Multi-family Residential

(a) ✓: The agency has started an implementation strategy for surveys and has been offering/completing surveys.
(b) ✓: The agency has been retrofitting devices through distributions/installations/rebates.
(c) ✓: The agency's unaccounted water loss was reported <10 percent.
(d) ✓: The agency's accounts are 100 percent metered; X: The agency has un-metered accounts.
(e) ✓: The agency has dedicated irrigation meter accounts with water budgets.
(f) ✓: The agency has been issuing HEW rebates.
(g) ✓: The agency has implemented the program and has been conducting public/school events.
(h) ✓: The agency has implemented a volumetric rate (uniform, increasing block, or volumetric flat rate).
(i) ✓: The agency has water conservation coordinator(s).
(j) ✓: The agency has ordinance in place although the ordinance is not imposed except for the City of Corona

TABLE ES-2
SUMMARY OF POTENTIAL WATER SAVINGS

BMP	Program	Potential Water Savings (AFY)						
		EVMWD	Western MWD	RCWD	City of Corona	City of Riverside	RCSD	JCSD
BMP 1	Residential Water Surveys	742	748	1117	914	1594	124	594
BMP 2	Low Flow Showerheads	66	23	92	48[(a)]	-	-	51
BMP 2	Faucet Aerators	134	81	139	124[(a)]	251[(a)]	-	81
BMP 2	Toilet Flappers	604	347	708	566[(a)]	1,051[(a)]	-	788
BMP 3	Unaccounted Water	All agencies in compliance with unaccounted water losses <10%.						
BMP 4	Metering	0	0	0	2,246	0	0	0
BMP 5	Large Landscape Surveys	452	489	429	1,091	3,501	131	744
BMP 6	High-Efficiency Clothes Washers (HECWs)	284	524	341	364	489	-	147
BMP 7	Public Information	Water savings estimates are not quantifiable for BMP 7.						
BMP 8	School Education	Water savings estimates are not quantifiable for BMP 8.						
BMP 9	CII Water Use Surveys	454	498	656	1,093	3,490	131	775
BMP 10	Wholesale Agency Programs	Not applicable to retailers						
BMP 11	Water and Sewer Rate Structures	Water savings estimates are not quantifiable for BMP 11						
BMP 12	Conservation Coordinator	Water savings estimates are not quantifiable for BMP 12						
BMP 13	Conservation Pricing	Water savings estimates are not quantifiable for BMP 13						
BMP 14	Residential ULFTs	350	107	508	-	1,311	-	277
Total Water Savings Potential (AFY)		**3,086**	**2,817**	**3,990**	**5,708**	**10,310**	**386**	**3,457**
Total Water Savings Potential for Seven Agencies (AFY)		**29,754**						

Notes:
Savings are for existing construction only and do not include future development
AFY: acre-feet per year
CII: Commercial, Institutional, and Industrial
"-": Not quantified due to the limited information.
ULFTs: Ultra-low-flush toilets
Water savings estimated for SFRs; water savings estimates for MFRs not quantified due to the limited information.

ES.3 Cost-Effectiveness Of BMPS

All BMPs evaluated appear to be cost-effective from an agency perspective, except for BMP 1 (see Table ES-3 for details). The return on an agency's contributions is the highest for Large Landscape Water Budgets/BMP 5 (with a benefit-cost ratio of 5.2) and lowest for Large

Landscape Water Surveys/BMP 5 (with a benefit-cost ratio of 1.8). The lower benefit-cost ratio for BMP 1 is attributed to the relatively high cost of conducting surveys against a small return on investment achieved through water savings. Residential surveys are an effective tool for promoting water conservation measures and devices within surveyed homes because they target both indoor and outdoor water use. With outdoor water use in the SFR sector identified as a primary target, BMP 1 should still be considered despite its low benefit-cost ratio.

TABLE ES-3
SUMMARY OF BMP COST-EFFECTIVENESS

BMP	Program	Quantifiable Savings[(a)]	Cost-Effectiveness Analysis Completed	Benefit-Cost Ratio
BMP 1	Water Survey Programs for SFR and MFR Customers	✓	✓	0.6
BMP 2	Residential Plumbing Retrofits	✓	✓	2.8
BMP 3	System Water Audits, Leak Detection and Repair	✓	All retailers currently in compliance, no program required[(c)]	-
BMP 4	Metering with Commodity Rates for All New Connections and Retrofits of Existing Connections	✓	✓	4.1
BMP 5	Large Landscape Conservation Programs and Incentives- Water Budget[(b)]	✓	✓	5.2
BMP 5	Large Landscape Conservation Programs and Incentives- Water Survey[(b)]	✓	✓	1.8
BMP 6	High Efficiency Washing Machine Rebate	✓	✓	1.9
BMP 7	Public Information Programs	X	Non-quantifiable savings	-
BMP 8	School Education Programs	X	Non-quantifiable savings	-
BMP 9	Conservation Programs for CII Accounts	✓	✓	3.4
BMP 10	Wholesale Agency Assistance Programs	X	Not applicable to retailers	-
BMP 11	Conservation Pricing	X	Non-quantifiable savings	-
BMP 12	Conservation Coordinator	X	Non-quantifiable savings	-
BMP 13	Water Waste Prohibition	X	Non-quantifiable savings	-
BMP 14	Residential ULFT Replacement Programs	✓	✓	5.5

Notes:
(a) ✓: Savings can be quantified for this BMP; X: Savings cannot be quantified for this BMP
(b) The cost-effectiveness of BMP 5 was evaluated for two categories separately, water surveys and water budgets, in accordance with CUWCC cost effectiveness spreadsheets.
(c) Even though savings for BMP 3 are quantifiable, this BMP was excluded from the cost effectiveness analysis because in Section 3 all the agencies reported to currently be in compliance with BMP 3.

ES.4 Emerging Technologies

In addition to BMPs, alternative technologies, products, and practices in the area of water efficiency are evolving today at an unprecedented rate. Whether in residential or non-residential applications, numerous opportunities now exist for reducing water demand that did not exist even as recently as a few years ago.

To determine the "best fit" water use efficiency program for Western MWD, emerging indoor and outdoor technologies were reviewed for feasibility. Many of these measures and technologies have extensive performance histories while others provide fewer comparable results or fully tested methodologies. Individual measures or emerging technologies do not constitute a complete program, as a fully developed conservation program may offer multiple products with overlapping administrative requirements, marketing, delivery or monitoring mechanisms.

ES.5 Conservation Related Legislation

Legislation has been enacted to reduce various sectors' dependence on potable water. Policies are being set at various levels of government as summarized in Table ES-4, and described in greater detail in Section 5.

Pending State Legislation

Assembly Bill 2175 introduced in 2008 would require that the Department of Water Resources establish a numeric water conservation target of 20 percent reduction in gpcd statewide by 2020. The targets will be reviewed every five (5) years beginning in 2012 and increased based on specific information. Each hydrologic region of the state would have interim targets in the urban and agricultural sectors. DWR would develop of list of water conservation technologies. Urban and agricultural water suppliers would then be required to adopt cost effective measures. The bill also reiterates the grant funding requirements of AB 1420, adopted in 2007. This bill was passed by the Legislature but vetoed by the Governor. A similar bill is expected in 2009.

Assembly Bill 1435 introduced in 2008 would establish water conserving rate structures. Water suppliers providing water to customers that have a metered service connection will be subject to a conservation rate structure. This structure will be based on the amount of water used, for purposes other than agriculture. This bill was not passed by the Legislature.

Assembly Bill 2882 introduced in 2008 would authorize the use of allocation-based conservation water pricing to reduce the quantity of water used, to eliminate waste of water and to conserve the supplies of the public entity providing the water. A public entity could adopt an allocation-based conservation water pricing structure which could include conservation measure costs and overuse costs. This bill was enacted and becomes effective January 1, 2009.

TABLE ES-4
SUMMARY OF MAJOR LEGISLATION CURRENTLY PASSED ESTABLISHING REQUIREMENTS AND STANDARDS FOR WATER EFFICIENCY AND CONSERVATION

Entities Impacted	Legislation	Requirement	Implementation Date
Federal agencies	Executive Order 13123	Reduce potable water use with cost effective measures	2010
		Report baseline usage and water usage	every 2 years
Cities and Counties	AB 325 Water Conservation in Landscaping Act	Requires adoption of model water efficient landscape ordinance by cities and counties	1993
	AB 566	Updated ordinance	2010
Cities, Counties, and Urban Water Retailers	AB 2717	Committee recommends best practices and improvement to water efficient landscape	2004
Manufacturers/ Retail	AB 715	Performance standard 1.6 gallon/flush toilet and 1 gallon/flush urinal	2010
		Only high efficiency toilet/urinal models offered by manufacturers in CA	2014
Urban Water Retailers	AB 1420	Show implementation of all DMM for grants or loans from DWR, SWRCB, or Bay-Delta Authority	2008

Entities Impacted	Legislation	Requirement	Implementation Date
	AB 1881	Separate metering for landscapes for all new retail water service	2008
Energy Commission	AB 1560	Adopt water efficient or conservation standards for residential buildings	2012
	AB 1881	Performance standards for irrigation equipment	2008
Cities, Counties and HOAs	AB 1881	Prevents prohibition of low water using plants	2008

ES.6 Incentives And Grant Opportunities

Agencies offer incentives for water conservation via rebates toward residential, landscape, and industrial process and equipment modifications. Metropolitan has a comprehensive rebate program that Western MWD and its customers can access as described in Section 6. Additional rebates are offered by electric and gas utilities for energy efficient products, such as those offered by Southern California Edison and Southern California Gas Company, which may also translate into water savings depending on the product installed.

A variety of opportunities for grant funding are also available to Western MWD and its retail purveyors. Many of these grant opportunities require the applicant to provide matching funds ("local match") as well as funds for operations and maintenance once a project or program is implemented; they also require applicants to have a complete Urban Water Management Plan. The source of local match and funds for operations and maintenance may include: water and wastewater general funds; capital improvement funds; and general funds from local cities, County departments, private organizations, member dues, etc. Local taxpayers may also fund these projects through rate increases, bond measures, and tax increases.

ES.7 Program Evaluation

To aide the design of Western MWD's water use efficiency programs, measures described in Sections 4 and 5 were evaluated and put through an initial screening process to identify those best suited to Western MWD's service area.

A weighted matrix using specific criteria was developed to screen potential conservation measures and technologies. The criteria were grouped into three (3) main classifications: cost, water savings and implementation, and weights were assigned to each classification based on the relative value anticipated upon implementation throughout the Western MWD service area as shown in Table ES-5.

Each conservation option was than given a score ranging from one (1, Low) to five (5, High). The scoring method varies by criterion, and is generally qualitative for purposes of discussion and comparison against the wide variety of conservation options available to Western MWD.

TABLE ES-5
COMPARISON MATRIX WEIGHTING

Main Group	Heading	Weighting
Cost	Total Cost	Qualitative
Water Savings	Area-wide Savings	20%
Implementation	Ease of Implementation	50%
	Funding Potential	25%
Total		**100%**

A significant part of the evaluation was the execution of a stakeholder process, to provide representatives of various customer sectors the opportunity to review the proposed conservation measures and programs and to comment on them.

ES.8 Water Use Efficiency Strategies

Recent Developments in Water Conservation

In the past 12 months the California water picture has changed dramatically. Recent Delta related court rulings that have reduced imported water deliveries to Southern California, which combined with an extended drought on the Colorado River has put extreme strain on the State's water resources, with impacts felt particularly in Southern California. This has translated into an increased focus on water conservation at the State policy level and continuing developments even as this report is being written. Three developments that have significant implications for the strategies outlined in this report are:

- AB 1420 was passed in 2007, and requires water purveyors to be implementing all locally cost effective BMPs in order to be eligible for State Grant Funding.
- The CUWCC embarked upon a significant revision of the Urban MOU and existing BMPs and is also planning to propose new ways of implementing BMPs.
- The Governor issued a mandate to reduce per capita water use 20 percent by 2020.

Each of these developments is discussed in more detail below, but what they highlight is that the conservation paradigm is likely to change significantly in the next five (5) years. This was a major consideration when developing both short-term and in particular long-term conservation strategies.

Water Use Efficiency Objectives

Objective 1: Maintain Compliance with Legislation

Compliance with Urban MOU and AB1420
To ensure that Western MWD is in compliance with the Urban MOU and therefore AB 1420, it is recommended that the Implementation Blueprint described in Section 8.4 include programs that target all BMPs that are determined to be locally cost-effective.

Pending Legislation
It is recommended that as legislative changes are introduced, Western MWD review its water use efficiency strategies to ensure its compliance with the new laws and policies. It should also become an active participant in the crafting of conservation-related legislation.

Objective 2: Reduce Demand on Imported Water

Statewide water supply shortfalls and focus on local regional water management planning have emphasized the need for agencies to reduce their dependence on imported water. Expanding water use efficiency programs beyond the minimum requirements of AB 1420 will aide Western MWD in this effort.

Western MWD proposes to achieve this by fast tracking some water use efficiency programs for immediate implementation and by creating a comprehensive Implementation Blueprint that will design additional water use efficiency programs targeting markets that exhibit the most potential for water savings.

Water Use Efficiency Strategy

To reach its objectives of reducing imported water demands and maintaining legislative compliance, Western MWD will use the information presented throughout this Plan to design and implement water use efficiency programs that:

- Target markets with the **Highest Water Savings** opportunity, both in immediate savings and long-term sustainability (Refer Sections 2 and 3);
- Address each of the **Existing BMPs** as defined by the Urban MOU;
- Select cost effective technologies that yield the "**Greatest Bang for the Buck**" (Refer Sections 4, 5 and 7);
- Pursue all available **External Funding** to defray costs and allow for a higher number of program participants (Refer Section 6);
- Develop focused programs that, over time, can be **Expanded with New Product Offerings or with Increased Production.**

Implementation Blueprint

A detailed Implementation Blueprint has been prepared to provide Western MWD's staff with a "Road Map" to carry out Western MWD's WUE Strategy. The Implementation Blueprint is contained in Volume 1 and uses information presented throughout this Master Plan to design water use efficiency programs best suited to Western MWD's service area characteristics.

Section 1: Introduction and Agency Background Information

1.1 Introduction

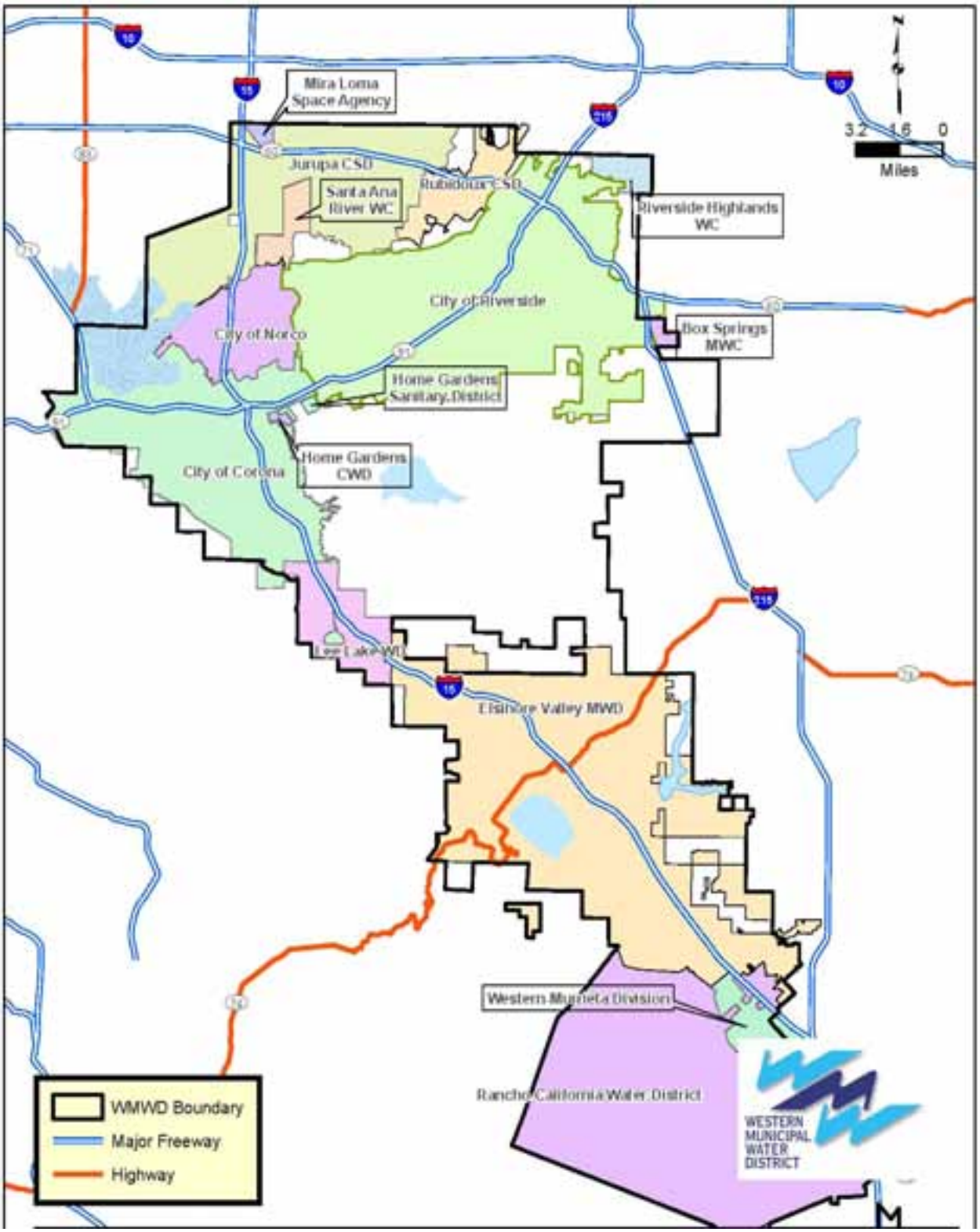
As water shortages and increasing demands upon infrastructure occur throughout the country, water conservation planning, technologies and practices are evolving today at an unprecedented rate. In concert with the growing emphasis on water use efficiency programs, Western Municipal Water District (Western MWD) has commissioned the preparation of a Water Use Efficiency Master Plan (Plan). The purpose of the Plan is to prepare a comprehensive long term plan for the Western MWD service area by adopting objectives, policies and programs designed to promote innovative emerging technologies and practices as well as proven and cost-effective conservation measures.

1.2 Western Municipal Water District

Western MWD was formed in 1954 to bring supplemental water to growing western Riverside County. Today, Western MWD serves more than 24,000 retail customers with water from both the Colorado River and the State Water Project. Supplemental water (groundwater) is also received from the City of Riverside. Western MWD's wholesale service area consists of a 527 square mile area of western Riverside County with a population of over 600,000 people. Western MWD currently sells over 100,000 acre-feet (AF) of water annually (see Figure 1-1). As a member agency of the Metropolitan Water District of Southern California (Metropolitan), Western MWD provides wholesale water to the following cities and water agencies:

- Box Springs Mutual Water Company
- City of Corona
- City of Norco
- City of Riverside
- Eagle Valley Mutual Water Company
- Elsinore Valley Municipal Water District
- Home Gardens County Water District
- Rancho California Water District
- Lee Lake Water District
- Jurupa Community Services District
- Riverside Highland Water Company
- Rubidoux Community Services District

FIGURE 1-1
WESTERN MWD AND RETAIL AGENCY SERVICE AREAS



About 60 percent of the water Western MWD sells is treated; the balance is untreated or raw water. Water sold by Western MWD for agricultural purposes is used to irrigate crops such as citrus and avocados, and nurseries. Agricultural water use in the retail area has decreased in past years with increasing urbanization. Western MWD also operates and maintains domestic and industrial wastewater collection and conveyance systems for its retail service area.

Western MWD is one of five member agencies of the Santa Ana Watershed Project Authority (SAWPA), a regional water resources planning and project implementation organization.

1.3 Climate

Western MWD's wholesale service area is located in the "Inland Empire" approximately 50 miles east of Los Angeles, where the warm dry climate is generally considered Mediterranean in characteristics (Western MWD Urban Water Management Plan [UWMP], 2005). The climate typically exhibits hot, dry summers and mild, wet winters. Annual precipitation totals vary substantially from year to year. Most rainfall occurs during the months of November through April. Onshore airflow occurs during most of the year producing southwesterly winds. "Santa Ana" conditions occur occasionally producing warm, dry, northeast winds that can reach high velocities. Average temperature is 64.6^{o}F. Table 1-1 provides average climatic data for a weather station near the Western MWD retail service area.

TABLE 1-1
MONTHLY WATER STATISTICS IN WESTERN MWD

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual
Standard Monthly Average ETo (inches)	2.49	2.91	4.16	5.27	5.94	6.56	7.22	6.92	5.35	4.05	2.94	2.56	56.37
Average Rainfall (inches)	2.16	2.15	1.75	0.81	0.23	0.07	0.04	0.12	0.26	0.32	0.93	1.21	10.04
Average Temperature (Fahrenheit)	54.0	55.5	57.5	61.4	65.9	71.3	77.0	77.7	74.4	67.3	59.1	54.3	64.6

Source: Western MWD 2005 UWMP.

1.4 Retail Agencies ("Purveyors")

1.4.1 Western MWD Retail

In addition to providing imported water to its wholesale customers Western MWD also provides retail water directly to approximately 24,000 domestic and 130 irrigation customers. The retail service area covers about 73 square miles, including the unincorporated and non-water-bearing areas around Lake Matthews and portions of the cities of Riverside and Murrieta. Western MWD's retail service area is projected to experience significant growth as demonstrated in Table 1-2.

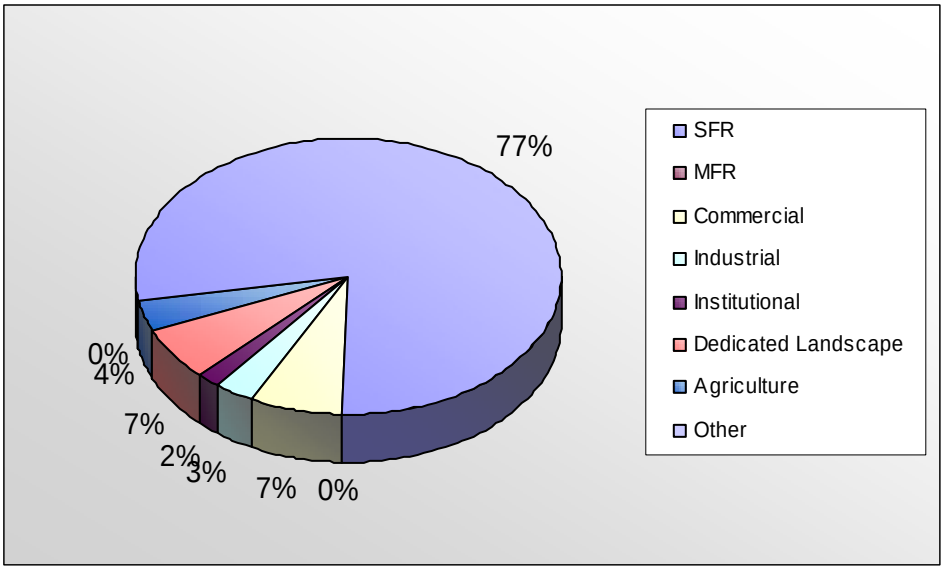
TABLE 1-2
WESTERN MWD PROJECTED RETAIL SERVICE AREA POPULATION

	2005	2010	2015	2020	2025	2030
Retail Service Area Population	26,690	31,000	35,730	41,280	47,810	55,490

Source: Western MWD.

The number of future retail Residential, Commercial and Industrial customers is expected to increase at the same rate as the estimated population growth. Based on 4 percent growth per year for 2006 and 2007 and subsequent 3.3 percent growth to 2030, Western MWD's retail service area will have nearly 39,500 Residential, 600 Commercial, and 605 Institutional customers by 2030. Dedicated Landscape customers are also expected to grow at the same rate. The number of agricultural users is not expected to increase, but rather may decrease with urbanization (Western MWD UWMP, 2005). Figure 1-2 gives a breakdown of water use by customer sector for Western MWD's retail service area.

FIGURE 1-2
WESTERN MWD RETAIL TOTAL WATER USE BREAKDOWN BY SECTOR (2005)



Source: Western MWD Retail Area Metered Data.

1.4.2 Western MWD Murrieta Division

1.4.2.1 Service Area

According to the 2008 Integrated Regional Water Management Plan (IRWMP), the Murrieta Division (formerly Murrieta County Water District), which was acquired by Western MWD in 2005, served approximately 2,600 customers within the 6.5 square mile service area.

TABLE 1-3
WESTERN MWD MURRIETA DIVISION POPULATION

	2008	2010	2015	2020	2025	2030
Retail Service Area Population	2,500	4,000	5,500	7,000	7,400	7,400

Source: - Western MWD IRWMP.

1.4.2.2 Water Supply Sources

The Murrieta Division obtains its water primarily from the Murrieta-Temecula Groundwater Basin. Average annual water production requirement is estimated to increase from 1,900 AF in 2005 to approximately 7,400 AF at ultimate development (approximately 2025). The recommended water production requirement for existing conditions is 3,100 gallons per minute (gpm) (includes 700 gpm reserve capacity) and 10,700 gpm for ultimate development (includes 1,500 gpm reserve capacity). Currently supplemental water to meet current peak demands is imported from Metropolitan through an interconnection with Eastern Municipal Water District (EMWD). Western MWD also plans to construct an interconnection with the Elsinore Valley Municipal Water District (EVMWD) system for emergency use.

1.4.3 Box Springs Mutual Water Company

1.4.3.1 Service Area

Box Springs Mutual Water Company (BSMWC) has approximately 585 service connections in a 430 acre service area (Western MWD IRWMP, 2008). The service area is primarily composed of medium density single family residential development, with some light commercial development (Box Springs Mutual Water Company History and Master Plan, 2001).

1.4.3.2 Water Supply Sources

BSMWC currently receives water from one BSMWC-owned well located in the Riverside South Groundwater Basin. The well has a 4-inch metered connection to Western MWD. This well produces 700 to 800 gpm. Water is purchased from Western MWD to meet peak flow requirements during the summer months and for blending to alleviate moderate nitrate levels. Water purchases from Western MWD have averaged approximately 160 acre-feet per year (AFY) during the 1980s. In 2000 purchases from Western MWD totaled approximately 120 AF, and there were no purchases in 2005.

1.4.4 City of Corona

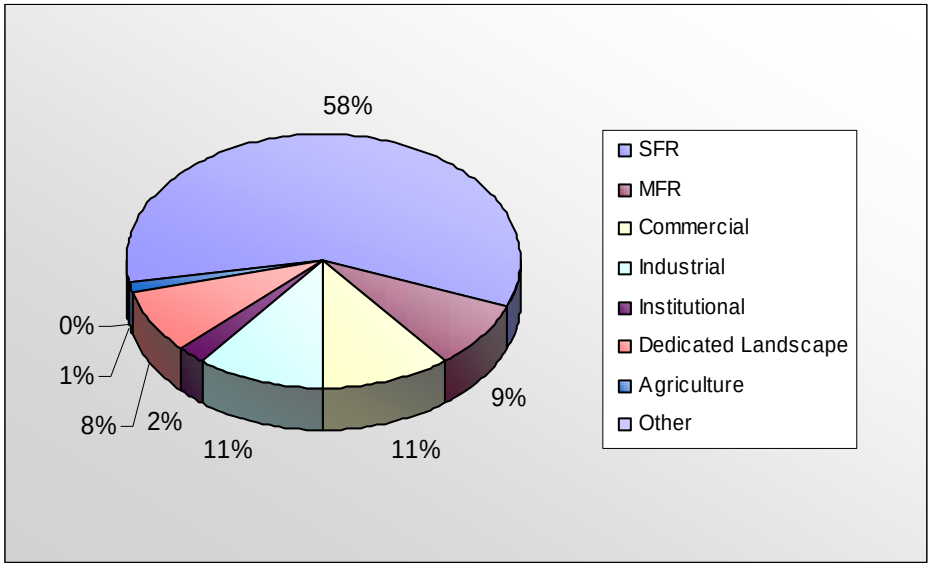
1.4.4.1 Service Area

According to the City of Corona 2005 UWMP, the City of Corona's (Corona) service area is located in the northwestern portion of Riverside County and serves approximately 150,000 customers in a 45 square mile service area both inside the city limits and in unincorporated Riverside County. Corona is a suburban community with 30 percent of land use being residential.

1.4.4.2 Customer Demographics

Corona developed as an agricultural area and was a major citrus producer and mining center between 1900 and 1950. Development in the region slowed in the mid 1990's, and then increased again in 1995 through the present. The last growth spurt occurred in the industrial areas and infill growth in the northern portions of the Corona, South Corona, and Temescal Canyon lands. Figure 1-3 gives a breakdown of water use by customer sector for Corona.

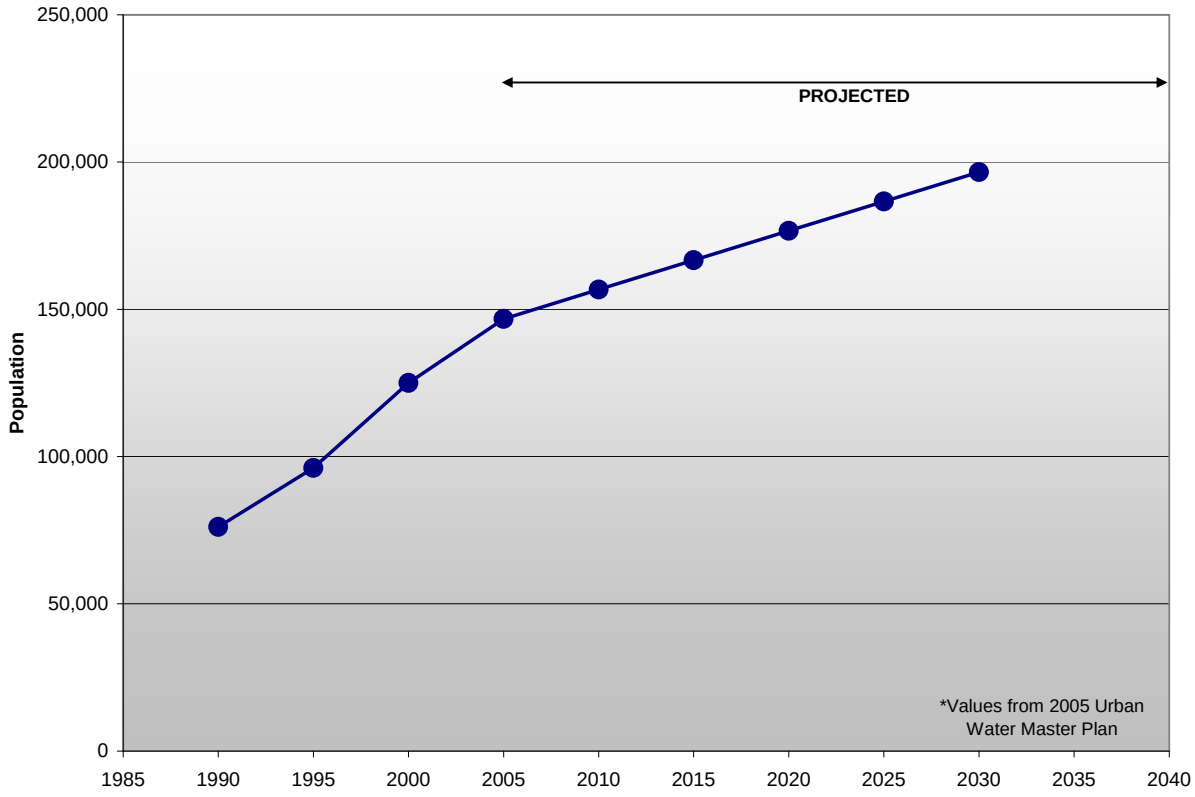
FIGURE 1-3
CORONA TOTAL WATER USE BREAKDOWN BY SECTOR (2007)



Source: City of Corona UWMP, 2005.

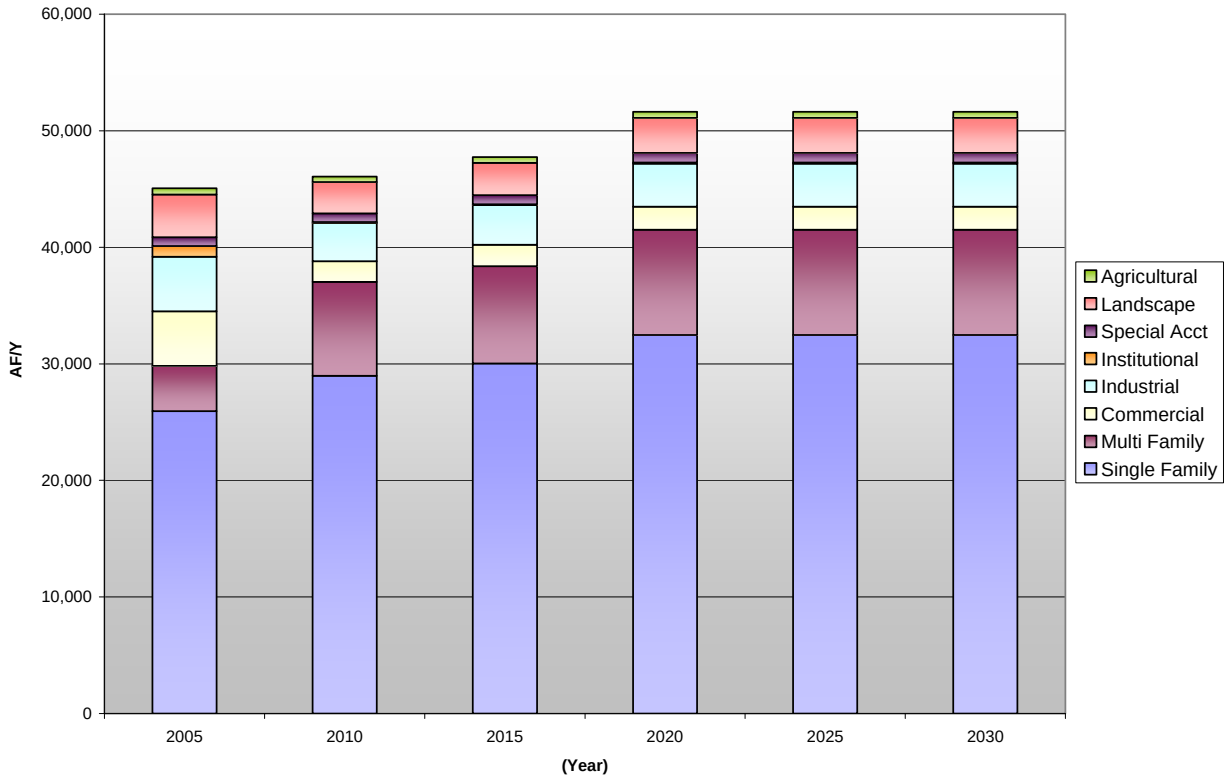
Between 1990 and 2005, Corona increased its population by 90 percent to nearly 150,000 people as shown in Figure 1-4. Its high population growth characterized by higher-end residential development is expected to occur into the future. The population is expected to grow by 33 percent to 196,500 in 2030.

FIGURE 1-4
CORONA POPULATION GROWTH



While the population is expected to grow 33 percent by 2030, water use is only expected to grow 15 percent by 2030. Total Residential water use is expected to account for the greatest increase, from 29,800 to 41,500 AFY, a 40 percent increase. This increase will be offset by decreasing Commercial, Industrial, and Landscape uses. Figure 1-5 shows the projected increase in water use through 2030 for different water use types.

FIGURE 1-5
CORONA WATER USE DEMAND PROJECTION



1.4.4.3 Water Supply Sources

Corona's water system obtains potable water from two sources. Groundwater from the Temescal Basin and the Bedford and Coldwater Sub-Basins serve as Corona's primary source. Purchased water from Western MWD makes up the secondary source. Corona's current available total water supply is 79,056 AFY. In 2004, the City produced over 50 percent of its supply from local groundwater. By 2030, Corona expects to have 105,000 AFY of available water supply, with 38 percent from imported sources, 50 percent from groundwater, and 12 percent from recycled water (City of Corona UWMP, 2005).

1.4.5 City of Norco

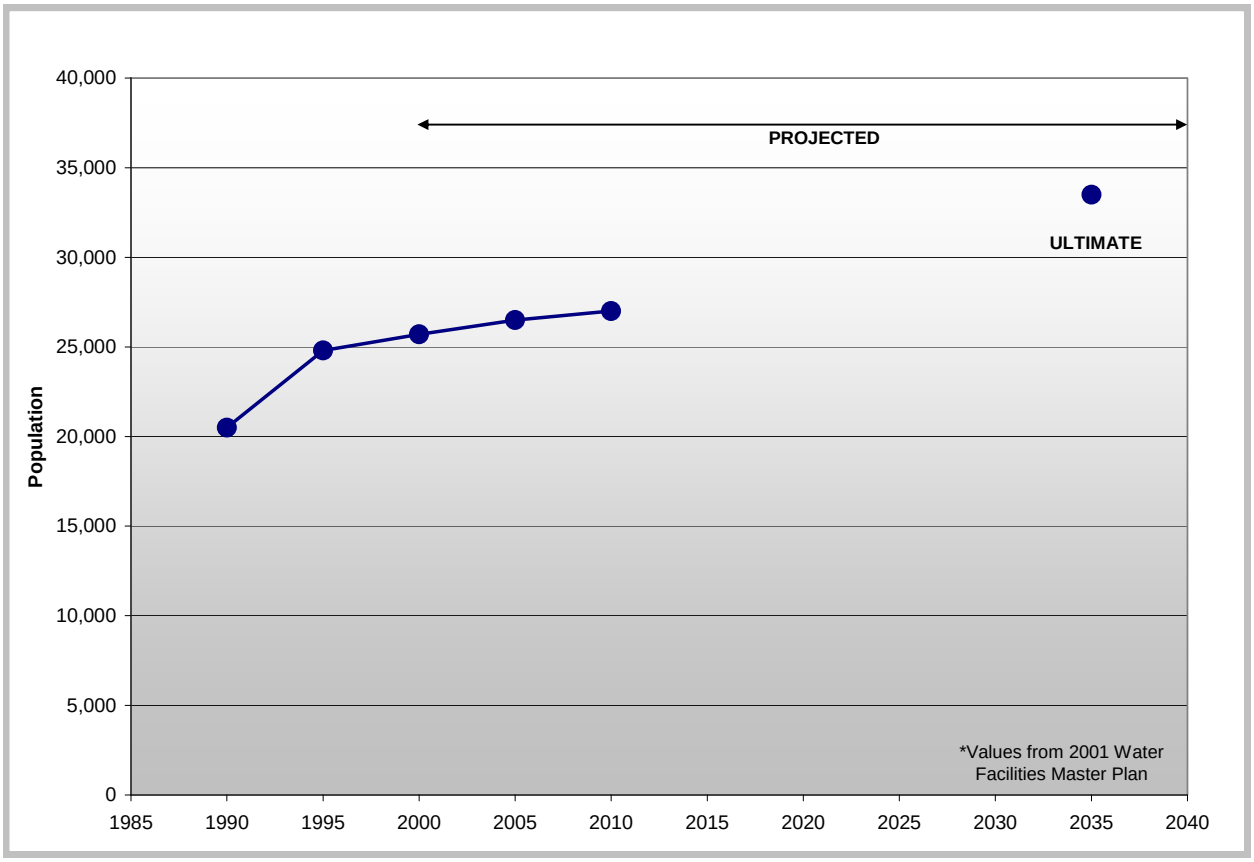
1.4.5.1 Service Area

As discussed in the City of Norco's (Norco) 2001 Water Master Plan, Norco serves approximately 26,000 customers in a 15.5 square mile service area. Between 1990 and 2005, Norco increased its population by nearly 30 percent as shown in Figure 1-6.

1.4.5.2 Customer Demographics

Of the 15.5 square mile service area, 60 percent is zoned for Residential, 6 percent is Commercial, 6 percent is Industrial, 6 percent is California Rehabilitation Center and the Naval Weapons Center, and approximately 21 percent is zoned as other (open space, streets, and freeways).

FIGURE 1-6
NORCO POPULATION GROWTH



1.4.5.3 Water Supply Sources

As the primary source of its water supply, Norco currently extracts groundwater from both the Chino Groundwater Basin and the Temescal Groundwater Basin. In addition to groundwater, Norco also relies on system interconnections with the Chino Basin I Desalter and Corona for its

supplies. Currently, Norco serves about 70 percent of its supply from the Temescal Groundwater Basin, 1 percent from the Chino Groundwater Basin, 14 percent from the Chino Basin I Desalter and 15 percent from Corona. It also appears that Norco will receive additional 5,400 AFY desalter water (1,000 AFY from the Chino Basin II Desalter and 4,400 AFY from the Arlington Desalter) (City of Norco, 2001). Norco is currently in the process of increasing groundwater production from 8,200 AFY to an ultimate 10,100 AFY.

In 2005, Norco purchased about 1,560 AF of imported water through Corona from Western MWD.

1.4.6 City of Riverside

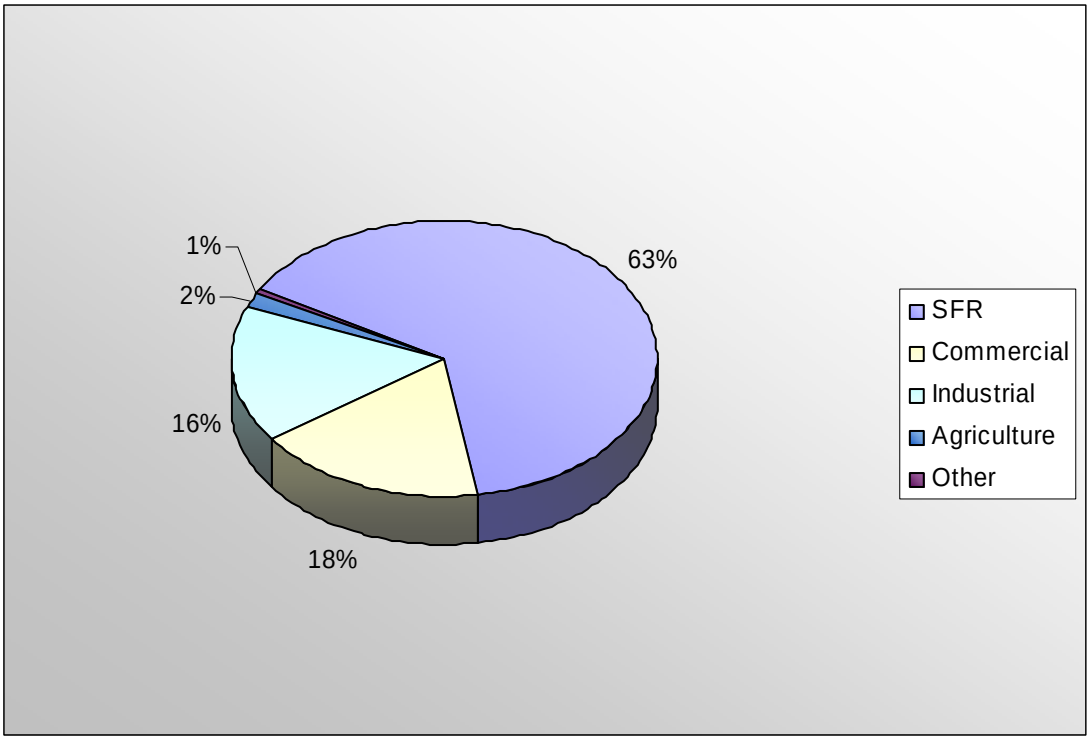
1.4.6.1 Service Area

According to the City of Riverside 2005 UWMP, the City of Riverside (Riverside) is served primarily by Riverside Public Utilities (RPU), which provides water through approximately 62,000 water service connections within a service area of 74 square miles, of which approximately 69 square miles are within Riverside's city limits. Approximately 9 square miles within the city limits are served by Western MWD and 1 square mile within the Riverside's limits are served by EMWD. A small area (1/4 square mile) in northeast Riverside is served by Riverside Highland Water Company (RHWC).

1.4.6.2 Customer Demographics

Riverside began as an agricultural community and has evolved from agricultural to urban use since the 1940s. Now, Riverside consists primarily of residential land uses. Promoting the shift in land uses are high-income jobs migrating inland from coastal areas, which is causing the fast population growth, as documented by the 2005 UWMP. Figure 1-7 identifies current water use in Riverside by sector.

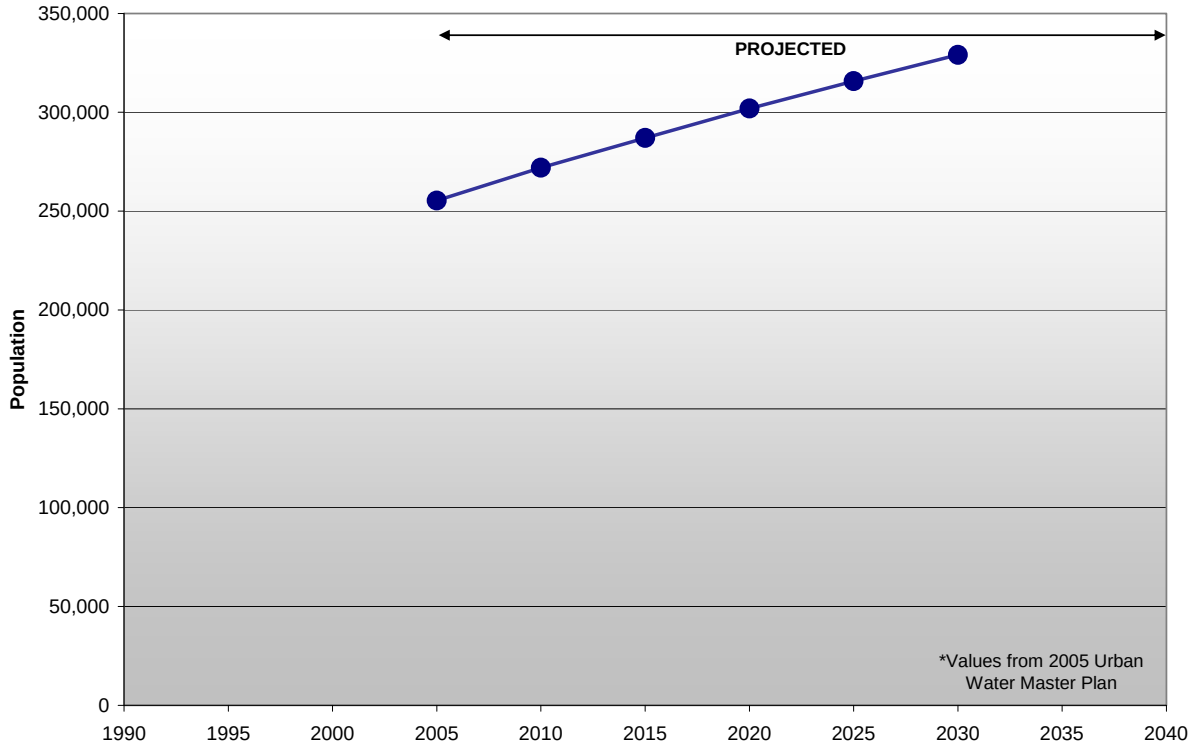
FIGURE 1-7
RIVERSIDE WATER USE BY SECTOR



Source: City of Riverside UWMP, 2005.

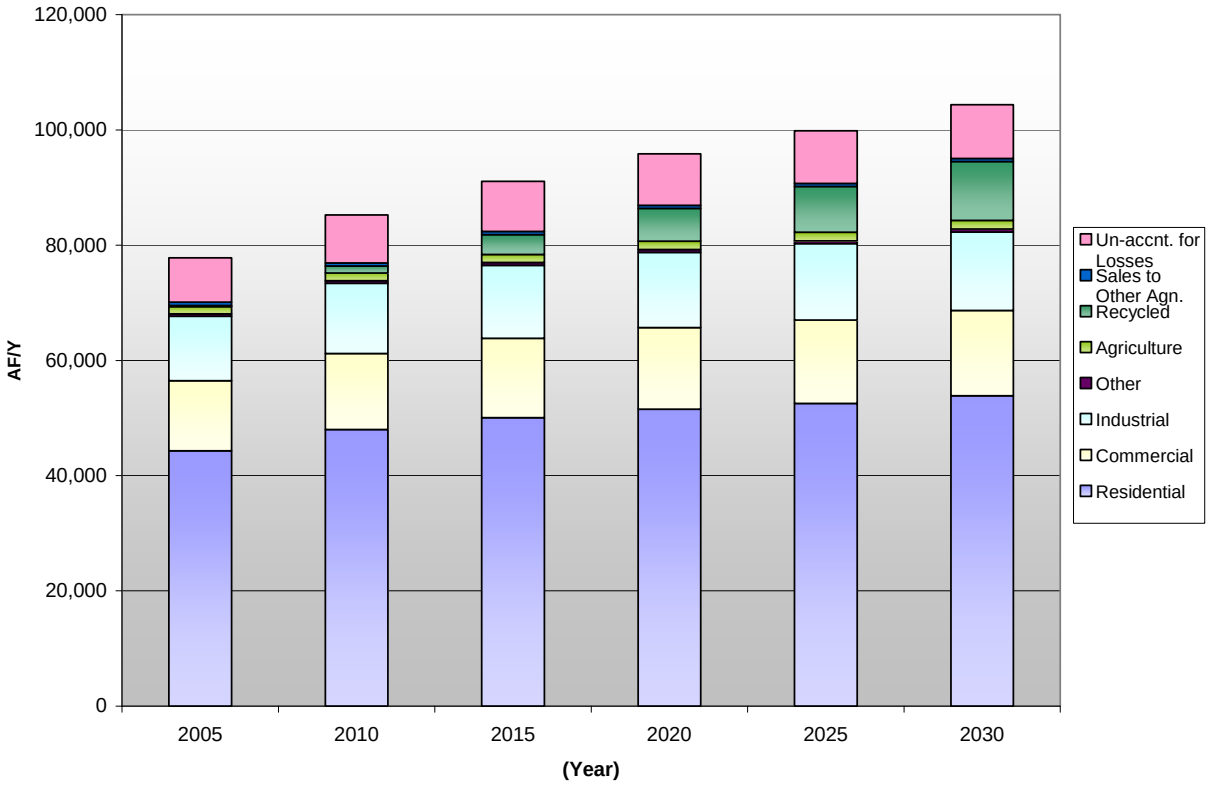
RPU had a service area population of 255,000 in 2005 and is expected to grow by nearly 30 percent to 329,000 people by 2030, as shown in Figure 1-8.

FIGURE 1-8
RIVERSIDE POPULATION GROWTH



Water use is expected to grow by 34 percent from 77,800 to 104,400 AFY from 2005 to 2030. This includes water sales to other agencies, recycled water uses, and continued population growth. A quarter of the increase is expected to come from growth of residential and recycled water use. Figure 1-9 shows the projected growth of water use in the RPU service area through 2030.

FIGURE 1-9
RIVERSIDE WATER USE DEMAND PROJECTION



Source: City of Riverside UWMP, 2005.

1.4.6.3 Water Supply Sources

Riverside obtains nearly all of its water from local groundwater basins including the Bunker Hill, and Riverside North and South Basins. Imported water from Western MWD is relied upon primarily to meet peak demands and comprises only about 3 percent of the water supply. Additionally, Riverside is engaged in a water exchange program with the Gage Canal Company, whereby it provides low quality water for irrigation in exchange for domestic water. In the future, recycled water will become a more significant portion of the water supply and will make up approximately 9 percent of the water supply portfolio.

1.4.7 Eagle Valley Mutual Water Company

According to the 2008 Western MWD IRWMP, Eagle Valley Mutual Water Company (EVMWC) was established in the late 1950s as a privately owned mutual water company to serve non-potable irrigation water to an area of approximately 3,070 acres in Eagle Valley, west of Lake Mathews. EVMWC obtains its water supply through Western MWD's WR-12 connection on Metropolitan's Lower Feeder. Raw water supply is boosted from Western MWD's connection

into the EVMWC service area. From 1990 to 1995, EVMWC delivered an average of 2,400 AFY to its customers. EVMWC has no groundwater production at this time.

1.4.8 Elsinore Valley Municipal Water District

1.4.8.1 Service Area

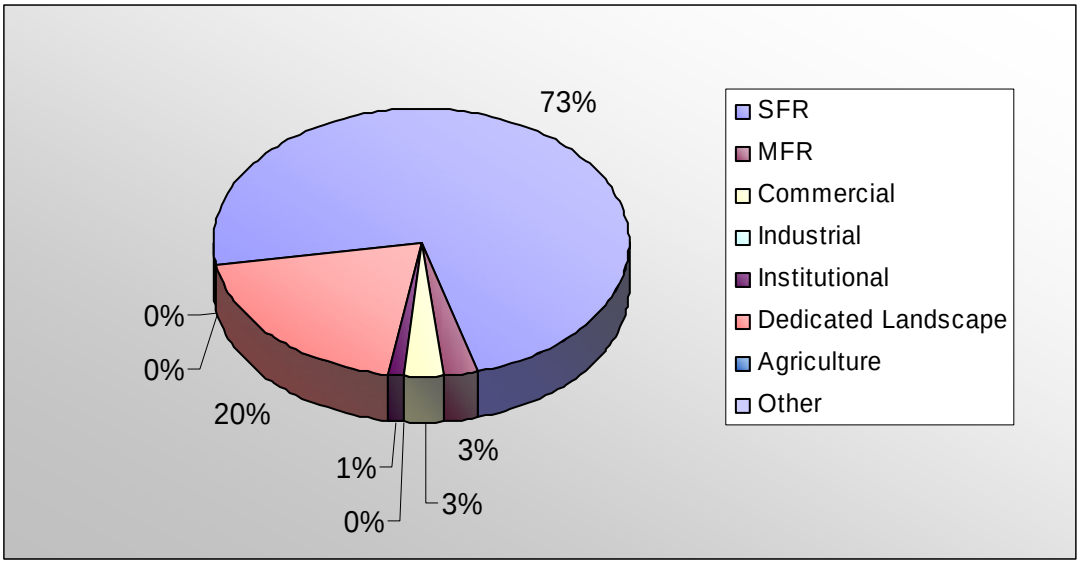
According to the 2005 EVMWD UWMP, EVMWD was annexed to Western MWD's service area in 1954, after Western MWD's annexation to Metropolitan. Since then EVMWD has grown slowly through annexing mutual water companies and service areas.

Currently, EVMWD's service area is divided into the Elsinore and Temescal Divisions, comprising nearly 100 square miles of service area around Lake Elsinore and serving approximately 100,000 people. The service area includes the cities of Lake Elsinore, Canyon Lake and Murrieta, and other unincorporated areas. EVMWD is broken into two (2) divisions; 1) the Elsinore Division, and 2) Temescal Division with the Elsinore Division accounting for over 95 percent of the service area and customer accounts.

1.4.8.2 Customer Demographics

According to the agency's metered data, water use in EVMWD is primarily single family residential, which comprises of three quarters of total potable water use. Dedicated landscape accounts for another 20 percent, with Commercial, Multi-Family Residential (MFR), and Institutional uses accounting for roughly 6 percent of total use, as shown in Figure 1-10.

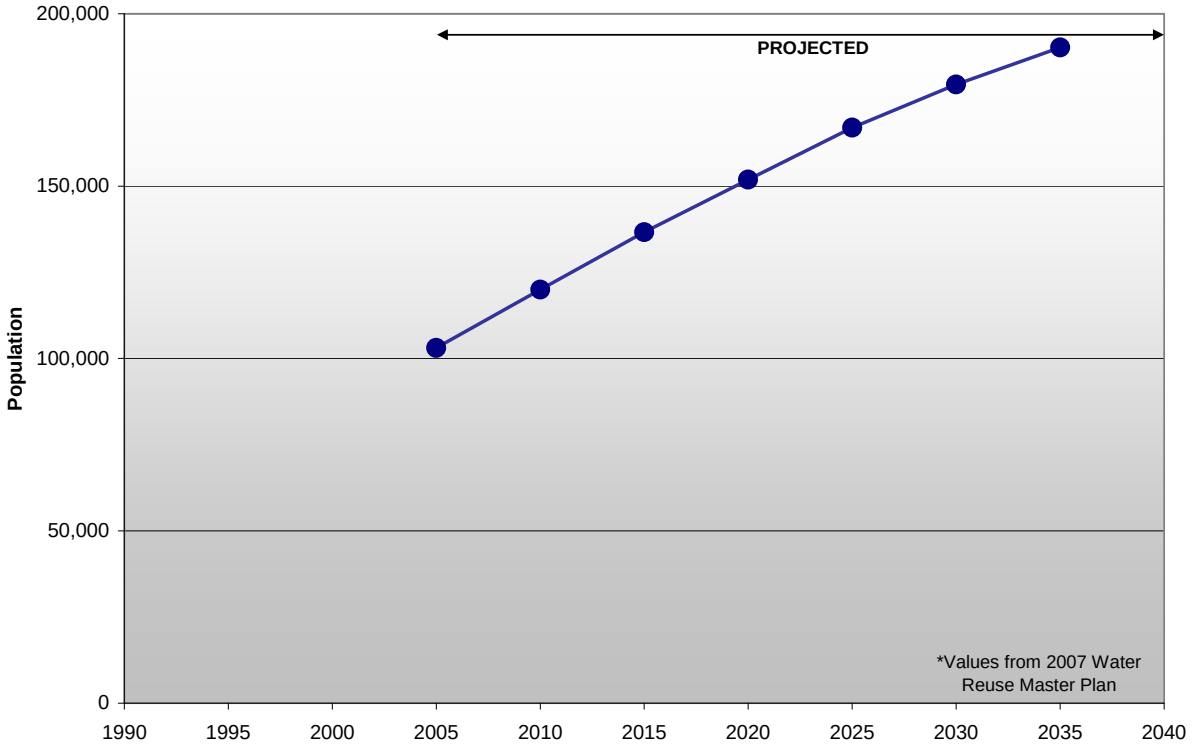
FIGURE 1-10
EVMWD TOTAL WATER USE BREAKDOWN BY SECTOR (2006)



Source: EVMWD Meter Data.

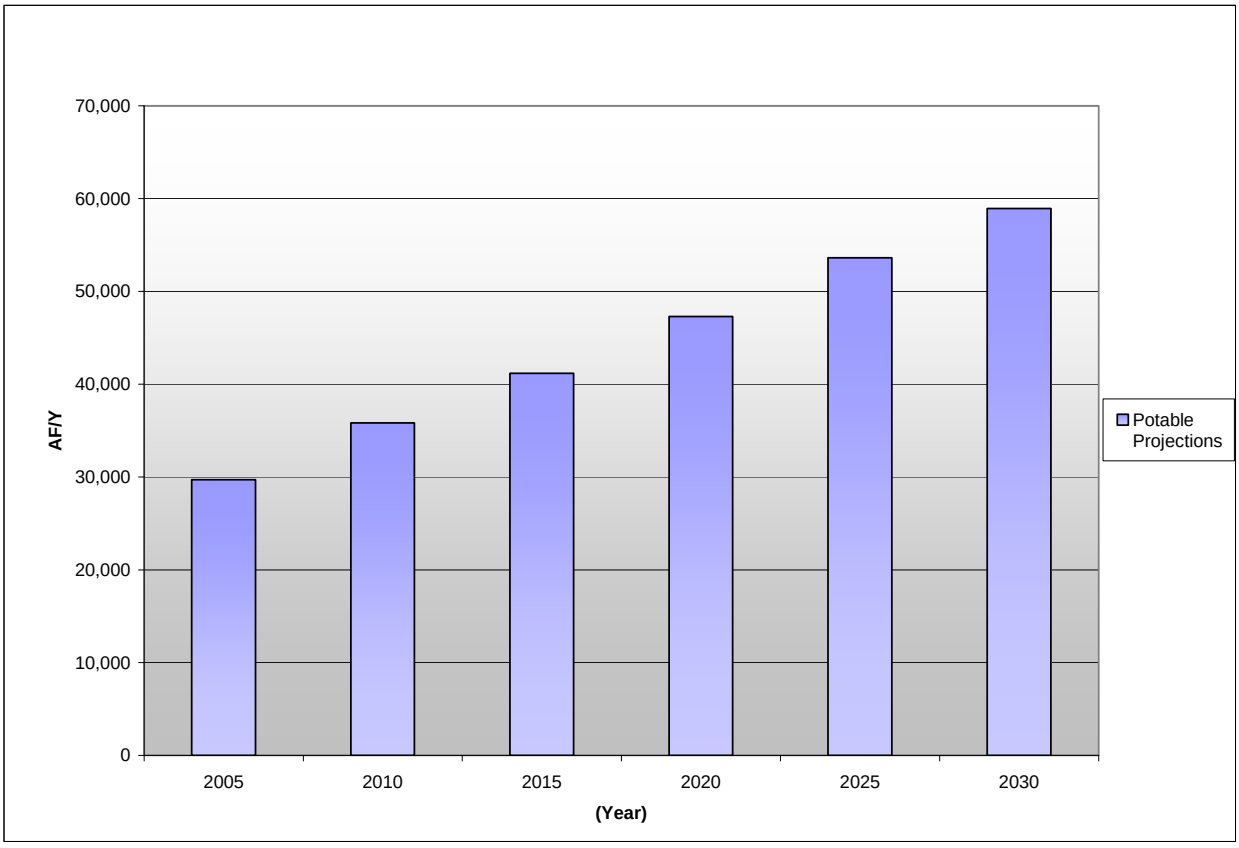
According to the Southern California Association of Governments, the area has been experiencing extremely rapid growth and development, increasing by as much as 25 percent between the years 2000 to 2005. The population in the service area is expected to grow greatly from 100,200 to 181,200 people from 2005 to 2030, an increase of 82 percent. Figure 1-11 illustrates this population growth in the EVMWD service area.

FIGURE 1-11
EVMWD POPULATION GROWTH



Concurrent with population growth, potable water demands are expected to increase by nearly 100 percent from 29,700 to 58,900 AFY between 2005 and 2030, according to the EVMWD 2005 UWMP. This includes a reduction in potable demand from the addition of recycled water facilities, but does not account for possible reduction from water conservation efforts. Figure 1-12 shows the expected growth of water use within EVMWD's service area.

FIGURE 1-12
EVMWD WATER USE DEMAND PROJECTION



Source: EVMWD UWMP, 2005.

1.4.8.3 Water Supply Sources

EVMWD relies on a combination of local groundwater, surface water, imported water, and recycled water to meet its potable and non-potable demands. Groundwater production has been historically stable since 1992, averaging about 14,000 AFY. Surface water supplies have been highly variable, ranging from 1,600 to 7,500 AFY. Imported water purchases have increased significantly between 2000 and 2005, averaging 9,600 AFY in this period. EVMWD's existing potable supplies consist of approximately 5,500 AFY of groundwater, 2,700 AFY of surface water, and 47,390 AFY of imported water. Quantities of existing potable supplies are not expected to change significantly in the future, however an additional 22,000 AFY of imported water supply will be purchased. Additionally, another 22,000 AFY of reclaimed water supply is expected to be available by 2030.

1.4.8.4 Elsinore Water District

Elsinore Water District (EWD) is a small district located in Lake Elsinore that is part of EVMWD. According to the 2008 Western MWD IRWMP, EWD serves only potable water and has about 1,801 connections, primarily residential with the exception of 70 commercial connections. The EWD service area is located entirely within EVMWD service area and is split into two (2)

separate systems: 1) Lake Elsinore, the Country Club System, and 2) the Lakeland Village System.

EWD delivers about 710 AFY of potable water to its customers. Currently, EWD has one local groundwater well that pumps from the Elsinore Basin and supplies 15 to 20 percent of the total demand. The remainder of the total demand is served by imported water received through two connections with EVMWD.

1.4.9 Home Gardens County Water District

1.4.9.1 Service Area

According to the 2008 Western MWD IRWMP, Home Gardens County Water District (HGCWD) was established in 1979 as a county water district. With its formation, it acquired the assets and facilities of the Home Gardens Mutual Water Company. HGCWD serves an area of more than 230 acres in Riverside County east of Temescal Street and South of Sampson Avenue. It has approximately 800 metered services for a population of approximately 3,000 people.

1.4.9.2 Water Supply Sources

Initially, HGCWD served its customers with local groundwater from wells in the Arlington Basin. Because of the basin's poor water quality, HGCWD has discontinued much of its well supply, currently receiving approximately two-thirds of its water from the City of Riverside through an 8-inch meter connection at Andover Street and Harlow Avenue.

1.4.10 Lee Lake Water District

1.4.10.1 Service Area

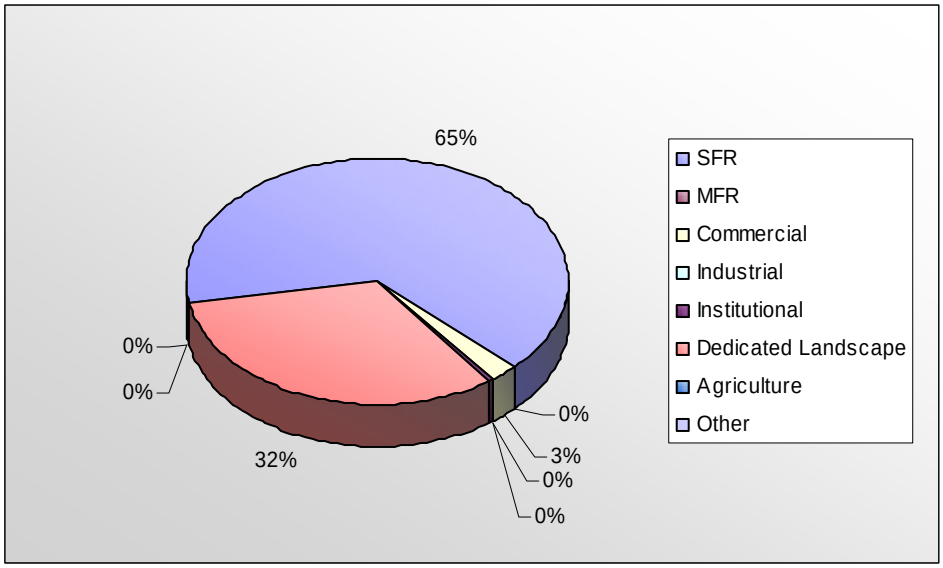
According to the Lee Lake Water District 2004 Water System Master Plan Update, Lee Lake Water District (LLWD) has approximately 2,000 service connections in a service area of approximately 450 acres. Although LLWD encompasses approximately 6,755 acres, the LLWD distribution system only serves 450 acres. The main portion of LLWD is served imported water from Western MWD.

Areas currently being served imported water consist of residential development in Wildrose, which is now built out, commercial parcels in the Wildrose East Business Park along Temescal Canyon Road, and residential development in the first construction phases of the Trilogy development. Other portions within the LLWD boundary are undeveloped, supplied from wells, or supplied from Corona or EVMWD.

1.4.10.2 Customer Demographics

In 2003, demand was 2,200 AFY and is expected to grow to 6,200 AFY by 2010. Ultimate potable demand within LLWD's service area is projected to be 7,700 AFY with non-potable demand contributing up to 1,500 AFY. Figure 1-13 depicts LLWD's water use by customer sector.

FIGURE 1-13
LLWD TOTAL WATER USE BREAKDOWN BY SECTOR (2005)



Source: LLWD Meter Data.

Of the LLWD's existing undeveloped service area, approximately 20 percent is planned for residential use and another 20 percent for commercial and industrial use. Much of the remaining area shall remain open space and is designated for mining uses in the Riverside County General Plan.

1.4.10.3 Water Supply Sources

In 2004, LLWD received all of its water as imported water from Western MWD from a turnout connection along the Mills Pipeline. In addition to imported water supplies, LLWD is developing a recycled water supply with the Lee Lake Water Reclamation Facility (LLWRF). The plant currently has a capacity of 1.58 million gallons per day (MGD) with the ability to expand to 2.25 MGD in the future.

1.4.11 Jurupa Community Services District

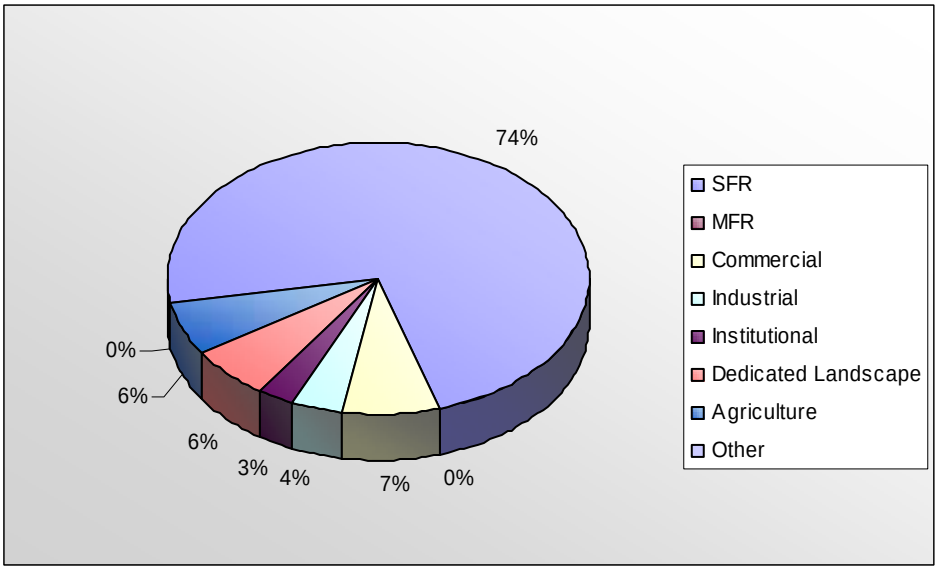
1.4.11.1 Service Area

According to the Jurupa Community Services District 2005 UWMP, Jurupa Community Services District (JCSD) serves approximately 45,000 customers in a 42 square mile service area in western Riverside County (see Figure 1-14). JCSD also provides water to the Santa Ana River Water Company, which is encompassed within its service area.

1.4.11.2 Customer Demographics

The local region developed initially with agricultural activities, primarily cattle grazing and dairy farming. Residential land use in the area has grown significantly and now accounts for almost 50 percent of total water use.

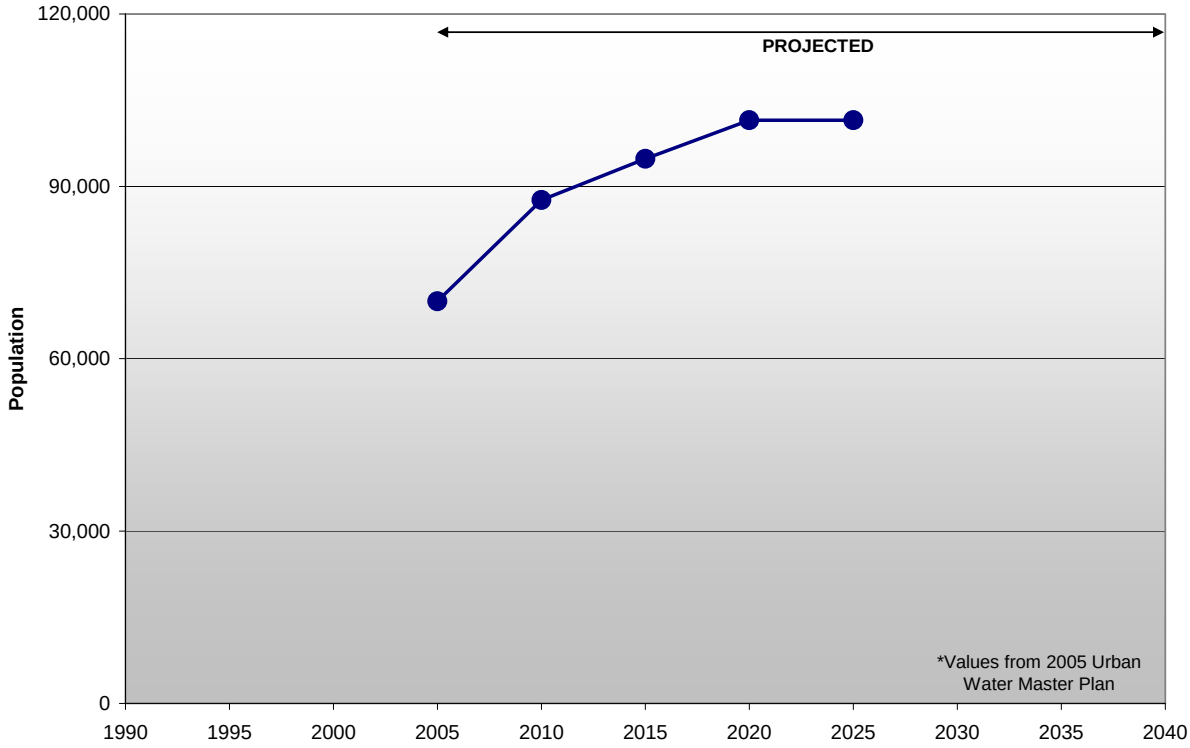
FIGURE 1-14
JCSD TOTAL WATER USE BREAKDOWN BY SECTOR (2007)



Source: JCSD Meter Data.

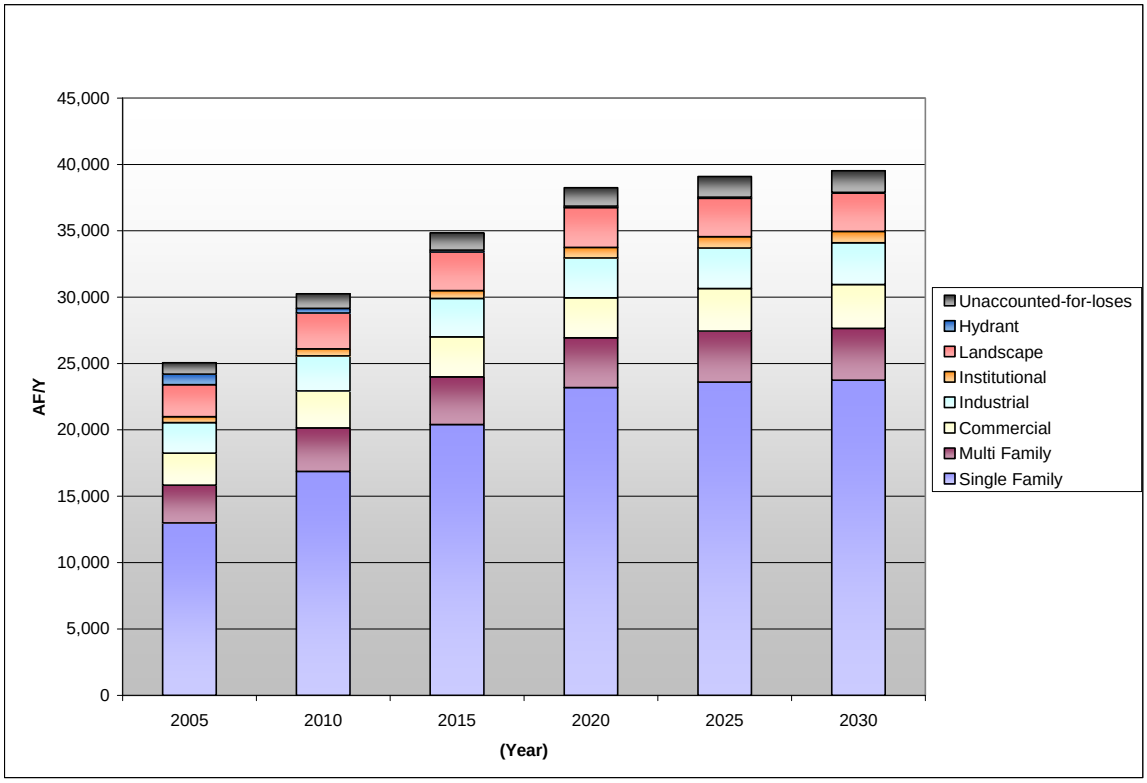
The population is projected to grow from 70,000 to 101,500 people from 2005 to 2025, a growth of 45 percent. Figure 1-15 shows the projected increase in population until the year 2025.

FIGURE 1-15
JCSD POPULATION GROWTH



Total water demand is expected to grow 62 percent in that time, from 25,000 to 40,600 AFY. Residential and commercial sectors are expected to account for most of the growth, with a projected annual growth rate of 8 and 7 percent, respectively, over the next 20 years. Figure 1-16 illustrates the projected growth in consumption by each sector.

FIGURE 1-16
JCSD WATER USE DEMAND PROJECTION



Source: JCSD UWMP, 2005.

1.4.11.3 Water Supply Sources

In 2005, JCSD had a total of 23,300 AFY of water supply, of which 14 percent came from the Chino Desalter I, 77 percent came from locally produced groundwater, 4 percent came from imported water, and the rest transferred from Rubidoux Community Services District (RCSD). JCSD receives water through Corona and Norco and does not purchase imported water directly from Western MWD. An additional 3,300 AFY of water is expected to become available from the Chino Desalter II in 2012, local groundwater and imported water sources are expected to increase in the future. By 2025, JCSD expects to have 49,700 AFY of water supply, comprised of 16 percent Chino Desalter water, 52 percent locally produced groundwater, 10 percent imported water, and 1 percent transfer from RCSD. Additionally, JCSD is developing recycled water sources for the future and has planned projects to obtain recycled water from the City of Riverside and Inland Empire Utilities Agency.

1.4.12 Rancho California Water District

1.4.12.1 Service Area

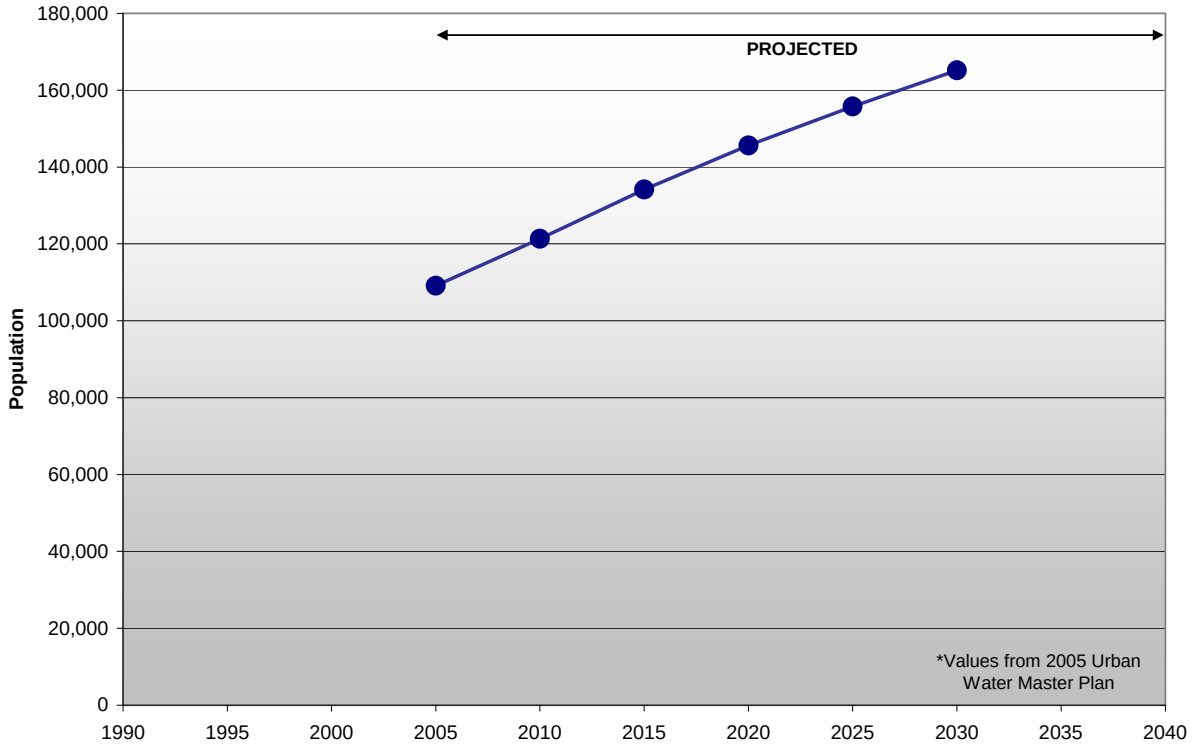
According to the Rancho California Water District 2005 UWMP, Rancho California Water District (RCWD) serves approximately 100,000 customers and encompasses almost 100,000 acres.

RCWD provides water to users in the City of Temecula, portions of the City of Murrieta, and unincorporated Riverside County areas. It is divided into the Rancho Division and the Santa Rosa Division. The Santa Rosa Division is the portion of RCWD within Western MWD. Current land use in the service area is 15 percent residential (primarily single family), 4 percent commercial/institutional, 19 percent agricultural, 10 percent parks and open space, and the remaining half is undeveloped.

1.4.12.2 Customer Demographics

The cities of Temecula and Murrieta are within RCWD's service area and are both experiencing rapid population growth. Population within RCWD's service area is expected to grow 51 percent between 2005 and 2030, from 109,000 people to 165,000 people. Figure 1-17 shows the projected population growth.

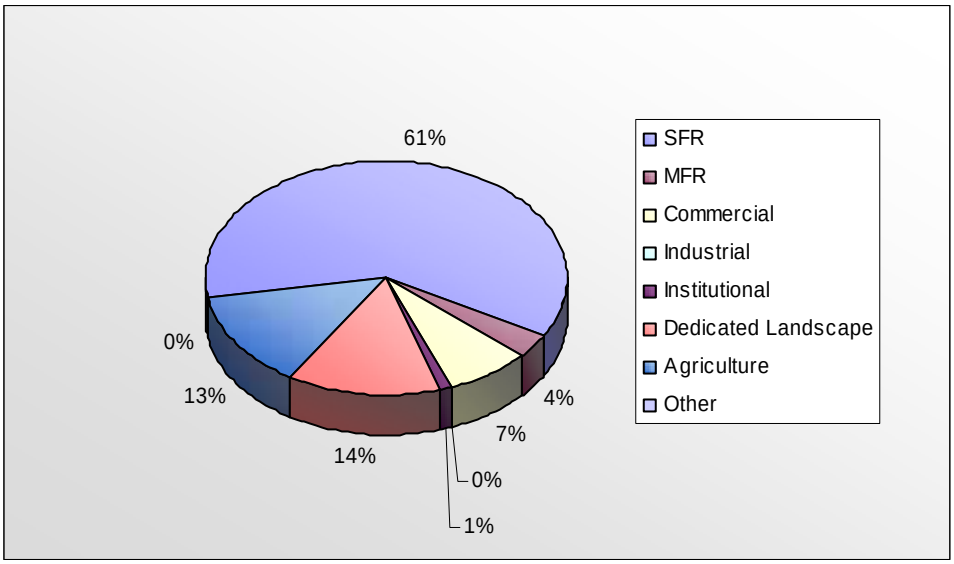
FIGURE 1-17
RCWD POPULATION GROWTH



According to recent metered water use data, it was calculated that the Single Family Residential (SFR) sector accounts for the largest water use in the service area with 62 percent of the total water use. This was followed by Dedicated Landscape and Agricultural uses with 14 and 13 percent, respectively. Finally, Commercial and Institutional water use accounted for 7 and

4 percent of total use in the service area. There were no recorded industrial uses. Figure 1-18 shows the total water use broken down by the different sectors.

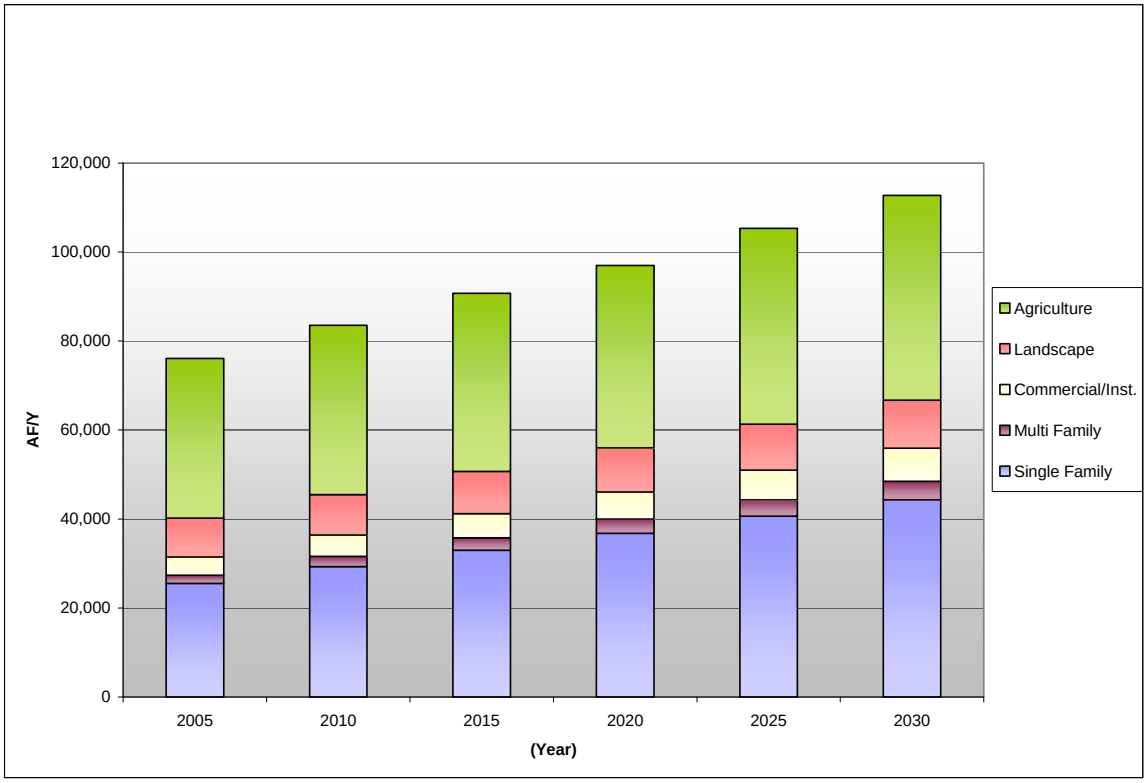
FIGURE 1-18
RWCD TOTAL WATER USE BREAKDOWN BY SECTOR (2006)



Source: RCWD Meter Data.

The ongoing increase in population is expected to result in an increase of water demand by 48 percent from 76,000 to 113,000 AFY. Roughly half of the increase will come from single family development, with almost a third from developing agriculture and the rest from multi-family residential development, commercial/institutional development, and landscape uses. Figure 1-19 shows the projected increase in water demand.

FIGURE 1-19
RCWD WATER USE DEMAND PROJECTION



Source: RCWD UWMP, 2005.

1.4.12.3 Water Supply Sources

Water supply has typically been 25 to 40 percent groundwater, 60 to 70 percent imported water, and less than 5 percent recycled water. In 2005, RCWD had 95,700 AFY of water supply. RCWD plans to increase groundwater production through recharge and construction of new wells. Imported water supplies will also be developed to recharge the Pauba Valley Sub-Basin and provide additional treated imported water supply. Recycled water supply will be augmented with additional treatment facilities to provide lower salinity-water for agriculture and recharge uses. By 2030, RCWD expects to have 140,000 AFY of water supply, with 42 percent coming from imported water, 40 percent from local groundwater, and 18 percent from recycled water.

1.4.13 Riverside Highland Water Company

RHWC is located north of the City of Riverside. According to the Western MWD 2008 IRWMP, it currently has approximately 3,900 service connections in a service area of approximately 5,500 acres. The total supply for the water company originates from groundwater wells located in the Riverside North and South Basins and the Bunker Hill Basin. Riverside owns shares of this water company, and therefore the City gets approximately 270 AFY of water for its use. No water is imported via Western MWD to RHWC at this time.

1.4.14 Rubidoux Community Services District

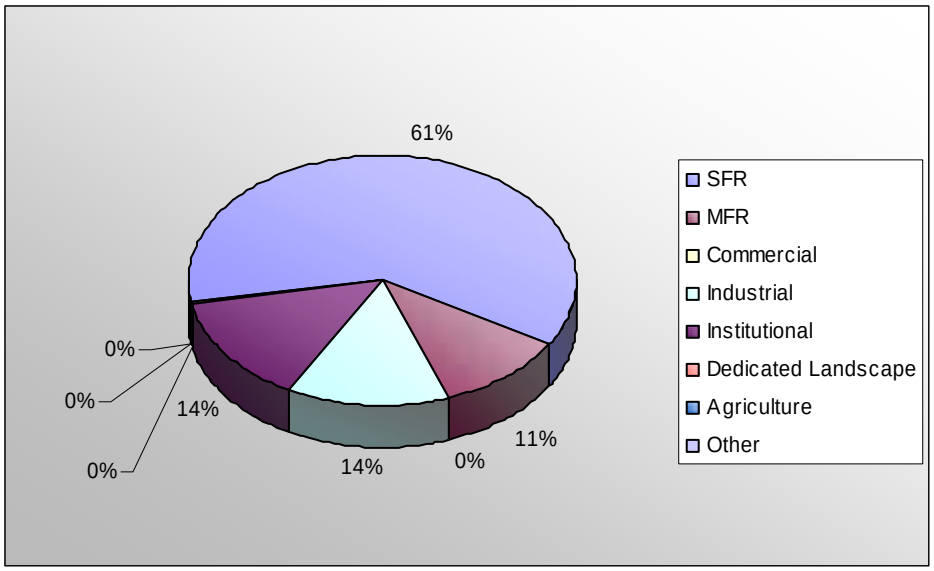
1.4.14.1 Service Area

RCSD service area predominantly lies within Riverside County, California, but also extends approximately 120 acres into San Bernardino County. In total, the district encompasses 7.5 square miles. It is bounded by San Bernardino County to the north, the Jurupa Mountains and Pedley Hills to the northwest, unincorporated areas of Jurupa on the west, the Santa Ana River on the south, and the City of Riverside on the east.

1.4.14.2 Customer Demographics

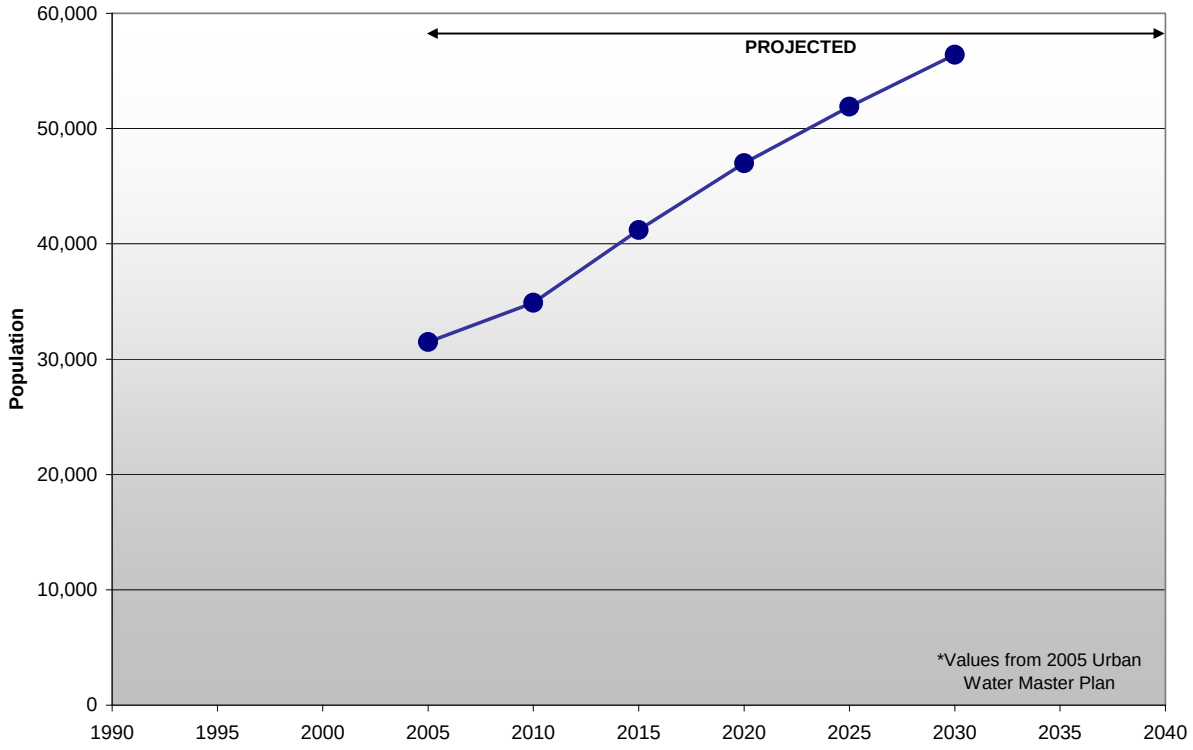
According to estimates in the 2005 UWMP, RCSD supplies about 12,900 AFY of water. As seen in the distribution of water use in the chart below, over 60 percent of the total water use in the service area is for SFR use. This is followed by 11 percent water use by MFR. Commercial, Industrial, and Institutional comprise 9 percent of the total water use each. Figure 1-20 shows the total water use as broken down by each sector.

FIGURE 1-20
RCSD TOTAL WATER USE BREAKDOWN BY SECTOR (2005)



Based on projected population trends provided by the Southern California Association of Governments, the population is expected to increase from 31,500 in 2005 to 56,400 people in 2030, almost an 80 percent increase, as seen in Figure 1-21. Water use in the service area is expected to increase to 25,400 AFY by the year 2030.

FIGURE 1-21
RCSD POPULATION GROWTH



1.4.14.3 Water Supply Sources

All of RCSD's potable water supply is obtained from extraction wells located within RCSD boundaries, except for emergency water supplies delivered through RCSD's interconnections with JCSD and West Valley Water District (WVWD) in San Bernardino County. Currently, there are no facilities available to convey imported water to RCSD.

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Section 2: End User Profiles

This section presents detailed water use profiles for the Western MWD retailers utilizing information available in Western MWD's and retail agencies' billing databases and UWMPs. Water use projections as well as current and historical water use trends are presented for different customer classes. The information presented in this section is used to form the basis of the Water Use Efficiency Master Plan (Plan) and to target the most effective conservation programs available.

2.1 Current and Projected Demands of Retail Agencies

Current and projected potable water demands, as presented in Table 2-1, were compiled for the Draft IRWMP. Many of these demands were taken from the UWMPs and other planning documents of Western MWD's retailers. To obtain a more accurate projection for its wholesale service area, Western MWD is in the process of refining these demand projections via the use of a forecasting demand model. It is anticipated that these projections will be available shortly and could be incorporated into the final Plan.

2.2 Meter Data Analysis

End-user data presented in this section was created from account-level data provided by the retail agencies. The data was analyzed to form a solid foundation regarding existing conditions and opportunities by customer class and subclass. A request was provided to each agency for volumetric billing data for the 5 most recent years available. The data was requested to be provided in monthly time blocks at the account level and include user name, account number, water use type, and address.

Data was obtained from the majority of the large retail agencies and some of the smaller agencies at differing levels of detail. Some retailers were not able to provide account-level data due to issues with billing software and time constraints. Additionally, due to differences in billing software, retailers submitted information at differing levels of detail. Data was provided by the retailers for varying time periods, with 2003 to 2005 being the only years where data was obtained from all retailers that submitted data. Although this limited the trend analysis that could be completed for this report, Western MWD could supplement the database as future data becomes available.

Customer class designations also differed greatly between retailers. Some retailers submitted detailed sub-user class designations while others parsed data only by basic user classes, making it difficult to analyze user-class characteristics in great detail. Additionally, it should be noted that account-level data for RCWD was provided and analyzed for the entire RCWD service area including that in EMWD's service area, and not just the Santa Rosa Division which serves the portion within Western MWD.

Despite challenges with analyzing end-use data, many useful trends were observed and are described in the following sections.

TABLE 2-1
CURRENT AND PROJECTED GROSS WATER DEMANDS FOR WESTERN MWD SERVICE AREA DURING NORMAL YEAR CONDITIONS 2005-2050 (AFY)

Agency	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050 – Ultimate[p]
Box Springs MWC[a]	571	635	699	763	827	890	954	1,018	1,082	1,146
City of Corona[b]	45,000	49,320	54,585	54,585	54,585	54,585	54,585	54,585	54,585	54,585
City of Norco[c]	8,700	9,000	9,275	9,550	9,825	10,100	10,100	10,100	10,100	10,100
City of Riverside[d]	77,529	85,231	91,048	95,858	99,835	104,374	105,172	106,224	107,286	108,359
EVMWC[e]	1,025	1,025	1,025	1,025	1,025	1,025	1,025	1,025	1,025	1,025
EVMWD[f]	28,393	37,166	44,531	51,672	58,798	60,680	62,561	64,443	66,324	68,206
EWD[g]	728	773	818	864	909	955	1,000	1,000	1,000	1,000
Home Gardens CWD[h]	500	625	625	625	625	625	625	625	625	625
LLWD[i]	3,474	6,275	6,501	6,727	6,953	7,178	7,404	7,630	7,856	8,082
RCWD[j]	22,793	25,600	28,350	31,075	33,950	36,800	39,600	42,400	45,178	47,958
Western MWD Retail Area[k]	26,688	31,007	35,726	41,278	47,809	55,491	58,000	61,000	64,000	67,000
Western MWD - Murrieta Division[l]	2,500	4,000	5,500	7,000	7,400	7,400	7,400	7,400	7,400	7,400
Jurupa CSD[m]	22,654	31,445	36,350	39,750	40,576	41,025	42,000	44,000	44,000	44,000
RHWC[n]	4,500	6,500	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000
RCSD[o]	7,520	9,120	9,820	10,520	10,600	10,600	10,600	10,600	10,600	10,600
Total	251,630	297,722	331,853	358,292	380,717	398,728	408,026	419,050	428,061	437,086

Notes:

(a) Source: "Box Springs Mutual Water Company History and Master Plan," prepared by Western MWD, April 2001.
(b) Source: faxed sheets from the City of Corona's "2005 Draft Updated Water Master Plan" and the City of Corona "Urban Water Management Plan," 2005.
(c) Source: "City of Norco Water Facilities Master Plan," 2001.
(d) Source: "City of Riverside Urban Water Management Plan," 2005. Does not include Gage irrigation demands of 17,700 AFY
(e) Source: Webb Associates and "City of Corona Water Master Plan Update", 2005.
(f) Source: "EVMWD District-wide Water Supply Assessment," 2002, "EVMWD Distribution System Master Plan," 2002, prepared by MWH; EVMWD "Urban Water Management Plan," 2000; "John Laing Homes Development Water Supply Assessment" prepared by MWH, October 2003.
(g) Source: Letter from Webb Associates, 2004. Phone call to EWD.
(h) Source: Phone call to General Manager.
(i) Source: "LLWD Water System Master Plan Update," 2004.
(j) Source: "RCWD Urban Water Management Plan," 2005 assumed that 50 percent of all M&I demand is in Santa Rosa Division within Western MWD. Also15 percent of ag/ag-domestic is M&I.
(k) Source: "Western North Added Facilities Area Master Plan" 2004, "Western South Added Facilities Area Master Plan" 2004, "Western Urban Water Management Plan" 2005 – Table 12. For ultimate demands, it was assumed that all agricultural or raw water demands have been converted to M&I usage.
(l) Source: Murrieta County Water District "Water System Facilities Master Plan" 2004, Murrieta County Water District "Urban Water Management Plan" 2002.
(m) Source: "Jurupa Community Services District Existing and Projected Water Demand and Supply" supplied by Webb Associates, "JCSD Urban Water Management Plan" 2005.
(n) Source: Phone call to General Manager.
(o) Source: "RCSD Urban Water Management Plan" 2002.
(p) Population projected from 2025 to 2050 using California Department of Finance County of Riverside projections and demands projected linearly according to population growth.

2.3 Water Use by Sector

The meter data analysis included an in-depth characterization of water use by customer types in order to determine trends within user classes and identify opportunities to target conservation programs towards particular user classes. Customer types were classified into 'sectors' as shown in Table 2-2. Agricultural water use was excluded from the analysis as this study focuses on urban water use only.

TABLE 2-2
CUSTOMER TYPES BY SECTOR

Sector	Customer Types
Single Family Residential (SFR)	Single family residential users
Multi-Family Residential (MFR)	Multiple residential users (townhomes, duplex, triplex, condos, apartments)
Commercial	Restaurants, department and retail stores, markets, Laundromats, warehouses, hotels and motels, wholesale bakery, professional offices
Industrial	Manufacturing, repair/service shops,
Institutional	Schools, hospitals and convalescence homes, churches, membership organizations, public buildings
Landscape	Potable landscape, treated irrigation,
Agriculture	Potable agriculture, sod farms, vineyards

Figure 2-1 shows the volume of water use by sector for each agency in the most recent year of data provided. For the City of Riverside and RCSD, data from the 2005 UWMPs are presented because this data was provided in place of meter data. Figure 2-2 shows the breakdown of potable water use by sector for all the agencies which provided data.

The figures show that single family residential water consumption makes up the vast majority of water demand, comprising of nearly three quarters of total potable water use. Commercial, Dedicated Landscape, and Industrial uses comprise most of the remaining water demand, with Institutional and MFR use making up only a very small proportion of total water use. It is important to note that industrial and commercial water use is generally small for most agencies, except within the City of Riverside where industrial and commercial water use accounted for about one third of total potable water use in 2005.

FIGURE 2-1
POTABLE WATER CONSUMPTION
WITHIN WESTERN MWD SERVICE AREA

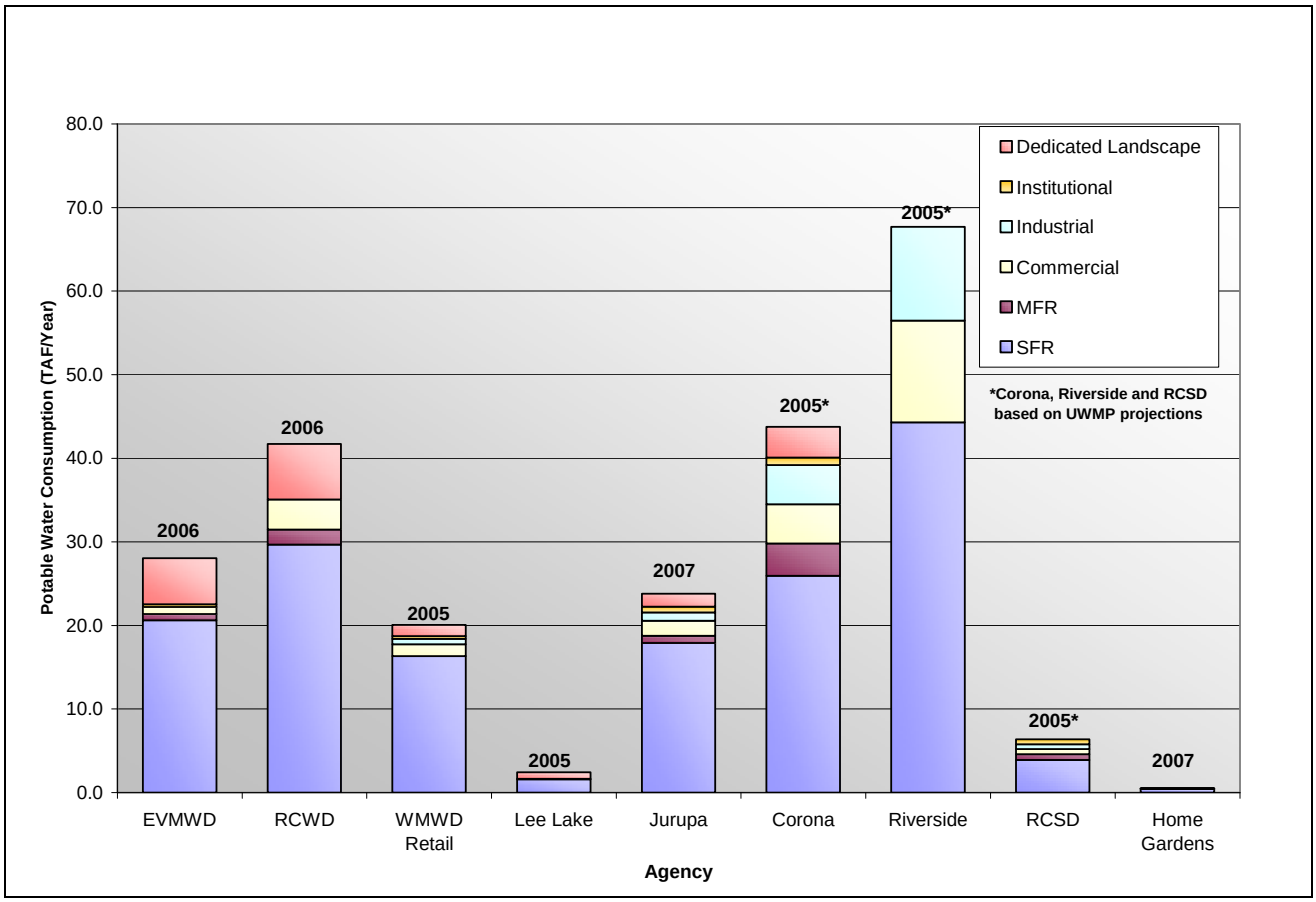
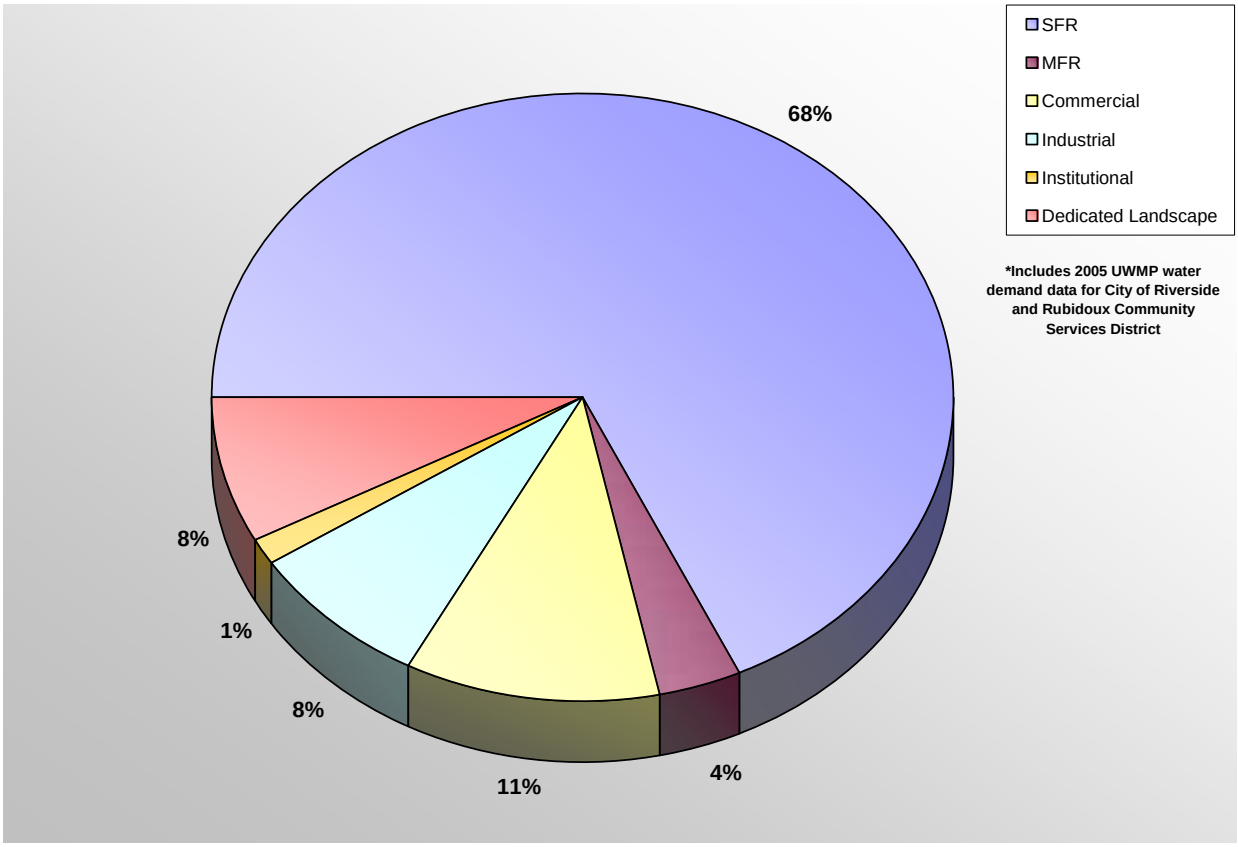


FIGURE 2-2
POTABLE WATER CONSUMPTION BY END USER (2005)



Figures 2-3 and 2-4 depict total yearly water use by sector for the years 2003 to 2005. Figure 2-4 depicts the same data as Figure 2-3, with SFR usage excluded in order to depict detailed trends for the other water use sectors. Between 2003 and 2005, the region experienced steady growth in SFR, Commercial, and Institutional water use, on the order of roughly 10 percent. The growth in demand slowed in 2005. Net MFR and Industrial water use decreased during that same time. However, this does not suggest that these sectors experienced slowing or less growth. The region experienced record precipitation in 2005, which resulted in a significant decrease in outdoor water use. Since outdoor water use is a significant component of total water use, this decrease masked any growth in the number of total accounts in each sector.

FIGURE 2-3
TOTAL YEARLY WATER USE BY SECTOR (SFR ONLY)

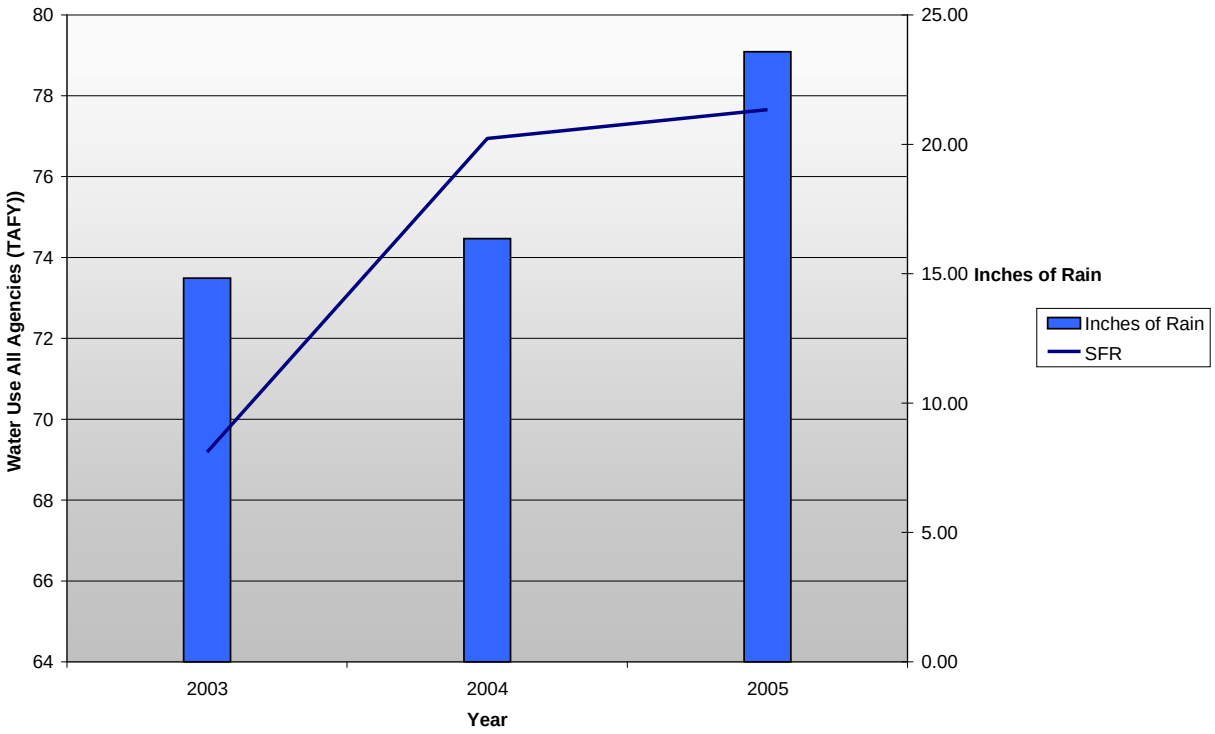
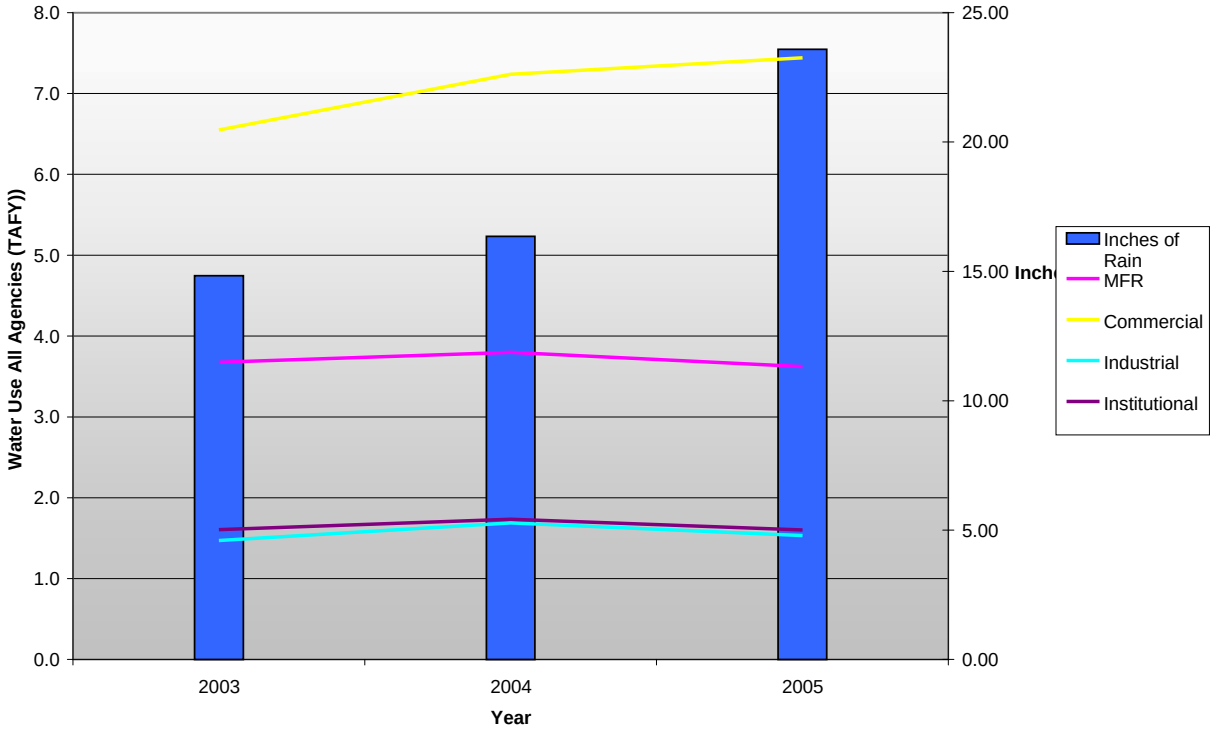


FIGURE 2-4
TOTAL YEARLY WATER USE BY SECTOR



Figures 2-5 and 2-6 show the total growth of accounts between years 2003 and 2005. These two figures show that the SFR and Commercial sectors experienced the most significant growth during this time, and that the MFR, Industrial, and Institutional sectors remained fairly constant.

FIGURE 2-5
TOTAL GROWTH OF ACCOUNTS (SFR ONLY)

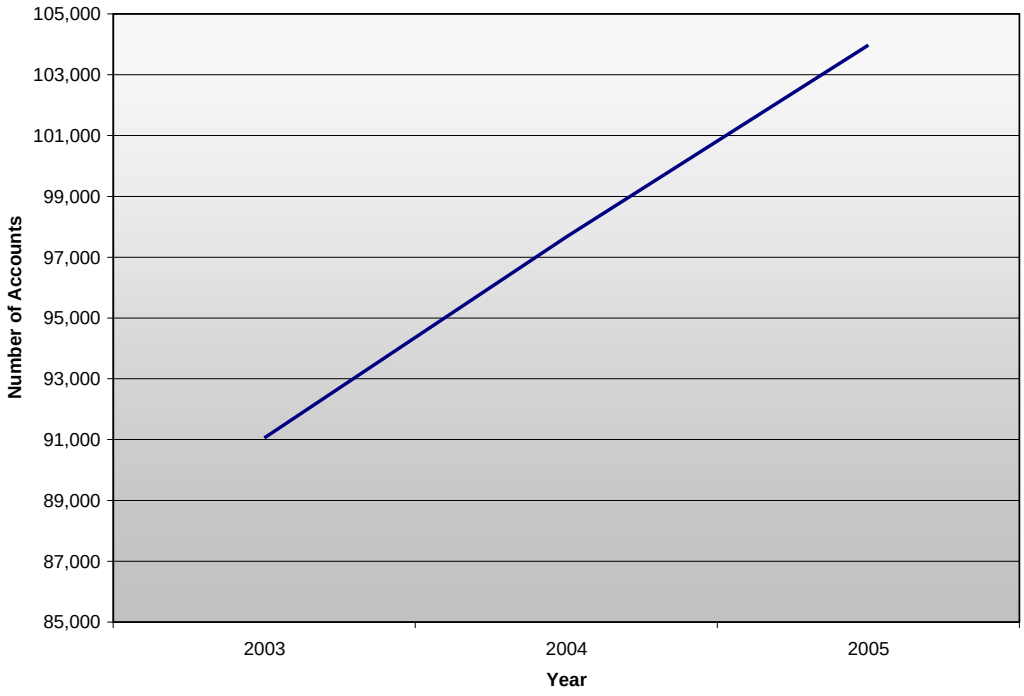
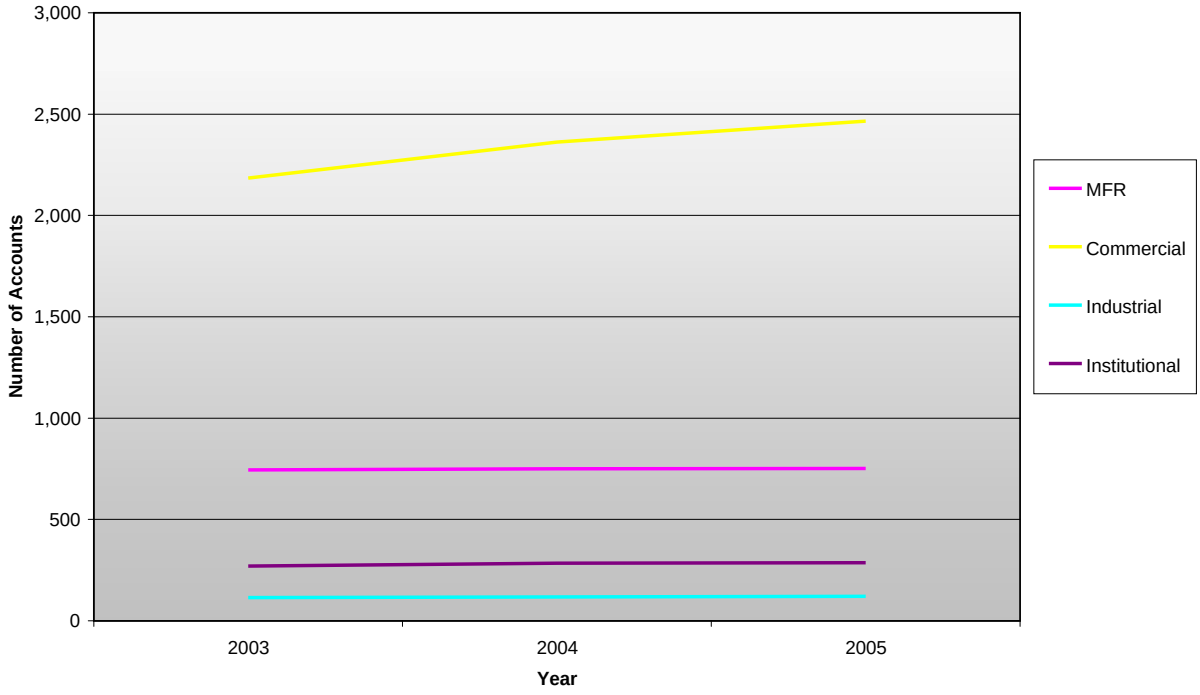


FIGURE 2-6
TOTAL GROWTH OF ACCOUNTS



2.4 Residential

Residential water usage in Western MWD's service area is almost entirely comprised of SFR usage. Figure 2-7 shows the water usage per capita for SFR accounts by agency in 2005. Due to the local dry climate, water usage per account in the region is significantly higher than normal, with an overall average of 200 gpcd for the service area. SFR water use varies widely between agencies. WMWD's retail service area is the highest per capita user, with a demand of 245 gpcd in 2005. The lowest, LLWD, used 140 gpcd in the same time period.

Per capita water use did not vary greatly between 2003 to 2005, ranging from a high of 190 gpcd to a low of 180 gpcd as shown in Figure 2-8. Water use increased from 2003 to 2004, and then decreased in 2005. It is difficult to discern a time-related trend due to the wet year in 2005, which is likely responsible for a decrease in per-account usage in 2005.

FIGURE 2-7
WATER USAGE PER CAPITA (SFR) 2005

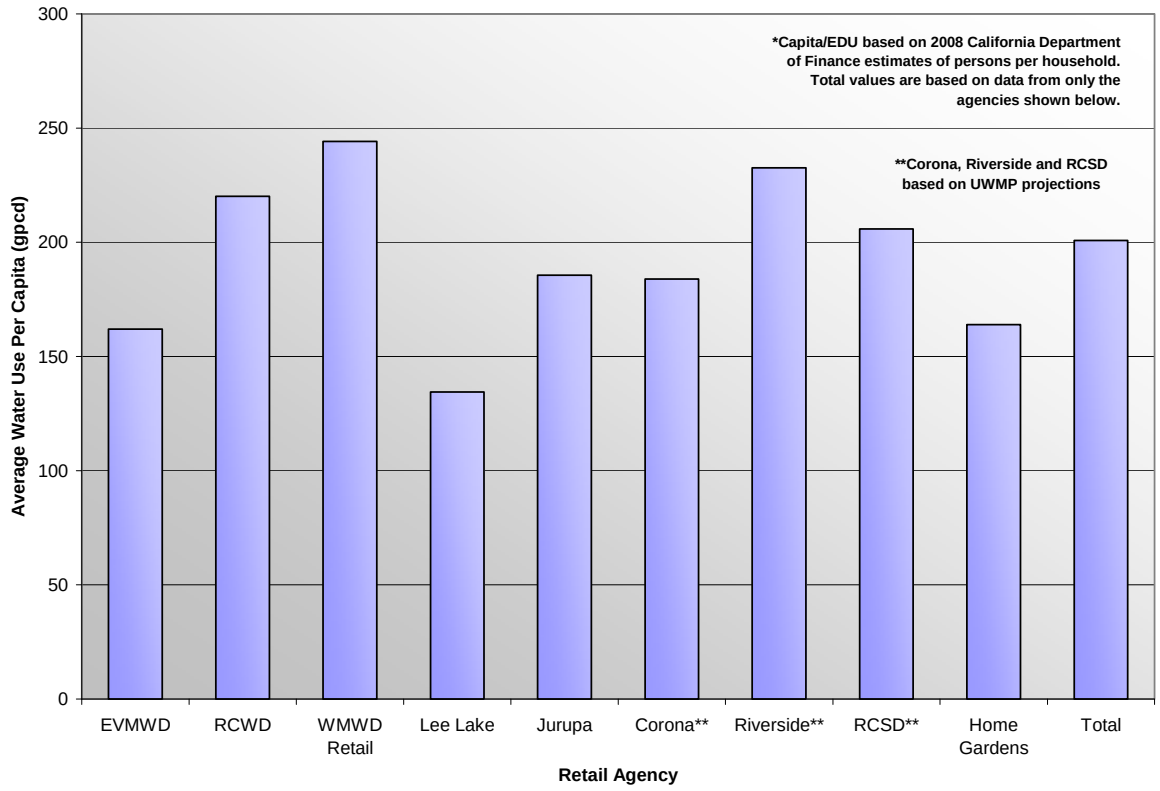
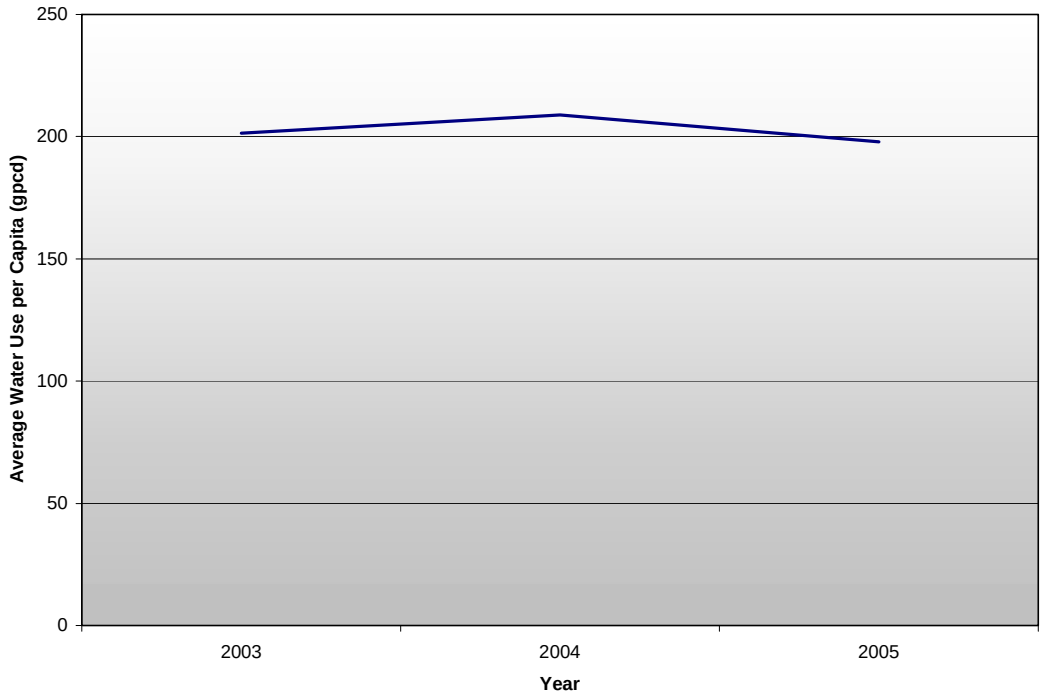


FIGURE 2-8
AVERAGE WATER USE PER CAPITA OVER TIME (SFR ONLY)



2.5 Commercial, Industrial and Institutional (CII) Sector

As discussed in previous sections, only a few agencies have detailed subclasses to categorize their customers. This made targeting specific business types difficult. Furthermore, limitations to billing databases prevented many agencies from providing detailed account level details for their CII customers.

Some agencies recorded all CII customers under the category of Commercial, so water use for Commercial customers is likely overstated and water use for Industrial and Institutional customers understated. The numbers as whole sector however should be more accurate.

In total, CII customers account for approximately 20 percent of potable water use within the Western MWD wholesale service area. The City of Riverside has the greatest proportion of water use in this sector; however, they have a much lower proportion of water used by dedicated landscape customers, which are typically converted from CII customers.

In general, water use in this sector varies greatly from one agency to the other. This means that programs targeting this sector would not be as equitable as those that target the SFR sector.

2.6 Large Landscape

This sector consists of customer accounts that have dedicated landscape meters. These customers are typically Commercial and Institutional sites with large landscaped areas, golf courses, sporting fields, parks, medians and other sites that require significant landscape irrigation. Currently 8 percent of the potable use in Western MWD's wholesale service area is used by these customers. It is likely that this percentage will increase as more mixed meter accounts are retrofitted with dedicated landscape meters. The analysis of outdoor water use vs. indoor water use presented in the next section highlights the remaining potential for these retrofits.

2.7 Outdoor vs. Indoor Water Use

Outdoor water use can be estimated through analysis of meter data. The majority of water customers throughout California do not have dedicated landscape meters; instead they are served by mixed use meters which record all water use from an account. Determining the volume of water used for landscape irrigation requires the separation of indoor water use from outdoor water use.

The raw data analyzed for this conservation study were supplied by participating agencies and included the following:

- Meter data for total monthly water use by customer category for a three year period
- Total service connections by year.

Monthly rainfall data was also collected for these time periods.

Water use for Residential, Commercial and Institutional customers can be characterized as being for indoor use or outdoor use. Landscape irrigation comprises almost all outdoor water use and is highly variable from season to season. Indoor water use is generally not climate dependant and is therefore relatively constant throughout the year.

By estimating indoor water use, this can be removed from the total water volume recorded by a meter to estimate the amount of water used by that customer for landscape irrigation.

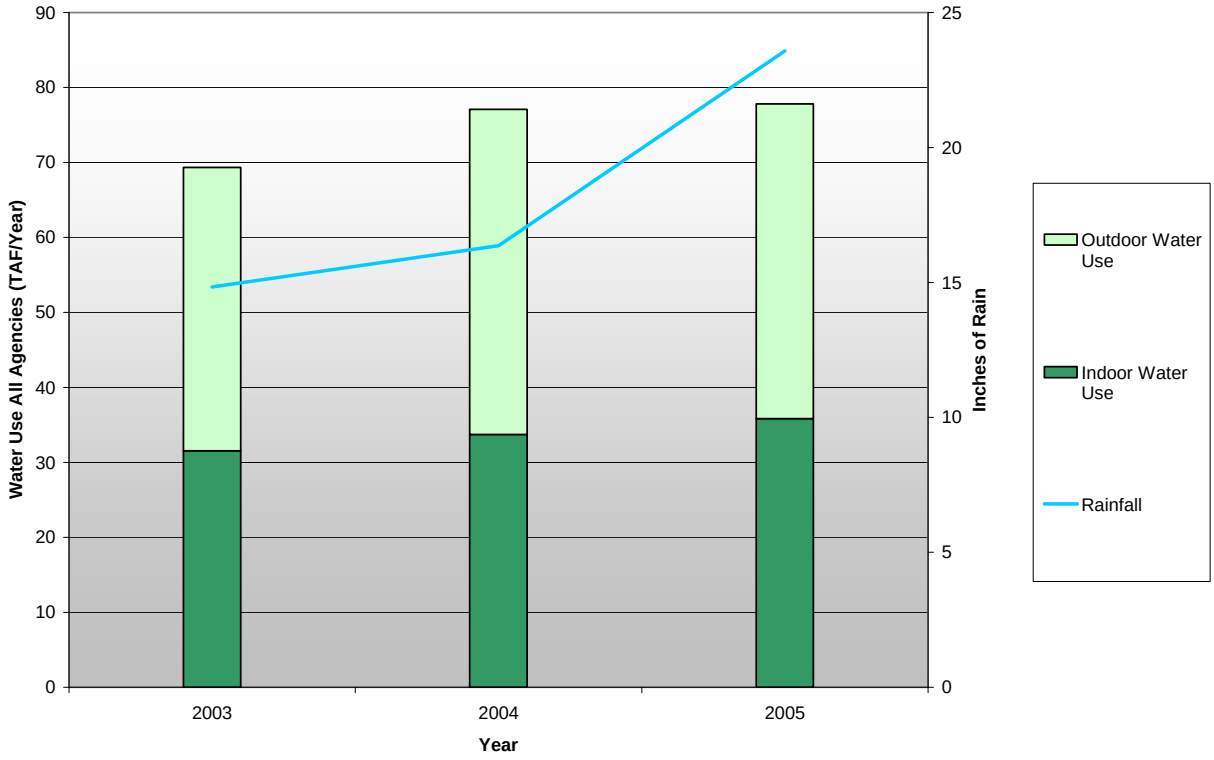
Indoor water use can be estimated by making the assumption that during winter or wet months, irrigation use is minimal and therefore total water use during these months consists entirely of indoor water use. Indoor water use is likely to be overestimated using this method in a climate such as Southern California, where some irrigation will occur even in the coldest and wettest months. By overestimating indoor water use, outdoor water use is underestimated. This method can therefore be considered conservative for estimating the volume of irrigation water that could be conserved or converted to recycled water.

To obtain as accurate a figure as possible, this analysis used the lowest water-use month for the entire five-year period to approximate indoor use. Dividing indoor water use for an entire customer sector by the number of accounts yields a unit rate for indoor water use by household.

This unit rate was used to extrapolate total indoor water use as population (or the number of service connections) increases.

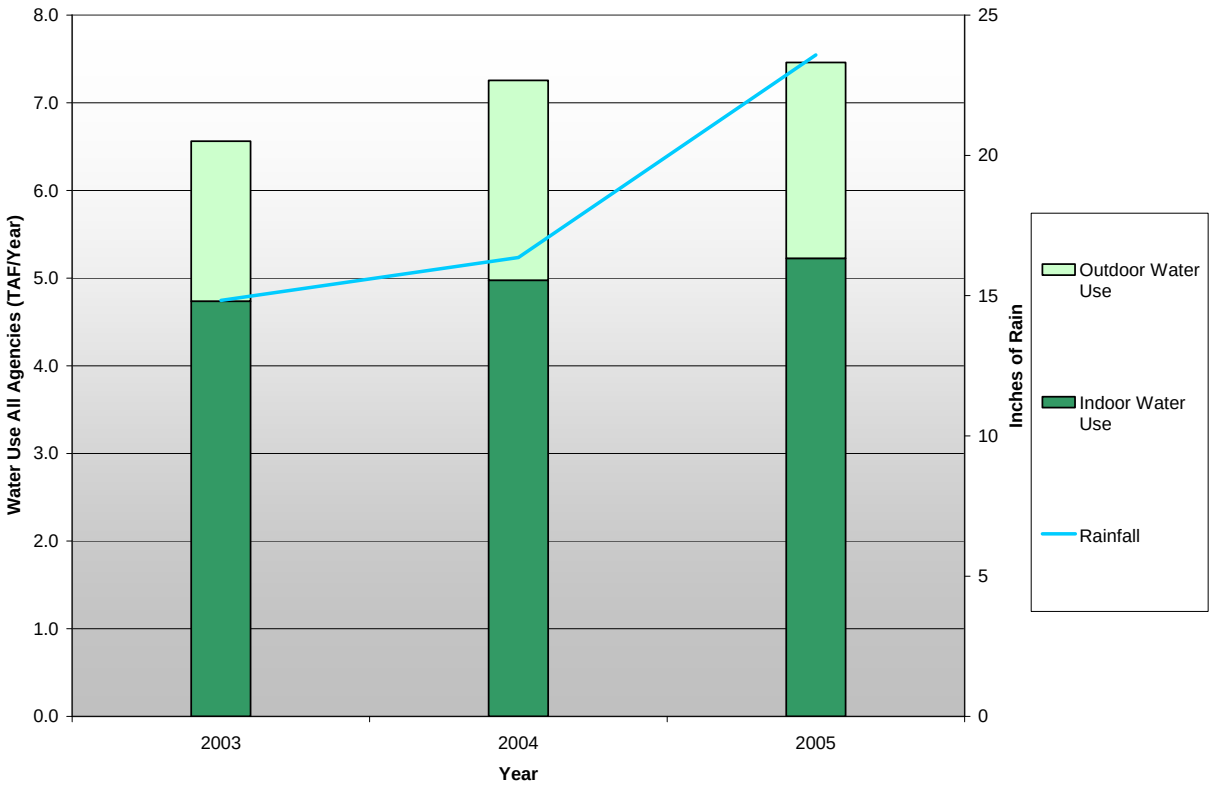
Figures 2-9, 2-10, and 2-11 show outdoor and indoor water use for Residential, Commercial, and Institutional customer sectors. The figures show a trend of steadily increasing indoor water use for the SFR and Commercial sectors. Institutional water use increased slightly between 2003 and 2004, but did not change significantly between 2004 and 2005. These patterns coincide with growth and development within the region during this time period. Outdoor water use was observed to increase at a faster rate than indoor use until 2005, during which above-average precipitation accounted for a drop in outdoor water use.

FIGURE 2-9
OUTDOOR VS. INDOOR WATER CONSUMPTION (SFR CUSTOMERS)



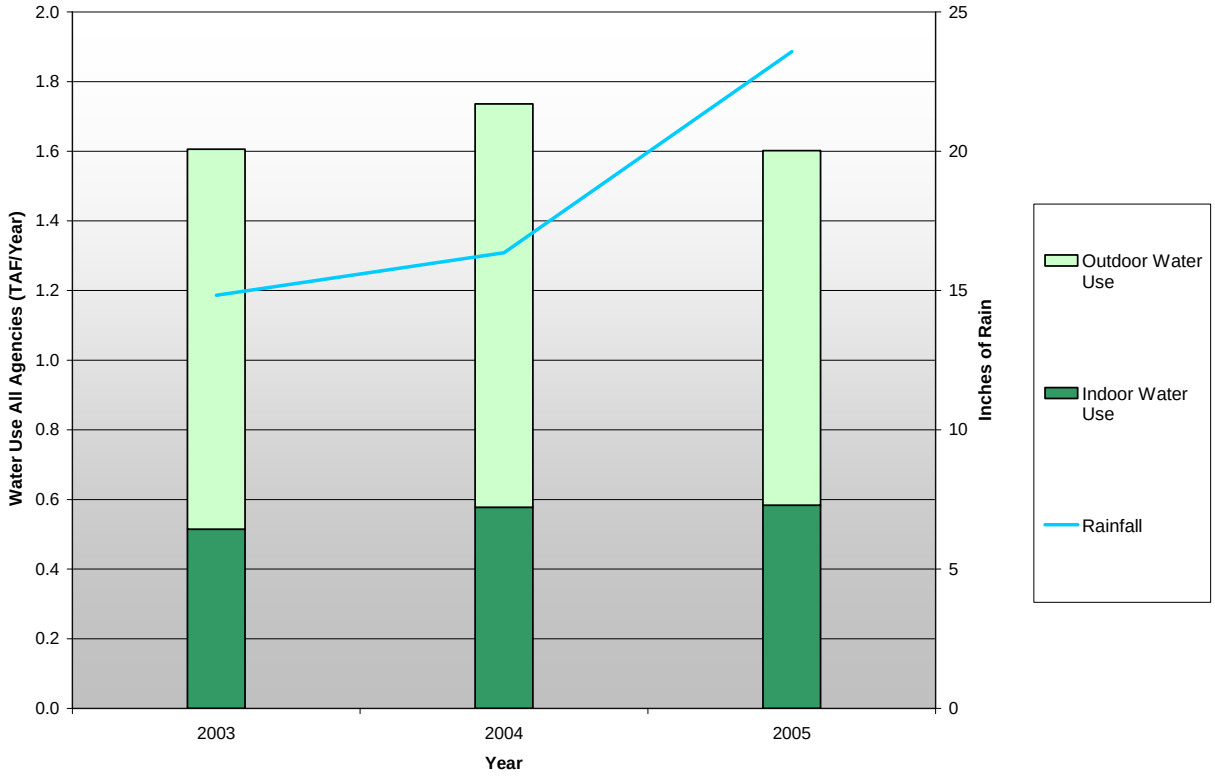
Outdoor water use is not as dominant in the Commercial sector as it is in the SFR sector. This trend is likely enhanced by the installation of dedicated landscape meters on CII accounts by some retailers. However, the fact that over 2,000 AFY is used for outdoor water use in this Sector demonstrates that there are still many CII customers that do not have dedicated landscape meters.

FIGURE 2-10
OUTDOOR VS. INDOOR WATER CONSUMPTION (COMMERCIAL CUSTOMERS)



The high ratio of outdoor water use to total water use in the Institutional sector indicates that that very few of these accounts have been retrofitted with dedicated landscape meters. With outdoor water use for this sector over 1,000 AFY there is still potential to reduce water consumption.

FIGURE 2-11
OUTDOOR VS. INDOOR WATER CONSUMPTION (INSTITUTIONAL CUSTOMERS)



2.8 Planned Future Development

Responses to the data request yielded minimal information relating to planned future development in any of the retail service areas. Although this prevents targeting of specific developments, a strategy should still be created to target this sector as a whole. Table 2-1 indicates that many of the retailers expect significant future growth within their service areas.

2.9 Sectors to Target

The analysis presented in this section revealed that primarily, the region is dominated by SFR land use and water consumption. This sector accounts for approximately three quarters of total potable water demand within Western MWD's wholesale service area. Further, almost 60 percent of the water used in this sector is for landscape irrigation. High irrigation water use is not uncommon in warmer climates such as the Inland Empire and accordingly water use per

capita is very high on average (200 gpcd) in the region. This suggests that landscape water use in the SFR sector should be the primary target of Western MWD's water use efficiency strategy.

Given that significant growth in demand is occurring in the region, at a rate of roughly 10 percent between 2003 to 2005, new developments should be targeted in addition to existing developments.

Water use by the CII sectors, although not as great as the SFR sector, still comprises a significant component of Western MWD's overall water consumption (approximately 20 percent). Water use in these sectors is not consistent from one agency to another therefore water use efficiency programs targeting these sectors will be more relevant for some retailers than others. Outdoor water use appears to be the most promising target area for the Institutional sector as it is far greater than indoor water use. There appears to be significant opportunity to retrofit mixed use accounts with dedicated landscape meters in both the Commercial and Institutional sectors.

Very little water (2 percent) is currently used by the MFR sector; therefore this sector should not be a major focus of Western MWD's water use efficiency strategies. However, if land use trends move towards denser developments in the future, this may need to be reassessed.

Section 3: Current Conservation Programs

3.1 Current Conservation Programs

Western MWD and six of its retail agencies are signatories to the Memorandum of Understanding Regarding Urban Water Conservation in California (Urban MOU), which requires the implementation of 14 Best Management Practices (BMPs) for water conservation. The Urban MOU was first adopted in December 1991 by the California Urban Water Conservation Council (CUWCC) and last amended in 1997. Agencies that are signatories to the Urban MOU are required to report regularly on their implementation efforts with regards to each of the 14 BMPs. These reports are archived in an online BMP Reporting Database at the CUWCC website and are publicly available. The 14 BMPs are described in more detail in Appendix A.

3.1.1 Retailer Implemented Conservation Programs

Table 3-1 presents an overview of BMP implementation qualitatively based on the level of each agency's BMP implementation efforts. It identifies the agencies that have undertaken conservation activities towards BMP implementation. Data for the table was primarily obtained from the CUWCC's online database, however it was recognized that some retailers are not signatories to the Urban MOU and that some retailers have conservation programs that go beyond the BMPs. To capture this additional information, a data request was distributed to the retailers requesting details of their current conservation programs.

TABLE 3-1
SUMMARY OF IMPLEMENTATION OF CONSERVATION PROGRAMS

	Box Springs Mutual Water Company	Elsinore Valley Municipal Water District	City of Norco	City of Corona Department of Water and Power	Lee Lake Water District	Rancho California Water District	Home Gardens County Water District	Jurupa Community Services District	City of Riverside Public Utilities	Riverside Highland Water Company	Rubidoux Community Services District	Western Municipal Water District (Retail)
Urban MOU Signatory		✓		✓		✓		✓	✓		✓	✓
BMPs												
BMP 1: Residential Survey Programs (SFR)[a]		✓		✓		✓			✓			
BMP 1: Residential Survey Programs (MFR)[a]		✓		✓		✓						
BMP 2: Residential Plumbing Retrofit – Low-flow Showerheads[b]		✓		✓		✓			✓			
BMP 2: Residential Plumbing Retrofit – Toilet Flappers[b]		✓		✓								
BMP 2: Residential Plumbing Retrofit – Faucet Aerators[b]		✓		✓		✓						
BMP 3: System Water Audits[c]		✓		✓		✓			✓			✓
BMP 4: Metering with Commodity Rates[d]		✓				✓		✓	✓		✓	✓
BMP 5: Large Landscape Conservation Programs and Incentives – Surveys[a]		✓		✓		✓			✓			✓
BMP 5: Large Landscape Conservation and Incentives - Dedicated Irrigation Meter Accounts with Water Budgets[e]		✓		✓		✓			✓			✓
BMP 6: High Efficiency Washing Machine Rebate Programs[f]		✓		✓		✓			✓			✓
BMP 7: Public Information Programs[g]		✓		✓		✓			✓		✓	✓
BMP 8: School Education Programs[g]		✓		✓		✓			✓		✓	✓
BMP 9: Conservation Programs for CII Accounts - Water Use Surveys[a]		✓							✓			
BMP 9: Conservation Programs for CII Accounts - ULFTs and Pre-rinse						✓						✓

	Box Springs Mutual Water Company	Elsinore Valley Municipal Water District	City of Norco	City of Corona Department of Water and Power	Lee Lake Water District	Rancho California Water District	Home Gardens County Water District	Jurupa Community Services District	City of Riverside Public Utilities	Riverside Highland Water Company	Rubidoux Community Services District	Western Municipal Water District (Retail)
Spray Valves[b]												
BMP 10: Wholesaler Agency Assistance Programs	Not applicable to retailers.											
BMP 11: Retail Conservation Pricing - Water Service for Residential[h]		✓		✓		✓		✓	✓		✓	✓
BMP 11: Retail Conservation Pricing - Water Service for CII[h]		✓		✓		✓		✓	✓		✓	✓
BMP 11: Retail Conservation Pricing – Water Service for Irrigation[h]				✓		✓		✓	NA		NA	✓
BMP 11: Retail Conservation Pricing - Sewer Service for Residential[h]		✓						✓	✓		✓	✓
BMP 11: Retail Conservation Pricing - Sewer Service for CII[h]		✓						✓	✓		✓	✓
BMP 11: Retail Conservation Pricing – Sewer Service for Irrigation[h]		✓				NA		✓	NA		NA	NA
BMP 12: Conservation Coordinator[i]		✓		✓		✓			✓			✓
BMP 13: Water Waste Prohibition[j]		✓		✓		✓		✓	✓			✓
BMP 14: Residential Ultra-Low-Flush Toilet Replacement Programs – SFR[b]		✓		✓		✓			✓			✓
BMP 14: Residential Ultra-Low-Flush Toilet Replacement Programs – MFR[b]		✓		✓								✓

Notes:
CII: Commercial, Institutional, and Industrial; ULFT: Ultra-low-flush toilet; NA : Service not available by the agency; SFR : Single Family Residential;
MFR: Multi-family Residential

(k) ✓: The agency has started an implementation strategy for surveys and has been offering/completing surveys.
(l) ✓: The agency has been retrofitting devices through distributions/installations/rebates.
(m) ✓: The agency's unaccounted water loss was reported <10 percent.
(n) ✓: The agency's accounts are 100 percent metered; X: The agency has un-metered accounts.
(o) ✓: The agency has dedicated irrigation meter accounts with water budgets.
(p) ✓: The agency has been issuing HEW rebates.
(q) ✓: The agency has implemented the program and has been conducting public/school events.
(r) ✓: The agency has implemented a volumetric rate (uniform, increasing block, or volumetric flat rate).
(s) ✓: The agency has water conservation coordinator(s).
(t) ✓: The agency has ordinance in place although the ordinance is not imposed except for the City of Corona.

3.1.2 Western MWD's Current Conservation Programs

Table 3-2 briefly describes the conservation programs currently implemented by Western MWD. Currently, Western MWD is focusing mainly on large landscape and CII water use sectors, installations of HECWs, and public and student education programs. In addition to these current active programs, Western MWD has two ongoing grant projects, both in progress, for implementing conservation programs: Poly High School Outdoor Retrofit Project and Murrieta High-Water Users. Poly High School was identified as a candidate likely to save water with retrofitting rotating sprinkler nozzles and central control systems. The Murrieta High-Water Users Project identifies highest water users as targets for outdoor retrofits with rotating sprinkler nozzles and smart controllers.

TABLE 3-2
WESTERN MWD'S CURRENT CONSERVATION PROGRAMS

Conservation Program	Description
BMP 5: Large Landscape Conservation and Incentives	Riverside Corona Resource Conservation District provides landscape water audits for customers requesting such services. Western MWD has issued one large landscape rebate so far ($630 per acre for WBIC rebate).
BMP 6: High-Efficiency Clothes Washing Machine Financial Incentive Programs	Western MWD has been implementing this program since 2004. Western MWD currently issues a rebate of $110 per washer as provided by Metropolitan to its customers.
BMP 7: Public Information Programs	Western MWD has been coordinating various public information programs and events. • Plans to launch a summer and year-round campaign to encourage water conservation with the public. Last year's summer campaign was "A Summer Must, Water Only after Dusk." • Coordinates events in a one acre water conservation garden to educate the public. Scheduled events: Earth Night in the Garden - April 22, 2008; Native Nights - August 2008 (date to be determined); and Autumn Festival - Fall 2008 (date to be determined). • Offers California Friendly Landscape classes, both residential and professional series. Classes scheduled from April to June 2008. • Landscape contest anticipated to be launched in May 2008. • Participates in community events such as festivals and fairs. Scheduled events include: April 19 - Dos Lagos Earth Day; April 26 - Community Water Festival at Diamond Valley Lake (co-sponsored by Western MWD); May 10 - Splash Festival (sponsored by Western MWD), and May 17-18 - Solar Cup. • Occasionally runs articles in the newspaper about Western MWD garden or conservation in general.
BMP 8: School Education Programs	Coordinates several activities through the school education programs. • Ongoing classroom presentations. • Teacher scholarships funded by Western MWD (e.g., Lois B. Krieger Grants awarded annually). • H2O Explorer Badge programs for scouts and other groups. • Theater Program. • Solar Cup, May 17-18 • Poster contest

Conservation Program	Description
BMP 9: Conservation Programs for CII Accounts	Participates in the following programs administered by Metropolitan: • Save Water, Save A Buck Program • Accelerated Public Sector Program
BMP 10: Wholesaler Agency Assistance Programs	• Participates in Metropolitan's Accelerated Public Sector Program. Western MWD assists its retailers with obtaining incentives for water saving devices. • Processes incentive payment for all rebates offered by Metropolitan and rebate reporting to Metropolitan. • Provides daily ongoing assistance.
BMP 11: Conservation Pricing	• All accounts are metered and flat rates are in effect with the exception of Murrieta Division. • Establishing a water-budget tiered rate structure. Anticipated to launch the tiered rate structure in fall 2009.
BMP 12: Conservation Coordinator	Provides both wholesale and retail assistance for program implementation.

3.2 BMP Saturation and Potential Water Savings

The following subsections evaluate agency implementation levels for the 14 BMPs. Estimates were also made for the potential water savings that could be realized from increased implementation of each BMP in the existing customer base. The primary data sources used to complete analysis in this section include the following:

- CUWCC BMP Reporting Database: Online reports are the basis of information used to evaluate market saturation and to estimate potential water use savings.
- CUWCC's Water Savings Assumptions: Water savings assumptions established by the CUWCC were adopted for calculating future water conservation savings resulting from BMP implementation.

The BMP Reporting Database typically contains annual BMP reports and base year data associated with each agency that is a signatory to the Urban MOU. At the time this report was prepared, some of the information required to perform the analysis in this section was not readily available online. Information from the retail agencies UWMPs was used if available to find the most recent and relevant information.

The data presented in the following subsections focuses only on the seven retail agencies that are the Urban MOU signatories and therefore have significant historical program implementation information available. These agencies are:

- City of Corona
- City of Riverside
- EVMWD
- JCSD

- RCWD
- RCSD
- Western MWD (Retail)

3.2.1 Calculation Assumptions

Key variables that were used to calculate saturation levels and potential water savings are listed and briefly described below:

- Decay Factors: Potential water savings can decay over time due to equipment breakdown, lack of maintenance, or decline in behavioral compliance with conservation activities. For the BMPs with a survey component, a decay factor was taken into account to estimate the equivalent number of surveys, which recognizes the decaying effect of previously conduced surveys. For the BMPs that involve device retrofits, decay factors and physical lifespan of devices suggested by CUWCC were used (CUWCC, 2005).

- Natural Replacement Rates: As homeowners remodel older homes or desire to replace aging plumbing fixtures, older homes come into compliance with new plumbing code requirements (e.g., low-flow showerheads and ultra-low-flush toilets [ULFTs]). Therefore, some old homes are retrofitted with high-efficiency devices through natural replacement, in addition to agency installations and rebates.

- The rate of change of service connections over time was assumed to be consistent with population growth when the number of housing units constructed after 1992 was unknown.

- Water savings estimates presented in Table 3-4 are based on achieving saturation levels with existing customers equal to 75 percent, with the exception of BMP 6. The water savings estimates do not include savings from future development.

- Unit water savings estimates were taken from references published by the CUWCC.

More detailed explanations of these calculations are provided in Appendix A.

3.2.2 BMP Saturation

Table 3-3 summarizes the estimated saturation levels of conservation programs for which these estimates are possible. Results suggest that implementation of the BMPs varies widely from one agency to another and from one BMP to another. Few of the 14 BMPs appear to be approaching or have reached saturation. Most agencies have reached a high saturation for installation of low-flow showerheads (BMP 2) and ULFTs (BMP 14) for their SFRs and MFRs. However, BMPs that require residential surveys (BMP 1), installation of other indoor retrofits (BMP 2) (i.e., faucet aerators), incentives for high efficiency washers (HECWs) (BMP 6), CII accounts (BMP 9), and large landscape sectors (BMP 5) still demonstrate significant potential

for increasing the saturation and resulting in additional water savings through conservation measures.

Implementation of non-quantifiable BMPs as described in the following section is overall relatively high. All the agencies run public information (BMP 7) and school education (BMP 8) programs with the exception of JCSD. Among the seven agencies, five of them have at least one part-time water conservation coordinator (BMP 12). Except for one agency, they all have a water waste ordinance (BMP 13) in place, but in most cases ordinances are not enforced. Also, all the agencies that are signatories to the Urban MOU use conservation-based variable rate structures for water services (BMP 11). Increasing block rates for water service are used only by five agencies, including City of Riverside, RCWD, RCSD, JSCD, and EVMWD (only for residential and commercial customers). For agencies that also provide sewer services, all except RCWD and City of Corona use conservation-based variable rate structures (BMP 11).

For BMP 11, the agencies have volumetric rates (uniform, increasing block, or volumetric flat rate) in place but it is unknown how each agency is currently implementing and adhering to the new requirements of the revised BMP 11 (June 2007). According to the revised BMP 11, at least 70 percent of total annual revenue should be based on volumetric rates and the remaining 30 percent should come from fixed customer charges. Additional potential savings from BMP 11 could be achieved by transferring uniform rate structures to increasing block rate structures and by implementing the new requirements for both their water and sewer services.

3.2.3 Potential Water Savings

Table 3-4 summarizes the estimated potential water savings from existing customers for each of the BMPs which are considered quantifiable. BMPs 7, 8, 11, 12, and 13 are considered not to have quantifiable water savings.

Similar to the saturation estimates, the potential for additional water savings varies significantly among the BMPs and across the agencies. Potential water savings are typically the highest for BMPs with low levels of implementation. BMPs that target residential customers (BMP 1 and 14), large landscape water use sectors (BMP 5), incentives for HECWs (BMP 6), and CII accounts (BMP 9) show the most potential for water savings.

No water savings were estimated for BMP 3 since all of the agencies are reported to be in compliance with the current requirements of BMP 3 by keeping their unaccounted water losses below 10 percent. However, anticipated future changes to this BMP 3 (in accordance with AWWA standards) may result in stricter compliance requirements. Water loss reduction on the order of 1 to 2 percent would contribute significantly to overall area-wide savings.

TABLE 3-3
SUMMARY OF BMP IMPLEMENTATION SATURATION

		Saturation Percentage						
BMP	**Program**	**EVMWD**	**Western MWD**	**RCWD**	**City of Corona**	**City of Riverside**	**RCSD**	**JCSD**
BMP 1	Residential Water Surveys (SFR)	0.0	0.0	0.5	0.4	45	0.0	0.0
BMP 1	Residential Water Surveys (MR)	0.0	0.0	4	1	-	0.0	0.0
BMP 2	Low Flow Showerheads (SFR)	52	63	43	62	100	-	47
BMP 2	Low Flow Showerheads (MFR)	79	33	51	-	-	-	45
BMP 2	Faucet Aerators (SFR)	12	17	11	18	4	-	11
BMP 2	Faucet Aerators (MFR)	9	8	13	-	-	-	12
BMP 2	Toilet Flappers (SFR)	28	35	22	-	-	-	24
BMP 2	Toilet Flappers (MFR)	58	17	22	32	10	-	25
BMP 3	Unaccounted Water	Saturation estimates are not appropriate for BMP 3.						
BMP 4	Dedicated Irrigation Meters for CII Accounts	63	62	45	19	0	25	2
BMP 5	Large Landscape Water Budgets	0.0	2.5	100	100	100	0.0	0.0
BMP5	Large Landscape Water Surveys Offered	2	3	81	5	5	0.0	0.0
BMP5	Large Landscape Water Surveys Completed	0.2	2	35	0.1	0.2	0.0	0.0
BMP 6	High-Efficiency Clothes Washers (HECWs)	5	6	4	5	3	5	-
BMP 7	Public Information	Saturation estimates are not appropriate for BMP 7.						
BMP 8	School Education	Saturation estimates are not appropriate for BMP 8.						
BMP 9	CII Water Use Surveys Offered	0.0	0.0	0.0	0.0	100	0.0	0.0
BMP 9	CII Water Use Surveys Completed	0.0	0.0	0.0	0.0	0.5	0.0	0.0
BMP 10	Wholesale Agency Programs	Not applicable to retailers.						
BMP 11	Water and Sewer Rate Structures	Saturation estimates are not appropriate for BMP 11.						
BMP 12	Conservation Coordinator	Saturation estimates are not appropriate for BMP 12.						
BMP 13	Conservation Pricing	Saturation estimates are not appropriate for BMP 13.						
BMP 14	Residential ULFTs (SFR)	54	65	44	77	27	-	47
BMP 14	Residential ULFTs (MFR)	58	35	43	-	-	-	48

Notes:
Savings are for existing construction only and do not include future development
CII: Commercial, Institutional, and Industrial
"-": Not quantified due to the limited information.
SFR: Single Family Residential
MFR: Multi-family Residential
ULFTs: Ultra-low-flush toilets

TABLE 3-4
SUMMARY OF POTENTIAL WATER SAVINGS

BMP	Program	Potential Water Savings (AFY)						
		EVMWD	Western MWD	RCWD	City of Corona	City of Riverside	RCSD	JCSD
BMP 1	Residential Water Surveys	742	748	1117	914	1594	124	594
BMP 2	Low Flow Showerheads	66	23	92	48[(a)]	-	-	51
BMP 2	Faucet Aerators	134	81	139	124[(a)]	251[(a)]	-	81
BMP 2	Toilet Flappers	604	347	708	566[(a)]	1,051[(a)]	-	788
BMP 3	Unaccounted Water	All agencies in compliance with unaccounted water losses <10%.						
BMP 4	Metering	0	0	0	2,246	0	0	0
BMP 5	Large Landscape Surveys	452	489	429	1,091	3,501	131	744
BMP 6	High-Efficiency Clothes Washers (HECWs)	284	524	341	364	489	-	147
BMP 7	Public Information	Water savings estimates are not quantifiable for BMP 7.						
BMP 8	School Education	Water savings estimates are not quantifiable for BMP 8.						
BMP 9	CII Water Use Surveys	454	498	656	1,093	3,490	131	775
BMP 10	Wholesale Agency Programs	Not applicable to retailers						
BMP 11	Water and Sewer Rate Structures	Water savings estimates are not quantifiable for BMP 11						
BMP 12	Conservation Coordinator	Water savings estimates are not quantifiable for BMP 12						
BMP 13	Conservation Pricing	Water savings estimates are not quantifiable for BMP 13						
BMP 14	Residential ULFTs	350	107	508	-	1,311	-	277
Total Water Savings Potential (AFY)		**3,086**	**2,817**	**3,990**	**5,708**	**10,310**	**386**	**3,457**
Total Water Savings Potential for Seven Agencies (AFY)		**29,754**						

Notes:
Savings are for existing construction only and do not include future development
AFY: acre-feet per year
CII: Commercial, Institutional, and Industrial
"-": Not quantified due to the limited information.
ULFTs: Ultra-low-flush toilets
(a) Water savings estimated for SFRs; water savings estimates for MFRs not quantified due to the limited information.

3.3 Evaluation of Current Conservation Programs

Western MWD's retail agencies have been implementing some of the BMPs actively, however overall implementation levels across Western MWD's wholesale service area could be improved. It is estimated that the seven signatory agencies alone could achieve water savings on the order of 30,000 AFY from their existing customer base by reaching long-term implementation goals.

This suggests that Western MWD and its retailers may benefit by focusing more on implementing proven technologies contained in existing BMPs rather than adopting some of the new emerging technologies that are outlined in Section 5; a combination of existing BMPs and new technologies may prove fruitful, especially with the proposed Urban MOU revision approach.

The incentive for implementing existing BMPs was increased with the passage of Assembly Bill (AB) 1420, which requires water purveyors to implement all locally cost effective BMPs to be eligible for State grant funds.

3.4 Urban MOU Revision and New Approaches to Water Conservation Programs

In November 2007, the CUWCC Steering Committee retreat included intensive discussions about the changing landscape of water supply planning in California, new focus on sustainable future water supplies and sources, and the need to update the Urban MOU to reflect the ending of the ten year BMP implementation term. The Urban MOU was last revised in 1997, and the Steering Committee agreed that the time had come for it to be revised again to accurately represent recent legislative requirements, new statewide and regional planning efforts and to update advances in water conservation technology and policy.

In addition it was agreed that the Urban MOU needs to more accurately reflect the diversity of CUWCC water agency signatories. To this end, a more flexible approach to water conservation program implementation is being developed through a process that involves all CUWCC members, in all three member groups. As currently proposed, water agencies would be given options by which they can customize their conservation programs to best meet the needs of their service areas. These options are defined as follows:

- BMPs: A list of BMPs organized by program category (Residential, Landscape, and Commercial, Industrial, Institutional), implemented by a signatory water agency to meet its water savings goals. This reflects the familiar list of 14 BMPs, but updates and reorganizes them into broad water user categories with a wide variety of devices, measures and programs, to enable member water agencies to more easily design and report on their programs.

- Flex Track: A programmatic approach to water conservation by a signatory water agency that may include BMPs from the checklist, but also includes the flexibility to allow the agency to add unique program elements to achieve its water savings goals. An agency can determine a water savings goal, and then focus its program efforts on the sector(s) it believes will achieve that goal.

- Foundational BMPs: Basic BMPs that must be implemented by all agency signatories, regardless of whether they choose the BMP or the Flex Track option. These are: BMPs 3 (System Water Audits, Leak Detection and Repair), 4 (Metering), 7 (Public Outreach), 8 (School Education), 11 (Retail Conservation Pricing), 12 (Conservation Coordinator) and 13 (Water Waste Prohibition) (as applicable to individual agency powers and authorities).

The CUWCC will spend much of 2008 engaged in the Urban MOU Revision effort and has set up several Revisions Subcommittees to design the Flex Tracks and to update BMP language. The details of how these new options will be incorporated into the Urban MOU, including particulars of implementation and reporting requirements, are described in various documents available at www.cuwcc.org/committees.lasso.

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Section 4: Local Cost-Effectiveness of CUWCC BMPs

This section evaluates the cost-effectiveness of BMPs from the local agency perspective. To achieve compliance with BMP 10, Western MWD, as a wholesale water supplier, is required to provide financial, technical, and program management support to its retail water agencies for implementing BMPs that are shown to be cost-effective in each agency's local service area. The Urban MOU states that an exemption from implementation of a particular BMP will be granted if that BMP is not cost-effective at the local agency level. A BMP is considered cost-effective if benefits are greater than costs.

Information resulting from the cost-effectiveness analysis can also be used to provide guidance to Western MWD and its local retail agencies regarding the economic return on future investments made in BMP implementation in their service areas.

4.1 Cost-Effectiveness of BMPs

Cost-effectiveness analysis was conducted for all quantifiable BMPs, including BMPs 1, 2, 4, 5, 6, 9, and 14. Cost-effectiveness for BMPs 7, 8, 10, 11, 12, and 13 cannot be determined as savings cannot be quantified for these BMPs. Table 4-1 lists all the BMPs and summarizes the benefit-cost ratios determined from the cost-effectiveness analysis.

TABLE 4-1
SUMMARY OF BMP COST-EFFECTIVENESS

BMP	Program	Quantifiable Savings[(a)]	Cost-Effectiveness Analysis Completed	Benefit-Cost Ratio
BMP 1	Water Survey Programs for SFR and MFR Customers	✓	✓	0.6
BMP 2	Residential Plumbing Retrofits	✓	✓	2.8
BMP 3	System Water Audits, Leak Detection and Repair	✓	All retailers currently in compliance, no program required[(c)]	-
BMP 4	Metering with Commodity Rates for All New Connections and Retrofits of Existing Connections	✓	✓	4.1
BMP 5	Large Landscape Conservation Programs and Incentives- Water Budget[(b)]	✓	✓	5.2
BMP 5	Large Landscape Conservation Programs and Incentives- Water Survey[(b)]	✓	✓	1.8
BMP 6	High Efficiency Washing Machine Rebate	✓	✓	1.9
BMP 7	Public Information Programs	X	Non-quantifiable savings	-
BMP 8	School Education Programs	X	Non-quantifiable savings	-

BMP	Program	Quantifiable Savings[(a)]	Cost-Effectiveness Analysis Completed	Benefit-Cost Ratio
BMP 9	Conservation Programs for CII Accounts	✓	✓	3.4
BMP 10	Wholesale Agency Assistance Programs	X	Not applicable to retailers	-
BMP 11	Conservation Pricing	X	Non-quantifiable savings	-
BMP 12	Conservation Coordinator	X	Non-quantifiable savings	-
BMP 13	Water Waste Prohibition	X	Non-quantifiable savings	-
BMP 14	Residential ULFT Replacement Programs	✓	✓	5.5

Notes:
(a) ✓: Savings can be quantified for this BMP; X: Savings cannot be quantified for this BMP
(b) The cost-effectiveness of BMP 5 was evaluated for two categories separately, water surveys and water budgets, in accordance with CUWCC cost effectiveness spreadsheets.
(c) Even though savings for BMP 3 are quantifiable, this BMP was excluded from the cost effectiveness analysis because in Section 3 all the agencies reported to currently be in compliance with BMP 3.

4.2 Data Sources

Data sources used to evaluate the cost-effectiveness include the following references:

- BMP Costs and Saving Study (CUWCC, 2005)
- California Urban Water Agencies Urban Water Conservation Potential (2001)
- Guidelines to Conduct Cost-Effectiveness Analysis of Best Management Practices for Urban Water Conservation (CUWCC, 1996).

CUWCC cost-effectiveness spreadsheets available on the CUWCC website were used to conduct the analysis, following the guidelines established by the CUWCC. Simplifying assumptions were made in the spreadsheets as needed where data was not available to complete spreadsheet inputs. Overall, the methodology used was consistent with the principles and methods put forth by the CUWCC guidelines.

4.3 Benefits and Costs

The Urban MOU defines a cost-effective BMP as one where the present value of the benefits exceeds the present value of the costs. The present value of benefits and costs were calculated from an agency perspective based on a conservative discount rate of 5 percent (provided by Western MWD). Appendix B describes specific cost and benefit categories, other variables used, assumptions made, and data sources used to arrive at the cost-benefit ratios discussed below.

4.3.1 Benefits

The two primary parameters used to define benefits to the retail agencies include the value of saved water based on "avoided water supply costs" and "avoided wastewater costs." The following assumptions and data sources were used to quantify these benefits:

- Avoided cost of water supply: This assumption was based on the Tier 2 rate that Metropolitan charges its member agencies, which includes Western MWD. Metropolitan's rate at $695 per AF (effective as of 1/1/2009) for Tier 2 fully treated water was utilized in the analysis.

- Avoided cost of wastewater capacity: BMPs that achieve reductions in indoor water use will result in a reduction in an agency's sewer flows that will avoid wastewater treatment capital and operation and maintenance (O&M) costs. There are a number of WWTPs within Western MWD's wholesale service area; therefore these avoided costs were based on Kennedy/Jenks professional experience and opinion related to internal planning estimates. The projected total cost for wastewater capacity was estimated to be $800 per AF, including a capital cost of $350 per AF and O&M cost of $450 per AF.

In instances where the cost-benefit ratio is close to 1, the CUWCC methodology requires an additional analysis to be undertaken from a "society" perspective. This considers other benefits, including reductions to utility bills, as a result of reduced water heating costs. Environmental benefits of conservation can also be quantified if necessary.

Assumptions used to calculate water savings are consistent with the analysis presented in Section 3 and including unit savings estimates, decay rates and device life spans. A detailed description of water saving assumptions made in the cost-effectiveness analysis is provided in Appendix B.

4.3.2 Costs

Program costs were compiled primarily from CUWCC published referenced values. Costs to the retail agency typically included capital expenditures for material costs, field costs, administrative costs, marketing costs, labor and equipment costs, and surveying costs. Rebates issued to customers and other financial incentives are typically considered as costs to the water supplier when these costs are covered by the water supplier. In this cost-effectiveness analysis, rebates and financial incentives available from Metropolitan were not included as part of the overall program costs and rebate costs to the local retail agencies. It was assumed that the agency does not provide any additional incentive but instead passes Metropolitan's rebate onto the customer.

4.4 Summary of Cost-Effectiveness of BMPs

Table 4-1 lists the benefit-cost ratios estimated for the BMPs 1, 2, 4, 5, 6, 9, and 14. Except for BMP 1, all BMPs evaluated appear to be cost-effective from an agency perspective. For the BMPs that are shown to be cost-effective, the benefit-cost ratio ranges from approximately 2 to 6.5. The return on an agency's contributions is the highest for Residential ULFT Replacement

Programs – BMP 14 (with a benefit-cost ratio of 5.5) and lowest for Large Landscape Water Budgets – BMP 5 (with a benefit-cost ratio of 1.8).

It should be emphasized that financial incentives from Metropolitan significantly reduce the cost of implementing many of the BMP programs. This makes these programs attractive to local retail agencies that are looking to minimize their investment costs.

The lower benefit-cost ratio for BMP 1 is attributed to the relatively high cost of conducting surveys against a small return on investment achieved through water savings. For comparison, a residential survey cost falls within the same range of a CII or large landscape customer survey cost. However, the savings achieved by residential accounts is not as great as savings that can be yielded by targeting higher water-using customers in the CII or large landscape sectors. Although BMP 1 was determined not to be cost-effective, residential surveys have significant synergies with other BMP programs. Residential surveys are an effective tool for promoting water conservation measures and devices within surveyed homes because they target both indoor and outdoor water use. With outdoor water use in the SFR sector being identified as a primary target sector in Section 2, this BMP should be considered in Section 7, Conservation Programs Evaluation despite its low benefit-cost ratio. From the cost perspective to the agencies, future funding opportunities could cover the cost of BMP 2 implementation and possibly turn this BMP into a cost-effective one. As discussed in Section 7, direct funding opportunities for surveys in general are limited; however, funding potential increases if surveys could be included as part of a larger conservation program targeting both indoor and outdoor water savings.

4.5 Monitoring Cost-Effectiveness

The cost-effectiveness of BMPs presented in this section should be viewed within the context of the simplifying assumptions made and the data sources used to derive the estimates. Actual costs and savings experienced in the retailers' service areas may be different from published guidelines. As a result, the actual cost-effectiveness of BMPs may differ from the estimates developed in this section.

- It is suggested that Western MWD construct a database to record the actual cost of administering the WUE strategies that it adopts from this study. This data could be used to update the CUWCC cost-effectiveness worksheets through time and with experience, and to verify that the conservation programs are indeed cost-effective to implement.

Section 5: Emerging Technologies and Legislation

Technologies, products, and practices in the area of water efficiency are evolving today at an unprecedented rate as water shortages and increasing demands upon infrastructure occur throughout the country. Whether in residential or non-residential applications, numerous opportunities now exist for reducing water demand that did not exist even as recently as a few years ago. This section identifies and evaluates a variety of emerging technologies, ordinances, and legislative directives aimed at water use efficiency practices that could feasibly be implemented within Western MWD's service area.

5.1 Emerging Indoor Technologies

An indoor hardware retrofit program that brings all residential and non-residential structures constructed before 1992 up to current practice with respect to water use efficiency requires a consortium of activities and rebates to ensure maximum water savings can be achieved. The following is a series of measures that could help Western MWD implement an effective indoor water use efficiency program throughout its service area, including all retail purveyors.

5.1.1 Residential Sector Conservation Measures

5.1.1.1 Residential High-Efficiency Toilets (HETs)

High-efficiency toilets (HETs) are defined as a fixture that flushes at 20 percent below the 1.6 gallons per flush (gpf) U.S. maximum or less, equating to a maximum of 1.28 gpf. This 20 percent reduction threshold serves as a metric for water authorities and municipalities designing more aggressive toilet replacement programs and, in some cases, establishing an additional performance tier for their financial incentives (e.g., rebate and voucher programs). It is also a part of the water efficiency element of many green building programs in the U.S. The newer HET models improve upon the water savings potential previously seen with ULFTs, which form the basis of BMP 14.

The use of residential HETs requires the replacement of existing toilet fixtures with models that use even less water than the previous 1.6 gpf ULFTs. There are over 200 different HET models available, from 23 different manufacturers, of which 142 are United States Environmental Protection Agency (USEPA) WaterSense certified. HETs may consist of: (a) dual-flush; (b) 1 gallon single-flush, pressure assisted; (c) 1.28 gallon single-flush, gravity-fed; or (d) 1.28 gallon flushometer valve toilets for commercial uses.

Current California legislation (AB 715, chaptered in 2007) mandates that after January 1, 2014, only HETs be sold or installed after in the state. With over eight years of sales and installations in California so far, HETs have exhibited a solid performance history and exceptional customer satisfaction overall.

5.1.1.2 High-Performance Showerheads

Another area of recent and significant attention by water efficiency advocates is the residential shower system and showerheads. A current trend of ever-increasing shower flow rates and

water use within new homes includes multiple showerheads, “rain” type shower systems, and shower spas and “gyms.” Installation of high-performing showerheads with flow rates that range from 1.5 to 2.0 gpm could achieve notable water savings in both new and remodeled homes. In order to increase the savings potential, however, limitations on the multiple-head shower system installations may be necessary through regulatory or other controls. The high-performance showerhead has a potential for water savings greater than the low flow showerheads included in BMP 2.

5.1.1.3 Low-Flow Lavatory Faucet Aerators

Faucets have not been a primary focus of water efficiency advocates, given that the Energy Policy Act (EPAct) of 1992 and subsequent EPAct legislation have limited faucet flows to 2.2 gpm (at 60 psi). It is only now that serious attention (by the USEPA’s WaterSense product labeling program) is again being given to residential lavatory faucets and possible new opportunities for further efficiencies. Installation of low-flow, 1.5 gpm faucet aerators in residential bathrooms may achieve measurable savings, although any reduction of residential bathroom faucet flows below the 2.2 gpm maximum will likely cause wait times for hot water to increase. As an example, with an assumed wait time of 30 seconds for hot water arriving through a 2.2 gpm faucet, the replacement of the aerator in that faucet with one flowing at 1.1 gpm will generally double the wait time for hot water to 1 minute. Therefore, any reductions proposed in the bathroom faucet flow rate must be accompanied by an evaluation of the effect upon the end-user and their attitudes towards the delivery of hot water when they want or expect it. The newer low-flow lavatory faucet aerators improve upon the water savings potential of those faucet aerators currently included in BMP 2.

5.1.1.4 Hot Water Demand Systems

A hot water demand system is an electronically, demand-controlled pumping system that sends cold water back to the water heater until hot water arrives at the sink, shower, or other fixture where it is needed. In the current average residence, there are twice as many water fixtures and appliances (e.g., showers, toilets, dishwashers, clothes washers, etc.) as there were in homes built pre-1970, and with increased home size, the distance to the farthest fixture has also more than doubled. Consequently, the time it takes hot water to reach the farthest fixture has significantly increased, resulting in inefficient and wasteful use of water during this “wait” period. Where determined to represent a potential water savings, installation of hot-water demand systems in the largest dwellings would be a feasible means for addressing efficiency in this sector.

5.1.1.5 High-Efficiency Clothes Washers (HECW)

High-efficiency clothes washers (HECWs) utilize technological advances to deliver high quality wash performance while saving both water and energy. Resource efficient models use 35 to 50 percent less water. Over 100 models of residential and commercial high-efficiency washers are offered. Incentives are currently available for the replacement of older clothes washers with these new water-efficient models as part of BMP 6.

5.1.1.6 New Home Construction Measures

For new home construction, the requirement for "structured plumbing" and the installation of water-efficient clothes washers and dishwashers (5.8 Water Factor (WF) or less) would be feasible. This would be similar to Metropolitan's "California Friendly Homes" program for new developments, in which efficient technologies are built-in to the new residences during construction.

5.1.2 Commercial, Industrial, Institutional (CII) Sector Conservation Measures

Implementation of the following emerging indoor technologies could help achieve water savings required as part of BMP 9.

5.1.2.1 Commercial HETs and High Efficiency Urinals (HEUs)

To achieve maximum water savings, commercial facilities may consider toilet replacement with HETs, urinal replacement with high-efficiency urinals (HEUs) (which use 0.5 gallons or less), and low-flow faucet aerator (0.5 gpm) retrofit installations in restrooms, as needed. Where feasible in new construction, non-water urinals could also be installed, provided that the owner understands the long-term physical and financial impacts of the product. While non-water urinals offer the complete elimination of flush valves and water use, other more customer acceptable high-efficiency technologies are now making their appearance. The current national standard for urinals mandates a maximum flush volume of 1.0 gallon. California's recent HET fixture legislation (AB 715) also mandates that all urinals sold or installed in the state shall be HEUs as of January 1, 2014. Urinals flushing at significantly less than 0.5 gpf have existed in the marketplace for at least 15 years and have proven that much less water is required in today's new construction. Today's new 1 pint ($1/8^{th}$ gallon) flushing urinals are gaining broad market acceptance, provide excellent performance, and avoid some of the negative issues associated with non-water urinals.

5.1.2.2 Package Graywater Treatment Systems

Graywater is generally defined as washwater originating from showers, bathtubs, clothes washers, lavatory sinks, and similar uses. Graywater is distinctly different from "black water" which originates from toilets, and water derived from dishwashers and garbage disposals. Package graywater treatment systems are one of the most significant, emerging water-saving building equipment technologies in the market. These systems use graywater from showers, bathroom lavatory sinks, and clothes washers for water reuse applications. Following treatment, the water could then be used for toilet flushing and potentially for drip irrigation.

The capture, treatment, and reuse of graywater not only yields usable water that would otherwise be directed to the sewer, its use on landscape and for car washing is generally not subject to the typical watering restrictions that are sometimes imposed by local jurisdictions. While the costs of graywater treatment systems vary significantly depending upon the application and the underlying technology of the system, it is frequently not cost-effective to install such a system as a retrofit for the purpose of reusing water inside the building. Instead, these systems are more ideally suited to new construction applications.

5.1.2.3 Pre-Rinse Spray Valves and Boilerless Food Steamers

Commercial food service represents one of the larger water using sectors in the CII sector. For food service operations (restaurants, cafeterias, commercial kitchens, etc.), the replacement of existing non-efficient pre-rinse spray valves (where not already replaced) and incentives for the installation and use of boilerless food steamers are the dominant and easily achieved water use reduction actions. Boilerless food steamers only use 14 gallons of water per day (per compartment), versus the standard boiler-based models that use up to 400 gallons per day (gpd). In addition, the replacement of water-cooled ice makers with water-efficient air-cooled models can be considered.

5.1.2.4 Water Recycling Technologies for Medical Equipment

For medical facilities, consideration must be given to eliminating once-through water use in vacuum systems, X-ray film processing, and steam sterilizers. The use of existing water recycling technologies for these items of equipment can reduce water use significantly (upwards of 98 percent annually).

5.1.2.5 Waterbrooms

When using a hose and nozzle to clean sidewalks, approximately 8 to 18 gpm of water can be wasted. With a pressurized Waterbroom, cleaning is more water efficient, using as little as 2.8 gpm. The Waterbroom nozzle jets use a combination of air and water pressure to clean and remove dirt and food spills from concrete, asphalt or any other composite surface. Studies have shown that the Waterbroom requires 75 percent less labor to operate than a garden hose or broom. Accordingly, for those facilities with wash-down requirements, incentives for the use of pressurized Waterbrooms could be provided.

5.2 Emerging Outdoor Technologies

Water conservation programs should integrate the available technologies with planning and infrastructure. New technology, equipment, leak reduction, dedicated meters, recycled water, appropriate landscape design, and rainwater collection reduces the use of potable sources. Part of planning an efficient, well monitored outdoor water conservation program is to obtain information about all existing and proposed new development large landscapes in an agency's service area. This includes large footprint residences as well as all Commercial and Institutional sites. Comprehensive site audits should incorporate indoor water use data and outdoor data, type and irrigation efficiency of irrigation equipment and plant types.

5.2.1 Dual Metering

Dual metering refers to the installation of separate meters to record indoor and outdoor water use. This provides an efficient way of tracking landscape water use.

In existing areas, a retrofit is needed to replace a mixed-use meter with dual meters. To complete this on a large scale can be a significant investment for a water agency. Therefore, all new construction should be encouraged (incentives) or required (ordinances) to install dedicated landscape meters. Agencies could offer a dual-metering program to all properties with large landscapes (about 5,000+ square feet.) in the service area. Properties with a

dedicated irrigation meter could be provided with an on-line landscape performance report every month. If recycled water becomes available in the future, the dedicated landscape meter could be hooked up to the recycled water system.

Also, water agencies are required to condition the installation of dedicated landscape meters for new retail service connections as of January 1, 2008. With landscape water use in the residential sector being such a significant source of water consumption, conditioning dual meters on new residential accounts in addition to CII accounts could have a substantial impact on Western MWD's overall water consumption. Dual metering is required for water budgeting (BMP5) of outdoor use.

5.2.2 Landscape Measures

5.2.2.1 Precision Irrigation

The State Legislature (based on recommendations of the AB 2717 Landscape Task Force) approved AB 1881 in 2006 regarding performance standards for irrigation equipment. In accordance with AB 1881, local planning agencies are required to adopt a model landscape ordinance that includes installation of water efficient devices and technology including moisture sensor, weather based irrigation controllers (smart-timers), and irrigation delivery devices such as rotator spray heads and drip systems on all Municipal and Industrial sites within its service area by January 1, 2025. In addition, water agencies are required to condition the installation of dedicated landscape meters for new retail service connections on all lots with more than 5,000 square feet of irrigated landscape, as of January 1, 2008.

- Drip or Low Precipitation Irrigation. Western MWD and its retailers could develop a list of approved irrigation devices such as drip irrigation. Drip irrigation uses 75 percent less water than standard irrigation practices. This technology reduces runoff (unaccounted water loss) and soil erosion. Application of the water is precisely directed and the flow rate can be adjusted to the local conditions.

  Metropolitan offers up to $4 per nozzle when installing high efficiency rotating spray nozzles. The water savings are realized through reduced precipitation rates, uniformity in watering, and greater radius. This technology allows landscape to use 20 percent less water. Another technology, pressure regulating devices, for sprinkler heads reduces water use through regulating the pressure. The device is designed not to exceed the manufacturer's water pressure standard.

- Weather Based Irrigation Controllers. Weather based irrigation controllers (WBICs) currently available on the market use remote sensing or controlling options to determine whether irrigation is necessary. Water savings is realized by watering only when necessary based on the local evapotranspiration (ETo) rate, solar index detected, or temperature based on the type of controller. For example, if a high ETo rate or high solar index is detected by the controller, the irrigation system will be turned on. Water savings of 0.05 AF per station annually can be obtained. Savings is estimated at more than 14,600 gallons per household per year.

- Nozzles. Auto shut off hose nozzles increase water savings through greater efficiency when watering. The best application of water efficient hose nozzles is through residential and commercial sites where gardeners or residents water their gardens or lawns manually. Nurseries or home improvement stores that regularly water their plants could save water through use of these nozzles. Auto shut off hose nozzles can save up to 7,500 gallons per year. Some districts offer free hose nozzles as part of their water conservation program.

- Soil Moisture Sensors and Probes. Soil moisture sensors and probes can be used to determine when watering is necessary. Tensiometers, electrical resistance devices, and moisture content or root zones are all technologies currently available for use. One application of this technology is watering of commercial/industrial areas where the irrigation system is controlled manually or small areas where large amounts of equipment may not be cost effective.

5.2.2.2 Landscape Design

Landscape design is a planning approach that would integrate several factors that will reduce water use. Landscaping for water conservation can include one or several of the following aspects for water savings to be realized: plant type, minimizing narrow paths or steep areas that produce inefficient irrigation, plant groups with similar irrigation requirements, regular maintenance of irrigation equipment, fertilizer, aeration, mulch, and reduced irrigation areas in new developments. Water budgets for the types of landscaping could be determined and monitored by the District.

- Appropriate Landscaping. "Water-wise" landscaping is a conceptual design emphasizing water conservation. The design includes a plan, soil analysis, plant selection, turf areas, efficient irrigation technology, mulch, and maintenance. The design incorporates low water use plants. Agencies could offer lists of low water use plants that grow in the region and local nurseries or websites that could provide them. Agencies could develop examples of ideal designs of water-wise landscaping for various land areas or site types such Commercial or Residential. Landscapers or the public would utilize this information and optimize it for their own sites. A subset of water-wise landscaping is "natural" landscaping which utilizes only regional plants for a site plan. Low to no maintenance is necessary since the plants are adapted to the local climate and only rainfall will be necessary to maintain the area once plants are established. Water districts provide information on native plants on their websites and in many cases local nurseries that sell these plants. Water agencies can encourage builders, Homeowners Associations (HOAs), and developers to use these plants in their model homes either through incentives or ordinances. New developments can incorporate these plant palettes into the design for water efficient landscaping.

- Education and Outreach. Landscape design programs should include training and certification programs. Several California cities and water agencies offer year-round bilingual training programs for their customers and their local landscapers. Many of these programs are offered in Spanish. One example is the "Protector Del Agua"

program run by Metropolitan, which could feasibly be applied to all retailers within the Western MWD service area.

A landscape contractor certification program could be considered. Sites that are performing close to the weather-based water budget could then be placed on a "certified" list. This program could also be applied to developers of new residential and commercial properties.

Additional efforts for education and outreach can include water conservation demonstration gardens and demonstration of irrigation technology. This would build on the success of Western MWD's existing "Landscapes Southern California Style" program. Model homes with various indoor and outdoor water conservation technologies could be demonstrated with tours for contractors, builders, or apartment complexes that have projects within the service area.

5.2.2.3 Turf

- Turf Removal. "Cash-for-grass" program: An example of this type of program that could be instituted in an agency's service area offers a financial incentive per square foot of removed grass from a property. Customers must remove all irrigation systems dedicated for that grass and replace them with drip or low-water use irrigation devices. Customers then submit a landscape plan that incorporates low-water use and native plants. A check is mailed to the customer once the landscape plan has been implemented and inspected by agency staff (or a contractor).

  This program could be expanded to incorporate the installation of smart controllers, soil evaluation and amendment incentives and new water-efficient irrigation equipment retrofits. HOAs could be targeted with public outreach to encourage the use of water-appropriate plant palettes instead of grass, with an eye toward amending CC&R restrictions that require turf grass in residential landscapes and common areas. This program could also be expanded to the Commercial sector, and could also be adapted to serve as the basis for landscaping requirements for new construction. However, homeowners are not required to keep the landscape and therefore may revert back to turf at some point, such as resale of the residence.

- Synthetic Turf. Synthetic turf is an alternative landscaping approach to reduce the water needs of an area. Synthetic turf can have an annual water savings of 6 AF per acre. Over the life of the product (which is approximately 10 years), the total water savings is 60 AF for every acre replaced. Athletic fields or schools may be an area where synthetic turf can replace turf yet not lose the recreational benefits of the site. However, financial incentives have remained low for these programs.

5.2.2.4 Swimming Pool Covers

From 2003 to 2006, Metropolitan established a rebate program for swimming pool covers that would cover 1 percent of the pools in its service area. The pool covers would require a minimum 12 millimeter (mm) in thickness but could be either bubbles, vinyl, or insulated vinyl covers. This program could be established with a goal to cover 10 percent of the pools in the

service area. Swimming pool covers could result in 30 percent reduction in water losses, which would be equivalent to approximately 7,000 gallons per year per swimming pool.

5.2.2.5 Ordinances

Mandatory landscape standards and ordinances could be modeled after the progress that AB 1881 achieves on municipal ordinances, and on the AB 2717 Landscape Task Force recommendations. The District and/or retailers could immediately adopt such ordinances and monitor and enforce them. Collaboration with City and County land use agencies could also result in their adoption and enforcement of standards and ordinances (see Section 5.3).

5.2.2.6 Water Budgets

Agencies could encourage and assist owners of large landscapes to develop a water efficient landscape using water budgets. The program could specify the types of irrigation equipment installed at each site, the irrigated area, and plant types present. The information could be entered into a web-based program so comparisons are made between the water budget of an area and weather-based water budgets. This comparison identifies any changes or upgrades to the current design for improved water savings. As recommended by the Landscape Task Force, user friendly materials and/or web-based software could be developed to determine water budgets for the irrigated areas for use by the district or individuals. Additionally, water audits could be required for any property that consistently exceeds 20 percent over the water budget that was determined by the software. Agencies could also use GIS/remote sensing data to determine the amount of landscaped area in a particular sector of the service area.

5.2.2.7 Recycled Water

Ordinances requiring recycled water for urban landscapes are increasing. Recycled water has become a feasible alternative water supply for various areas where water is not in abundance. One application of recycled water is for landscape irrigation. With proper salt management, this alternative water source can reduce the demand of potable water. With dual plumbing and metering, recycled water can be delivered independently to residential and commercial sites. Funding sources and beneficial uses for recycled water will need to be determined for the service area through additional separate studies.

5.2.2.8 Research

AB 2717 required a stakeholder workgroup to evaluate and recommend proposals for improving the efficiency of water use in new and existing urban irrigated landscapes in the state. Research in the areas of landscape and water conservation specifically identified program evaluation that could benefit from research, including how much water is conserved when precision irrigation programs are implemented in a service area. These types of post-implementation evaluations will help agencies determine whether to continue a program, shift strategies, or determine problems if a program is not effective.

5.3 Conservation-Related Legislation

Legislation is being enacted to encourage reduced dependence on potable water. Policies are being set at various levels of government as identified in Table 5-1 and described in greater detail, below.

5.3.1 Federal Legislation

Executive Order 13123, Greening the Government through Efficient Energy Management (1999), is a federal directive to government agencies for the implementation of measures to reduce water use. This order directs federal government agencies to reduce potable water use and incorporate cost-effective water conservation measures in their facilities by 2010. Another aspect of the order is Federal agencies must report baseline water usage and report on water usage every two years.

5.3.2 State Legislation

The state of California has been progressive in legislating water conservation policies and measures. Described below are existing State laws relevant to water conservation. As of the date of this report, several additional water conservation-related bills are pending in the State legislature during the 2008 session (see Section 5.3.4).

5.3.2.1 AB 325

The passage of California AB 325 (the Water Conservation in Landscaping Act of 1990) required that the California Department of Water Resources (DWR) develop a model water efficient landscape ordinance for entities to model their water conservation ordinances. The model ordinance requires landscapes greater than 2,500 square feet to maintain a water balance of 80 percent of reference ETo. Additional components include: irrigation must be 62 percent efficient, separate metering for landscapes, automatic controllers, designed to prevent runoff, appropriate plant selections, irrigation schedules, grading plans and irrigation audits, promote use of recycled water, provide conservation information to new home owners, and promote mulch on non-turf areas. Primarily cities and counties have been involved in establishing these ordinances at the local level and enforcement of the ordinance falls on the city or county, and usually not the local water supplier.

5.3.2.2 AB 2717

AB 2717, passed in 2004, set up a Landscape Task Force and requested the CUWCC to examine landscape water issues. In 2006, the Task Force made statewide recommendations as to the best landscape practices and improvements. Amendments and changes to the Model Water Efficient Landscape Ordinance were made through this committee, and were enacted via AB 1881, the Water Conservation in Landscaping Act.

5.3.2.3 AB 1881

AB 1881, passed in 2006, amends several codes, supplementing them with water conservation requirements or standards. The Davis-Sterling Common Interest Development Act regulates

community apartment projects, condominium projects, planned developments, and stock cooperatives and prevents the prohibition of using low water using plants within these communities. The Energy Commission is to determine performance standards for landscape irrigation equipment (controllers, valves, moisture sensors, and emission devices) which will reduce wasteful water and energy consumption. After 2012, any device that does not meet these standards will be prohibited from installation. For urban water suppliers, separate (dedicated) metering for landscape will be required for all new retail water service of a certain size threshold (5,000 square foot) after January 2008.

5.3.2.4 AB 566

With current amendments to the Water Conservation in Landscaping Act, the updated local ordinances must be submitted by 2010. AB 566, passed in 2007, amends the Water Conservation in Landscaping Act by requiring that climate information based on the California Irrigation Management Information System (CIMIS) be used for irrigation scheduling statewide.

5.3.2.5 AB 715

AB 715, passed in 2007, set performance standards for all toilets and urinals installed in the State of California. By 2014, all toilets and urinals sold in the state must be high efficiency and use no more that 1.6 gpf for toilets, and no more than 1 gpf for urinals. A schedule for manufacturers to offer these models has also been set by January 2010; HETs must be 50 percent of the models manufacturers provide in the State of California. By 2014, only HETs will be offered by manufacturers in the State of California.

5.3.2.6 AB 1420

AB 1420, passed in 2007, changes the funding eligibility requirements of Section 10631 of the Water Code (Urban Water Management Planning Act). For any urban water supplier to be eligible for grant or loan funding administered by DWR, the State Water Resources Control Board (SWRCB), or the Bay-Delta Authority (such as Propositions 50 and 84), the supplier must show implementation of all BMPs or water Demand Management Measures (DMMs), or show the schedule on which the supplier will begin implementing the DMMs if not already implementing. Any supplier not implementing the measures based on cost-effectiveness must submit proof showing why the measures are not cost-effective.

5.3.2.7 AB 1560

AB 1560 passed in 2007 amends the Warren-Alquist State Energy Resources Conservation and Development Act and directs the Energy Commission to adopt water efficiency or conservation standards that save energy for residential buildings. The Department of Housing and Community Development would incorporate these standards into the housing code either under a voluntary best practice or mandatory requirements. All standards will be assessed so that they do not cause the cost of housing to be unreasonable for Californians.

5.3.3 Local Ordinances

5.3.3.1 Western MWD Retail Division

Ord. 362 § 1, 2005: Western MWD under this ordinance requires all customers to conserve water via prevention of leaks or waste. Penalties for knowingly or negligently wasting water can be applied to the party and further result in discontinuation of service.

Ord. 364 § 1(1.3), 2006: Western MWD is committed to using recycled water when it "provides a beneficial use to the customer, is economically and technically feasible, is consistent with applicable regulatory requirements, and is in the best interests of public health, safety and welfare." Recycled water will be pretreated for the industrial and commercial customers by the District.

5.3.3.2 Riverside County

(Ord. 348.3928 § 2 (part), 2000: Ord. 348 § 19.300) Title 17.276. These ordinances through the County of Riverside require the promotion of water efficient landscaping, water use management and water conservation. The County also intends to increase public awareness of water conservation need and programs. Specific guidelines for the plant types, soil amendment needed, and turf areas are stated in the ordinance. Irrigation requirements include the use of automatically controlled irrigation timers, plant groupings, having capabilities to use non-potable water, similar crop coefficients for plants groups, and drip irrigation techniques. Model homes should demonstrate water efficient landscaping and educational materials should be provided to home buyers. These water efficient landscaping ordinances are incorporated into the Riverside County Zoning Ordinance, as amended through March 2008.

Ord. 859, as amended through Ord. 859.1, is the water efficient landscape ordinance for the County. The Riverside County Guide to California Friendly Landscaping establishes the plant types and their irrigation requirements from which a water budget is developed. Mulching is required in all non-turf areas. Irrigation designs must prevent runoff. These designs should include considerations for the type of irrigation equipment, plant type, water quantities delivered to the plants, and grading. Smart irrigation controllers will be incorporated into the design and recycled water will be used when appropriate. Irrigation schedules will be established. The ordinance went into effect January 2007, with amendments made effective in April 2008.

5.3.3.3 San Bernardino County

As part of Title 8 Development Code in Landscaping Standards, the County of San Bernardino requires that landscape plans be submitted by building permit applicants that are located in the service area of a water supplier with a water conservation policy. Also within Title 8 Chapter 88.02 Soil and Water Conservation, the county states that efforts should be made to conserve natural resources like soil and water. However, no specific actions are described in relation to water within the chapter.

5.3.3.4 City of Riverside

Chapter 19.570 of the Riverside Municipal Code describes the minimum landscape standards for water conservation and ecosystem / soil conservation for residential and non-residential

properties. The code calls for drought-tolerant or native species, calculation of a water budget as specified in the code, mulching, pool and spa covers, recirculating water features, dual water meters for new developments over 5,000 square feet, automatic controllers, irrigation that reduces overspray/runoff, and recycled water planning. Publications are required to be provided by the developer for public education. Additionally, at least one model home should be landscaped for demonstration of water efficient landscaping and irrigation. Information regarding the landscape design including plant types of the demonstration home should be provided.

5.3.3.5 City of Corona

(`78 Code, § 13.26.020.) (Ord. 2049 § 1 (part), 1991): The City of Corona adopted an ordinance to reduce overall water use by 15 percent except in the Green River area which will reduce by 20 percent. A Water Conservation Committee shall be formed for implementation of this reduction. Penalties will be assessed for consuming water greater than the specified amount. The City of Corona will keep this ordinance in effect until the water is replenished or augmented.

(Ord. 2544 § 4, 2001.): City of Corona will use recycled water within its jurisdiction whenever it is economically justified and technically feasible. The City will also adopt a Recycled Water Master Plan to develop recycled water projects. Current developments can apply under this ordinance for approval of recycled water projects. New developments may be required as part of their permit to include recycled water as part of the plans or to design the facility for future recycled water use.

Title 17.70.070: Water efficient landscape measures. The City of Corona has implemented a plan to reduce water consumption by landscape. All developer installed landscape will need to include the following elements drought tolerant plants, reduce turf areas, and use irrigation technologies in the design. This ordinance applies to all land uses. Additionally, model homes will be required to have at least one home in the subdivision to show water efficient landscaping with supplemental information for the home buyer. Landscape water conservation projects will be evaluated on a point system based on the following criteria: water conserving plants, plants grouped by water need, plant spacing based on mature growth, low water turf type, turf area, mulch, 10 to 20 percent hardscape, organic soil amendment, and deep root tree watering sleeves. Irrigation plans will be rated on water efficient spray for ground cover/turf, drip/ bubbler for shrubs and trees, automatic controller, CIMIS scheduling, soil moisture sensors, rain sensors, slope factors, sensitivity to aspect and check valves.

Ord. 2912 § 3 (part), 2007: Commercial and Residential Green Buildings. The purpose of this ordinance is to encourage resource conservation which also encourages landscape design and water conservation measures. No enforcement of this ordinance occurs since the measures are voluntary.

5.3.3.6 City of Murrieta

(Ord. 403 § 1 (part), 2007): In October 2007, the city of Murrieta adopted a landscape ordinance in accordance with AB 2717. The focus of the ordinance is to use water efficient landscaping, planned areas of turf, and use of irrigation technology and management. The city requires landscapes not to exceed 80 percent of the reference Eto, prevent overspray and

runoff, and include education and incentive programs to the public. Landscapes will be planned with the appropriate plants types and mulching. Turf areas will be included into a design when functionally needed. Irrigation for landscape areas should include smart controllers and prevent runoff and when possible should use non-potable water. All plans will be prepared based on a water budget.

5.3.3.7 City of Temecula

(Ord. 94-22 § 2 (part)): This ordinance promotes water-efficient landscaping using water management and water conservation approaches. Landscape designs will focus on long-term water conservation practices including irrigation schedules and technology, water audits, water budgets, and low use water plants. In the ordinance, specific design standards for slopes and tree placement are described. For model homes at least one (1) and up to 30 percent of the model homes should have water efficient landscape design and home buyers will be provided information regarding plants and plans for water efficient landscapes as part of a public education plan.

5.3.3.8 Retrofit on Resale Ordinances

Currently only a few cities and water districts in California have retrofit on resale ordinances. The text of one city ordinance includes language that describes the parties' responsibilities and the time frame within which the retrofit will take place. The current owner (i.e., the seller) is responsible for the replacement of any existing non-water conserving fixtures with water conserving plumbing fixtures including toilets, urinals, showerheads, and faucets. Exemptions are given for specific circumstances. Additionally any permit given by the city for a plumbing fixture will require the use of a water conserving fixture.

Wide acceptance of this type of ordinance would depend on several factors, such as percent of new development, percent existing facilities, percent incorporation of water conservation plumbing within the service area currently installed, time frame for implementation of ordinance, and the status of the housing market. The most effective conditions for this type of ordinance would be a high percentage of existing facilities without water conserving devices, a short timeframe, and a very active resale housing market (i.e., for non-new development). A short time frame would be necessary since AB 715 requires that by 2014 the only toilets and urinals available in California will be high efficiency models. For an effective retrofit on resale program, the program would have to begin immediately, and may not be cost-effective. Evaluation of the cost of implementation and enforcement of the program would need to be weighed against the percentage of the service area that would be captured to determine whether an ordinance is justified.

5.3.4 Pending State Legislation

Assembly Bill 1435 introduced in 2008 would establish water conserving rate structures. Water suppliers providing water to customers that have a metered service connection will be subject to a conservation rate structure. This structure will be based on the amount of water used, for purposes other than agriculture. This bill was not passed by the Legislature.

Assembly Bill 2175 introduced in 2008 would require that the Department of Water Resources establish a numeric water conservation target of 20 percent reduction in gpcd statewide by 2020. The targets will be reviewed every five (5) years beginning in 2012 and increased based on specific information. Each hydrologic region of the state would have interim targets in the urban and agricultural sectors. DWR would develop of list of water conservation technologies. Urban and agricultural water suppliers would then be required to adopt cost effective measures. The bill also reiterates the grant funding requirements of AB 1420, adopted in 2007. The bill was passed by the Legislature, but vetoed by the Governor. A similar bill is expected in 2009.

Assembly Bill 2882 introduced in 2008 would authorize the use of allocation-based conservation water pricing to reduce the quantity of water used, to eliminate waste of water and to conserve the supplies of the public entity providing the water. A public entity could adopt an allocation-based conservation water pricing structure which could include conservation measure costs and overuse costs. This bill have been enacted into law and becomes effective January 1, 2009.

TABLE 5-1
SUMMARY OF MAJOR LEGISLATION CURRENTLY PASSED ESTABLISHING REQUIREMENTS AND STANDARDS FOR WATER EFFICIENCY AND CONSERVATION

Entities Impacted	Legislation	Requirement	Implementation Date
Federal agencies	Executive Order 13123	Reduce potable water use with cost effective measures	2010
		Report baseline usage and water usage	every 2 years
Cities and Counties	AB 325 Water Conservation in Landscaping Act	Requires adoption of model water efficient landscape ordinance by cities and counties	1993
	AB 566	Updated ordinance	2010
Cities, Counties, and Urban Water Retailers	AB 2717	Committee recommends best practices and improvement to water efficient landscape	2004
Manufacturers/ Retail	AB 715	Performance standard 1.6 gallon/flush toilet and 1 gallon/flush urinal	2010
		Only high efficiency toilet/urinal models offered by manufacturers in CA	2014
Urban Water Retailers	AB 1420	Show implementation of all DMM for grants or loans from DWR, SWRCB, or Bay-Delta Authority	2008
	AB 1881	Separate metering for landscapes for all new retail water service	2008
	AB 2882	Use of allocation-based conservation water pricing	2009

Entities Impacted	Legislation	Requirement	Implementation Date
Energy Commission	AB 1560	Adopt water efficient or conservation standards for residential buildings	2012
	AB 1881	Performance standards for irrigation equipment	2008
Cities, Counties and HOAs	AB 1881	Prevents prohibition of low water using plants	2008

5.3.5 Recommended Updates to Ordinances

Most ordinances address landscape design, plant types, mulch, slopes, automatic control of irrigation devices, and precise irrigation technologies. Outreach and education is included extensively to new facilities or homes. Ordinances address the use of recycled water but are usually referring to a policy commitment but no specific requirements. Specified requirements for dual plumbing (indoor and outdoor) and dual metering for outdoor use should be evaluated as an ordinance for the service area. The ordinance could require recycled water infrastructure for all landscapes unless cost prohibitive and require retrofits for renovation projects. Additionally, water reporting/water budget ordinances for landscapes over a particular size and water audits for any sites that continue to violate their water budget will help monitor water use and target over-users.

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Section 6: Incentives and Funding Opportunities

6.1 Financial Incentive (Rebate) Programs

Agencies offer incentives for water conservation via rebates toward residential, landscape, and industrial process and equipment modifications. Metropolitan has a comprehensive rebate program that Western MWD and its customers can access as shown in Table 6-1. Additional rebates are offered by electric and gas utilities for energy efficient products, such as from Southern California Edison and Southern California Gas Company, which may also translate into water savings depending on the product installed (see Table 6-2).

6.1.1 Metropolitan Water District of Southern California (Metropolitan)

Metropolitan provides approximately $15 million annually in funding for a variety of rebate-based conservation incentive programs that are applicable within the Western MWD service area, and that come from its Conservation Credits Funding Program. Some of the funding for established incentive programs and grants programs are provided for these incentives. For example, Metropolitan will pay a flat incentive for each approved measure installed within Western MWD's service area. Devices covered include HETs, ULFTs and urinals, HECWs, WBICs, cooling tower conductivity controllers, synthetic turf replacement, and several others.

6.1.1.1 Metropolitan "Save A Buck"

"Save A Buck" is an aggressive rebate program tailored specifically for the CII sector. Rebates and incentives are available to business, industry and institutional water customers for installation or retrofit with qualifying water-saving devices. Fifty-seven (57) percent of devices rebated have been for ULFTs and HETs, although rebate programs exist for the majority of new and emerging technologies.

6.1.1.2 Metropolitan Public Sector Program

The Public Sector Water Efficiency Program addresses public agencies' water and energy savings needs by offering four services: water audits, enhanced device incentives, "pay for performance" cash back, and assistance to connect to recycled water supply. All public sector customers within Metropolitan's service area are eligible. A public sector customer is defined as a city, county, state or federal facility funded through public funding. Non-profit organizations are not eligible under this program.

6.1.2 Energy Utilities

Southern California Edison and Southern California Gas Company provide mail-in and instant rebates to replace or upgrade older residential, commercial and industrial appliances with new, ENERGY STAR qualified appliances, including high-efficiency clothes washers (with a water factor of 8.0 or less), dishwashers, water heaters, and other water efficient devices. Rebates for

FY 2008 must be purchased and installed before December 31, 2008, and are offered on a first-come, first-served basis.

6.2 Funding Opportunities

A variety of opportunities for grant funding are available to Western MWD and its retail purveyors. Many of these grant opportunities require the applicant to provide matching funds ("local match") as well as funds for operations and maintenance once a project or program is implemented. The source of local match and funds for operations and maintenance may include: water and wastewater general funds; capital improvement funds; and general funds from local cities, County departments, private organizations, member dues, etc. Local taxpayers may also fund these projects through rate increases, bond measures, and tax increases.

This section identifies various funding sources and their associated requirements and guidelines, to assist with implementation of the recommended conservation programs. Sections 6.2.1 through 6.2.3 present information on federal, State, and local funding sources. Table 6-3 provides a summary of these funding opportunities and provides contact information for each program.

6.2.1 Federal

This section includes a discussion of funds available through various federal programs and specifies eligibility requirements.

6.2.1.1 US Bureau of Reclamation

6.2.1.1.1 Water 2025 Challenge Grant Program

This grant program is intended to fund collaborative local projects that improve water conservation and management through advanced technology and conservation markets. Through this program, federal funding is provided to irrigation and water districts for up to 50 percent of the cost of projects involving conservation, efficiency and water marketing. Eligible applicants include irrigation and water districts and state governmental entities with water management authority. Applicants must be located in the western US (California is an eligible area). Applicants do not have to be part of a Reclamation project but proposals with a connection to Reclamation will receive more weight in the evaluation process.

6.2.1.1.2 Water Conservation Field Services Program

This program was initiated in 1996 to encourage water conservation, assist water agencies to develop and to implement effective water management and conservation plans, coordinate with state and other local conservation program efforts, and generally foster improved water management on a regional, statewide and watershed basis. Eligible applicants include agricultural and municipal and industrial water user entities, states, local governments, universities, and non-profit organizations that have a connection to or with a Reclamation Project, and tribes. Implementation of conservation measures is supported through local

programs on a cost-sharing basis, generally 50/50, through cooperative agreements or grants of up to $100,000 per eligible proposal.

6.2.1.2 US Environmental Protection Agency – Source Reduction Assistance

The purpose of this program is to prevent the generation of pollutants at the source and ultimately provide an overall benefit to the environment. This program seeks projects that support source reduction, pollution prevention, and/or source conservation practices. Source reduction activities include: modifying equipment or technology; modifying processes or procedures; reformulating or redesigning products; substituting raw materials; and generating improvements in housekeeping, maintenance, training, or inventory control. Pollution prevention activities reduce or eliminate the creation of pollutants via such procedures as: using raw materials, energy, water or other resources more efficiently; protecting natural resources through conservation; preventing pollution; and promoting the re-use of materials and/or conservation of energy and materials. Eligible organizations include units of State, local, and tribal government; independent school district governments; private or public colleges and universities; nonprofit organizations; and community-based grassroots organizations.

6.2.1.3 Natural Resources Conservation Service – Watershed Protection and Flood Prevention Grant

The purpose of the program is to support activities that promote soil conservation and that promote the preservation of the watersheds of rivers and streams throughout the US. This program seeks to preserve and improve land and water resources via the prevention of erosion, floodwater, and sediment damages. The program supports improvement of: (1) flood prevention including structural and land treatment measures; (2) conservation, development, utilization, and disposal of water; or (3) conservation and proper utilization of land. Successful applicants under this program receive support for watershed surveys and planning, as well as watershed protection and flood prevention operations. Funding for watershed surveys and planning is intended to assist in the development of watershed plans to identify solutions that use conservation practices, including nonstructural measures, to ultimately solve problems.

Matching funds are not required; however, applicants must generally provide matches ranging from 0 to 50 percent in cash or in-kind resources depending on such factors as project type and the kinds of structural measures which a project proposes.

Eligible entities include: states, local governments, and other political subdivisions; soil or water conservation districts; flood prevention or control districts; and tribes. Potential applicants must be able to obtain all appropriate land and water rights and permits to successfully implement proposed projects.

6.2.2 State

Potential funding for Plan implementation may be available through various State programs, including those provided by Propositions 50, 84 and 13, as described below.

6.2.2.1 Proposition 50 – Water Use Efficiency Grants

The Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002, Water Code §79500, et seq., was passed by California voters in the November 2002 general election. Proposition 50 authorized $3,440,000,000 in general obligation bonds, to be repaid from the State's General Fund, to fund a variety of water projects. Many of the grant programs funded by Proposition 50 have concluded, although the water use efficiency program continues to accept applications.

This particular grant program is intended to fund agricultural and urban water use efficiency projects. The program focuses on funding projects that are not locally cost effective, and that provide water savings or in-stream flows that are beneficial to the Bay-Delta or the rest of the State. Consideration is also given to projects that address water quality and energy efficiency. Specific types of projects that can be funded include: water use efficiency implementation projects providing benefits to the State; research and development projects; feasibility studies, pilot or demonstration projects; training, education or public outreach programs; and technical assistance programs related to water use efficiency. Cities, counties, joint power authorities, public water districts, tribes, non-profit organizations (including watershed management groups), other political subdivisions of the State, regulated investor-owned utilities, incorporated mutual water companies, universities and colleges, and State and Federal agencies are eligible applicants. Grants to urban water suppliers are conditioned on implementation of the DMMs described in CWC §10631.

6.2.2.2 Proposition 84

The Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Act of 2006 (Public Resources Code § 75001, et seq.), was passed by California voters in the November 2006 general election. The funding for Proposition 84 is tied to participation in a qualified IRWMP. Proposition 84 will be implemented by the Department of Public Health (DPH), DWR, and the SWRCB. Proposition 84 programs will primarily fund projects that are not "locally cost effective," and that provide water savings, or in-stream flows that are beneficial to the Bay-Delta or the rest of the state. Consideration is also provided for projects that emphasize water quality and energy efficiency benefits.

DWR will offer grants for projects that assist local public agencies to 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. Eligible projects must be part of integrated regional water management plans. Projects eligible for integrated regional water management plan funding include programs for water supply reliability, water conservation, and water use efficiency.

6.2.2.3 Proposition 13 – Agricultural Water Conservation Program

The Agricultural Water Conservation program under Proposition 13 is for voluntary, cost effective projects or programs intended to improve agricultural water use efficiency, and feasibility studies for such projects. The types of projects funded under this program include canal or ditch piping or lining projects; tail water recovery projects; and replacement of leaking distribution system components. Up to $5,000,000 per eligible project may be awarded, and local public agencies and incorporated mutual water companies are eligible for funding.

6.2.3 Local

Western MWD has planned, implemented, and funded the construction and operation of water use efficiency projects through application of local funds, obtained through programs such as those described below.

6.2.3.1 Capital Improvements Program Funding (Revenue Bonds, Certificates of Participation)

Water districts, as well as other government entities (e.g., counties and cities) can raise funds by issuing municipal bonds or certificates of participation. Bonds and certificates of participation are governed by an extensive system of laws and regulations. Under these systems, investors provide immediate funding for the promise of later repayment. Generally, bonds and certificates of participation are used for capital improvement projects. In the case of a water district, bonds and certificates are secured by revenues from the water system and by property taxes received by the agency.

6.2.3.2 Property Tax Assessment (Assessed Valuation)

Property taxes are a large source of revenue for water-related projects and agencies in the Western MWD service area. The Riverside County Tax Assessor collects the charges on behalf of various districts. This funding is used for general expenditures, capital improvements, and to service bond and certificate debt. While this is a large and important source of funding, in some cases, the State can divert these funds.

6.2.3.3 User Fees

Funding for O&M of water-related projects often comes from user fees, which are charges for water delivered to a home or charges for wholesale water supplies. In addition to these fees, many agencies also charge “hook-up” or “connection” fees – charges for providing facilities to provide water or wastewater services to a new development. These fees are also known as “facility capacity fees.” Facility capacity fee revenue is difficult to forecast due to the unpredictable timing of development activity. Development activity depends on real estate demands, the regional economy, and land use planning activity.

TABLE 6-1
WATER CONSERVATION INCENTIVES OFFERED BY METROPOLITAN WATER DISTRICT

Type	Incentive Program	Rebates	Water Savings
Commercial	Smart sprinkler controller	$630 per acre	Up to 400 gallons per day
	High efficiency toilets, low flush toilets or upgrades	$30-165 per fixture	15,000 gallons per year
	High efficiency urinals, zero and ultra low water urinals, or upgrades	$120-400 per fixture	45,000 gallons per year
	Process improvement guidelines -Reuse and reduced demand	$3/1,000 gallons water saved	Project dependent
	Irrigation system improvement - Efficient equipment upgrades	$3/1,000 gallons water saved	Project dependent
	Water Use Efficiency Program - Landscape	Free program	Reduced irrigation needs
	Waterbrooms	$150/unit	50,000 gallons per year
	Cooling tower conductivity controller	$625 per device	800,000 gallons per year
	pH conductivity controller	$1,900 per device	
	High efficiency clothes washer	$210 per unit	35-50 percent reduction in water use
	Pre-wash sprayer	$60 per unit	Up to 4.4 gallons per minute
	Connectionless food steamer	$485 per unit	81,500 gallons per year
	X-ray film processor recirculation system	$3,120 per unit	774,870 gallons per year
	Steam sterilizer retrofit	$1,900 per unit	45-50 gallons per hour
Residential (SFR and MFR)	Rotating sprinklers	$4/sprinkler	20 percent less water used
	Smart sprinkler controller	Up to $80	40 gallons per day
	Low-flow toilet	$30-165 per fixture	14 gallons per day
Builders	Dual flush or 1 gallon toilets	$100 per unit	12,000 gallons per year
	High efficiency clothes washer	$400	35-50 percent reduction in water use
	Smart sprinkler controller	$200	Up to 400 gpd
	Landscaping	$0.80/$ft^2$ up to 2,000 ft^2	Project dependent
Public Space and Agriculture	Irrigation system improvement	$3/1,000 gallons water saved	Project dependent
	Rotating sprinklers	$4/sprinkler	20 percent less water used
	Water Use Efficiency Program-Landscape	Free program	Reduced irrigation needs

TABLE 6-2
REBATES FOR ENERGY EFFICIENT TECHNOLOGIES RELATED TO WATER CONSERVATION

Type	Technology	Rebate	Water Savings	Rebate Provider
SFR	Tankless Water heater	$200 per unit	TBD	SoCal Gas
	Clothes Washer	$35 per unit	TBD	SoCal Gas
	Energy Star dishwasher	$50 per unit	TBD	SoCal Gas
	Hot Water Boiler	$150 tax credit	TBD	USDOE
	Gas, oil, propane, water heater (energy factor 0.8)[(a)]	$300 tax credit	TBD	USDOE
	Gas, oil, propane, water heater (energy factor 2.0)[(a)]	$300 tax credit	TBD	USDOE
	Gas or electric storage water heaters	$30 per unit	TBD	SDGE
MFR	High Efficiency Dishwasher	$30-50 per unit	TBD	SoCal Gas
	Gas Water Heaters	$500 per unit	TBD	SoCal Gas
	Water Heater/Boiler Controller	$750-$1500 per unit	TBD	SoCal Gas
Commercial	Coin Operated Laundry Rebate	$130 per unit	TBD	Cal-UCONS
	High Efficiency Clothes Washer	$50-75 per unit	TBD	SoCal Gas
	Spray valve and installation	Free	TBD	SoCal Gas
	Connectionless (Boilerless) Steamer	$750 per unit	TBD	SoCal Gas
	Instantaneous Water heater	$0.50-2.00 per mBtuh	TBD	SoCal Gas
Commercial/Industrial	Process Boiler Direct Contact Water Heater	$2.00 per mBtuh	TBD	SoCal Gas
	Steam Trap Replacement	$100 per unit	TBD	SoCal Gas
Manufacturers	Dishwasher/cloth washer	$75-175/unit tax credit	TBD	IRS
Agriculture	Low-pressure sprinkler nozzles	$1.15 per unit	TBD	SCE
	Agricultural pump efficiency program	Up to 50 percent of project cost	TBD	PG&E/SCE/CPUC

Notes:
(a) Tax credits for SRF as part of the Energy Bill passed in 2005. Some tax credits ended in 2007 and many of the tax credits will end on December 31,2008.
TBD-Water savings to be determined
SCE- Southern California Edison
USDOE- United States Department of Energy
CPUC- California Public Utilities Commission
SoCalGas- Southern California Gas Company
IRS- Internal Revenue Service
PG&E-Pacific Gas and Electric

TABLE 6-3
POSSIBLE FUNDING OPPORTUNITIES

Funding Objective	Program Sponsor	Brief Description	Key Points	Eligibility	Submit Grant Application	Contact
FEDERAL						
Water Conservation	United States Bureau of Reclamation (USBR)	Challenge Grant Program: Through the Challenge Grant Program, Reclamation provides 50/50 cost share funding to irrigation and water districts and states for projects focused on water conservation, efficiency, and water marketing. Projects are selected through a competitive process, based on their ability to meet the goals identified in Water 2025: Preventing Crises and Conflict in the West. The focus is on projects that can be completed within 24 months that will help to prevent crises over water.	Funding for Water 2025 Challenge Grant projects is awarded on a competitive basis through a merit-based review process performed by a Technical Proposal Evaluation Committee. Matching funds are required. Applicants must provide a minimum 50 percent of project costs in non-Federal cash or in-kind resources. Priority is given to projects that will be completed within 24 months from the date of the award, and that will decrease the likelihood of conflict over water.	Eligible applicants include irrigation and water districts, state governmental entities with water management authority. Projects must be located in Western US.	The FY 2008 budget request for *Water 2025* is $11 million http://www.doi.gov/water2025/grant.html	Miguel Rocha, Water 2025 Program Coordinator (303) 445-2841
Water Conservation	USBR	Water Conservation Field Services Program: This program is intended to: assist in developing effective water management and conservation plans; encourage and promote implementation of water efficiency measures; demonstrate conservation technologies; and promote and support water education and training. Through this program, Reclamation provides 50/50 cost share funding.	Funding is awarded on a competitive basis through a merit-based review process. Matching funds are required at a minimum 50 percent of total project costs, with up to $100,000 per eligible project/activity awarded.	Eligible applicants include agricultural and municipal and industrial water use entities, state governmental entities, universities, tribes, and non-profit organizations that have a connection with a Reclamation Project. Projects must be located in the Southern California Area Office (SCAO) service area.	Not currently soliciting applications.	Debra Whitney, SCAO Water Conservation Coordinator (951) 695-5319
Water Quality	USEPA	Source Reduction Assistance: The purpose of this program is to provide an overall benefit to the environment by preventing the generation of pollutants at the source. This program seeks projects that support source reduction, pollution prevention, and/or source conservation practices.	Specific requirements for measurement and reporting requirements.	Units of state, local, and tribal government; independent school district governments; private or public colleges and universities; nonprofits; and community-based grassroots organizations.	Funding opportunity anticipated in FY 2008.	Leif Magnuson, Pollution Prevention Coordinator (415) 972-3286
Resource Stewardship	Natural Resources Conservation Service	Watershed Protection and Flood Prevention: Funding for activities that promote soil conservation and the preservation of the watersheds of rivers and streams throughout the US.	Matching funds are not required: applicants must generally provide matching ranging from 0 percent-50 percent in cash or in-kind resources depending on such factors as project type and the kinds of structural measures a project proposes.	States, local governments, and other political subdivisions; soil or water conservation districts; flood prevention or control districts and tribes. Potential applicants must be able to obtain all appropriate land and water rights and permits to successfully implement proposed projects.	Not currently soliciting applications.	Luana Kiger, Acting Director Watershed Planning Services (530) 792-5661

Funding Objective	Program Sponsor	Brief Description	Key Points	Eligibility	Submit Grant Application	Contact
STATE						
Proposition 50						
Conservation/Water Use Efficiency (WUE)	Proposition 50-Chapter 7(g) DWR WUE Grant Program	Program primarily funds urban and agricultural projects not locally cost effective, and that provide water savings, or in-stream flows that are beneficial to the Bay-Delta or the rest of the state. Consideration also for water quality and energy efficiency.	Two step on-line process application process: first step is concept proposal and second step is detailed on-line submittal. Project Funding: $3 million, cost-share expected	Cities, counties, districts, tribes, non-profits; also utilities and mutual water companies for Section A, also universities, colleges, state and federal for section B.	DWR posted its 2008 WUE Proposal Solicitation Package (PSP) on January 25, 2008. Step 1 Application due TBD. Step 2 Application due TBD. http://www.grantsloans.water.ca.gov/grants/efficiency.cfm	Baryohay Davidoff, DWR (916) 651-9666
Proposition 84 (by chapter)						
Multiple Topics	Proposition 84 Water supply/flood protection, etc.	In general, this bond law would provide funding for flood control, integrated regional projects, water quality, etc.	$5.388 Billion major grants for local entities through IRWMPs	IRWMP is a primary tool of Proposition 84	Draft Guidelines and PSP expected for release in mid 2008; TBD	Anna Aljabiry (916) 651-9262 aljabiry@water.ca.gov
Chapter 4 Planning	DWR	Plan and Feasibility studies/ climate change evaluation for impacts on flood and water systems, integration of flood and water systems, modeling, reservoir operations	$65 million budget	Interregional	Draft Guidelines and PSP expected for release in mid 2008; TBD	Anna Aljabiry (916) 651-9262 aljabiry@water.ca.gov
Chapter 9 Sustainable Communities	TBD by Legislation	Urban greening projects that reduce energy, conserve water, and improves air/water quality, including not less than $20M for urban forestry projects	$90 million budget	Interregional	Draft Guidelines and PSP expected for release in mid 2008; TBD	Anna Aljabiry (916) 651-9262 aljabiry@water.ca.gov
Chapter 9 Sustainable Communities	TBD by Legislation	Plan grants and incentives for regional and local land use plans designed to promote water conservation, reduce auto use/fuel consumption, encourage greater infill/compact development, protect natural resources/ag lands, revitalize urban/commercial centers	$90 million budget	Interregional	Draft Guidelines and PSP expected for release in mid 2008; TBD	Anna Aljabiry (916) 651-9262 aljabiry@water.ca.gov
Proposition 13						
Water Conservation	DWR	Agricultural Water Conservation: voluntary, cost effective projects or programs to improve agricultural water use efficiency, and feasibility studies for such projects	Canal or ditch piping or lining projects; tail water recovery projects; and replacement of leaking distribution system components; $5 million per eligible project	Local public agencies and incorporated mutual water companies	Continuous filing; application being updated http://www.grantsloans.water.ca.gov/loans/conservation.cfm	Baryohay Davidoff (916) 651-9666
LOCAL						
Local funding opportunities include bonds and property taxes for capital, parcel taxes, existing capital improvement budgets, local sales taxes, utility fees, water sales, and local and regional rebate programs.						

Section 7: Conservation Measures Evaluation

To aid the design of Western MWD's water use efficiency programs, measures described in Sections 4 and 5 were evaluated and put through an initial screening process to identify those best suited to Western MWD's service area.

Many of these measures and technologies have extensive performance histories while others provide fewer comparable results or fully tested methodologies. Individual measures or emerging technologies do not constitute a complete program, as a fully developed conservation program may offer multiple products with overlapping administrative requirements, marketing, delivery or monitoring mechanisms.

A significant part of the evaluation was the execution of a stakeholder process, to provide representatives of various customer sectors the opportunity to review the proposed conservation measures and programs and to comment on them.

7.1 Screening Criteria

Each of the potential measures and technologies were screened and ranked according to the criteria described below. A point value was given showing its relative importance compared to the other listed criteria. The most sought-after characteristics were scored with the highest number value awarded (5 points), with the least sought-after characteristic receiving a lower score.

7.1.1 Total Cost

The total dollar cost of a program is considered to include the retail value of the technology or program on a per unit basis, the operations and maintenance costs required for long-term operation and monitoring (including the administrative, marketing, and other related staffing costs), as well as the initial training and educational costs to ensure accurate implementation. The total cost of measures to Western MWD will be highly dependent on the details of the program design and are therefore difficult to quantify. Despite these difficulties, it is still desired include cost as a category in the initial screening process as Western MWD strongly desires to maximize its return on investment when designing these programs.

Measures are assessed based on whether the above costs make a measure immediately cost prohibitive or not. A measure considered to be cost prohibitive shall not be included in a program design even if its overall score is high.

7.1.2 Area-wide Water Savings Potential

This screening criterion is a quantifiable means to look at the potential volume of water savings anticipated from program implementation within Western MWD's service area in terms of potential AF saved per year, as well as potential participation (e.g., number of existing devices, customers, retrofit opportunities, etc.).

Area-wide water savings was scored relative to the total volume of savings anticipated on an annual basis for each program. The conservation measure(s) Area-wide savings score contributes 50 percent to the overall score.

7.1.3 Ease of Implementation

To determine the ease of implementation of a proposed program, the ability to quickly ramp up (or down) with minimal impact on management or staffing at Western MWD or its retail purveyors was identified as a measure of feasibility. For example, an entirely new WBIC installation program would likely require training of outside contractors to properly install, program and monitor the effectiveness of that program; therefore, that program may be considered to have a greater impact on staffing and management efforts (assuming that there is no existing dedicated staff) during the initial ramp up period and hence would receive a lower ease of implementation value.

However, as a member agency of Metropolitan, numerous rebate programs are offered and implemented on behalf of Western MWD, which can ensure equal coverage within both its retail and wholesale service areas. As a result, installation of WBICs can be completed by Metropolitan as part of an existing rebate program, thereby ensuring the feasibility of program implementation.

Ease of implementation was scored based on the ability for all agencies within the Western MWD wholesale service area to quickly ramp up and offer or distribute a particular program or technology to customers with minimal impact on management or staffing. The program(s) with the least amount of time required to implement either due to pre-existing programs in place or the support/subsidy of Metropolitan, received a higher score (4 or 5), whereas a more complicated program requiring extensive vendor training and installation received a lower rated score (2 or 3). Ease of implementation accounts for 25 percent of the overall score.

7.1.4 Potential for Outside Funding

This screening criterion evaluates whether the proposed program is eligible for grant funding, shared program costs, or other outside funding sources in order to lower total program costs, thereby increasing the cost-effectiveness of that program.

A major variable in determining the success of implementation on a region-wide scale, and one which accounts for the range of purveyor needs is the ability to fund the conservation program. The number of applicable funding options for a particular program is the evaluation method, with a score of five (5) given for the more marketable programs envisioned by the funding options described in greater detail below. Funding potential accounts for 25 percent of the total score.

7.2 Screening Analysis

A weighted matrix using the above criteria was developed to screen potential conservation measures and technologies to aide program selection and design. The criteria were grouped into three (3) main classifications: cost, water savings and implementation, and weights were

assigned to each classification based on the relative value anticipated upon implementation throughout the Western MWD service area. The groups and weights are shown in Table 7-1.

Each conservation option was given a range of one (1, Low) to five (5, High). The scoring method varies by criterion, and is generally qualitative for purposes of discussion and comparison against the wide variety of conservation options available to Western MWD. A summary of each conservation program and its score using this methodology is provided in Table 7-2 (see also Appendix B).

TABLE 7-1
COMPARISON MATRIX WEIGHTING

Main Group	Heading	Weighting
Cost	Total Cost	Qualitative
Water Savings	Area-wide Savings	20%
Implementation	Ease of Implementation	50%
	Funding Potential	25%
Total		**100%**

The matrix groups measures into the following categories:

Foundational BMPs: These measures must be implemented for Western MWD to be considered in compliance with the Urban MOU.

Additional Measures: These measures are either non-foundational programmatic BMPs or emerging technologies. Under the CUWCC's new flex track system, measures other than those specified by the former BMPs (including emerging technologies) can be used to obtain compliance with non foundational BMPs as long as they are appropriate to the programmatic BMP category (Residential, Landscape or CII).

Non-WUE Measures: These measures can still result in a significant reduction in potable water consumption but are not classified as a WUE measure and are therefore not currently eligible for BMP compliance.

Some measures listed in the matrix are not described in detail in Section 5 as they were added following the stakeholder process.

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TABLE 7-2
CONSERVATION PROGRAM COMPARISON SCORING MATRIX

Conservation Program Options	BMP Sector	Res vs Com	Former BMP	Description	Program Ranking Criteria								Total	Service Area Saturation %	MWD Incentives
					Cost	*Water Savings*		*Implementation*							
					Total Cost	*Area-wide Savings in Territory*		*Ease of Implementation*		*Funding Potential*					
					Qualitative	*50%*		*25%*		*25%*					
					Cost Prohibitive ?	Grade[(a)]	Sub-total	Grade[(a)]	Sub-total	Grade[(a)]	Sub-total				
Foundational BMPs															
Reduce Unaccounted for Water	Foundational Utility Ops	NA	3	Investigate unaccounted for water and fix all leaks throughout the system.											
Meter All Accounts and Bill by Volume of Use	Foundational Utility Ops	Res an CII	4	Install meters at all sites. BMP 4 requires metering 100% of the existing un-metered accounts and billing by volume of use.											
Conservation Coordinator	Foundational Utility Ops	NA	12	Designate an individual as the agency's responsible party for conservation											
Public Information	Foundational Education	NA	7	Public information program to promote water conservation and its benefits											
School Education	Foundational Education	NA	8	School education program to promote water conservation and its benefits											
Pricing	Foundational Conservation Pricing	All	11	Adopting conservation pricing rate structure and, pursuant to the amendment in June 2007, setting up a pricing rate such that at least 70% of total annual revenue comes from volumetric rates as apposed to fixed customer charges.											
Wholesale Agency Support	Foundational Utility Ops	NA	10	Financial investments, technical support, program management, water shortage allocation policy, non-signatory reporting and encouraging CUWCC membership											
Eliminate Water Waste (Landscape)	Foundational Utility Ops	Res and CII	13	Limit turf area, mandate irrigation system efficiencies and weather-based irrigation controllers											
Eliminate Water Waste (not related to Landscape)	Foundational Utility Ops	Res and Com	13	Prohibit single pass cooling systems, non-reclaimed water systems for vehicle washes, commercial laundry, decorative water fountains											
Measures Being Considered															
Rotating Nozzles for Pop Up Spray Head Retrofits	Landscape	Res and CII		Also known as MP Rotators, the multi-trajectory, rotating streams of the rotating nozzles apply water more slowly and uniformly than conventional sprays and rotors - especially after arc and radius adjustment. Independent water audits now document water savings of 20%. Can be used in residential and commercial settings.	No	5	2.5	4	1	5	1.25	4.75			Yes
Residential High Efficiency Clothes Washers (HECW)	Residential	Res	6	HECWs utilize technological advances to deliver high quality wash performance between 35 to 50 percent less water. Current standards must meet a water factor of 4.5 or less.	No	4	2	5	1.25	5	1.25	4.50	5-10%		Yes

Conservation Program Options	BMP Sector	Res vs Com	Former BMP	Description	Program Ranking Criteria							Total	Service Area Saturation %	MWD Incentives
					Cost	*Water Savings*		*Implementation*						
					Total Cost	*Area-wide Savings in Territory*		*Ease of Implementation*		*Funding Potential*				
					Qualitative	*50%*		*25%*		*25%*				
					Cost Prohibitive ?	Grade[(a)]	Sub-total	Grade[(a)]	Sub-total	Grade[(a)]	Sub-total			
Residential Dual Metering	Landscape	Res		Same as dedicated irrigation for large commercial landscape. Requires smaller meter. Most cost effective for new construction.	Yes	5	2.5	4	1	3	0.75	4.25		
High Efficiency Nozzles for Large Rotary Sprinklers	Landscape	CII		High efficiency nozzles for large rotary sprinklers replaces standard plastic nozzles with durable metal nozzles. These replacement nozzles are resistant to wear and provide high distribution uniformity. Mostly used on golf courses and other open landscape for long range and close-in watering.	No	4	2	4	1	5	1.25	4.25		Yes
Turf Removal	Landscape	Res and CII		Removing turf and replacing with low water using plants and efficient irrigation	Dependant on incentive	5	2.5	3	0.75	3	0.75	4.00		Proposed
Residential Weather-Based Irrigation Controllers	Landscape	Res		aka WBICs or Smart Controller are irrigation controllers that AUTOMATICALLY adjusts irrigation schedules in response to changing weather or environmental conditions.	No	4	2	3	0.75	5	1.25	4.00		Yes
Low Precipitation Irrigation Systems	Landscape	Res and CII		Drip, micro, low volume precipitation irrigation is the slow application of water to a plant's root zone. This delivery reduces evaporation and eliminates overspray. Plants thrive on the optimum balance of oxygen and moisture around their roots.	CII only	4	2	3	0.75	5	1.25	4.00		Yes
Eliminating Water Waste	Foundational Utility Ops	Res and CII	13	Enforceable water conservation measures to eliminate waste such as no hosing sidewalks, no runoff, and time of day irrigation.	Yes	5	2.5	3	0.75	2	0.5	3.75		No
Commercial Weather-Based Irrigation Controllers	Landscape	CII		Similar to residential but commercial grade with more stations. Would also include central irrigation controllers with weather-based technology that adjusts the schedule based upon local weather conditions.	No	3	1.5	4	1	5	1.25	3.75		Yes
Residential High Efficiency Toilets (HETs)	Residential	Res	14	Toilet fixture that flushes at 20 percent below the 1.6 gallons per flush U.S. maximum or less, equating to 1.28 gpf.	No	3	1.5	4	1	5	1.25	3.75		Yes
Commercial High Efficiency Toilets	CII	CII		Toilet fixture that flushes at 20 percent below the 1.6 gpf U.S. maximum or less, equating to 1.28 gpf.	No	3	1.5	4	1	5	1.25	3.75		Yes

Conservation Program Options	BMP Sector	Res vs Com	Former BMP	Description	Program Ranking Criteria							Total	Service Area Saturation %	MWD Incentives
					Cost	*Water Savings*		*Implementation*						
					Total Cost	*Area-wide Savings in Territory*		*Ease of Implementation*		*Funding Potential*				
					Qualitative	*50%*		*25%*		*25%*				
					Cost Prohibitive ?	Grade[(a)]	Sub-total	Grade[(a)]	Sub-total	Grade[(a)]	Sub-total			
Dedicated Irrigation Meters for Large Landscape Commercial High Efficiency Clothes Washers	Landscape CII	CII CII	4 9	Install separate meters for irrigation water use. This offers the customer more information about their specific landscape use. Same technology as residential, however many are coin-operated and located in laundromats and multi-family common areas.	No No	4 2	2 1	4 5	1 1.25	3 5	0.75 1.25	3.75 3.50	0-63%	No Yes
Dual Plumbing				Mandate that new developments include dual plumbing to allow for future conversion to recycled water	Maybe	4	2	3	0.75	3	0.75	3.50		No
Dual water mains				Mandate that new subdivisons include dual water mains in the streetscape to allow for future conversion to recycled water	Maybe	4	2	3	0.75	3	0.75	3.50		No
Residential Water Surveys	Residential	Res	1	Outdoor survey is similar to large landscape surveys. Indoor portion includes assessing all water using fixtures and appliances including: toilets, faucets, showers, washing machines and dishwashers	Yes	4	2	3	0.75	3	0.75	3.50		
Large Landscape Water Surveys	Landscape	Res or CII	5	A large landscape survey is a valve by valve assessment of the irrigation system. The evaluation would generate a site specific baseline watering schedule as well as recommendations for repairs and improvements.	No	4	2	3	0.75	3	0.75	3.50	40-80%	No
Water Budgets	Landscape	Res or CII	5	A water use budget is an upper bound estimate of water needed at a site given its landscape area, local weather conditions and other factors (i.e. plant type). Each billing period customers receives notices comparing their actual use to their budget.	No	4	2	4	1	2	0.5	3.50		No
Residential High Efficiency Dishwashers	Residential	Res		High efficiency dishwashers are both water and energy efficient. They also clean better than older models. Estimated savings are 3-6 gallons per day.	No	4	2	4	1	2	0.5	3.50		
High Efficiency Urinals	CII	CII		The current U.S. standard mandates ultra low flow urinals which use 1.0 gpf. New models use from 0 -.5 gpm.	No	3	1.5	3	0.75	5	1.25	3.50		Yes
Industrial Process Water Use Improvements	CII	CII	9 and PBMP	Evaluating the washing and rinsing of products during processing to determine where modifications can be made to reduce water use via deionization or recycling. Depending on industry, 2 to 365 million gallons/year were saved in one study.	No	3	1.5	3	0.75	5	1.25	3.50		Yes
Regional Landscaping	Landscape	Res or CII		Conceptual design landscaping that utilizes regional plant palettes with an emphasis on low water using plants	No	4	2	3	0.75	3	0.75	3.50		No
Synthetic Turf	Landscape	Res and CII		Artificial turf	Yes	4	2	2	0.5	3	0.75	3.25		

Conservation Program Options	BMP Sector	Res vs Com	Former BMP	Description	Program Ranking Criteria							Total	Service Area Saturation %	MWD Incentives
					Cost	*Water Savings*		*Implementation*						
					Total Cost	*Area-wide Savings in Territory*		*Ease of Implementation*		*Funding Potential*				
					Qualitative	*50%*		*25%*		*25%*				
					Cost Prohibitive ?	Grade[(a)]	Sub-total	Grade[(a)]	Sub-total	Grade[(a)]	Sub-total			
Residential Hot Water Demand Systems	Residential	Res		An electronically, demand-controlled system that sends cold water back to the water heater until hot water arrives at the fixture where it is needed	No	4	2	3	0.75	2	0.5	3.25		No
High Efficiency Pre-Rinse Spray Valves	CII	CII		Pre-rinse spray valves are used in restaurants to pre-rinse dishes prior to putting them in the dishwashers. The current national standard is 1.6 gpm. New models being sold are at 1.2 gpm or less	No	2	1	4	1	5	1.25	3.25		Yes
Pressurized Water brooms	CII	CII	9	Uses a combination of air and water pressure to clean and remove dirt and food spills with up to 75 percent less water needed. Replaces using a hose, nozzle or high pressure water broom (power washer) that typically uses 8 - 18 gpm with a low flow model that uses 2.0 gpm or less.	No	2	1	4	1	5	1.25	3.25		Yes
Residential Hose Nozzles	Landscape	Res		Nozzle attaches to hose with on/off control	No	3	1.5	4	1	3	0.75	3.25		No
High-Performance Showerheads	Residential	Res	2	Showerheads that use less than the 2.5 gallons per minute U.S. maximum. There are models that use as low as 1.5 gpm.	No	3	1.5	5	1.25	2	0.5	3.25		No
Soil Moisture Sensors and Probes	Landscape	Res or CII		Monitor soil moisture to determine irrigation requirements and adjust the irrigation schedule based upon the moisture content.	No	3	1.5	4	1	3	0.75	3.25		No
Connectionless Food Steamers	CII	CII		Incentives for the installation and use of boilerless food steamers. Saves 30 gallons per hour.	No	2	1	4	1	5	1.25	3.25		Yes
Automatic Meter Reading	Residential	Res		AMR with minute-by-minute reads to identify leaks	No	3	1.5	5	1.25	2	0.5	3.25		
CII Water Use Surveys	CII	CII	9	Commercial water use surveys evaluate and analyze water usage based upon the specifics of a given site. This can include inventorying sanitary equipment or evaluating opportunities for recycling water used in an industrial process. The survey would results in recommendations along with a cost/benefit analysis.	No	3	1.5	3	0.75	3	0.75	3.00	0-100%	No
Graywater Treatment Systems	Residential and Landscape	Res	PBMP	Use of graywater from showers, bathroom lavatory sinks, and clothes washers for water reuse applications, such as toilet flushing or irrigation	Yes	3	1.5	3	0.75	3	0.75	3.00		

Conservation Program Options	BMP Sector	Res vs Com	Former BMP	Description	Program Ranking Criteria							Total	Service Area Saturation %	MWD Incentives
					Cost	*Water Savings*		*Implementation*						
					Total Cost	*Area-wide Savings in Territory*		*Ease of Implementation*		*Funding Potential*				
					Qualitative	*50%*		*25%*		*25%*				
					Cost Prohibitive ?	Grade[(a)]	Sub-total	Grade[(a)]	Sub-total	Grade[(a)]	Sub-total			
Commercial High Efficiency Dishwashers	CII	CII		Commercial dishwashers are available in a variety of designs, ranging from the under counter type, to the flight type used in the highest volume establishments. Costs also range dramatically with many machines costing from $12k - over $50k. Efficient machines can use water at a rate of 1.0 gallons per rack compared to 2.5 gallons per rack of the less than efficient models.	No	3	1.5	4	1	2	0.5	3.00		
X-ray Film Processing Recycling System	CII	CII		Standard x-ray or film processors use a constant flow of water to cool the machines and rinse the film. Recycling systems capture the water and reuse it. Many medical facilities are moving to digital technology which eliminate all water use.	No	2	1	3	0.75	5	1.25	3.00		Yes
High Performance Faucets	Residential	Res		Kitchen or bathroom faucets or aerators that use less than the U.S. maximum of 2.2 gpm.	No	3	1.5	4	1	2	0.5	3.00		No
Cooling Tower Conductivity Controllers	CII	CII		Cooling towers are part of the air conditioning system of large buildings. These towers are used to expel heat from the system through evaporation. In order to keep salts and other impurities from corroding the towers it is necessary to bleed water out of the towers. Installing a conductivity controller gives customers the ability to only bleed out water after a certain conductivity is met aka increasing the cycles of concentration.	No	2	1	3	0.75	5	1.25	3.00		Yes
Cooling Tower pH controllers	CII	CII		pH controllers are a sophisticated version of a conductivity controller which by monitoring pH and adding a different set of chemicals can reduce the bleed even more increasing the cycles of concentration up to 5-7 cycles.	No	2	1	3	0.75	5	1.25	3.00		Yes
Dry Vacuum Pumps	CII	CII		Water-ring pumps are commonly used in smaller dental offices, but are infrequently used in larger operations due to high water consumption and increased power requirements. With a dry pump, a liquids separator is placed between the wet piping and the pump eliminating the need to flush the system with water.	No	2	1	3	0.75	5	1.25	3.00		Yes
In-Home Meter Monitors	Residential	Res		In-home meters that assist customers in tracking how water is used in the home	Maybe	3	1.5	3	0.75	3	0.75	3.00		
Shower Stall Head Limit	Residential	Res		Limit the number of showerheads to one showerhead per 2500 square inches.	No	3	1.5	4	1	1	0.25	2.75		No
Pond and Water Feature Recycling	Residential and CII	Res and CII	13	Water reuse for these outside features	Yes	3	1.5	3	0.75	2	0.5	2.75		

Conservation Program Options	BMP Sector	Res vs Com	Former BMP	Description	Program Ranking Criteria							Total	Service Area Saturation %	MWD Incentives
					Cost	*Water Savings*		*Implementation*						
					Total Cost	*Area-wide Savings in Territory*		*Ease of Implementation*		*Funding Potential*				
					Qualitative	*50%*		*25%*		*25%*				
					Cost Prohibitive ?	Grade[(a)]	Sub-total	Grade[(a)]	Sub-total	Grade[(a)]	Sub-total			
Commercial Laundry Retrofits	CII	CII		On-site commercial laundry retrofits includes ozone and other treatments	No	3	1.5	2	0.5	3	0.75	2.75		
Submetering	Residential and CII	Res and CII		Installing submeter at sites with master meters. Could provide landlord with billing by volume of use capability or provide end use customer with information on their use.	Yes	2	1	3	0.75	3	0.75	2.50		
Steam Sterilizers	CII	CII		Steam sterilization is the use of pressurized steam to kill infectious agents on medical equipment. New sterilizers can only operate while the water trap is open and some recycle a portion of the water.	No	2	1	3	0.75	3	0.75	2.50		Yes
Ice machines	CII	CII		Water-cooled ice machines are more energy efficient and energy-cooled machines are more water efficient. Eliminating water-cooled machines is one option. Ice machines that have earned the ENERGY STAR label are on average 15 percent more energy-efficient and 10 percent more water-efficient than standard models.	No	2	1	3	0.75	3	0.75	2.50		
On-site Leak Detection	Residential	Res	1	Identify leaks in customer's homes and provide assistance to repair leak	Yes	3	1.5	2	0.5	2	0.5	2.50		
Water Efficiency Salon Sprayers	CII	CII		Low water using sprayers located at hair salons.	No	2	1	3	0.75	3	0.75	2.50		
Wet Cleaning	CII	Com		Retrofits at a dry cleaners moving to wet cleaning technologies which eliminates cooling tower requirement thereby reducing water use	Maybe	2	1	3	0.75	3	0.75	2.50		
Car Wash Reclamation Systems	CII	CII	PBMP	Recycle water at a car wash	Link to ordinance	2	1	3	0.75	2	0.5	2.25		
Waterless Wok	CII	CII		Wok used in Chinese restaurants that uses no water. Current woks run water the entire time restaurant is open.	No	1	0.5	3	0.75	3	0.75	2.00		
Additional Measures Not Considered a WUE Program														
Recycled Water	NA	CII		Feasible alternative water source for landscapes		4	2	2	0.5	4	1	3.50		Yes
Water Budgets - Water Rates with Allotments	Utility Ops	Res and CII		Volumetric allotments of water to customers based on customer-specific characteristics		3	1.5	3	0.75	5	1.25	3.50	0-100%	

Note: (a) Each criterion scored on a range of 1 – 5, with 5 being the highest possible grade and 1 being the lowest possible grade

7.3 Stakeholder Process

As part of this Plan effort, Western MWD conducted a stakeholder outreach process that requested and included the participation of water retailers, high water use customers, local municipalities and other governmental organizations, trade group representatives, environmental interests, and members of the general public.

In preparation for informative and interactive workshops, a copy of the Plan was posted on Western MWD's website for easy accessibility and convenient reference. Letters were also mailed to the stakeholders announcing event details for two summer workshops. To maximize attendance of the various interested stakeholders, the same workshop format was utilized at two different locations on June 12, 2008 and June 26, 2008.

Western MWD hosted and professionally facilitated the workshops which addressed key sectors identified in the Plan within four distinct breakout groups. These breakout groups included: Residential Landscape; Large Landscape; Emerging Technologies; and New Construction.

During the course of the breakout sessions, each group facilitator asked the following discussion questions of the stakeholder participants:

1) *Do you think this technology/product would be attractive to your business, customers, or clients?*

2) *What would be the challenges/difficulties with getting these technologies/products to your customers?*

The facilitators also attempted to elicit responses to the following questions:

1) *List the top three challenges/difficulties*

2) *List solutions to challenges/difficulties*

The discussions were recorded by facilitators during the sessions at each stakeholder workshop and transcribed into the following summary narratives.

7.3.1 Breakout Group Session No. 1: Residential Landscape

Maureen Erbeznik was the Facilitator for this group session. Major technologies and products discussed in the Residential Landscape session included:

- Weather Based Irrigation Controllers
- Turf Removal
- Irrigation System Upgrades and Repairs
- Low Precipitation Irrigation Systems

7.3.1.1 Challenges

The main challenges identified in this breakout session included a need for "user-friendly" language about landscaping and irrigation systems, as well as provision of simple brochures and data sheets with savings and case study examples. From the customer perspective, many challenges they face included fear of "gadgets" or lack of knowledge about irrigation systems, no relationship with their yard, no connection to or awareness of the price of water, and/or no technical expertise. In addition, these products are seen as complicated, and customers are often unaware if there are system problems, or if installations are not done correctly.

Some contractors are concerned about liability if a system doesn't work properly. There may be design, maintenance and scheduling problems as well. Many new homeowners think that their systems are automatically efficient, and if attempts are made to educate them, they think it is a sales pitch. Do-it-yourself customers tend to view the products as too expensive. Finally, when irrigation system controllers and WBICs first emerged onto the market, there was an initial lack of quality products that did not provide sustained savings, which leaves customers with an ongoing perspective that these products "don't work."

7.3.1.2 Opportunities

Towards the end of the session, the group discussed a few ideas to overcome these challenges, which include use of newspaper ads, informative highlighted text on water bills, and subsidized advertising. Education is an integral component in creating awareness on the customer level. Ideas for education included: breaking down technical knowledge to the "customer" level along with the message that water rates will (or are) going up; irrigation management with consumption data to show percent reduction in water use; financial payback to show customers "what's in it for me"; providing a variety of incentives including free landscape irrigation assessments, institutional support services, training of field personnel to increase knowledge of technology, and holding landscape workshops. Providing an unbiased list of contractors with the required expertise and providing recorded training materials would also help to overcome these obstacles. Finally, a retrofit-on-resale program or ordinance that is similar to others in California that cover indoor sector plumbing devices should be considered for landscape technologies.

7.3.2 Breakout Group Session No. 2: Emerging Technologies

John Koeller was the Facilitator for this group session. Major technologies and products in the Emerging Technologies session included:

- Hot water on Demand
- Gray water systems
- Low-flow/high efficiency toilets; waterless urinals, dual flush toilets

7.3.2.1 Challenges

In this session, education was identified as the major challenge. As there are over 400 water agencies in California, consistent terminology among the water agencies is needed to prevent confusion among the public, and an identified leader is needed to send a unified message. Another challenge is the perception of high efficiency products. Being efficient doesn't necessary mean sacrificing the quality of the product. In the end, the consumers will end up not using a product if they are not happy with it. Water agencies are trying to find products that are effective, but consumers will want to use the claims on products made by manufacturers (fixture or equipment life/warranty and benefits, rebates, etc.) as the standard, even if the claims are not always true or supported by documented evidence.

A third educational challenge is the unfamiliarity of the term "gray water". Language barriers may also be an issue with this technology. Again, there is a need to make terms and instructions consumer-friendly. In addition, health codes are an important factor in the use of gray water because it is very difficult to regulate and many agencies would need to streamline their regulation of this technology to more widely allow its use. Gray water technology itself is not an issue, but the lack of education about gray water systems is a concern.

7.3.2.2 Opportunities

The group determined that a labeling system such as those used on Energy Star products would contribute to overcoming these challenges. Also, the emerging new Water Sense labels that highlight water saving products would provide an additional educational venue so that consumers are made aware of new high efficiency products. Another potential education opportunity discussed is one-on-one consultation for facilities managers and the ability to contact water district staff for more information.

Offering incentives to generate purchases of new technologies was also discussed, but without significant cash incentives, consumers will not often change behavior and begin purchasing these high efficiency products. One method to overcome this would be to provide "instant rebates" at the point of purchase. The groups concluded that communication and education are keys to promoting new technologies and high efficiency products.

7.3.3 Breakout Group Session No. 3: Large Landscape

Pamela Pavela was the Facilitator for this group session. Major technologies and products in the Large Landscape session included:

- Weather Based Irrigation Controllers (WBICs)
- Turf Removal
- Irrigation System Upgrades and Repairs
- Low Precipitation Irrigation Systems

7.3.3.1 Challenges

The top challenges for the Large Landscape group included funding (both for equipment and for certified irrigation contractors; and customers paying more for irrigation systems, but with lower overall long-term costs), tangible incentives to end users or contractors with ease of use, and education (especially for maintenance workers, and to build community awareness of conserving products and technologies).

Another challenge discussed was funding WBICs, especially for central control systems, which require central control system specialists. Finally, there was an identified need to change the mindset of education and training that can also include WBIC programming by trained persons only (or restricting customer access to WBICs) to avoid incorrect applications.

7.3.3.2 Opportunities

The group determined that Western MWD should provide recycled water as an upfront measure to reduce use of potable water on landscapes as a means to overcome this challenge. Providing necessary equipment and follow-up with customers, as well as streamlining the recycled water hook up process and overall reduction in paperwork would further assist with meeting the identified challenges.

Initiating a "turnkey" project would also be an ideal route to overcome challenges in this sector, for which Western MWD would provide the installation contractor and the irrigation product for its customers. By conditioning this incentive on design and installation by a certified designer/contractor, it would assist with proper installation and increase the water savings benefits.

For education and certification, providing training programs, both on location and on-line would be useful. Adoption of mandatory irrigation certification requirements or ordinances (or assisting other agencies to adopt), could focus incentives to only those customers using certified contractors, which would provide an enforcement mechanism and would apply to maintenance contractors as well as installation contractors.

In regards to WBICs, solutions included offering incentives and rebates, and marketing these to property managers, shopping centers (i.e., International Council of Shopping Centers), Homeowners Associations and other retail entities. Some possible solutions for education included getting customers personally involved, by marketing and sponsoring workshops and training (including Spanish language training materials), supplier workshops and various free products and other enticements, more industry training to workers, better training by manufacturers to those who know the properties being irrigated, and infrastructure to support sophisticated controller systems and staff.

7.3.4 Breakout Group Session No. 4: New Construction

Mary Lou Cotton was the Facilitator for this group. Major technologies and products in the New Construction session included:

- Short run hot water services
- Hot water on demand
- High Efficiency Toilets (HETs)
- High Efficiency Clothes Washers (HECWs)
- Weather Based Irrigation Controllers (WBICs)
- High Efficiency Dishwashers
- Dual Metering (and submetering)
- Dual Plumbing (for recycled water service)

7.3.4.1 Challenges

The top challenges for New Construction were identified as costs to the building industry, interaction with water suppliers and government agencies, and familiarity with technologies such as dual metering and submetering. While these technologies and the others listed in this category were determined to be desirable by builders, they add to the costs of residential construction.

7.3.4.2 Opportunities

One way to overcome this challenge is that water agencies would need to help financially and make incentive programs operate like those run by energy utilities. Also, water conservation-related programs should include energy efficiency, so that customers will see Energy Star and Water Sense on products placed in new construction. Builders are willing and motivated to go "green," but would like assistance with achieving LEED standards.

Builders and government agencies in these sessions also discussed the need for increased interaction and partnerships between both planning and water agencies and the building industry during the planning and construction process. Key factors include reducing meter costs and having County/City incentives such as permit "fast tracking" for those builders willing to incorporate water use efficiency or green standards into their developments. It was generally agreed that County-wide ordinances, coordinated with those of local cities and the State of California, would be very helpful in enabling new construction to "build in" water use efficiency as well as energy efficiency and other LEED standard components. This would require an education process for elected Boards of Directors, Councils, and other governmental entities.

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Section 8: Water Use Efficiency Strategy

This section begins by describing new mandates and developments in water conservation, many of which have occurred during the preparation of the Plan. These developments significantly impact the objectives of Western MWD's Water Use Efficiency Strategy which is defined in this section. The strategy focuses on meeting Western MWD's short term and long term goals by providing a flexible approach with ongoing program evaluation, monitoring and adjustment. A recommendation is made for the creation of a detailed Implementation Blueprint to provide Western MWD's staff with a 'Road Map' to successfully accomplish the defined objectives.

Section 8 – Water Use Efficiency Strategy

- Recent Developments in Water Conservation
- Water Use Efficiency Objectives
- Water Use Efficiency Strategy
- Implementation Blueprint

8.1 Recent Developments in Water Conservation

In the past 12 months the California water picture has changed dramatically. Recent Delta related court rulings that have reduced imported water deliveries to Southern California, which combined with an extended drought on the Colorado River has put extreme strain on the State's water resources, with impacts felt particularly in Southern California. This has translated into an increased focus on water conservation at the State policy level and continuing developments even as this report is being written. Three developments that have significant implications for the strategies outlined in this report are:

- AB 1420 was passed in 2007, and requires water purveyors to be implementing all locally cost effective BMPs in order to be eligible for State Grant Funding.
- The CUWCC embarked upon a significant revision of the Urban MOU and existing BMPs and is also planning to propose new ways of implementing BMPs.
- The Governor issued a mandate to reduce per capita water use 20 percent by 2020.

Each of these developments is discussed in more detail below, but what they highlight is that the conservation paradigm is likely to change significantly in the next five (5) years. This was a major consideration when developing both short-term and in particular long-term conservation strategies.

8.1.1 AB 1420

AB 1420 was approved by the Governor on October 13, 2007. It requires urban water purveyors to implement all BMPs that are deemed to be locally cost-effective to be eligible to receive State grant funds administered by DWR, the SWRCB, or the Bay-Delta Authority, and to describe water conservation activities in their UWMPs. Western MWD, as a wholesale water supplier under BMP 10, is required to provide support to all of its retailers for BMPs that are deemed to be cost-effective. All retailers, including Western MWD Retail, must show implementation of all water DMMs (pursuant to Section 10631 of the Water Code, equivalent to the BMPs), or to show the schedule on which the supplier will begin implementing the DMMs if not already implementing. Any supplier not implementing the measures based on cost-effectiveness must show why the measures are not cost-effective. If this information is not included in the UWMP, the UWMP will be found "not complete" by DWR.

8.1.2 Urban MOU Revision

As discussed in Section 3.4, the CUWCC is in the progress of updating the Urban MOU. Many of the existing BMPs will be revised and some new BMPs will be created. The overriding objective of the update is to provide more flexibility to the signatories, not to make things more difficult. As part of the revision process, signatories are asked to participate to determine what should be included in the BMP revisions and the new BMP options (as described in Section 3). It is intended that the BMPs will be made flexible enough so that signatories can choose to develop their own programs and determine their own water savings targets in order to obtain compliance. At the end of 2008, signatories will be asked to approve the revisions to the Urban MOU and BMPs.

8.1.3 Governor's Mandate

Governor Schwarzenegger has recently issued a mandate that Californians must reduce per capita water usage 20 percent by 2020. It has not currently been determined how this 20 percent reduction is to be achieved but as details are defined it will have a significant impact on water conservation policy and program implementation in California.

8.2 Water Use Efficiency Objectives

In response to imported water shortages and the new regulatory developments described above, Western MWD has identified two key objectives to be achieved by the WUE Strategy.

Water Use Efficiency Strategic Objectives

Objective 1:

Maintain Compliance with Legislation:

- AB 1420 (Wholesale and Retail BMPs)
- Pending Legislation

Objective 2:

Reduce Demand on Imported Water – Implement additional water use efficiency programs (beyond those required by legislation) with the objective of reducing Western MWD's dependence on imported water.

8.2.1 Objective 1 - Maintain Compliance with Legislation

8.2.1.1 Compliance with Urban MOU and AB1420

Achieving compliance with the Urban MOU and therefore AB 1420 ensures that Western will remain eligible for future State grant funding. The Implementation Blueprint described in Section 8.4 should therefore include programs that target all BMPs that are determined to be locally cost-effective.

Once the Urban MOU is revised, signatories will be asked to vote on approval of the revisions. Western MWD should also continue to participate in the CUWCC and future updates to the Urban MOU and can use the matrix presented in Section 7 as a tool to assist their decision making processes. As these revisions and future updates take effect, the Implementation Blueprint should be reviewed to ensure that Western MWD remains in compliance with the Urban MOU.

It is apparent that one of the Urban MOU revisions will include a new BMP category that will address landscape water use in the residential sector. This should be of major interest to Western MWD and its retailers given the amount of water that is used by this sector within Western MWD's wholesale service area. It is recommended that Western MWD closely monitor the creation of this BMP and update the Implementation Blueprint upon its initiation.

8.2.1.2 Pending Legislation

New legislation continues to change the way in which water agencies address water use efficiency in their service areas; this has been highlighted by the Governor's mandate to reduce per capita water consumption 20 percent by 2020. Although it is not yet clear what this will actually mean for water agencies, there is a real likelihood that agencies will be required to implement more than just BMPs to achieve the Governor's water conservation goals. New technologies will likely pave the way for meeting these water savings directives and diversifying Western MWD's water portfolio.

It is recommended that as legislative changes are introduced, Western MWD review its WUE Strategy and Implementation Blueprint to ensure its compliance with the new laws and policies. Western MWD should also become an active participant in the crafting of conservation-related legislation.

8.2.2 Objective 2 – Reduce Demand on Imported Water

Statewide water supply shortfalls and focus on local regional water management planning have emphasized the need for agencies to reduce their dependence on imported water. Expanding water use efficiency programs beyond the minimum requirements of the Urban MOU will aid Western MWD in this effort. It is also important to continue existing conservation programs subject to savings decay (beyond saturation of the service area). This will ensure that the water savings achieved over time will be maintained.

As Western MWD and its retailers begin to implement recommendations of this Plan, per capita water use should be monitored. Any reductions in per capita water use should be used to update future demand projections in the Western MWD wholesale service area agencies' ongoing UWMP updates (updated every five years, in years ending in "5" and "0").

8.3 Water Use Efficiency Strategy

To reach its objectives of reducing imported water demands and maintaining legislative compliance, Western MWD will use the information presented throughout this Plan to design and implement water use efficiency programs that:

- Target markets with the **Highest Water Savings** opportunity, both in immediate savings and long-term sustainability (Refer Sections 2 and 3);
- Address each of the **Existing BMPs** as defined by the Urban MOU;
- Select cost effective technologies that yield the "**Greatest Bang for the Buck**" (Refer Sections 4, 5 and 7);
- Pursue all available **External Funding** to defray costs and allow for a higher number of program participants (Refer Section 6);

- Develop focused programs that, over time, can be **Expanded with New Product Offerings or with Increased Production.**

Highest Water Savings

Markets with the highest potential for water savings were identified in Section 2 of this Plan. There is a substantial opportunity to reduce water consumption for landscape irrigation particularly within the single family residential sector. This sector comprises 70 percent of Western MWD's potable water consumption with 60 percent of the water being used outdoors primarily for landscape irrigation. Opportunities to a lesser extent also exist in the Large Landscape, Multi-family Residence, Commercial, Industrial and Institutional sectors.

Additionally, the Western MWD service area is projected to grow by 50 percent by 2025. As this construction occurs, opportunities for the installation of water (and energy) efficient devices and dual meters are lost. Enacting ordinances or connection fee programs requiring the mandatory installation of any of these devices in new construction would avoid expensive retrofit programs in the future that would need to be funded by Western MWD or its retailers. The Implementation Blueprint should evaluate the implications of enacting these types of programs.

Existing BMPs

To ensure that Western MWD is in compliance with the Urban MOU and therefore AB 1420, WUE programs must address all BMPs that are determined to be locally cost-effective. Section 4 evaluated local cost effectiveness for the existing BMPs and determined that only BMP1 – Residential surveys was not cost effective. However, these surveys are a valuable mechanism to increase participation in other WUE programs in the residential sector. The Implementation Blueprint should therefore include WUE programs that address all of the existing BMPs described in Table 8-1. As Western MWD performs the role of both wholesaler and retailer there are different requirements for each BMP.

Greatest Bang for the Buck

Water use efficiency measures should be selected from matrix presented in Section 7 that address the target markets identified above. The highest ranking measures should be incorporated into water use efficiency programs and evaluated for cost effectiveness to ensure that Western MWD gets the "Greatest Bang for the Buck."

External Funding

Metropolitan offers a wide variety of incentive programs and rebates intended to help its member agencies meet their BMP requirements under the Urban MOU, as well as incentivize new technologies. Western MWD actively pays into this fund and should make use of these incentives to the maximum extent possible. Metropolitan is continually introducing new incentives and Western MWD should evaluate the implementation of programs that could pass on any new incentives to its customers, at both the retail and wholesale levels.

Program designs should also consider measures that appeal to the various grant funding opportunities described in Section 6. By maximizing program funding, Western MWD can

expand the number of program participants, open up to smaller customers, or penetrate deeper into niche markets that might have otherwise been excluded.

Ability to Expand with New Product Offerings or with Increased Production

The success of Western MWD's Water Use Efficiency Programs should be subject to ongoing monitoring to ensure that they are meeting the objectives of the WUE Strategy. Program designs should be flexible to allow expansion or modifications as required by future changes to legislation or the Urban MOU. This may necessitate that the Implementation Blueprint be enhanced with additional programs that utilize emerging technologies. As these emerging technologies are continually being created or improved, the matrix presented in Section 7 should be reviewed and if necessary revised, prior to selecting new water use efficiency programs.

It is suggested that the Water Use Efficiency Implementation Blueprint be evaluated annually and that the Water Use Efficiency Master Plan be updated every 5 years.

8.4 Implementation Blueprint

A detailed Implementation Blueprint has been prepared to provide Western MWD's staff with a "Road Map" to carry out Western MWD's WUE Strategy. The Implementation Blueprint is contained in Volume 1 and uses information presented throughout this Master Plan to design water use efficiency programs best suited to Western MWD's service area characteristics.

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Appendix A: BMP Implementation and Savings Estimates

Appendix A describes each of the 14 BMPs and presents implementation data (saturation levels) for retailers service areas in more detail than Section 3. Estimates are also made for potential additional water savings that would be realized by increasing these saturation levels.

A.1 BMP Saturation and Potential Water Savings

The following subsections evaluate the level of effort by agencies toward implementation of the 14 BMPs. An estimation was also made of the potential water savings that could be realized from increased implementation of each BMP. The primary data sources used to complete analysis presented in this section include the following:

- CUWCC BMP Reporting Database: Online reports are the basis of information used to evaluate market saturation and to estimate potential water use savings.

- CUWCC's Water Savings Assumptions: Water savings assumptions established by the CUWCC were adopted for calculating future water conservation savings resulting from BMP implementation.

The BMP Reporting Database typically contains annual BMP reports and base year data associated with each agency that is a signatory to the Urban MOU. At the time this report was prepared, some of the information required to perform the analysis in this section was not readily available online. Information from the retail agencies UWMPs was used if available to find the most recent and relevant information.

The data presented in the following subsections focuses only on the seven retail agencies that are the Urban MOU signatories and therefore have significant historical program implementation information available. These agencies are:

- City of Corona
- City of Riverside
- EVMWD
- JCSD
- RCWD
- RCSD
- Western MWD (Retail)

A.2 Calculation Assumptions

Key variables that were used to calculate saturation levels and potential water savings are listed and briefly described below:

- Decay Factors: Potential water savings can decay over time due to equipment breakdown, lack of maintenance, or decline in behavioral compliance with conservation activities. For the BMPs with a survey component, a decay factor was taken into account to estimate the equivalent number of surveys, which recognizes the decaying effect of previously conduced surveys. For the BMPs that involve device retrofits, decay factors and physical lifespan of devices suggested by CUWCC were used (CUWCC, 2005).

- Natural Replacement Rates: As homeowners remodel older homes or desire to replace aging plumbing fixtures, older homes come into compliance with new plumbing code requirements (e.g., low-flow showerheads and ULFTs). Therefore, some old homes are retrofitted with high-efficiency devices through natural replacement, in addition to agency installations and rebates.

- The rate of change of service connections over time was assumed to be consistent with population growth when the number of housing units constructed after 1992 was unknown.

- Water savings estimates are not related to the ultimate compliance targets of BMP's. In many cases the compliance targets have been set conservatively and therefore it is possible to achieve savings beyond these compliance targets. Therefore two estimates are given in the below tables. One involves the service area being saturated to 75 percent and one that assumes complete saturation (100 percent). The complete saturation estimate represents the maximum savings possible, while the 75 percent target is a more achievable and realistic target.

Unit water savings estimates were taken from references published by the CUWCC.

A.3 BMP 1 - Residential Water Surveys

BMP 1 is the development and implementation of a strategy to survey water use by SFR and MFR customers. Surveys include both indoor and outdoor components to evaluate customer water systems for water conservation efficiency. Indoor surveys typically include checking for leaks, checking flow rates of showerheads, aerators, toilets, and offering or recommending replacement of devices, if necessary. Outdoor surveys include checking irrigation systems and timers, reviewing or developing irrigation schedules.

Studies suggest savings from residential surveys tend to decay over time as much as 20 to 30 percent per year (CUWCC, 2005). Given the limited persistence of water savings from residential surveys, residents that previously received surveys need to be re-surveyed periodically to maintain water savings that would be lost due to savings decay. Surveys are an effective tool for promoting the use of water conservation measures and devices within surveyed homes. Since water use surveys may result in indoor and outdoor retrofits, increasing the number of surveys offered to customers is one avenue for the agencies to increase saturation levels for other BMPs.

A.3.1 Implementation Status

Tables A-1 and A-2 below summarize water use survey saturation for SFR and MFR customers, respectively, for the seven (7) agencies that are signatories to the Urban MOU. Information presented in these two (2) tables, including the number of surveys offered and completed, was compiled from the agency's BMP reports available at the CUWCC website based on the information available between 1999 and 2006.

TABLE A-1
SINGLE FAMILY RESIDENTIAL WATER USE SURVEY SATURATION

Agency	Strategy for SFR Water Use Surveys[(a)]	Year Strategy Implemented[(b)]	No. of SFR Accounts (Year)	No. of Surveys Offered	No. of Surveys Completed	No. of Active Surveys[(d)] (Including Decay)	Saturation of Active Surveys
EVMWD	✓	1991	34,331 (2006)	848	44	14	0.0%
Western MWD	X	-	22,390 (2006)	2	2	0	0.0%
RCWD	✓	2004	34,513 (2006)	290	212	190	0.5%
City of Corona	✓	1998	34,942 (2006)	1,100	325	135	0.4%
City of Riverside	✓	1989	57,308 (2006)	105,386	105,349	25,596	44.7%
RCSC	X	-	6,450 (2006)	0	0	0	0.0%
JCSD	X	-	20,360 (2005)[(c)]	0	0	0	0.0%

Note:
(a) ✓: Yes; X: No.
(b) "-" defines no information was reported at the CUWCC website.
(c) Source: JCSD 2005 UWMP. The number of SFR accounts reported at the CUWCC website is 15,917 for the reporting year 2003.
(d) Active surveys refer to those surveys that are still actively achieving water savings. Most surveys only have an effective life of ~ 3 years.

TABLE A-2
MULTI-FAMILY RESIDENTIAL WATER USE SURVEY SATURATION

Agency	Strategy for MFR Water Use Surveys[a]	Year Strategy Implemented[b]	No. of MFR Accounts (Year)	No. of Surveys Offered	No. of Surveys Completed	No. of Active Surveys[e] (Including Decay)	Saturation of Active Surveys
EVMWD	X	-	389 (2006)	0	0	0	0.0%
Western MWD	X	-	121 (2006)	0	0	0	0.0%
RCWD	✓	2004	186 (2006)	11	7	7	3.6%
City of Corona	✓	1998	1,583 (2006)	400	74	19	1.2%
City of Riverside	✓	1989	NA[f] (2006)[c]	4,060	4,060	502	NA[f]
RCSD	X	-	48 (2006)	0	0	0	0.0%
JCSD	X	-	162 (2005)[d]	0	0	0	0.0%

Note:
(a) ✓: Yes; X: No; "-": No information available.
(b) "-" defines no information reported at the CUWCC website.
(c) The number of MFR accounts for the City of Riverside is unknown. Customer billing records maintained by the City of Riverside do not differentiate single family and multi-family accounts.
(d) Source: JCSD 2005 UWMP. The number of MFR accounts reported at the CUWCC website is 168 for the reporting year 2003.
(e) Active surveys refer to those surveys that are still actively achieving water savings. Most surveys only have an effective life of ~ 3 years.
(f) The number of MFR accounts is incorporated in the number of SFR accounts in Table A-1.

EVMWD, RCWD, City of Corona, and City of Riverside, have developed and implemented a targeting and marketing strategy for this BMP, while three of the seven agencies have not. With the exception of the City of Riverside, most of the agencies that have an operational program have not yet experienced significant customer participation. Although the City of Riverside has operated an extremely successful program, participation appears to have recently ceased. As a result, saturation levels for active surveys (those that have not had their savings eroded by decay) have declined to 45 percent.

Saturation levels for the other agencies are all below 5 percent which suggests that significant savings are still achievable from the implementation of this BMP.

A.3.2 Water Savings Estimates

Total potential water savings from residential surveys were estimated following the CUWCC's methodology (the Urban MOU, BMP 1, Section F) that assumes a landscape survey will deliver a 10 percent reduction in outdoor water use for residential accounts. Additional assumptions used in the calculations include:

- Outdoor water use by each agency is assumed to be 50 percent of total water use.

- Potential water savings are based on achieving a saturation target for active surveys of 75 percent.

- A decay factor of 30 percent was taken into account when estimating the equivalent number of surveys that are considered to be active.

- Average outdoor water use per account was derived from meter data analyzed in Section 2 of the study.

- To eliminate double counting, savings estimates presented in the below table do not include savings from the installation of devices that form part of other BMPs. These include indoor retrofits such as low-flow showerheads and toilet retrofits which are covered as part of BMPs 2 and 14. It should therefore be recognized that customer surveys provide significant synergies with other conservation programs.

Table A-3 summarizes potential water savings estimates for the seven agencies that are signatories to the Urban MOU. The number of surveys to be completed was calculated based on the total number of accounts less the equivalent number of active surveys that have been completed. Estimated potential water savings for each agency range from approximately 120 to 1,100 AFY.

TABLE A-3
WATER SAVINGS ESTIMATES FROM RESIDENTIAL WATER USE SURVEYS

Agency	Equivalent No. of Surveys Completed[(a)]	No. of SFR and MFR Surveys to be Completed	Total Water Use (AFY)	Total Outdoor Use (AFY)	Average Outdoor Use by a Single Account (AFY)	Total Potential Water Savings (AFY)[(b)]
EVMWD	14	31,660	19,797	9,899	0.29	742
Western MWD	0	65,552	19,954	9,977	0.44	748
RCWD	190	34,509	29,958	14,979	0.43	1,117
City of Corona	135	36,390	24,423	12,212	0.33	912
City of Riverside	25,596	31,712	44,297	22,149	0.39	919
RCSD	0	6,498	3,314	1,657	0.26	124
JCSD	0	16,085	15,839	7,920	0.39	454

Note:
AFY: acre-feet per year
(a) Equivalent number of surveys takes into account a water survey decay factor of 30 percent per year.
(b) 10 percent outdoor use reduction was assumed to result from landscape surveys.

A.4 BMP2 – Residential Plumbing Retrofits

BMP 2 consists of targeting and implementing a marketing strategy to distribute or directly install high-quality, low-flow showerheads (rated at 2.5 gpm or less), toilet displacement devices

(as needed), toilet flappers (as needed), and faucet aerators (rated at 2.2 gpm or less) to SFRs and MFRs constructed prior to 1992.

Low-flow showerheads have been mandatory in all new dwellings since 1992 by changes to the State of California plumbing code made after the 1987-1992 drought. Since 1992, the plumbing code of the State of California has required 1.6 gpf toilets, 2.5 gpm showerheads, and 2.5 gpm faucets in all new construction. As homeowners remodel older homes or desire to replace aging plumbing fixtures, older homes come into compliance with the plumbing code through time.

Studies suggest water savings achieved from indoor retrofitting devices can reduce demand nearly 36 percent (EBMUD, 2003). Water savings associated with device retrofits could decay overtime due to a device decay factor, which is reported to be 20 to 30 percent per year for showerheads (or 3 to 7 years of device life span) (CUWCC, 2005). An ongoing program is needed to maintain saturation levels and water savings and to offset device decays.

As toilet flappers age, they frequently begin to leak long before they are replaced. This rate of deterioration can be accelerated with the use of toilet bowl treatments and cleaners. A study on residential indoor water conservation by the East Bay Municipal Utility District found that leaks caused by leaking toilet flappers accounted for 65 percent of all leaks within a home.

The following sections describe the status of device installations and potential water savings associated with low-flow showerheads, faucet aerators, and toilet flappers. The number of agency installations or device distributions was compiled from each agency's BMP reporting at the CUWCC website and information provided by the retail agencies. Water savings estimates are based on achieving future saturation levels equal to 75 and 100 percent.

A.4.1 Low-flow Showerheads - Implementation Status

Tables A-4 and A-5 present saturation estimates for SFRs and MFRs, respectively, based on the total number of housing units that have been retrofitted with low-flow showerheads. Calculations take into account the following assumptions:

- A natural replacement rate of 4 percent annually was assumed if resale rates from the agency's base year report were not available (CUWCC, 2005, the Urban MOU, Exhibit 6).
- All houses constructed after 1992 were assumed to have low-flow showerhead devices.
- A decay rate of 5 percent was used for low-flow showerhead devices.

Among the seven agencies, four agencies, including EVMWD, RCWD, City of Corona, and City of Riverside, have developed a targeting and marketing strategy to distribute or directly install low-flow showerheads for SFRs and MFRs while the other three agencies have not. Saturation levels for the agencies are relatively high, ranging from 52 percent to full saturation for SFRs, and from 33 percent to 79 percent for MFRs. Although the City of Riverside has operated a successful program, participation appears to decline during 2005 and 2006 as the City of Roseville reported zero device retrofits.

TABLE A-4
SINGLE FAMILY RESIDENTIAL LOW-FLOW SHOWERHEAD SATURATION

Agency	Strategy Implemented for SFR[a]	Year Strategy Implemented[a]	No. of SFR Accounts (Year)	Installation by Agency	No. of Housing Units with Devices[b]	Device Saturation
EVMWD	✓	1997	34,331 (2006)	765	17,701	52%
Western MWD	X	-	22,390 (2006)	0	14,802	63%
RCWD	✓	2005	34,513 (2006)	373	14,714	43%
City of Corona	✓	1998	34,942 (2006)	1,953	21,509	62%
City of Riverside	✓	1989	57,308 (2006)	75,469	57,308	100%
JCSD	X	-	20,360 (2005)[c]	0	9,578	47%

Note:
(a) ✓: Yes; X: No; "-": No information available.
(b) No. of housing units with devices includes natural replacements, new housing units constructed after 1992, and installations by the agency.
(c) Source: JCSD 2005 UWMP. The number of SFR accounts reported at the CUWCC website was 15,917 for the reporting year 2003.

TABLE A-5
MULTI-FAMILY RESIDENTIAL LOW-FLOW SHOWERHEAD SATURATION

Agency	Strategy Implemented for SFR[a]	Year Strategy Implemented[a]	No. of MFR Accounts (Year)	Installation by Agency	No. of Housing Units with Devices[b]	Device Saturation
EVMWD	✓	1997	389 (2006)	174	306	79%
Western MWD	X	-	121 (2006)	0	40	33%
RCWD	✓	2005	186 (2006)	20	96	51%
City of Corona[c]	✓	1998	1,583 (2006)	2,025	-	-
City of Riverside[c]	✓	1989	0 (2006)	8,494	-	-
JCSD	X	-	162 (2005)[d]	0	72	45%

Note:
(a) ✓: Yes; X: No; "-": No information available.
(b) No. of housing units with devices includes natural replacements, new housing units constructed after 1992, and installations by the agency.
(c) The number of MFR accounts for the City of Riverside is unknown. Customer billing records maintained by the City of Riverside do not differentiate single family and multi-family accounts.
(d) Source: JCSD 2005 UWMP. The number of MFR accounts reported at the CUWCC website was 168 for the reporting year 2003.

A.4.2 Low-flow Showerheads - Water Savings Estimates

Table A-6 presents potential water savings estimates for achieving 75 percent and full saturation with low-flow showerhead installations. The following assumptions were made in estimating water savings reported in Table A-6:

- Full saturation assumes all existing housing units would have low-flow showerheads.
- Each showerhead installation would save 2.29 gpcd, following the water saving assumption by the CUWCC for pre-1980 construction (CUWCC, 2005, BMP 2, Section F).
- The number of showerheads to be installed per capita was assumed to be 0.75.

The number of device installations in a single housing unit was calculated based on the number of persons in a single housing unit (SFR and MFR) multiplied by the number of showerheads per capita (0.75).

- The number of persons was taken from the agency's base year data when data are available. Otherwise, it was assumed to be 3.2 for a SFR and 2.53 for a MFR, using the Western MWD's base year data information as an example.

TABLE A-6
WATER SAVINGS ESTIMATES FROM LOW-FLOW SHOWERHEAD INSTALLATIONS

	Based on 75% Saturation			Based on 100% Saturation		
Agency	No. of SFR Installations	No. of MFR Installations	Total Water Savings (AFY)	No. of SFR Installations	No. of MFR Installations	Total Water Savings (AFY)
EVMWD	19,313	0	66	39,912	158	137
Western MWD	6,504	95	23	19,938	153	69
RCWD	26,811	83	92	47,518	171	163
City of Corona[a]	14,093	-	48[b]	40,299	-	138[b]
City of Riverside[a]	0	-	-	0	-	-
JCSD	14,541	114	51	28,302	208	86

Notes:
AFY: acre-feet per year
(a) "-": Information not available to evaluate the no. of MFR installations and water savings from MFRs.
(b) Savings only from SFRs.

Total potential water savings from SFRs and MFRs would range from 20 to 90 AFY at the 75 percent saturation and could reach 70 to 160 AFY. Although the background device saturation is relatively high, it is necessary to keep an active program to maintain saturation levels and water savings that could otherwise be lost due to device decays. Since the implementation of this BMP is easy through distributions or direct installations and rebate programs are popular among the customers, water savings can be maintained by running an ongoing program.

A.4.3 Faucet Aerators – Implementation Status

Tables A-7 and A-8 present saturation levels of faucet aerators estimated for SFRs and MFRs, respectively. Assumptions made in calculations are listed below:

- A natural replacement rate of 4 percent annually was assumed if resale rates from the agency's base year report were not available (CUWCC, 2005, the Urban MOU, Exhibit 6).

- An average device decay rate factor was assumed to be 50 percent per year based on the device decay rates reported to be between 40 and 60 percent per year (CUWCC, 2005).

Saturation levels of faucet aerators is lower compared to low-flow showerheads, ranging from 4 to 18 percent for SFRs and from 8 to 13 percent for MFRs. The City of Corona and the City of Riverside are the two agencies who have distributed toilet flappers to their customers.

TABLE A-7
SINGLE FAMILY RESIDENTIAL FAUCET AERATORS SATURATION

Agency	No. of SFR Accounts (Year)	Installation by Agency	No. of Housing Units with Devices[(a)]	Device Saturation
EVMWD	34,331 (2006)	0	4,284	12%
Western MWD	22,390 (2006)	0	3,860	17%
RCWD	34,513 (2006)	215	3,663	11%
City of Corona	34,942 (2006)	3,770	6,333	18%
City of Riverside	57,308 (2006)	0	2,529	4%
JCSD	20,360 (2005)[(b)]	0	2,290	11%

Notes:
(a) No. of housing units with devices includes natural replacements, new housing units constructed after 1992, and installations by the agency.
(b) Source: JCSD 2005 UWMP. The number of SFR accounts reported at the CUWCC website is 15,917 for the reporting year 2003.

TABLE A-8
MULTI-FAMILY RESIDENTIAL FAUCET AERATORS SATURATION

Agency	No. of MFR Accounts (Year)	Installation by Agency	No. of Housing Units with Devices[(a)]	Device Saturation
EVMWD	389 (2006)	0	34	9%
Western MWD	121 (2006)	0	10	8%
RCWD	186 (2006)	10	24	13%
City of Corona[(b)]	1,583 (2006)	3,100	-	-
City of Riverside[(b)]	0 (2006)	0	-	-
JCSD	162 (2005)[(c)]	0	19	12%

Notes:
(a) No. of housing units with devices includes natural replacements, new housing units constructed after 1992, and installations by the agency.
(b) Information not available to evaluate the no. of housing units with devices and the percent saturation.
(c) Source: JCSD 2005 UWMP. The number of MFR accounts reported at the CUWCC website was 168 for the reporting year 2003.

A.4.4 Faucet Aerators - Water Savings Estimates

Table A-9 presents potential water savings estimates and the number of device installations in SFRs and MFRs at the 75 percent and full saturation levels. Water savings estimates reported in Table A-9 are based on the following assumptions:

- Full saturation assumes all existing housing units would have faucet aerators that achieve water savings.
- Each faucet aerator installation would save approximately 1.5 gpd per device (CUWCC, 2005).
- The number of faucet aerators per household was taken from the agency's reporting or assumed to be 3.7 for a SFR and 2.4 for a MFR.
- The number of device installations was calculated by multiplying the number of households that need to be retrofitted with the number of faucet aerators per household.
- A natural replacement rate of 4 percent annually was assumed if resale rates from the agency's base year report were not available (CUWCC, 2005, the Urban MOU, Exhibit 6).

Total potential savings that could be achieved range from approximately 80 to 250 AFY at the 75 percent saturation and from 110 to 340 AFY at the full saturation. Water savings per device are small, yet considerable amount of area-wide savings could be recognized since the service areas of the agencies are mostly unsaturated with respect to faucet aerators. These devices are reported to have a short life span (1 to 3 years) and a high device decay rate (40 to 50 percent per year) (CUWCC, 2005). Therefore, these devices need to be retrofitted frequently on an ongoing basis to maintain savings.

TABLE A-9
WATER SAVINGS ESTIMATES FROM FAUCET AERATOR INSTALLATIONS

	Based on 75% Saturation			Based on 100% Saturation		
Agency	No. of SFR Installations	No. of MFR Installations	Total Water Savings (AFY)	No. of SFR Installations	No. of MFR Installations	Total Water Savings (AFY)
EVMWD	79,417	619	134	111,173	852	188
Western MWD	47,850	195	81	68,560	267	116
RCWD	82,220	278	139	114,145	389	192
City of Corona[a]	73,533	-	124[b]	105,854	-	178[b]
City of Riverside[a]	149,673	-	251[b]	202,683	-	341[b]
JCSD	48,025	246	81	66,858	344	113

Notes:
AFY: acre-feet per year
(a) "-": Information not available to evaluate the no. of MFR installations and water savings from MFRs.
(b) Savings only from SFRs.

A.4.5 Toilet Flappers – Implementation Status

Tables A-10 and A-11 present saturation levels of toilet flappers for SFRs and MFRs, respectively, based on the following assumptions:

- A natural replacement rate of 4 percent annually was assumed if resale rates from the agency's base year report were not available (CUWCC, 2005, the Urban MOU, Exhibit 6).

- A device decay factor was assumed to be 20 percent based on a lifetime of 5 years for toilet retrofit.

Saturation levels are relatively low, mostly between 20 to 30 percent. Except EVMWD, the agencies have not distributed toilet flappers to SFRs and MFRs.

TABLE A-10
SINGLE FAMILY RESIDENTIAL TOILET FLAPPERS SATURATION

Agency	No. of SFR Accounts (Year)	Installation by Agency	No. of Housing Units with Devices[(a)]	Device Saturation
EVMWD	34,331 (2006)	765	9,760	28%
Western MWD	22,390 (2006)	0	7,856	35%
RCWD	34,513 (2006)	0	7,630	22%
City of Corona	34,942 (2006)	0	11,158	32%
City of Riverside	57,308 (2006)	0	5,760	10%
JCSD	20,360 (2005)[(b)]	0	4899	24%

Notes:
(a) No. of housing units with devices includes natural replacements, new housing units constructed after 1992, and installations by the agency.
(b) Source: JCSD 2005 UWMP. The number of SFR accounts reported at the CUWCC website is 15,917 for the reporting year 2003.

TABLE A-11
MULTI-FAMILY RESIDENTIAL TOILET FLAPPER SATURATION

Agency	No. of MFR Accounts (Year)	Installation by Agency	No. of Housing Units with Devices[(a)]	Device Saturation
EVMWD	389 (2006)	174	226	58%
Western MWD	121 (2006)	0	21	17%
RCWD	186 (2006)	0	41	22%
City of Corona	1,583 (2006)	0	-	-
City of Riverside	0 (2006)[(b)]	0	-	-
JCSD	162 (2005)[(c)]	0	40	25%

Notes:
(a) No. of housing units with devices includes natural replacements, new housing units constructed after 1992, and installations by the agency.
(b) The number of MFR accounts for the City of Riverside is unknown since customer billing records maintained by the City of Riverside do not differentiate single family and multi-family residential units.
(c) Source: JCSD 2005 UWMP. The number of SFR accounts reported at the CUWCC website is 168 for the reporting year 2003.

A.4.6 Toilet Flappers - Water Savings Estimates

Table A-12 presents water savings estimates from toilet flappers for achieving 75 and 100 percent saturation for SFRs and MFRs. Water savings estimates reported in Table A-12 was based on the following assumptions:

- Full saturation assumes all existing housing units would have toilet flappers that actively achieve water savings.
- Replacing leaky toilet flappers would reduce total average indoor water use per household by 16.8 gpd per household (EBMUD, 2003).
- The number of toilet flappers to be installed was taken from the agency's base year data if data are available or assumed to be 2.05 per SFR and 1.56 per MFR (representing data from Western MWD).
- The number of toilet flappers in each household was assumed to be equal to the number of toilets in each household.

Total savings for SFRs and MFRs range approximately from 350 to 1,050 AFY at the 75 percent saturation and from 560 to 1,460 AFY at the full saturation. Among the three devices considered under BMP 2, toilet flappers offer the highest potential savings.

TABLE A-12
WATER SAVINGS ESTIMATES FROM TOILET FLAPPERS INSTALLATIONS

	Based on 75% Saturation			Based on 100% Saturation		
Agency	**No. of SFR Installations**	**No. of MFR Installations**	**Total Water Savings (AFY)**	**No. of SFR Installations**	**No. of MFR Installations**	**Total Water Savings (AFY)**
EVMWD	31,977	132	604	49,143	5,490	931
Western MWD	18,320	143	347	29,795	126	563
RCWD	37,422	202	708	55,110	297	1,043
City of Corona[a]	30,097	-	566[b]	47,568	-	895[b]
City of Riverside[a]	55,831	-	1051[b]	77,322	-	1,455[b]
JCSD	41,698	163	788	30,922	122	582

Notes:
AFY: acre-feet per year
(a) "-": Information not available to evaluate the no. of MFR installations and water savings from MFRs.
(b) Savings only from SFRs.

A.4.7 Summary of BMP 2 Saturation

Table A-13 lists the percent saturation for low-flow showerheads, faucet aerators, and toilet flappers in the service areas of the seven agencies that are signatories to the Urban MOU. Among the three device retrofits considered under BMP 2, low-flow showerheads have the highest percent saturation, from nearly 50 percent to a full saturation for SFRs and from about

30 to 80 percent for MFRs. The percent saturation of toilet flappers ranges from 10 to 35 percent for SFRs and from 20 to 60 percent for MFRs. The percent saturation for faucet aerators is the lowest, mostly less than 20 percent for SFRs and less than 10 percent for MFRs.

TABLE A-13
SINGLE FAMILY AND MULTI-FAMILY RESIDENTIAL SATURATION FOR LOW-FLOW SHOWERHEAD, FAUCET AERATORS, AND TOILET FLAPPERS

	Saturation for Low-flow Showerheads		Saturation for Faucet Aerators		Saturation for Toilet Flappers	
Agency	SFR	MFR	SFR	MFR	SFR	MFR
EVMWD	52%	79%	12%	9%	28%	58%
Western MWD	63%	33%	17%	8%	35%	17%
RCWD	43%	51%	11%	13%	22%	22%
City of Corona[(a)]	62%	-	18%	-	32%	-
City of Riverside[(a)]	100%	-	4%	-	10%	-
JCSD	47%	45%	11%	12%	24%	25%

Note:
(a) "-": Information not available to evaluate the no. of MFR installations and the percent saturation for MFRs.

A.4.8 Summary of BMP 2 Potential Water Savings

For comparison of water savings among the three devices considered under BMP 2, results of savings from low-flow showerheads, faucet aerators, and toilet flappers are tabulated in Table A-14 and summarized below.

- Toilet flappers offer the highest water savings, ranging from approximately 350 to 1,050 AFY at the 75 percent saturation target.
- Savings from faucet aerators are estimated to range from 80 to 250 AFY at the 75 percent saturation target.
- Low-flow showerheads would have the lowest savings ranging from 20 to 90 AFY, partially because of the higher saturation rates, at the 75 percent saturation target.
- Significantly higher savings could be achieved for saturation reaching 100 percent.

TABLE A-14
TOTAL POTENTIAL WATER SAVINGS ESTIMATES FROM LOW-FLOW SHOWERHEADS, TOILET FLAPPERS, AND FAUCET AERATOR INSTALLATIONS

	Based on 75% Saturation			Based on 100% Saturation		
Agency	Low-Flow Showerheads (AFY)	Faucet Aerators (AFY)	Toilet Flappers (AFY)	Low-Flow Showerheads (AFY)	Faucet Aerators (AFY)	Toilet Flappers (AFY)
EVMWD	66	134	604	137	188	931
Western MWD	23	81	347	69	116	563
RCWD	92	139	708	163	192	1,043

Agency	Based on 75% Saturation			Based on 100% Saturation		
	Low-Flow Showerheads (AFY)	Faucet Aerators (AFY)	Toilet Flappers (AFY)	Low-Flow Showerheads (AFY)	Faucet Aerators (AFY)	Toilet Flappers (AFY)
City of Corona[(a)]	48	124	566	138	178	895
City of Riverside[(a)]	-	251	1,051	-	341	1,455
JCSD	51	81	788	86	113	582
TOTAL	**280**	**810**	**4,064**	**593**	**1,128**	**5,469**

Note:
AFY: acre-feet per year
(a) Savings only from SFRs.

A.5 BMP3 – System Water Audits, Leak Detection

BMP 3 consists of a pre-screening audit of the agency's entire water supply system to determine the need for a full-scale system audit. If system losses exceed 10 percent then a full scale audit is required. BMP 3 requires the agency to perform distribution system leak detection when warranted and cost-effective, and to repair leaks when found. Also, customers are advised whenever it appears possible that leaks exist on the customer's side of the meter.

The CUWCC is considering a revision to this BMP, which would upgrade the requirements to those of the recently revised AWWA/IWA Water Loss Practices M36 Manual. These new requirements would alter the methodology by which water losses are calculated and will require additional effort and reporting by each agency.

A.5.1 Implementation Status

Table A-15 summarizes the percent unaccounted water for each agency based on their records of total water sales and water purchases. Each of the retail agencies is currently in compliance with this BMP. Current leak detection and repair programs will have to be maintained to keep system losses below the target 10 percent of this BMP. If the compliance requirements for this BMP are tightened to 9 percent or lower, agencies may need to complete a comprehensive system audit.

TABLE A-15
SUMMARY OF UNACCOUNTED WATER LOSS

Agency	Reporting Year	Total Water Sales (AFY)	Other System Verifiable Uses (AFY)	Total Water Purchases (AFY)	% Unaccounted Water
EVMWD	2004	31,457	0	33,629	9.9
Western MWD	2006	28,090	0	30,406	7.62
RCWD	2006	77,494	0	77,503	0.01
City of Corona	2006	39,412	1.74	41,934	6.01
City of Riverside	2006	61,186	473	62,985	0.0
RCSD	2005	-	-	-	less than 6[(a)]
JCSD	2005	-	-	-	less than 10[(b)]

Notes:
AFY: acre-feet per year
"-" defines information not available from the most recent reporting in 2004 at the CUWCC website.
(a) Source: RCSD 2005 UWMP.
(b) Source: JCSD 2005 UWMP.

A.5.2 Water Savings Estimates

Since each of the retail agencies is currently in compliance with BMP 3 and reported to have losses less than 10 percent, potential area-wide water savings are assumed to be zero. However, the revised BMP would change the implementation and compliance requirements, and the way water losses are accounted. As a result, potential water savings estimates may change upon revision of BMP 3.

A.6 BMP4 – Metering with Commodity Rates for All New Connections and Retrofit of Existing

Implementation of BMP 4 requires agencies to undertake the following activities:

- Require meters for all new service connections.
- Establish a program to retrofit existing unmetered service connections.
- Read meters and bill customers by volume of use.
- Prepare a written plan, policy, or program to test, repair, and replace meters.
- Identify intra - and inter-agency disincentives or barriers to retrofitting mixed-use commercial accounts with dedicated landscape meters, and conduct feasibility studies to assess the merits of a program to provide incentives to switch mixed-use accounts to dedicated landscape meters.

A.6.1 Implementation status

Table A-16 summarizes implementation of BMP 4 based on qualitative measures. It appears that the agencies have not yet implemented incentive programs for switching their accounts from mixed-use meters to dedicated meters and have not developed a written plan and policy to test, repair, and replace meters.

TABLE A-16
IMPLEMENTATION STATUS OF METERING

Implementation Requirements	EVMWD	Western MWD	RCWD	City of Corona	City of Riverside	RCSD	JCSD
A Meter Retrofit Plan	-	✓	X	✓	X	-	X
Read Meters and Bill Customers by Volumetric Rates	✓	X	✓	✓	X	✓	-
Incentive Programs for Moving Mixed-Use Meters to Dedicated Landscape Meters	X	-	X	X	X	X	X
Bill Metered Customers as Often as Bimonthly	-	X	-	-	-	-	-
A Written Plan/Policy to Test, Repair, Replace Meters	-	-	-	-	-	-	-

Note: (a) ✓: Yes; X: No; "-": Information not available from the most recent reporting in 2006 at the CUWCC website.

Table A-17 summarizes the number of unmetered accounts, total CII accounts, and dedicated irrigation meter accounts for CII accounts in each agency's service area. Overall, the agencies have 20 to 60 percent of their CII accounts with dedicated irrigation meters. According to BMP reporting, all of the City of Riverside's CII accounts have mixed-use meters. Except for the City of Corona, all the agencies have metered accounts, based on the information presented on the CUWCC website and in UWMPs. The City of Corona currently has approximately 10,200 unmetered accounts out of more than 40,000 total accounts (about 25 percent).

TABLE A-17
UN-METERED ACCOUNTS AND SATURATION OF DEDICATED IRRIGATION METERS FOR CII ACCOUNTS

Agency	Unmetered Accounts (All Categories)[(a)]	Total CII Accounts	Dedicated Irrigation Meters	Saturation of Dedicated Irrigation Meters
EVMWD	0	1,287	808	63%
Western MWD	0	1,061	663	62%
RCWD	0	2,425	1,099	45%
City of Corona	10,219	3,621	692	19%
City of Riverside	0	5,414	0	0%
RCSD	0	508	129	25%
JCSD	0	197	4	2%

Note:
(a) All categories include SFRs, MFRs, CII accounts, and dedicated irrigation accounts as reported at the CUWCC website in 2006.

A.6.2 Water Savings Estimates

Water savings estimated for BMP 4 are based on the assumption that meter retrofits and volumetric rates combined would result in a 20 percent reduction in demand for retrofitted accounts (CUWCC, 2005, BMP 4, Section F). Since the City of Corona is the only agency with

un-metered accounts, water savings were estimated only for this retail agency. Given the total water use of 11,231 AFY estimated for the 10,219 unmetered accounts, the City of Corona could save about 2,246 AFY, reducing their water use by 20 percent.

Although the majority of the service areas of the retail agencies that are signatories to the Urban MOU are metered, un-metered accounts may exist in other service areas within Western MWD. Given this possibility and relatively high water saving reductions associated with meter retrofits and volumetric rate structures, potential for additional savings could exist outside of the service areas of these seven agencies analyzed herein.

A.7 BMP5 – Large landscape Conservation Programs and Incentives

Implementation of BMP 5 consists of the following actions:

- Provide non-residential customers with support and incentives to improve their landscape water-use efficiency.
- Identify accounts with dedicated irrigation meters and assign Evapotranspiration (ET)-based water-use budgets.
- Provide notices each billing cycle to accounts with water-use budgets showing the relationship between the budget and actual consumption.
- Develop and implement a strategy targeting and marketing large landscape water-use surveys to commercial/industrial/institutional (CII) accounts with mixed-use meters.
- Provide information on climate-appropriate landscape design and efficient irrigation equipment/management to new customers and change-of-service customer accounts.

The CUWCC is considering a revision to this BMP, which would require additional technical assistance to customers who are a certain percentage over their assigned water budgets. In addition, large landscape water budgets are a specific recommendation of the AB 2717 Landscape Task Force, which was convened by the state Legislature, and may become law in the future.

In October 2007, AB 566 was passed by the legislature and signed by the Governor to further promote water use efficiency in landscape irrigation. AB 566 requires the state's model local landscape ordinance (per the Water Conservation in Landscaping Act) to include climate information for irrigation scheduling based on the CIMIS system.

A.7.1 Implementation Status

Table A-18 presents saturation of dedicated irrigation meter accounts with water budgets. According to the most recent information from 2004 and 2006, three out of seven agencies (RCWD, the City of Corona, and the City of Riverside) have water budgets for all their dedicated irrigation accounts. Western MWD reports 407 dedicated irrigation accounts; of these, 10 accounts have water budgets.

TABLE A-18
LARGE LANDSCAPE WATER BUDGET SATURATION

Agency	No. of Dedicated Irrigation Meter Accounts (Year)	Dedicated Irrigation Meter Accounts with Water Budgets (Year)	Saturation
EVMWD	757 (2006)	0 (2006)	0%
Western MWD	407 (2006)	20 (2006)	5%
RCWD	1,099 (2006)	1,099 (2006)	100%
City of Corona	1,100 (2006)	1,100 (2006)	100%
City of Riverside	424 (2006)	424 (2006)	100%
RCSD	50 (2006)	0 (2006)	0%
JCSD	2 (2004)	0 (2004)	0%

Table A-19 demonstrates saturation of water use surveys to CII accounts. Overall, survey saturation is very low (zero or close to zero) except for RCWD, which has been successful in offering and completing a large number of surveys. However, the effect of surveys RCWD conducted is lost over time due to the decay factor. Records indicate EWMWD has been offering 3 to 6 surveys annually since 1999. Western MWD and RCWD began offering surveys in 2005. The City of Corona and City of Riverside have been offering surveys regularly since 1999, but the number of surveys offered in recent years has dropped significantly. RCSD and JCSD have no records of surveys offered or completed.

TABLE A-19
LARGE LANDSCAPE SURVEY SATURATION

Agency	Marketing Strategy for Landscape Surveys[(a)]	Year Strategy Implemented[(a)]	No. of CII Accounts	No. of Surveys Offered	No. of Surveys Completed	No. of Active Surveys[(c)] (Including Decay)	Saturation of Active Surveys
EVMWD	✓	1994	1,287	30	5	3	0.2%
Western MWD	✓	1987	1,061	30	30	20	2%
RCWD	✓	2004	2,425	1,975	1,104	838	35%
City of Corona	✓	1996	3,621	180	110	4	0.1%
City of Riverside	✓	1992	5,677	269	252	9	0.2%
RCSD	X	-	197	0	0	0	0%
JCSD	X	-	348 [(b)]	0	0	0	0%

Notes:
(a) ✓: Yes; X: No; "-": Not available.
(b) Source: JCSD 2005 UWMP.
(c) Active surveys refer to those surveys that are still actively achieving water savings. Most surveys only have an effective life of ~ 3 years.

A.7.2 Water Savings Estimate

Table A-20 presents estimated potential water savings from large landscape surveys. The following assumptions were made in calculating water savings:

- Landscape water surveys would result in a 20 percent reduction of total demand in surveyed accounts, based on water savings estimated to be 20.6 percent reported in the BMP Cost and Savings Study (CUWCC, 2005).

- The number of surveys to be completed takes into account a water survey decay factor of 30 percent, as suggested by the CUWCC cost-effectiveness spreadsheet.

Potential exists for the agencies to achieve significant water savings by improving their water survey programs for large landscape customers. Overall, the area-wide potential savings range from approximately 130 AFY up to 3,500 AFY.

TABLE A-20
WATER SAVINGS ESTIMATES FROM LARGE LANDSCAPE SURVEYS

Agency	Equivalent No. of Surveys Completed[(a)]	No. of Surveys to be Completed	Total Water Use by CII Accounts (AFY)	Average Water Use by a Single Account (AFY)	Total Potential Water Savings (AFY)[(b)]
EVMWD	3	1,284	3,023	2.3	452
Western MWD	20	1,042	3,323	3.1	489
RCWD	838	1,587	4,370	1.8	429
City of Corona	4	3,617	7,283	2.0	1,091
City of Riverside	9	5,668	23,378	4.1	3,501
RCSD	0	197	875	4.4	131
JCSD	0	348	5,165	14.8	775

Notes:
AFY: acre-feet per year
(a) Equivalent number of surveys takes into account a water survey decay factor of 30 percent per year.
(b) 20 percent reduction was assumed to result from landscape surveys.

A.8 BMP6 - High Efficiency Clothes Washing Machine Financial Incentive Programs

BMP 6 consists of offering financial incentives, if cost-effective, for the purchase of HECWs. This BMP has the goal of transforming the clothes washer market by increasing market share of HECWs.

The CUWCC is working with the California Energy Commission and the Federal Department of Energy to revise energy and water savings standards for clothes-washer manufacturers. Therefore, over time these devices are expected to become more efficient, more commonplace, and less expensive on the retail market.

A.8.1 Implementation Status

Table A-21 presents the number of rebates issued by each agency and the number of housing units retrofitted with HECWs. The following assumptions were adopted to estimate the saturation levels:

- A natural replacement rate of 4 percent per year was assumed if resale rates from the agency's base year report were not available.
- A decay factor of 7 percent (based on an average lifetime of 14 years for washers) was used (CUWCC, the Urban MOU, BMP 6, Section F).
- HECW market share of 12 percent was taken into account (i.e., 12 percent of customers already have HECWs).
- The target compliance was assumed to be 36 percent to increase the market share.
- HECWs were assumed to be on the market beginning from 1998.

Saturation levels are very low, ranging from 3 to 6 percent. Despite the high number of rebates issued by five agencies (EVMWD, Western MWD, RCWD, City of Corona, and City of Riverside), HECWs still comprise a small portion of clothes washers in the service areas of each of these five agencies. Therefore, this BMP shows potential for agencies to target and save additional water by increasing implementation.

TABLE A-21
HIGH EFFICIENCY CLOTHES WASHERS SATURATION

Agency	Rebates Issued for HECWs[a]	No. of SFR+MFR Dwelling Units (Year)	Rebates Issued by Agency	No. of Dwelling Units with Devices[a]	% Saturation [a]
EVMWD	✓	31,674 (2006)	912	1,654	5
Western MWD	✓	65,552 (2006)	569	3,624	6
RCWD	✓	33,854 (2006)	972	1,700	4
City of Corona	✓	45,394 (2006)	1,657	2,466	5
City of Riverside	✓	56,916 (2006)	3,593	1,961	3
RCSD	X	6,498 (2006)	0	356	5
JCSD	✓	20,522 (2005)[c]	77	-	-

Note:
(a) ✓: Yes; X: No; "-": Not available.
(b) No. of dwelling units with devices includes natural replacements, new housing units constructed after 1998, and rebates issued by the agency.
(c) Estimated based on the total number of SFR and MFR accounts in its service area (JCSD 2005 UWMP).

A.8.2 Water Savings Estimates

Table A-22 presents potential water savings estimates for installing HECWs in the service areas of each of the seven agencies. Assumptions in calculating water savings estimates include:

- A natural replacement rate of 4 percent per year was assumed if resale rates from the agency's base year report were not available.

- A single HECW was assumed to be retrofitted per household.

- Water savings of 8,541 gallons per year per device was assumed using the formula adopted from the Urban MOU, BMP 6, Section F (Water savings = (13.3 - 6) X 1,170 where 13.3 is the baseline water factor for washers sold in 1994; 1,170 gallons per year is the average change in water use for a unit change in water factor; and 6 is the water factor for HECWs installed).

Savings estimates range from 150 to 525 AFY. The highest savings would be reached in areas where the highest number of HECWs installed to reach the 36 percent target saturation.

TABLE A-22
HIGH EFFICIENCY CLOTHES WASHER WATER SAVINGS ESTIMATES

Agency	Rebates to be Issued by Agency[(a)]	Potential Water Savings (AFY)[(b)]
EVMWD	9,917	284
Western MWD	19,975	524
RCWD	10,871	341
City of Corona	13,876	364
City of Riverside	18,551	489
JCSD	6,959	147

Notes: AFY: acre-feet per year
(a) Assumes a target saturation of 36 percent.
(b) Assumes installation of HECWs with less than or equal to 6 water factor.

A.9 BMP7 – Public Information Programs

BMP 7 consists of implementing a public information program to promote water conservation and related benefits. According to the Urban MOU, implementation shall consist of at least the following actions:

1. Implement a public information program to promote water conservation and water conservation related benefits.

2. Program should include, but is not limited to, providing speakers to employees, community groups and the media; using paid and public service advertising; using bill inserts; providing information on customers' bills showing use in gpd for the last billing period compared to the same period the year before; providing public information to promote water conservation practices; and coordinating with other government agencies, industry groups, public interest groups, and the media.

A.9.1 Implementation Status

Saturation estimates for BMP 7 are not quantifiable. Table A-23 summarizes the public information program activities undertaken by each agency to demonstrate their efforts in

implementing this BMP. The total number of events coordinated since 1999 was compiled from the CUWCC website and the average annual number of events was calculated to compare each agency's implementation efforts.

With the exception of JCSD, all the agencies have an active public information program. Based on the total number of events, EVMWD, Western MWD, RCWD, and the City of Riverside have coordinated more than 200 events so far. On an annual basis, Western MWD and RCWD have been conducting an average of more than 100 events.

TABLE A-23
IMPLEMENTATION STATUS OF PUBLIC INFORMATION PROGRAM

Implementation Requirements	EVMWD	Western MWD	RCWD	City of Corona	City of Riverside	RCSD	JCSD
Public Information Program Implemented	✓	✓	✓	✓	✓	✓	-
Program to Coordinate with Other Government Agencies, Industry and Public Interest Groups and Media	✓	✓	✓	✓	✓	✓	-
Conservation Information Program Annual Expenditures ($ for 2006)	$174,401	-	$24,547	$2,500	$29,470	$5,000[(a)]	-
Total No. of Events Conducted							
Paid Advertising	44	10	52	2	38	-	-
Public Service Announcement	14	95	283	3	14	-	-
Bill Inserts/Newsletters/Brochures	63	55	16	24	48	36	-
Bill Showing Water Usage in Comparison to Previous Year's Usage	-	-	-	-	-	-	-
Demonstration Gardens	0	55	4	4	26	6	-
Special Events, Media Events	22	12	32	8	66	18	-
Speaker's Bureau	65	20	8	1	41	-	-
Total	**208**	**247**	**395**	**42**	**233**	**60**	**-**
Average Annual No. of Events Conducted							
Paid Advertising	7	5	10	1	6	-	-
Public Service Announcement	2	48	94	3	3	-	-
Bill Inserts/Newsletters/Brochures	11	28	3	12	8	6	-
Bill Showing Water Usage in Comparison to Previous Year's Usage	-	-	-	-	-	-	-
Demonstration Gardens	4	28	1	2	4	1	-

Implementation Requirements	EVMWD	Western MWD	RCWD	City of Corona	City of Riverside	RCSD	JCSD
Special Events, Media Events	0	6	5	4	11	3	-
Speaker's Bureau	11	10	2	1	7	-	-
Total Average	**35**	**125**	**115**	**23**	**39**	**10**	**-**

Notes: ✓: Yes; X: No; "-": Information not available.
(a) Represents information available for 2004.

A.9.2 Water Savings Estimates

Water savings are not quantifiable for BMP 7.

A.10 BMP8 – School Education Programs

BMP 8 consists of implementing a school education program to promote water conservation and related benefits. According to the Urban MOU, implementation shall consist of at least the following actions:

1. Implement a school education program to promote water conservation and water conservation related benefits.

2. Programs shall include working with school districts and private schools in the water suppliers' service area to provide instructional assistance, educational materials, and classroom presentations that identify urban, agricultural, and environmental issues and conditions in the local watershed. Education materials shall meet the state education framework requirements, and grade appropriate materials shall be distributed to grade levels K-3, 4-6, 7-8, and high school.

A.10.1 Implementation Status

An estimation of saturation for BMP 8 is not possible. Table A-24 summarizes the school education program activities undertaken by each agency in their service areas as part of BMP 8 implementation. The total number of program activities since 1999 was compiled from the CUWCC website and the average annual number of program activities was calculated to compare each agency's implementation efforts.

TABLE A-24
IMPLEMENTATION STATUS OF SCHOOL EDUCATION PROGRAM

Implementation Requirements	EVMWD	Western MWD	RCWD	City of Corona	City of Riverside	RCSD	JCSD
School Education Program Implemented	✓	✓	✓	✓	✓	✓	X
Implementation Year	1991	1982	1984	1996	1989	1985	-
School Education Program Annual Expenditures ($ for 2006)	$7,597	$26,196	$13,147	$5,500	-	$0	-
Total No. of Program Activities							
No. of Class Presentations	719	100	299	526	71	72	-
No. of Students Reached	28,932	9,700	12,285	17,976	188,166	2,520	-
No. of Teachers' Workshops	195	26	0	97	71	0	-
Total	**29,846**	**9,826**	**12,584**	**18,599**	**188,308**	**2,592**	
Average Annual No. of Program Activities							
No. of Class Presentations	90	13	37	66	9	9	-
No. of Students Reached	3,617	1,213	1,536	2,247	23,521	315	-
No. of Teachers' Workshops	24	3	0	12	9	0	-

Note: ✓: Yes; X: No; "-" : Information not available.

With the exception of JCSD, all the agencies have an active school education program. Based on total program activities, the City of Riverside has reached nearly 190,000 students, conducting 71 class presentations and teachers workshops. On an annual basis, Western MWD has been conducting the highest number of school events by giving an average of 90 presentations and coordinating about 24 workshops annually.

A.10.2 Water Savings Estimate

Water savings are not quantifiable for BMP 8.

A.11 BMP9 – Conservation Programs for CII Accounts

BMP 9 consists of identifying retrofitting options to accelerate replacement of existing high-water-using toilets with ultra-low-flush (1.6 gallons or less) toilets in commercial, industrial, and institutional facilities, and either (a) providing water use surveys and customer incentives programs or (b) achieving a certain water use reduction by CII accounts.

A.11.1 Implementation Status

An agency can comply with this BMP in multiple ways. An accurate saturation estimate was not possible for many CII programs as agency billing categories were not specific enough to match the programs to their target users. Saturation for this BMP was therefore measured by estimating the number of CII accounts that have received a water use survey.

Table A-25 lists the number of agency installations for the various retrofitting options considered under BMP 9. Overall, based on the information available, none of the agencies have identified retrofitting options in their service areas, as the area-wide implementation for device installations is very low. Among the seven agencies, only RCWD has installed ULFTs and pre-rinse spray valves. For Western MWD and JCSD, no records of device installations were available. A small number of cooling tower controllers and commercial clothes washers were installed by RCWD and the City of Riverside.

Table A-26 presents saturation of surveys completed by each agency for CII accounts. The City of Riverside is the only agency that has offered and completed surveys. The City of Riverside offered a large number of surveys particularly between 1999 and 2001, but only a small portion of their offered surveys were completed by customers. Water savings achieved from surveys tend to decay over time as much as 30 percent. Therefore, accounts that were previously surveyed would need to be re-surveyed periodically to maintain the water savings.

TABLE A-25
DEVICE INSTALLATIONS IN CII ACCOUNTS

Devices	No. of CII Accounts	EVMWD	Western MWD	RCWD	City of Corona	City of Riverside	RCSD	JCSD
ULFTs	1,287	0	-	46	0	0	0	-
Pre-rinse Spray Valves	1,061	0	-	338	0	0	0	-
Cooling Tower Controllers	2,425	0	-	2	0	0	0	-
Dual Flush Toilets	3,621	0	-	0	0	0	0	-
HETs (1.2 pdf or less)	5,677	0	-	0	0	0	0	-
High Efficiency Urinals	348	0	-	0	0	0	0	-
Non-water Urinals	197	0	-	0	0	0	0	-
Commercial Clothes Washers	1,287	0	-	-	0	-	0	-
Food Steamers	1,061	0	-		0	0	0	-

Note: "-": Information not available.

TABLE A-26
CII SURVEY SATURATION

Agency	No. of CII Accounts	No. of Surveys Offered	No. of Surveys Completed	No. of Active Surveys [(a)] (Including Decay)	Saturation of Active Surveys
EVMWD	1,287	0	0	0	0%
Western MWD	407	0	0	0	0%
RCWD	2,425	0	0	0	0%
City of Corona	3,621	0	0	0	0%
City of Riverside	5,677	13,864	149	27	0.5%
RCSD	508	0	0	0	0%
JCSD	197	0	0	0	0%

Note: (a) Active surveys refer to those surveys that are still actively achieving water savings. Most surveys only have an effective life of ~ 3 years.

A.11.2 Water Savings Estimate

Table A-27 presents potential water savings estimates resulting from CII water use surveys. The following assumptions were made in the calculations:

- Water surveys would result in a 20 percent reduction in surveyed accounts (CUWCC, 2005).
- The number of surveys to be completed takes into account a water survey decay factor of 30 percent (CUWCC, 2005).
- It was assumed that 75 percent of the accounts that have not been surveyed previously would receive surveys.
- Total potential water savings were estimated based on the number of surveys to be completed multiplied by the average water saving by a single CII account.

Significant savings can be achieved by targeting CII water use sector and offering them water use surveys. The area-wide savings are estimated to range from 130 to 3,500 AFY.

TABLE A-27
WATER SAVINGS ESTIMATES FROM CII WATER USE SURVEYS

Agency	No. of Active Surveys [(a)] (Including Decay)	No. of Surveys to be Completed	Total Water Use by CII Accounts (AFY)	Average Water Use by a Single Account (AFY)	Total Potential Water Savings (AFY) [(b)]
EVMWD	0	1,287	3,023	2.3	454
Western MWD	0	1,061	3,323	3.1	498
RCWD	0	2,425	4,370	1.8	656

Agency	No. of Active Surveys [a] (Including Decay)	No. of Surveys to be Completed	Total Water Use by CII Accounts (AFY)	Average Water Use by a Single Account (AFY)	Total Potential Water Savings (AFY)[b]
City of Corona	0	3,621	7,283	2.0	1,093
City of Riverside	27	5,650	23,378	4.1	3,490
RCSD	0	197	875	4.4	131
JCSD	0	348	5,165	14.8	775

Notes:
AFY: acre-feet per year
(a) Active surveys refer to those surveys that are still actively achieving water savings. Most surveys only have an effective life of ~ 3 years..
(b) 20 percent reduction was assumed to result from CII water use surveys.

A.12 BMP10 – Wholesale Agency Assistance

BMP 10 directs that wholesale water suppliers provide financial, technical, and program management support, as appropriate, beneficial, and mutually agreeable to their retail water agency customers to advance water conservation efforts and effectiveness. Western MWD is the only agency included in this study required to implement this BMP.

None of the implementation requirements for BMP 10 is suitable for an estimate of saturation or estimation of water savings.

A.13 BMP11 – Conservation Pricing

Implementation of BMP 11 directs the adoption of water-conserving pricing structures. Based on the recent revision to this BMP, a specific threshold for the commodity charge component is required. Agencies are obligated to set up a pricing rate such that at least 70 percent of total annual revenue comes from volumetric rates (as opposed to fixed customer charges). Implementation level of BMP 11 by each agency based on this revision is currently unknown since implementation of the revised BMP began in 2008. Discussion of the BMP 11 implementation below covers the BMP requirements prior to the revision.

A.13.1 Implementation Status

None of the implementation requirements for this BMP are suitable for an estimate of saturation. Tables A-28 and A-29 summarize water and sewer pricing structures, respectively, based on the most recent information available (2003 for JSCD or 2006 for the other agencies). All agencies have a water conserving pricing structure for all water services. For sewer services, except RCWD and City of Corona, all other five agencies have water conserving pricing structure (uniform or increasing block).

TABLE A-28
SUMMARY OF WATER PRICING STRUCTURES

Agency	Residential	Commercial	Industrial	Institutional	Irrigation
EVMWD	Increasing Block	Increasing Block	Uniform	Uniform	Uniform
Western MWD	Uniform	Uniform	Uniform	Uniform	Uniform
RCWD	Increasing Block	Increasing Block	Increasing Block	Increasing Block	Increasing Block
City of Corona	Uniform	Uniform	Uniform	Uniform	Uniform
City of Riverside	Increasing Block Seasonal	Increasing Block Seasonal	Increasing Block Seasonal	NA	NA
RCSD	Increasing Block	Increasing Block	NA	NA	NA
JSCD[(a)]	Increasing Block	Increasing Block	Increasing Block	Increasing Block	Increasing Block

Note:
NA: Service not available.
(a) Based on the 2003 reporting at the CUWCC website.

TABLE A-29
SUMMARY OF SEWER PRICING STRUCTURES

Agency	Residential	Commercial	Industrial	Institutional	Irrigation
EVMWD	Uniform	Increasing Block	Increasing Block	Increasing Block	NA
Western MWD	Uniform	Uniform	Uniform	Uniform	NA
RCWD	Non-volumetric Flat Rate	Non-volumetric Flat Rate	Non-volumetric Flat Rate	Non-volumetric Flat Rate	NA
City of Corona	Non-volumetric Flat Rate	Non-volumetric Flat Rate	Non-volumetric Flat Rate	Non-volumetric Flat Rate	Non-volumetric Flat Rate
City of Riverside	Uniform	Uniform	Uniform	NA	NA
RCSD	Uniform	Uniform	NA	NA	NA
JSCD[(a)]	Uniform	Uniform	Uniform	Uniform	Uniform

Note:
NA: Service not available.
(a) Based on the 2003 reporting at the CUWCC website.

A.13.2 Water Savings Estimate

Implementation requirements for BMP 11 are not suitable for water savings estimates. However, agencies with uniform rate structures could likely realize some significant savings by transferring to an increasing block rate structure for water (and sewer, as applicable) services.

A.14 BMP12 – Conservation Coordinator

BMP 12 directs the designation of a water conservation coordinator and support staff (if necessary), whose duties include the coordination and oversight of conservation programs and BMP implementation, preparation and submittal of the Council BMP implementation report, and communication and promotion of water conservation issues to agency senior management.

A.14.1 Implementation Status

Implementation requirements for this BMP are not suitable for an estimate of saturation. This BMP implementation appears to be on track given the total of 11 conservation coordinator positions available in the Western MWD's service area, as shown in Table A-30. Each agency has at least one part-time conservation coordinator, with the exception of RCSD and JCSD. In-house staffing expenditures range from approximately $23,000 to $160,000 annually. Additional conservation coordinator staff may be needed to implement BMP programs successfully if programs are upgraded or require more rigorous implementation and/or reporting requirements. Western MWD could benefit from a dedicated, full-time conservation coordinator given its large wholesale service area and numerous retailers, which require support under the terms of BMP 10.

TABLE A-30
CONSERVATION STAFFING SUMMARY

Agency	No. of Conservation Coordinators	Coordinator's Position Full-time Equiv. (%)	Staffing Expenditures (Year)	Year Positions Created
EVMWD	3	95	$37,193 (2006)	1991 and 2005
Western MWD	1	25	$23,092 (2006)	1990
RCWD	3	40	$98,938 (2006)	2006
City of Corona	2	80	$158,652 (2006)	2000
City of Riverside	2	50	$0 (2006)	1995
RCSD	-	-	-	-
JCSD	-	-	-	-

Note: "-": Information not available at the CUWCC website.

A.14.2 Water Savings Estimate

Implementation requirements for this BMP are not suitable for water savings estimates.

A.15 BMP13 - Water Waste Prohibition

BMP 13 requires adopting waste water ordinances to prohibit water waste through gutter flooding, single-pass cooling systems in new connections, non-recirculating systems in all new conveyer car wash and commercial laundry systems, and non-recycling decorative water fountains. It also requires that residential water audits include a check of water softener installations, and that use of timer-based softeners be discouraged.

A.15.1 Implementation Status

Implementation requirements for this BMP are not suitable for an estimate of saturation. Table A-31 lists whether each agency has waste water ordinances for enforcing measures to prohibit water waste. Six agencies have ordinances in effect, but most ordinances are not imposed. Adopting and enforcing waste water ordinances would be in the public's interest if agencies have the power and authority to impose them in their service areas.

TABLE A-31
WATER WASTE ORDINANCES

Agency	Gutter Flooding	Cooling Systems	Car Washes	Commercial Laundries	Decorative Fountains	Water Softeners
EVMWD	X	X	X	X	X	X
Western MWD	X	X	X	X	X	X
RCWD	X	X	X	X	X	X
City of Corona	✓	✓	✓	✓	✓	X
City of Riverside	✓	✓	X	X	✓	X
RCSD	-	-	-	-	-	-
JCSD	X	✓	X	X	X	X

Note: (a) ✓: Ordinance imposed; X: Ordinance not imposed; "-": No ordinance in effect

A.15.2 Water Savings Estimate

Implementation requirements for this BMP are not suitable for water savings estimates.

A.16 BMP14 – Residential ULFT Replacements

BMP 14 directs the implementation of programs for replacing existing high-water-using toilets (3.5 to 7 gpf) with ULFTs (1.6 gallons or less) in pre-1992 SFRs and MFRs. In California, ULFTs have been available since 1992. Since January 1, 1994, the federal EPAct of 1992 has required toilets to use 1.6 gpf.

In 2007, the state Legislature passed amendments to the plumbing code that promulgated the installation of new technology HETs and urinals (with flush volumes less than 1.6 gpf) in all new construction, and waterless urinals where appropriate, with all high-efficiency devices to be available on the market in California by 2014. To reflect this legislation, this BMP will be revised by the CWUCC to encourage rebate programs for newer-technology devices.

A.16.1 Implementation Status

Tables A-32 and A-33 present the percent saturation estimates of ULFTs for SFRs and MFRs, respectively. The following assumptions were taken into account in the percent saturation calculations:

- A natural replacement rate of 4 percent annually was assumed in homes constructed prior to 1992 if resale rates from the agency's base year report were not available (CUWCC, 2005, the Urban MOU, Exhibit 6).

- All houses constructed after 1992 were assumed to have ULFTs.
- A decay rate of 5 percent was used for ULFTs.

Since ULFTs have been required since 1992, the saturation estimates presented in Tables A-32 and A-33 account for the natural replacement of these devices in homes constructed prior to 1992. Although the area-wide saturation is relatively high, this BMP has not yet reached full saturation for any of the agencies.

TABLE A-32
SINGLE FAMILY RESIDENTIAL ULFT SATURATION

Agency	No. of SFR Accounts (Year)	Installation by Agency	No. of Housing Units with Devices[(a)]	Device Saturation
EVMWD	34,331 (2006)	1,150	18,455	54%
Western MWD	22,390 (2006)	193	14,606	65%
RCWD	34,513 (2006)	466	15,261	44%
City of Corona	34,942 (2006)	9,005	26,941	77%
City of Riverside	57,308 (2006)	4,265	15,368	27%
JCSD	20,360 (2005)[(b)]	15	9,491	47%

Notes:
(a) No. of housing units with devices includes natural replacements, new housing units constructed after 1992, and installations by the agency.
(b) Source: JCSD 2005 UWMP. The number of SFR accounts reported at the CUWCC website is 15,917 for the reporting year 2003.

TABLE A-33
MULTI-FAMILY RESIDENTIAL ULFT SATURATION

Agency	No. of MFR Accounts (Year)	Installation by Agency	No. of Housing Units with Devices[(a)]	Device Saturation
EVMWD	389 (2006)	111	226	58%
Western MWD	121 (2006)	0	42	35%
RCWD	186 (2006)	0	80	43%
City of Corona[(b)]	1,583 (2006)	987	-	-
City of Riverside[(b)]	0 (2006)	3	-	-
JCSD	162 (2005)[(c)]	0	78	48%

Notes:
(a) No. of housing units with devices includes natural replacements, new housing units constructed after 1992, and installations by the agency.
(b) Information not available to evaluate the number of housing units with devices and the percent saturation.
(c) Source: JCSD 2005 UWMP. The number of MFR accounts reported at the CUWCC website was 168 for the reporting year 2003.

A.16.2 Water Savings Estimates

Table A-34 presents the estimated number of future ULFT replacements and corresponding potential water savings for SFRs and MFRs for 75 and 100 percent saturation. The following assumptions were made in estimating water savings:

- Full saturation assumes all existing housing units would be retrofitted with ULFTs.
- Each ULFT installation would save 42.4 and 49.2 gpd per household for SFRs and MFRs, respectively (CUWCC, 2005, Exhibit 6).
- The average number of toilets in each household was taken from the agency's base year data, if available, or assumed to be 2.05 and 1.26 for SFRs and MFRs, respectively (based on data available for Western MWD).
- The number of device installations was calculated based on the number of housing units to be retrofitted with ULFTs and the average number of toilets in each household.

Significant savings can be potentially achieved by continuing toilet replacement programs although saturation of this BMP is relatively high. Savings estimate range from 100 to 1,300 AFY at the 75 percent saturation and from 380 to 2,000 AFY at the full saturation.

TABLE A-34
WATER SAVINGS ESTIMATES FROM ULFT INSTALLATIONS

	Based on 75% Saturation			Based on 100% Saturation		
Agency	No. of SFR ULFTs to be Replaced	No. of MFR ULFTs to be Replaced	Total Water Savings (AFY)	No. of SFR ULFTs to be Replaced	No. of MFR ULFTs to be Replaced	Total Water Savings (AFY)
EVMWD	14,586	132	350	31,752	326	763
Western MWD	4,483	62	107	15,958	100	374
RCWD	21,779	75	508	39,467	133	920
City of Corona[a]	3,244	-	0[b]	16,002	-	380[b]
City of Riverside[a]	41,420	-	1,311[b]	62,910	-	1,992[b]
JCSD	11,557	44	277	40,565	84	968

Notes:
AFY: acre-feet per year
(a) "-": Information not available to evaluate the no. of MFR installations and water savings from MFRs.
(b) Savings only from SFRs.

Appendix B: Local Cost Effectiveness Analysis

Appendix B provides a description of variables and data sources used, and assumptions made to perform the cost-effectiveness analysis for Section 4 of this study. Information is presented in the following section for each BMP separately. Variables listed below are common to all BMPs and are explained only once as part of BMP 1.

- Avoided cost of water supply was assumed to be $695 per AF based on Metropolitan's rate for Tiered 2 fully treated water, effective January 1, 2009.

- Avoided cost of wastewater capacity, including capital and O&M costs, was assumed to be $800 per AF (estimated by Kennedy/Jenks Consultants based on past experience and professional engineering opinion).

- Avoided cost of gas and electricity was used to estimate other benefits that can be recognized through water use reduction.

- Agency and societal discount rates were used to estimate the present value of costs and benefits.

B.1 BMP 1 – Residential Surveys

Category	Variable	Value Used	Data Sources and Assumptions
Agency Cost	Survey cost	$300 per survey	Cost of survey targeted indoor/outdoor was reported to be $200 in 1995 dollars (CUWCC, 2005, page 2-51). Cost projected to be approximately $300 per survey in 2008 dollars.
	Labor and equipment	$60 per survey	Cost of residential audit for labor and equipment was reported to be $40.75 in 1994 dollars (CUWCC, 2005, page 2-50). Cost projected to be $60 in 2008 dollars.
Water Savings	Reduction in average use	32.2 gpd for both SFR and MFR	Savings from intensive home surveys targeted to high water SFRs was reported to be 32.2 gpd (CUWCC, 2005, page 2-48). Assumed the same saving would be achieved in surveyed MFRs.
	Savings decay	20% per year	According to studies reported by CUWCC (2005), survey savings tend to decay over time by as much as 20% to 25% per year.
Agency Benefits	Unit cost of avoided water supply	$695 per AF	Assumed based on the Metropolitan's rate for Tier 2 fully treated water, effective as of 1/1/2009 (see http://www.mwdh2o.com/mwdh2o/pages/finance/finance_03.html)
	Unit cost of avoided wastewater treatment	$800 per AF	Estimated total cost for avoided wastewater treatment includes the capital and O&M costs (estimated by Kennedy/Jenks Consultants).
Other Benefits and Costs (Avoided Customer Energy Costs)	Cost for gas price	$0.96/therm	Gas price according to Southern CA Gas Company effective as of 4/1/08.
	Cost for electricity price	$0.12/KWh	Electricity price from Southern California Edison for Tier 1 rate.
	Customer benefits	50%	Assumed value for hot water use as a percent of total survey water saving. Assumed value for the percent of residential hot water heated with gas.
Discounting Information	Agency discount rate	5% per year	A conservative estimate (provided by Western MWD).
	Social discount rate	2.4% per year	An average real discount rate was assumed based on values for 3-yr, 5-yr, 7-yr, 10-yr, and 30-yr provided by 2008 Office of Management and Budget Circular No. A-94 (see http://www.whitehouse.gov/omb/circulars/a094/a94_appx-c.html)

B.2 BMP 2 – Residential Plumbing Retrofits

Category	Variable	Value Used	Data Sources and Assumptions
Agency Costs	Administration cost	$60 per year	An assumed value in 2003 dollars, based on a example given by CUWCC (2005, page 3-4)
	Field labor (kit distribution)	$20 for direct installation	Cost of direct installation was given as $5-$15 in 1995 dollars (CUWCC, 2005).Cost projected to be $20 in 2008 dollars.
	Material cost	$3 per kit	Cost of typical retrofit kit cost was reported as $2 in 1995 dollars (CUWCC, 2005). Cost projected to be $3 in 2008 dollars.
	Marketing cost	$50 per year	Cost of residential audit for labor and equipment was reported to be $40.75 in 1994 dollars (CUWCC, 2005, pg. 2-50). Projected to be $60 in 2008 dollars.
Savings	Water savings (gpd per residential unit)	Total savings of approximately 60 gpd for SFR and 58 gpd for MFR, based on savings from low flow showerhead, toilet flapper, faucet aerator, turf audit and timer.	Savings from low-flow showerheads were reported to range from 5.5 and 5.8 gpd per device for SFRs; and 5.2 gpd per device for MFR. Based on the average saving of 5.65 gpd per device for SFR ((CUWCC, 2005, page 2-41, Table 1), savings were assumed be 11.3 per SFR and 10.4 gpd per MFR with two devices. Savings from faucet aerators were reported to be 1,5 gpd per device. Savings were assumed to be 3 gpd per SFR and MFR with two devices. Savings from toilet flappers were given as 16.8 gpd per household (EBMUD, 2003). Savings from turf audit with timer was given as 25.9 gpd per household. Total saving is the sum of savings listed for each device above: 11.3+3+16.8+25.9 = 57 gpd for SR and 10.4 +3+16.8+25.9 = 56.1 gpd for MFR.
	Saving decay	40% per year	Assumed an average value of 40% annually based on the device decay rates given in the range from 20% to 60% (CUWCC, 2005, page 2-48, Table 1)
Agency Benefits	Unit cost of avoided water supply	$695 per AF	Refer to BMP 1.
	Unit cost of avoided wastewater treatment	$800 per AF	Refer to BMP 1.

Category	Variable	Value Used	Data Sources and Assumptions
Other Benefits and Costs (Avoided Customer Energy Costs)	Cost for gas price	$0.96/therm	Refer to BMP 1.
	Cost for electricity price	$0.12/KWh	Refer to BMP 1.
	Customer benefits	50%	Refer to BMP 1.
Discounting Information	Agency discount rate	5% per year	Refer to BMP 1.
	Social discount rate	2.4% per year	Refer to BMP 1.

B.3 BMP 4 – Meter Retrofit

Category	Variable	Value Used	Data Sources and Assumptions
Program Costs	Agency cost for meter purchase and installation	$700 per meter installed	Cost of meter purchase and installation ranging from $250 to $750 per meter based on 1995 dollars (CUWCC, 2005, pg. 2-28). Cost projected to be in 2008 based on an average of $500 in 1995 dollars.
	One-time setup	$30	Cost was reported to be $25 for receiver, computer, software (CUWCC, 2005, page 2-30). Cost projected to be $30 in 2008 dollars.
	Admin cost	$60/yr	Assumed value in 2003 dollars, based on an example given by CUWCC (2005, pg. 3-4)
	Meter useful life	14 years	Reported to be 7 to 14 years (CUWCC, 2005, page 2-29).
Retrofit Water Savings	Average annual water use by an unmetered account	1.1 AF per year	Assumed an annual water use based on a single unmetered account for the City of Corona.
	Percentage reduction in water use	20% per year	Assumed meter retrofits and volumetric rates combined will result in a 20% reduction in demand for retrofitted accounts (the Urban MOU, BMP 4, Section F).
Agency Benefits	Unit cost of avoided water supply	$695 per AF	Refer to BMP 1.
	Unit cost of avoided wastewater treatment	$800 per AF	Refer to BMP 1.
Other Benefits and Costs (Avoided Customer Energy Costs)	Cost for gas price	$0.96/therm	Refer to BMP 1.
	Cost for electricity price	$0.12/KWh	Refer to BMP 1.
	Customer benefits	50%	Refer to BMP 1.
Discounting Information	Agency discount rate	5% per year	Refer to BMP 1.
	Social discount rate	2.4% per year	Refer to BMP 1.

B.4 BMP5 – Landscape Water Budgets

Category	Variable	Value Used	Data Sources and Assumptions
Program Costs	Budget development costs	$126/budget	CUWCC's default value in the spreadsheet.
	Inventory of dedicated irrigation meters	$2400 one-time	Was given as 30 hours at $60/hr in 1999 dollars (CUWCC, 2005, page 2-106). Labor cost projected to be $80/hr in 2008 dollars. Total cost projected to be $2,400 (30 hours X $80/hr).
	Staff cost to manage the program	$60 per year	Assumed value in 2003 dollars, based on an example given by CUWCC (2005, page 3-4)
	Staff cost for budget management	$80 per site	Reported to be $60 in 1999 dollars for monitoring and tracking and budget distribution (CUWCC, 2005, page 2-106). Cost projected to be $80.
Water Savings	Average annual water use	6.4 AF per year per site	Average annual water use by a single dedicated landscape account based on 2005 meter data from the four agencies, including Western MWD, RCWD, LLWD, and RCSD.
	Saving reduction	19% per surveyed account	Used an approximate value based on the reported value of 18.6% (CUWCC, 2005, page 2-102).
Agency Benefits	Unit cost of avoided water supply	$695 per AF	Refer to BMP 1.
	Unit cost of avoided wastewater treatment	$800 per AF	Refer to BMP 1.
Other Benefits and Costs	Assumed none.		
Discounting Information	Agency discount rate	5% per year	Refer to BMP 1.
	Social discount rate	2.4% per year	Refer to BMP 1.

B.5 BMP5 – Landscape Water Surveys

Category	Variable	Value Used	Data Sources and Assumptions
Annual Costs	Administration cost	$250 per survey	Was given $200 in 2000 dollars, according to CUWCC (2000, pg. 25, table 11)
	Field labor cost	$2,000	Was given as $500 - $1500 per site in 1999. Used $1500, would be about $2,000 in 2008 dollars.
Water Savings	Average annual water use per site	6.4 AF per year per site	Average annual water use by a single dedicated landscape account based on 2005 meter data from the four agencies, including Western MWD, RCWD, LLWD, and RCSD.
	Saving reduction	20% per surveyed account	Used an approximate value based on the reported value of 18.6% (CUWCC, 2005, page 2-102).
	Saving decay	30% per yr	Used the higher end of savings decay reported by CUWCC (2005, page 2-105) and the cost effectiveness spreadsheet.
Agency Benefits	Unit cost of avoided water supply	$695 per AF	Refer to BMP 1.
	Unit cost of avoided wastewater treatment	$800 per AF	Refer to BMP 1.
Other Benefits and Costs (Avoided Customer Energy Costs)	Cost for gas price	$0.96/therm	Refer to BMP 1.
	Cost for electricity price	$0.12/KWh	Refer to BMP 1.
	Customer benefits	50%	Refer to BMP 1.
Discounting Information	Agency discount rate	5% per year	Refer to BMP 1.

B.6 BMP6 – High Efficiency Washing Machine Rebate Programs

Category	Variable	Value Used	Data Sources and Assumptions
Annual Costs	Administration cost	$60/yr	Assumed value in 2003 dollars based on an example given by CUWCC (2005, page 3-4).
	Marketing	$50/yr	Assumed value in 2003 dollars based on an example given by CUWCC (2005, page 3-4).
Water Savings	Average annual water use per site	5,250 gallons per year per machine	Used CUWCC's savings estimate in the cost effectiveness spreadsheet
	Machine useful life	12 years	Used an average value based on the reported values from 10 to 15 years.
Agency Benefits	Unit cost of avoided water supply	$695 per AF	Refer to BMP 1.
	Unit cost of avoided wastewater treatment	$800 per AF	Refer to BMP 1.
Other Benefits and Costs	Assumed none.		
Discounting Information	Agency discount rate	5% per year	Refer to BMP 1.
	Social discount rate	2.4% per year	Refer to BMP 1.

B.7 BMP 9 – CII Surveys

Category	Variable	Value Used	Data Sources and Assumptions
Annual Costs	Administration cost	$250 per survey	Reported to be $200 in 2000 dollars (CUWCC, 2000, page 25, Table 11). Projected to be $250 in 2008 dollars.
	Survey cost	$1,500 per survey	According to CUWCC (2005, pg 2-69, Table 7), analyst survey $600; consultant survey $1,500 in 1999 dollars. Took average of $1050, would be about $1,500 in 2008 dollars.
Water Savings	Average water savings per survey	834 gpd (or 0.93 AF per year)	Used average annual use by a single account based on the seven agencies' data reported in the BMP database online with a 20% reduction in water use. Average water use by a single account was estimated to be 4.7 AF per year or 4,170 gpd. With a 20%, estimated water savings of 0.93 AF per year or 834 gpd. Assumed a 20% reduction in surveyed accounts based on the mean water use reduction reported (CUWCC, 2005, page 2-66, Table 1).
	Saving reduction	20% per surveyed account	Used an approximate value based on the reported value of 18.6% (CUWCC, 2005, page 2-102).
	Saving decay	20% per yr	According studies reported by CUWCC (2005), survey savings tend to decay over time by as much as 20 to 25% per year. Used the lower range.
Agency Benefits	Unit cost of avoided water supply	$695 per AF	Refer to BMP 1.
	Unit cost of avoided wastewater treatment	$800 per AF	Refer to BMP 1.
Other Benefits and Costs	Assumed none.		
Discounting Information	Agency discount rate	5% per year	Refer to BMP 1.
	Social discount rate	2.4% per year	Refer to BMP 1.

B.8 BMP14 – Residential ULFT Replacement Programs

Category	Variable	Value Used	Data Sources and Assumptions
Annual Costs	Administration cost	$60 per year	Assumed value in 2003 dollars based on a example given by CUWCC (2005, page 3-4).
	Marketing	$50 per year	Assumed value in 2003 dollars based on a example given by CUWCC (2005, page 3-4).
	Evaluation and follow-up cost	$60 per year	Assumed value in 2003 dollars based on a example given by CUWCC (2005, page 3-4).
Water Savings	Average persons per household	2 persons	Assumed value.
	Average savings per ULFT	19.1 gpd for SFR and 36.7 gpd for MFR	Assumed based on CUWCC reliable savings estimate reported in the cost effectiveness spreadsheet.
	Toilet natural replacement rate	4%	Assumed based CUWCC (2005, Exhibit 6).
Agency Benefits	Unit cost of avoided water supply	$695 per AF	Refer to BMP 1.
	Unit cost of avoided wastewater treatment	$800 per AF	Refer to BMP 1.
Other Benefits and Costs	Customer participation cost	$150	Rebates given to Metropolitan range from $30to $165 per device. Used average value of $100/device. Residential toilet price was reported to be $189- $300 in 2005 dollars. Projected toilet price is $250 per device in 2008 dollars. Cost to customer estimates to be $150 per device ($250-$100).
Discounting Information	Agency discount rate	5% per year	Refer to BMP 1.
	Social discount rate	2.4% per year	Refer to BMP 1.