UPPER SAN GABRIEL VALLEY
MUNICIPAL WATER DISTRICT

WATER USE EFFICIENCY MASTER PLAN

Co-funded by:

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

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Executive Summary

The Upper San Gabriel Valley Municipal Water District (Upper District) has developed this Water Use Efficiency (WUE) Master Plan in support of its mission to provide a reliable and efficient supply of water for its customers. In addition, Senate Bill SBx7-7 (approved in November 2009) requires all urban retail suppliers to reduce per capita water use by 20 percent by 2020 (and an interim target of 15 percent by 2015). This law contains consequences for urban retail suppliers who do not meet the mandated target:

- Conditions eligibility for state water grants and loans on compliance as of January 1, 2016.
- Failure to meet targets establishes a violation of law for administrative or judicial proceedings after January 1, 2021.

The purpose of the Upper District Water Use Efficiency (WUE) Master Plan is to:

- Create a strategy and set forth a blueprint to meet water demand reduction targets.
- Deliver customized tools required to track performance and to adapt to changing circumstances.

The Upper District WUE Master Plan is organized by the following chapters.

Chapter 1 Overview and Strategy. The Strategic Vision presented by the WUE Master Plan includes program and marketing strategies uniquely adapted to Upper District as regional wholesaler to effectively reach the ultimate end-users of water:

1. Deliver regionally cost-effective water use efficiency programs;
2. Support the local efforts and unique programs of retail water agencies;
3. Solicit third-party grant funding;
4. Encourage water retailers to develop water budget allocations; and
5. Advocate for regulations and ordinances that promote water use efficiency.

In support of the strategies, the Plan launches important new initiatives to implement a comprehensive set of landscape programs and a focused set of commercial programs utilizing a business-to-business approach. The Plan develops a systematic marketing approach to assure customer participation and to boost participation in Upper District's current conservation offerings.

Chapter 2 Planning Process. Working in partnership with Upper District, the research team gathered and organized data from member agencies and a wide range of other sources. With the data, the Plan summarizes existing market characteristics and remaining conservation opportunities. Programs are examined in terms of their water savings potential as well as funding opportunities and feasibility of implementation. A recommended portfolio of programs was selected from a number of alternatives. In addition to the recommended conservation plan, the Master Plan process developed a number of useful tools and data sources.

Chapter 3 Demand Assessment and Savings Potential. The Plan is built on a foundation of knowledge about the Upper District service area. Chapter 3 summarizes the demand profile of end-use customers, land use, and businesses. Data sources include Urban Water Management Plans (UWMPs), account level billing system records, housing and population demographics, assessor parcel data, and business types. Of the total water use in the Upper District, single-family customers consume the greatest share (56%), followed by commercial customers (19%), and other sectors. It is estimated that 46% of single family use is outdoor use, and 48% is outdoor use over all sectors.

Chapter 4 Existing Conservation and Compliance. Over the past two decades, Upper District's conservation programs have delivered water savings from toilets, clothes washers, irrigation equipment, cooling towers, and other devices. Moving forward, the strategies and programs included in the Plan are designed to meet the conservation requirements of the Upper District's role as wholesaler, and also to support its retailers. The Plan supports Upper District's obligations as a member of the California Urban Water Conservation Council (CUWCC) by supporting its Best Management Practices (BMPs). The Plan assures eligibility for state financial assistance programs for water-related projects which are conditional on compliance with Demand Management Measures (DMMs) under Assembly Bill 1420. Finally, the Plan supports Upper District and its retailers in their compliance with Senate Bill SBx7-7, which requires urban retail suppliers to reduce per capita water use by 20 percent by 2020.

The simultaneous Integrated Resource Planning (IRP) process developed alternative water resources (water reuse, stormwater capture) to meet compliance and planning goals in addition to the WUE Active Programs in this document. The IRP process developed a quantitative target for water use efficiency active programs of 5,000 AFY in savings, which is used as the target design goal for this WUE Master Plan.

Chapter 5 Potential and Recommended Programs. To achieve the WUE active programs goal, Upper District will need to implement several programs that deliver savings through 2020, and in some cases years beyond. Table ES-1 is an overview of the acre-feet per year savings in the target year of 2020 for each of the programs.

Table ES-1 2020 Water Savings by WUE Active Programs

WUE Active Program	*Estimated Savings in target year 2020 (AFY)*
SoCal Water$mart Residential Rebate Program	294
Save A Buck Commercial Rebate Program	883
HET Distribution Program	192
Large Landscape Survey and Retrofit Program	749
FreeSprinklerNozzles.com Voucher Program	1,600
HOA Sprinkler Direct Installation Program	367
Smart Controller Voucher Program	633
Urinal Retrofit Program	389
Total	5,108*
***Column does not foot due to rounding**	

The annual conservation program cost to Upper District (including the requisite Education and Outreach budget and an estimate of staff cost to run several identified programs) is about 2.4 million dollars per year on average over the nine years (Table ES-2). These costs are significant and must be compared to the benefits obtained from the water saved.

Table ES-2 Costs of the WUE Master Plan to the Upper District Service Area

Costs of the Upper District WUE Master Plan				
Program Year	**Programs Budget ($/Yr)**	**Education and Outreach ($/Yr)**	**Staff Cost (approx. $/Yr)[§]**	**Total Annual Budget ($/Yr)**
2012	$2,004,755	$375,000	$344,000	$2,723,755
2013	$2,044,850	$375,000	$469,000	$2,888,850
2014	$2,085,747	$375,000	$469,000	$2,929,747
2015	$1,416,453	$375,000	$469,000	$2,260,453
2016	$1,444,782	$375,000	$469,000	$2,288,782
2017	$1,522,257	$100,000	$469,000	$2,091,257
2018	$1,575,226	$100,000	$469,000	$2,144,226
2019	$1,560,783	$100,000	$469,000	$2,129,783
2020	$1,591,998	$100,000	$469,000	$2,160,998
Average Annual	$1,694,095	$252,778	$455,111	
Grand Total: Sum of Average Annual Program Budget, Education and Outreach ,and Staff Cost ($/Yr)				**$2,401,984**

[§] Staff costs were estimated for one conservation manager, two conservation staff(one to coordinate indoor and commercial activities and the other responsible for landscape programs). Staff costs include salary and additional benefits. In addition, an outsourced marketing consultant would be responsible for the general outreach plan and activities as well as direct program level marketing. All costs are nominal dollars.

The Upper District WUE Master Plan is estimated to save 52,250 acre-feet over the lifetime of its savings measures at a cost to Upper District of $386 per acre-foot (Table ES-3). This falls below Upper District's avoided supply cost of $896 per acre-foot; comprised of Metropolitan Tier 2 untreated water, pumping costs, and avoided new supply (see Appendix B – Economic Analysis[1]).

[1] Note that the Economic Analysis does not attempt to estimate any costs associated with SB7x7 noncompliance borne by producers.

Table ES-3 Highlights of the Upper District WUE Master Plan

Plan Overview	
Cost per Acre-Foot*	$386 /AF
Lifetime Water Savings	50,841 AF
Lifetime Net Benefits	$26,099,873
Average Annual Budget (over 9 years)	$2,401,984
Recommended Staffing	4 FTEs
***Includes Education & Outreach Programs**	

Chapter 6 Recommended Program Details. This chapter contains detailed stand-alone descriptions of each of the recommended programs. Each description includes an overview and context, who will implement the program, advantages and disadvantages, specifics of the measures offered, incentive amounts, cost-effectiveness, and savings.

Chapter 7 Implementation Plan. Upper District and Metropolitan will coordinate the administration of regional programs, including duties such as securing outside funding, managing vendors, planning and scheduling, tracking, and reporting. Upper District will act as liaison between Metropolitan and Upper District member agencies. To effectively implement and oversee the identified program initiatives, an expanded organization will be required to manage outsourced program implementation to consultants and companies that carry specific expertise. This chapter describes the program ramp up dates, staffing, and details of implementation tasks. Program funding described, including a projected $286,000 in Member Agency Administered (MAA) Program funding from Metropolitan in FY 2012/13. Funds will be used for the new high efficiency nozzle and smart controller voucher programs. In addition Upper District projects to utilize Metropolitan funds for incentives processed through the SoCal Water$mart and Save A Buck Programs.

The Upper District WUE Master Plan is designed to be an adaptable and flexible plan that can be changed to meet new circumstances and challenges.

Chapter 1: Overview and Strategy

Background

The Upper San Gabriel Valley Municipal Water District (Upper District) is a wholesale water agency operating under the Municipal Water District Act. The Upper District's mission is focused on providing a reliable supply of water for its retailers to provide for residential, commercial, irrigation and industrial purposes.

Upper District purchases water from the Metropolitan Water District of Southern California (Metropolitan) and provides recycled water on a wholesale basis for sale to 29 member agencies in the San Gabriel Valley. Member agencies include municipal water departments, investor-owned water companies, and land-owner held mutual water companies that in turn provide the water at retail water rates to their residential, commercial, and industrial customers. The Upper District also works with these 29 member agencies to provide water conservation and education programs.

Approximately 910,000 people live and the Upper District's 144 square mile service area. Water sales totaled 43,114 AF in FY 2008-09, including direct deliveries of treated water, sales of cyclic storage to the Main San Gabriel Basin Watermaster (Watermaster) and to producers for groundwater replenishment, and recycled water direct sales.

The Upper District has developed direct use recycled water projects (Direct Use Projects) to increase the reliability of water service within its service area and to augment imported water supplies. The Direct Reuse Projects obtain recycled water from the San Jose Creek Water Reclamation Plant and the Whittier Narrows Water Reclamation Plant, which are operated by the County Sanitation Districts of Los Angeles, and supply the recycled water to irrigation and industrial customers. The Upper District also has a robust program devoted to promoting water conservation and public education on water issues.

Water supplies such as water recycling, water use efficiency programs, education, and groundwater quality protection are used to serve demand reliably. Of these options, water use efficiency is a cost-effective new source of water.

Purpose of the Water Use Efficiency Master Plan

The purpose of this Water Use Efficiency (WUE) Master Plan is to:

- Create a strategy and blueprint to meet water demand, reliability, and efficiency goals;
- Deliver customized tools required to track performance and to adapt to changing economic circumstances and weather variability; and
- Ensure compliance with water reduction goals and regulatory requirements.

Strategic Vision

Upper District's role as a regional water wholesaler means that unique marketing efforts and program strategies need to be developed. To achieve specific water use efficiency results within each customer class, conservation programs must effectively reach the ultimate end-users of water.

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

1. **Deliver regionally cost-effective water use efficiency 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.
2. **Support the local efforts and unique programs of each retail water agency, when feasible,** 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.
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 water budgets 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.**

Program Tactics

Upper District will deliver cost-effective water savings through the following means:

- **Continue active participation in Metropolitan's Regional Programs.** Offer enhanced incentives to customers and drive response rates by providing regional messaging. The Metropolitan SoCal Water$mart and Save A Buck programs delivered the highest volume of water saving for the Upper District in 2011 and are projected to maintain high savings over the next several years.
- **Offer High Efficiency Toilet Distribution Program limited to the next three years.** The HET Distribution Program has been well received by customers and delivers highly cost effective water savings. HETs are not mandated until 2014 and the HET Distributions will accelerate the replacement of high water consuming toilets.
- **Implement Comprehensive Landscape Program Offerings.** The landscape market has long remained an "untapped" market opportunity. With the

development of new technologies and increased customer awareness, this market segment is beginning to yield positive results. The plan will offer the following landscape measures:

- Nozzle and smart controller voucher programs
- HOA sprinkler head installation program
- Comprehensive and customized program for large landscape sites that include surveys, irrigation system repairs and device installations

- **Implement a Focused Commercial Offering.** Utilizing a business-to-business outreach approach, commercial sites will be targeted for program participation. This includes food service, hospitality, office buildings, and public sector customers. Programs will dedicate resources to conduct meetings utilizing cost/benefit tools to determine best opportunities for energy and water efficiency incentives and programs. The Upper District will continue to offer increased incentives through the Save A Buck Program and it will offer a new Urinal Retrofit Program.

Water Reduction Goals, BMPs and Regulatory Compliance

The strategies and programs included in the Plan are designed to meet the conservation requirements of its role as wholesaler, and also to support Upper District retailers:

- California Urban Water Conservation Council. Upper District is a long standing member of the California Urban Water Conservation Council (CUWCC) and is signatory to its Memorandum of Understanding (MOU) to implement Best Management Practices (BMPs). Upper District is in compliance with BMPs and submitting bi-annual BMP Reports.
- AB 1420. Assembly Bill 1420, which amended the Urban Water Management Planning Act, made eligibility for state financial assistance programs for water-related projects conditional on compliance with Demand Management Measures (DMMs). The DMMs correspond to the CUWCC BMPs listed in the MOU and are equated with DMMs for loan and grand funding eligibility purposes.
- SBx7-7. In November 2009, Senate Bill SBx7-7 was approved, which requires all urban retail suppliers to reduce its per capita water use by 20 percent by 2020. In addition, wholesale water suppliers must assess their conservation measures to help achieve reductions in their urban water management plans.

In the simultaneous development of the IRP, water resources were developed to meet compliance and planning goals, including:

1. WUE Active Programs - offering customers a program portfolio with cost-effective water efficiency measures (described in this plan);
2. WUE Passive Policy Initiatives - including building codes and landscape ordinances; and
3. Recycled Water Supply - reducing demand for potable water by increasing recycled water supply.

The target for water use efficiency active programs was chosen as 5,000 AFY in savings (as part of the IRP process). For this reason we developed this WUE Master Plan to achieve 5,000 AFY through the year 2020.

To achieve the WUE active programs' goal, Upper District will implement several programs that deliver savings through 2020, and in some cases years beyond. Table 1-1 contains an overview of the acre-feet per year savings in the target year of 2020 for each of the programs:

Table 1-1 2020 Water Savings by WUE Active Programs

WUE Active Program	*Estimated Savings in target year 2020 (AFY)*
SoCal Water$mart Residential Rebate Program	294
Save A Buck Commercial Rebate Program	883
HET Distribution Program	192
Large Landscape Survey and Retrofit Program	749
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The Plan is estimated to save 52,250 acre-feet over the lifetime of its savings measures at a cost to Upper District of $386 per acre-foot (Table 1-2). This falls below Upper District's avoided supply cost of $896 per acre-foot; comprised of Metropolitan Tier 2 untreated water, pumping costs, and avoided new supply (see Appendix B – Economic Analysis).

Table 1-2 Highlights of the Plan

Plan Overview	
Cost per Acre-Foot*	$386 /AF
Lifetime Water Savings	50,841 AF
Lifetime Net Benefits	$26,099,873
Average Annual Budget	$2,401,984
Recommended Staffing	4 FTEs
***Includes Education & Outreach Programs**	

Chapter 2: Planning Process

With major challenges ahead, Upper District recognizes that a sound, fact-based plan is needed as a tool to guide water use efficiency program implementation over the upcoming years. The WUE Master Plan was conducted in a step by step manner. Tasks and deliverables are summarized in Table 2-1.

Table 2-1 WUE Master Plan Tasks and Deliverables

Description	*Deliverable*
Demand and Water Savings Potential Assessment	• Customer counts by sector • Summary of demand by sector • Land use evaluation • Landscape & irrigation use estimate
Evaluation of all Water Use Efficiency Programs	• Assessment of past programs • Historical water savings from programs • Estimated saturation of devices
Evaluation of Compliance Status	• BMP compliance status • AB 1420 compliance status • 20x2020 compliance target and status
Potential WUE Program Concepts and Analysis	• Program concepts list with devices, program formats and non-device opportunities • Evaluation of potential programs
Develop Recommendations for New WUE Programs	• Program details and strategies for recommended new programs & high performing existing programs
Develop WUE Program Evaluation Models	• Program evaluation spreadsheet with tracking and evaluation functionality
Perform Economic Analysis of Selected WUE Programs	• Economic analysis with budget information, annual and lifetime water savings, potential 3rd party funding for differing water savings goals
Finalize *Water Use Efficiency Master*	• Final *Water Use Efficiency Master Plan*

Working in partnership with Upper District, the A&N Technical Services team gathered and organized data from member agencies and a range of other sources to fully understand the service area characteristics. Data sources included the following:

- Urban Water Management Plans (UWMPs)
- Records of Conservation Program History
- Account Level Water Use History
- Demographics
- Assessor Parcel Data
- Businesses

From these sources, data were compiled into summaries of water use and accounts by customer class, land use characteristics, population, housing units, and business types. We assessed the savings from past historical programs, conservation device saturation, and remaining opportunities for savings.

With known opportunities and markets for specific technologies, the next step was to develop a "first pass" program concept list. These concepts are similar to puzzle pieces in that they are not fully designed programs but, instead, components of a successful program. A concept might be a technology that offers high water savings or a marketing strategy that is known to deliver a high customer response. The developed program concept list included potential devices, program formats and non-device opportunities. An overview of activities is shown in Figure 2-1.

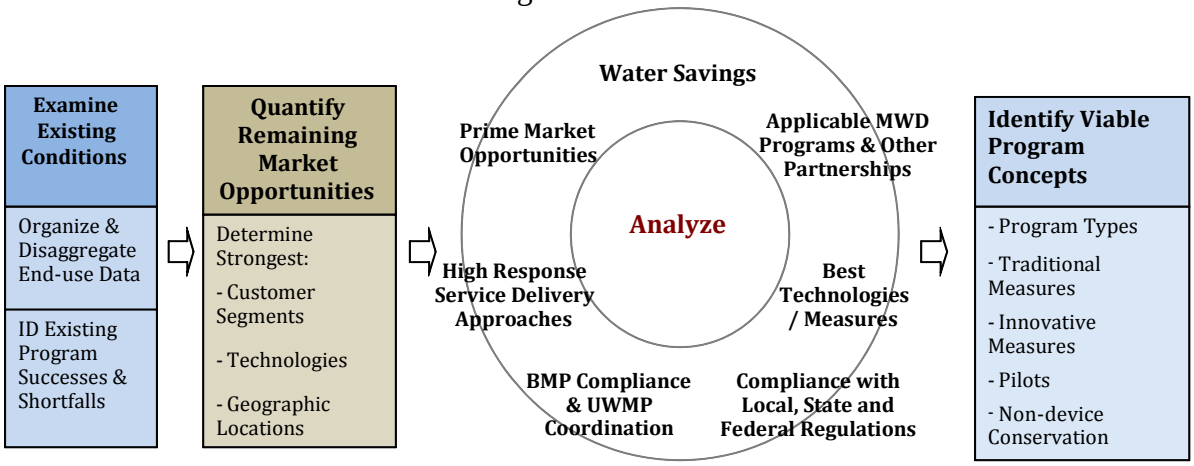

Figure 2-1 Plan Development Process

The program concept list was then reworked and refined into actual program formats. Program overviews were created for each recommended program with detail regarding budgets, funding, potential market, water savings opportunities, cost/benefit, and marketing approaches (Chapter 6).

The potential programs were evaluated using the Alliance for Water Efficiency Conservation Tracking Tool (Tracking Tool). Using the Tracking Tool, Upper District was able to better understand the economic and water savings performance for each

program possibility. The set of potential programs was modeled in a number of draft program portfolios in the process of developing the recommended portfolio of programs in collaboration with Upper District staff and member agencies. The final task was the creation of the final regional Water Use Efficiency Master Plan.

Value for Retail Water Agencies

The Upper District has a strong working accord with its member agencies and accomplished the following as a result of the planning process:

- Agreement on a regional strategy to focus on landscape water use efficiency as well as a portfolio of regional programs;
- Completion of a documented plan that provides the implementation steps necessary to launch the programs as well as clearly defined roles/responsibilities between Upper District and the retail agencies; and,
- Commitment from Upper District to administer the regional programs with retail agencies responsible for implementing and possibly augmenting programs within their individual service areas.

Many agencies may need to develop an individual plan for their agency in order to understand their specific compliance requirements, and to address the local needs of their respective service areas.

New Tools and Resources

As a part of the planning process, a number of valuable tools and resources were developed for Upper District and its agencies. Table 2-2 Provides details on these tools and resources.

Table 2-2 Newly Created Tools and Resources

New Tools and Resources		
Region-wide Data	**Regional Water Use Efficiency Master Plan**	**Alliance for Water Efficiency Tracking Tool**
Regional Demand Profile	Selected Programs for FY 2012/13	Customized Activity Library
Device Saturation	Roll Out Plans for FY 2012/13	Water Savings Analysis
Landscape & Irrigation Use	Potential Programs for Future Consideration	Cost / Benefit Analysis
Top Measures for Water Use Efficiency Opportunities	BMP & Regulatory Compliance Evaluation	Multiple Scenario Analysis
Overall Opportunities and Targets	10 Years of Budgets, Water Savings, & Benefit & Cost Data	Future Program Tracking

All of the data sources and the Tracking Tool are working resources created in this Plan that can be used to guide Upper District and member agencies well into the future.

This WUE Master Plan is designed to be a flexible resource that can be adapted to changing circumstances. As budgets and grant funding fluctuate over time, Upper District and its member agencies will be able to enter new parameters into the Tracking Tool and analyze the impact of their changes. The Tracking Tool can help the Upper District and its member agencies evaluate options and track results. The Tracking Tool can also be used to record program and economic performance as the programs are rolled out and can be used to ensure that incremental milestones are being met on schedule.

Chapter 3: Demand Assessment and Savings Potential

This chapter summarizes the demand profile of retailer end-use customers within the Upper District boundaries. It describes their number, water use, and various other characteristics.

Retail Service Areas

Upper District's policy is to include all retail end-use customers within its geographic boundaries in water use efficiency program efforts whenever feasible. Thus, the WUE Master Plan assessed demand and potential for all retail end-use customers within Upper District's boundaries. Since Upper District is comprised of 29 member agencies, and the account level data is at the retailer level, a broad data collection process was necessary.

The first step is to examine the geographic areas of the retail agencies to determine the share of their service area within Upper District. Figure 3.1 shows the retail service areas based on Geographic Information System (GIS) boundary files provided by Metropolitan Water District of Southern California (Metropolitan). For example, the polygon labeled SGABVUS is the San Gabriel Valley Water Company service area within Upper District.

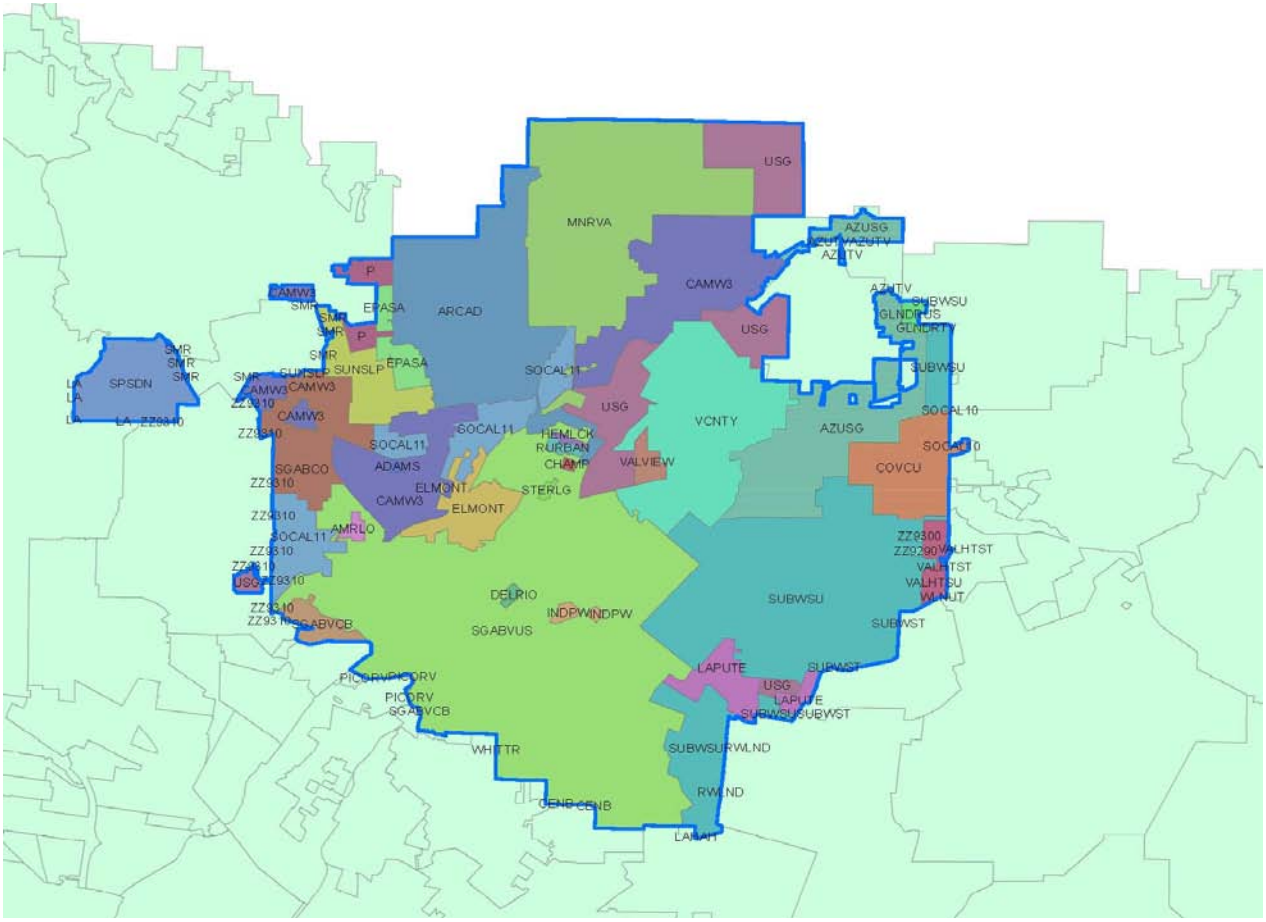

Figure 3-1 Upper District Retail Service Area

Table 3-1 shows the GIS retail service areas sorted by square feet area from high to low. For example, San Gabriel Valley Water Company has the largest area, encompassing 26 percent of the service area. The table also identifies the areas for which we have been able to acquire a 2010 Urban Water Management Plan (UWMP).

Table 3-1 Upper District Retail Service Areas

Retailers (1)	*Area (x 1,000 sq ft)*	*Area Percent*	*UWMP Collected*
San Gabriel Valley Water Company	1,049,016	25.8%	Yes
Suburban Water Systems	568,562	14.0%	Yes
City of Monrovia	384,982	9.5%	Yes
California American Water	319,057	7.8%	Yes
City of Arcadia	308,382	7.6%	Yes
Valley County Water District	253,649	6.2%	Yes
Azusa Light and Water	229,618	5.6%	Yes
Upper San Gabriel Valley MWD (2)	219,564	5.4%	No
Golden State Water	132,743	3.3%	Yes
San Gabriel County Water District	101,998	2.5%	Yes
City of Covina	98,577	2.4%	No
City of South Pasadena	95,080	2.3%	Yes
Sunny Slope Water Company	66,372	1.6%	Yes
City of El Monte	59,600	1.5%	Yes
La Puente Valley County Water District	51,808	1.3%	No
East Pasadena Water Company	28,683	0.7%	No
City of Pasadena (3)	26,663	0.7%	Yes
Valencia Heights Water Company	23,033	0.6%	No
Valley View Mutual Water Company	13,505	0.3%	No
City of Glendora	7,073	0.2%	Yes
Industry Public Utilities	6,299	0.2%	No
Amarillo Mutual Water Company	5,829	0.1%	No
Rurban Homes Mutual Water Company	5,404	0.1%	No
Del Rio Mutual Water Company	3,237	0.1%	No
Sterling Mutual Water	2,340	0.1%	No
Hemlock Mutual Water	2,271	0.1%	No
Adams Ranch Mutual Water Company	1,921	0.0%	No
Champion Mutual Water Company	1,675	0.0%	No
City of Whittier	101	0.0%	Yes
Grand Total	**4,067,043**	**100.0%**	

1. ***Covina Irrigating Company and California Domestic Water Company are not listed since they are member agencies that do not serve retail customers within Upper District boundaries.***
2. ***Upper San Gabriel Valley MWD indicates geographic areas without designated retail agency.***
3. ***City of Pasadena is not a member agency yet some of its customers are within Upper District boundaries.***

UWMPs were collected for 93.6 percent of the total Upper District area that has retail service. Note that retail agencies are not required to produce an UWMP if they are smaller than 3,000 connections or 3,000 AF.

Accounts and Water Use by Customer Class

In order to sum the number of accounts and water use by customer class for the retail areas, the share of each retail agency within Upper District's service area was multiplied by the UWMP number of accounts and water use. The total number of accounts and water use was then summed across all the retail service areas providing totals for Upper District's entire service area. Table 3-2 presents the total number of accounts and water use.[2]

Table 3-2 Summary of Accounts and Use By Class

Upper District Customer Class	*Acre Feet(AF)*	*Accounts*	*AF/Account*
Single Family	110,532	156,915	0.70
Multi Family	16,038	5,737	2.80
Commercial	38,176	13,258	2.88
Industrial	6,018	433	13.89
Institutional	3,957	914	4.33
Irrigation	5,208	1,015	5.13
Recycled	2,018	15	138.77
Other	5,739	785	7.31
Non-Revenue Water	9,325		
Total	**197,010**	**179,072**	**1.10**

Figure 3-2 shows the percentage of water use by customer class.

[2] Figures in this table are approximate because customer class definitions are not uniform in the UWMPs, coverage is not 100%, and share within Upper District is assumed proportional to area.

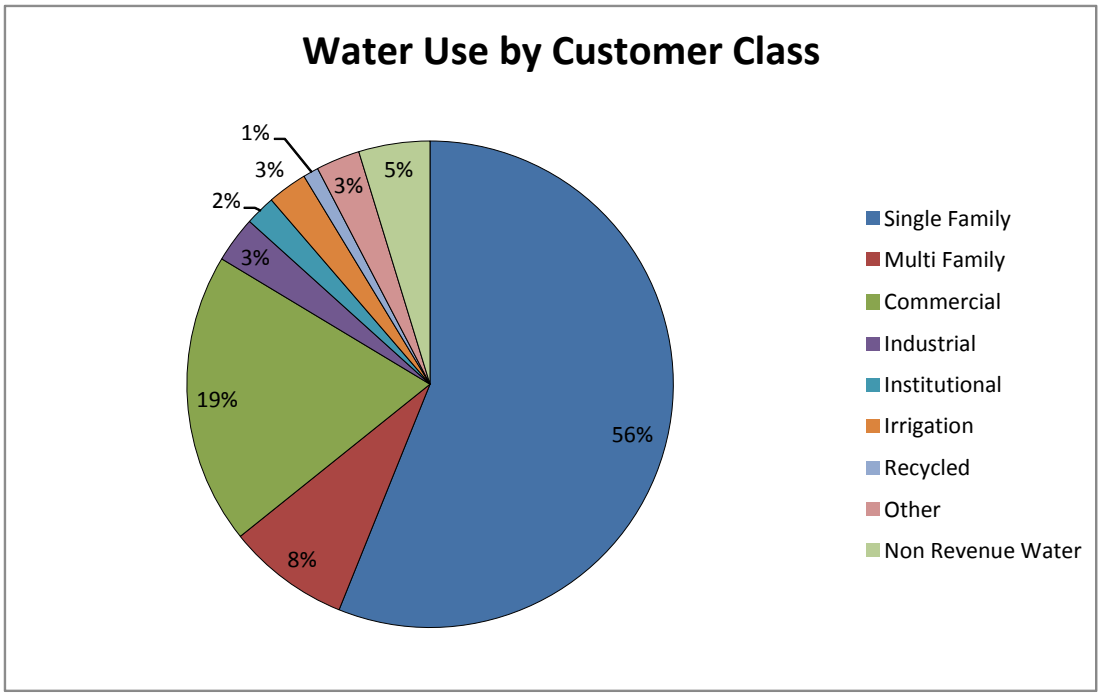

Figure 3-2 Upper District Water Use by Customer Class

Figure 3-3 shows the number of accounts by customer class. Note the 0% listed in this chart reflects the very small number of accounts in some customer classes (see also Table 3-2).

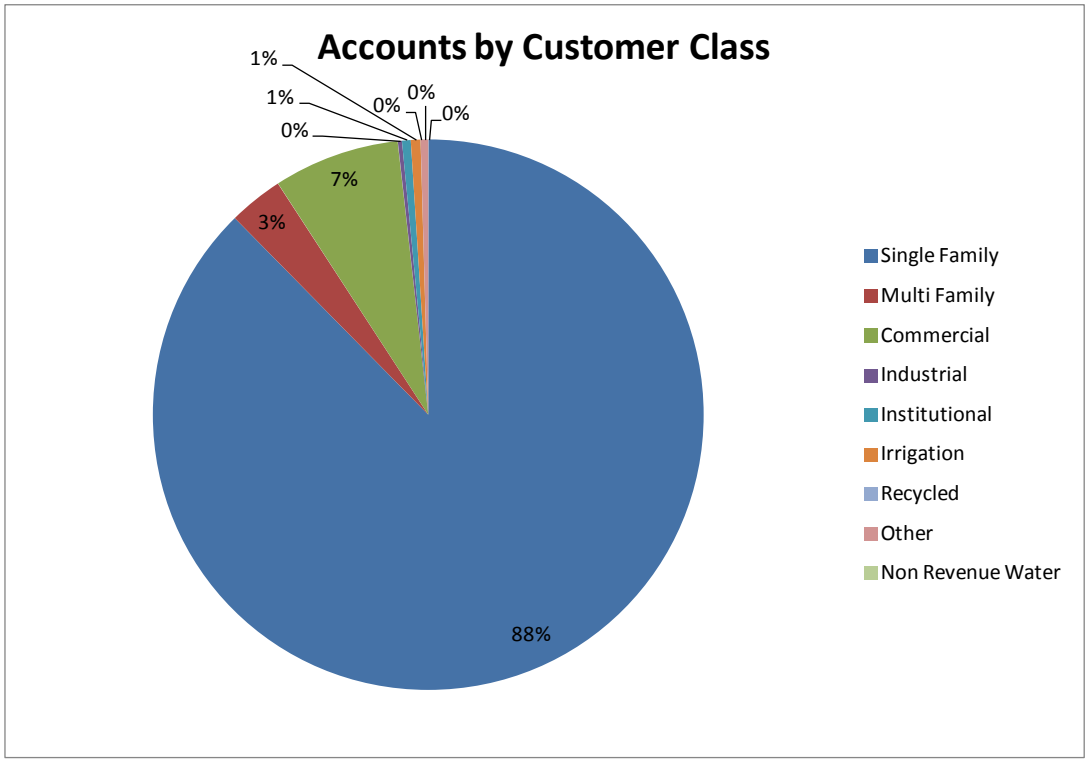

Figure 3-3 Upper District Number of Accounts by Customer Class

Landscape Water Use

The semi-arid climate of the San Gabriel Valley, with only 17.8" of average annual rainfall, combined with the lush landscaping aesthetic that predominates in the region, creates a significant water demand for landscape irrigation.

Water used for landscaping is generally not directly metered (except in those cases where dedicated irrigation meters exist). For this reason, outdoor water demand needs to be estimated. For the purposes of this WUE Master Plan two methods were used. As we see below, outdoor water use is estimated to be nearly half of total demand across all sectors.

Method 1. A common method used to infer outdoor use is to assume that all winter use is categorized as indoor consumption. For example, if we calculate winter minimum use over 12 months we have inferred total indoor use for the year. Total use for the year minus indoor use then equals outdoor use.

For a subset of suppliers account-level data were acquired and processed to show the monthly variation by sector. Figure 3-4, as illustration, shows water use by month using the 2010 billing data provided by San Gabriel Valley Water Company (SGVWC). The strong seasonal pattern reflects irrigation needs during the summers. Irrigations needs are apparent in all sectors, but less so for the Industrial and Multi-Family Residential sectors. The recycled water customers approach zero use in the middle winter months.

Method 1 underestimates outdoor use because there is likely to be winter irrigation in dry climates such as Upper District's territory.

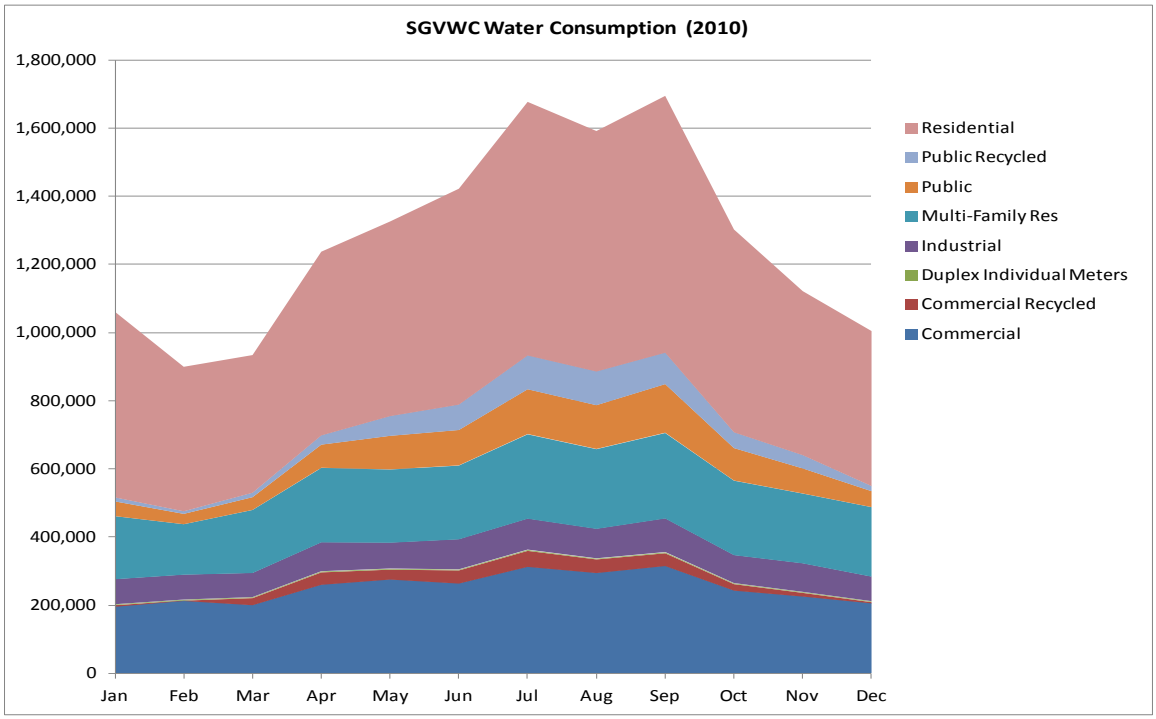

Figure 3-4 SGVWC 2010 Water Consumption

Method 2. The second method to infer outdoor water use consists of employing the pattern of seasonal variation used by dedicated irrigation meters and applying it to other sectors with mixed meters. With dedicated irrigation meters, winter irrigation is directly measured. Thus, we can measure relative water use in winter and summer irrigation seasons and apply this pattern to other sectors. For example, winter minimum for irrigation-only customers is 27 percent of the "seasonal range" (difference between peak month and minimum month). This method results in a higher estimate of outdoor water use than Method 1 and it relies on the assumption that the seasonal variation of outdoor use is the same across sectors.

Figure 3-5 shows residential sector use, with winter irrigation delineated from indoor use.

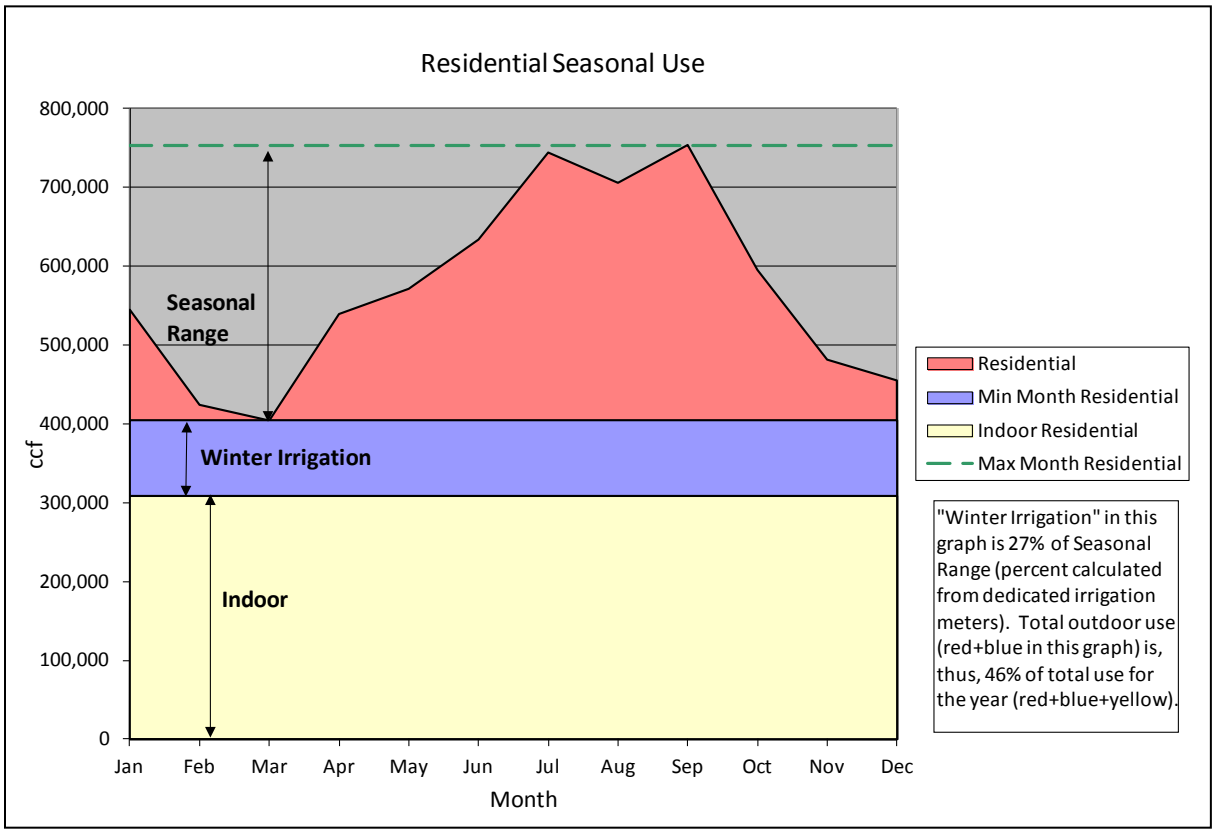

Figure 3-5 Upper District Residential Seasonal Water Use

Table 3-3 presents the estimated outdoor water use **as a percentage of each sector's** total water demand utilizing both Method 1 and 2 to create a low and high estimate range.

Table 3-3 Upper District Outdoor Use

Upper District Outdoor Water Use by Class	*Method 1: Percent Outdoor Use (Assumes zero winter irrigation)*	*Method 2: Percent Outdoor Use (Assumes irrigation-meter seasonal pattern)*
Duplex Individual Meters	0%	0%
Industrial	13%	23%
Commercial	26%	39%
Multi-Family Res	24%	39%
Residential	29%	46%
Commercial Recycled	96%	100%
Public	63%	100%
Public Recycled	84%	100%
Total	**32%**	**48%**

Water Use Distribution

To plan program levels it is important to know how many large water users there are so targeting strategies can be evaluated. Figure 3-6 shows the distribution of annual water use for the SGVWC residential sector. Notice the residential distribution has the characteristic bell curve distribution in the middle range, largely symmetric, but with a long tail to the right indicating a trailing number of accounts with large water use. This graph is truncated in the extreme right tail. The purpose of displaying this distribution is to determine the similarity in use among the residential customers. For example, the tall narrow shape shows a large share of the accounts fall between 50 and 200 ccf per year. This shape is characteristic of single family water use. Also common is the small number of customers in the right hand tail that consume much more than average.

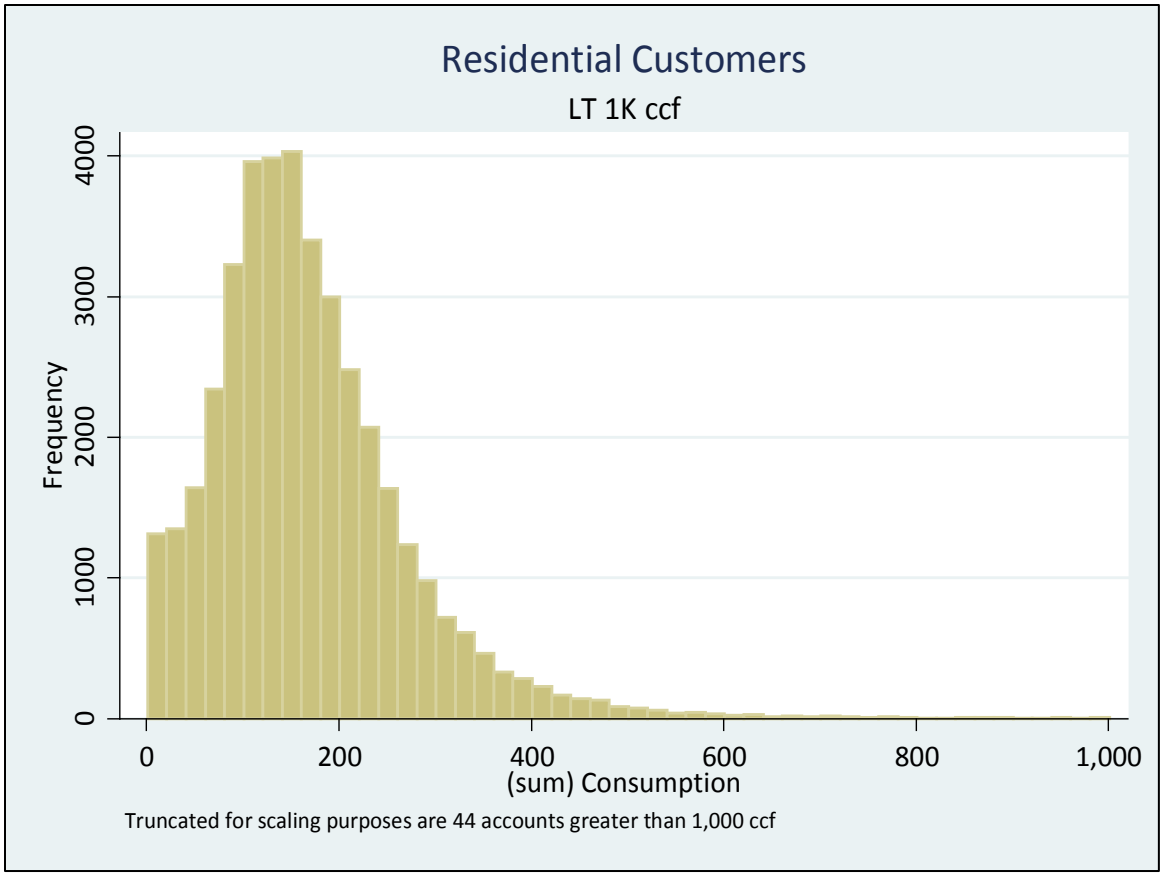

Figure 3-6 Residential Annual Water Use

Figure 3-7 shows the water use distribution for the Public Agencies customer class. These institutional customers' water use distribution is a considerably different shape - asymmetric with a long tail reflecting the diversity of sites such as office buildings, schools, and parks.

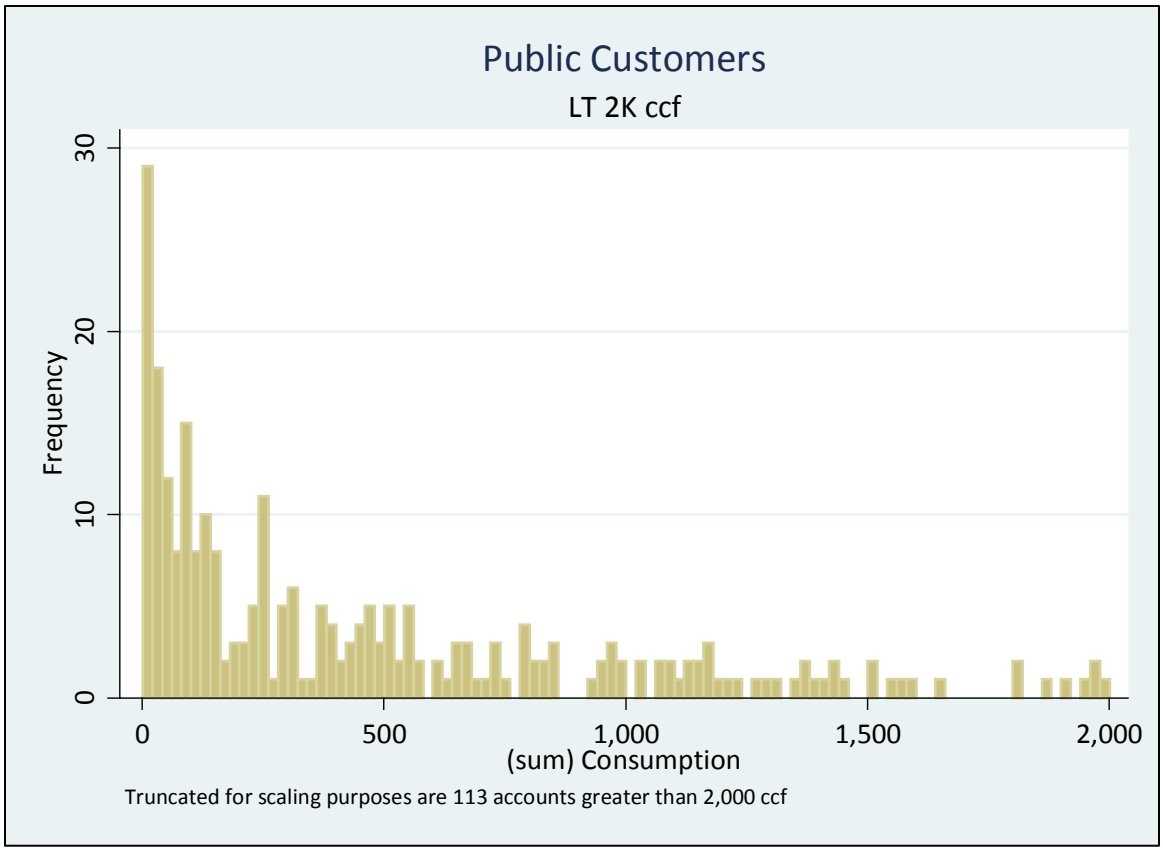

Figure 3-7 Public Customers (Institutional)

Housing Units

The growth in housing units since 1991 has been slow for the single family sector and flat for the multi-family housing sector. Housing is expected to continue to grow at a moderate rate in the future. Figure 3-8 highlights the growth for each sector, yellow for single family sector and blue for multi-family sector.

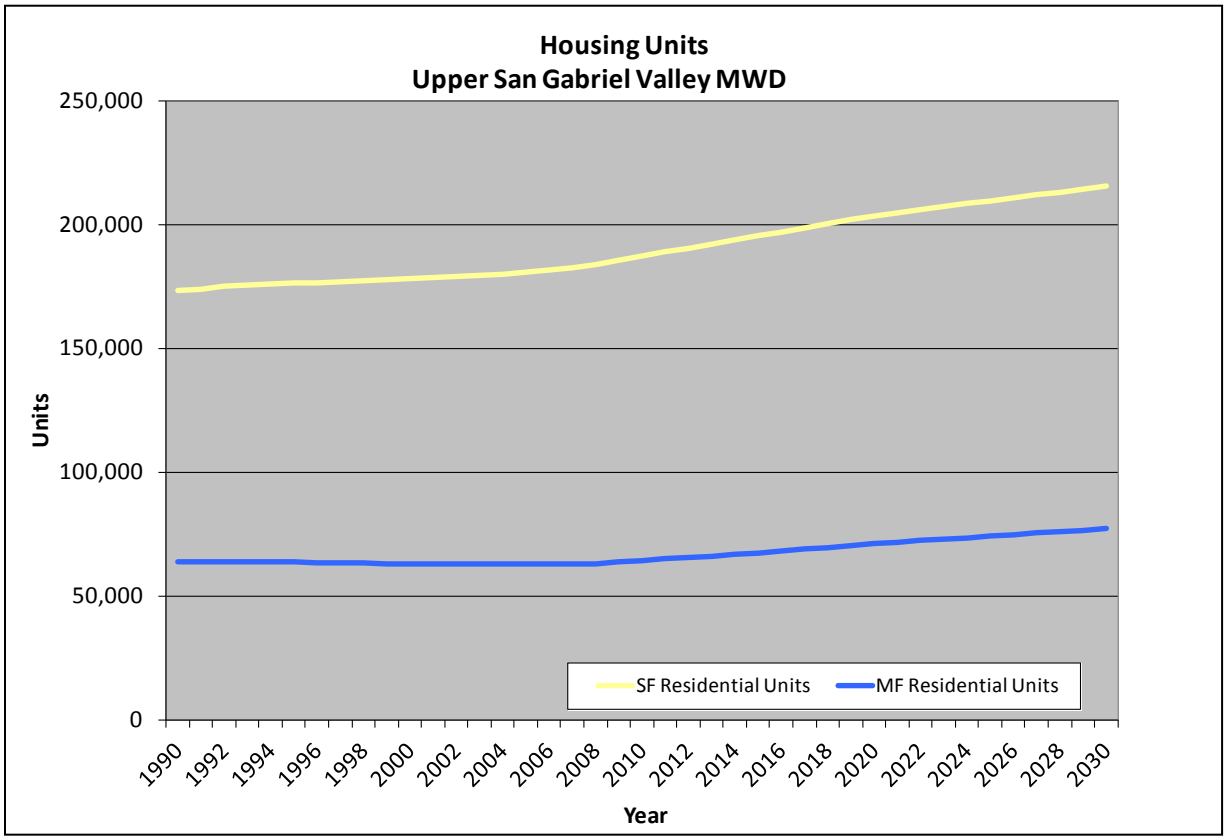

Figure 3-8 Housing Units

Population

Historical population has grown from 776,511 in 1990 to 909,403 in 2010 (CDM population data compilation). Future population forecasts are made at the level of the Traffic Analysis Zones (TAZ) used for demographic projections by the Southern California Association of Governments (SCAG). Summing the TAZs within Upper District gives us the future projection that population will grow to 1,095,558 by the year 2035. Table 3-4 provides the estimated population within the Upper District service area from 1990 to 2035 as per the CDM population data compilation.

Table 3-4 Estimated Population within Upper District Service Area

Estimated Population within Upper District Service Area*	
1990	776,511
1995	799,145
2000	842,001
2005	888,527
2010	909,403
2015	954,604
2020	991,493
2025	1,027,650
2030	1,062,420
2035	1,095,558
***Population Estimates developed as part of the IRP process by CDM Smith with assistance from Stetson Engineering**	

Land Use

Data from the Los Angeles County Assessor at the parcel level was purchased for the entire Upper District service area. This parcel data is useful for summarizing service area characteristics that impact water use. For example, Figure 3-9 shows the distribution of single family lot sizes in the Upper District service area. The majority of lots are between 5,000 and 10,000 square feet. This graph assists in identifying the opportunity for landscape WUE measures and the type of program that may be appropriate for mid-sized lots. Note that the graph omits the largest 5 percent of lots for illustration purposes. When planning programs, the large lots can be listed for priority program targeting.

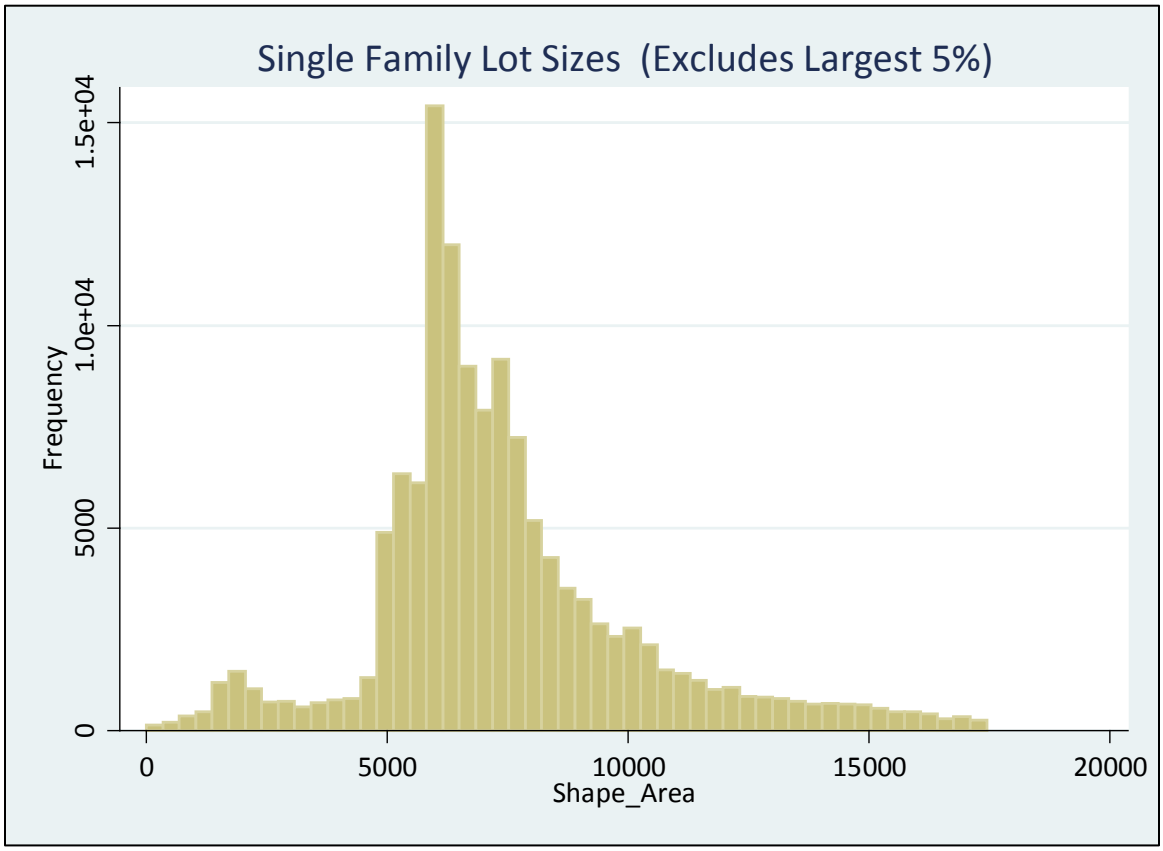

Figure 3-9 Upper District Single Family Lot Sizes

Figure 3-10 displays the number of homes built each year. The age of the housing stock is important in water use efficiency planning because it indicates the efficiency of the originally installed stock of water using plumbing devices. Other fields that are of interest in understanding water demand are number of pools and bathrooms.

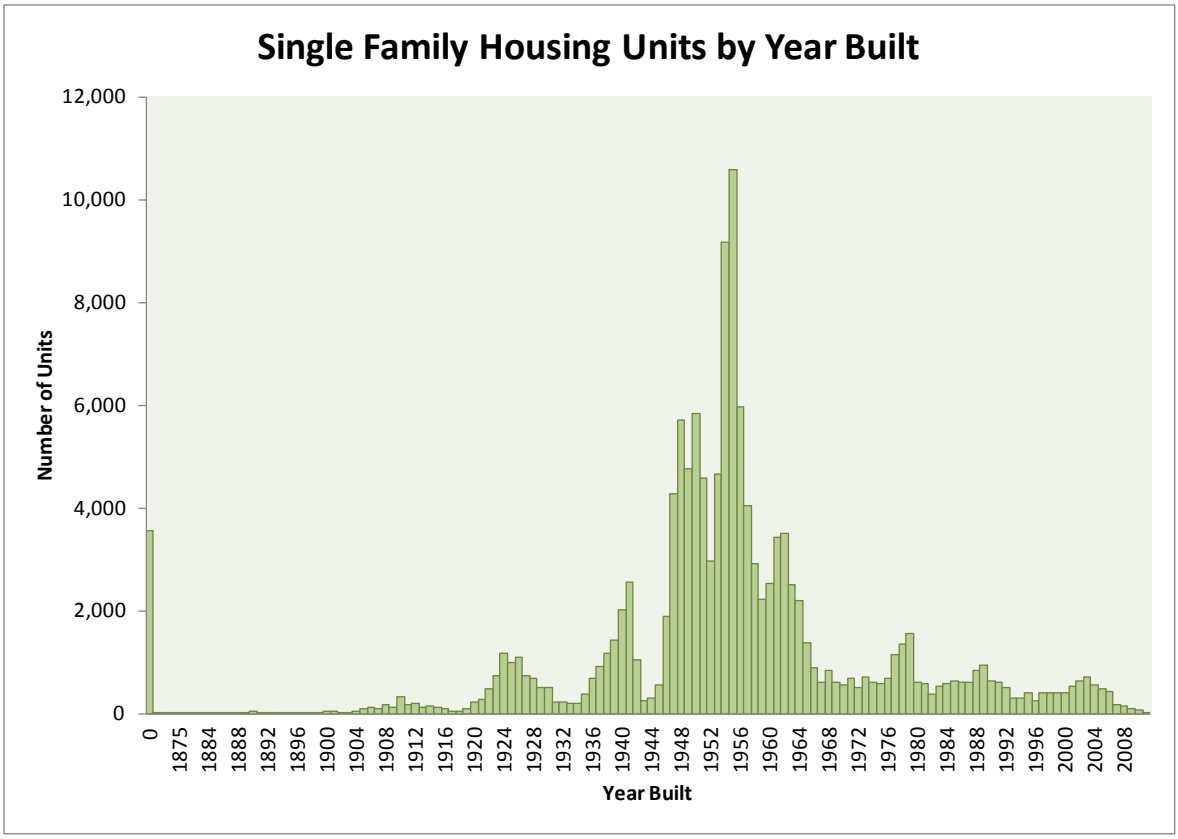

Figure 3-10 Single Family Housing Units by Year Built

Additional tables further detailing land-use in the Upper District are in Appendix A (Tables A-1 through A-6).

Business Types

As part of the demand assessment a proprietary data set was acquired that includes more than 27,000 businesses within the Upper District, each verified by telephone annually (ESRI Business Locations data sourced from the InfoGroup). For each business, the type of business is identified by the North American Industry Classification System (NAICS). Figure 3-11 shows the geographic location of the identified businesses. The business type data is particularly useful when identifying marketing opportunities for conservation programs in the commercial and industrial sectors. For example, the data show there are 179 Food Manufacturing businesses in the Upper District, including 117 Retail Bakery businesses. Also, there are 1,820 Food Service and Drinking Place businesses, including 1,348 Full Service Restaurant businesses.

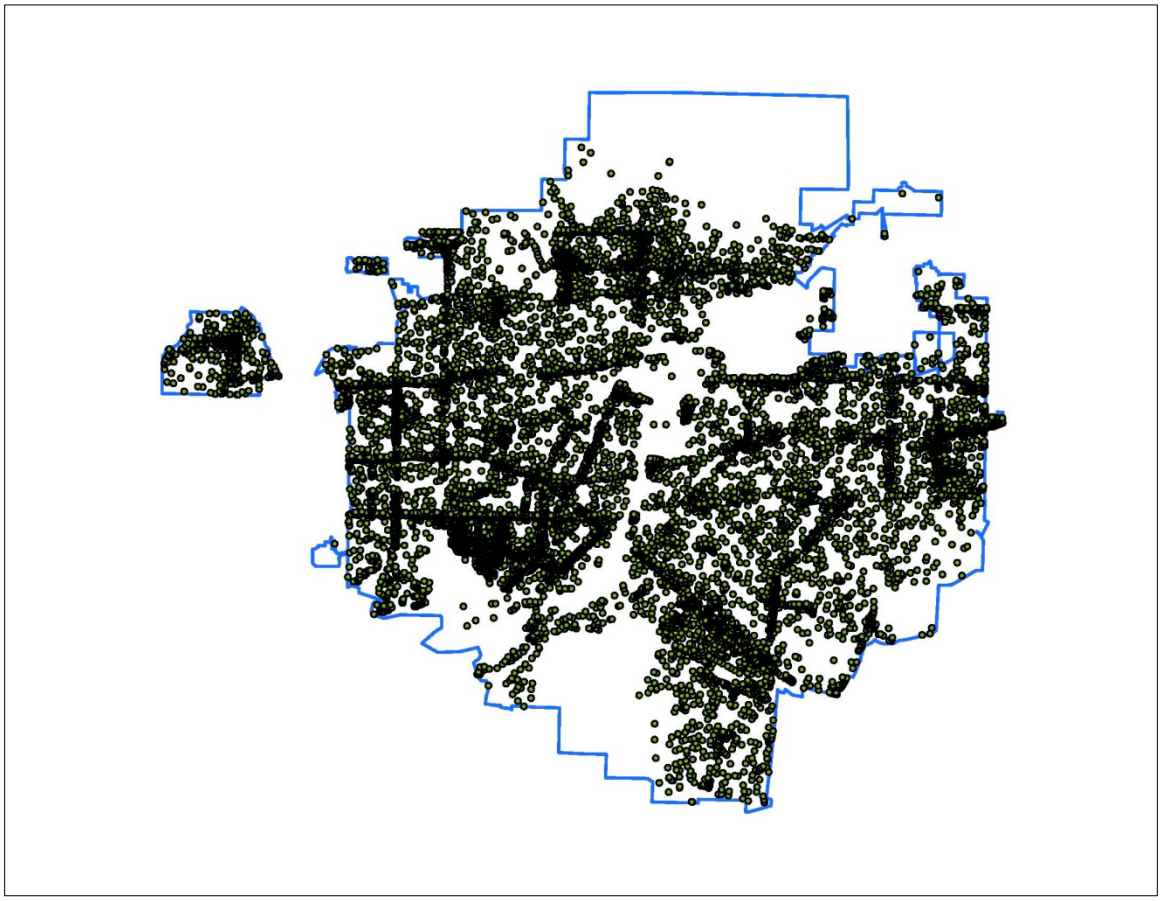

Figure 3-11 Businesses Identified

For additional information on Business Types refer to Table A-7 in Appendix A.

Conservation Device Saturation and Remaining Potential

Combing past active and passive conservation activities allows us to calculate the percentage of device saturation for some of the key savings activities. This allows us to better understand the remaining conservation potential. Using a model based approach we calculate saturation of conserving devices for the indoor residential sector. For example, Figure 3-12 shows the transformation of the stock of single family residence toilets to ULF toilets and then to HE toilets.

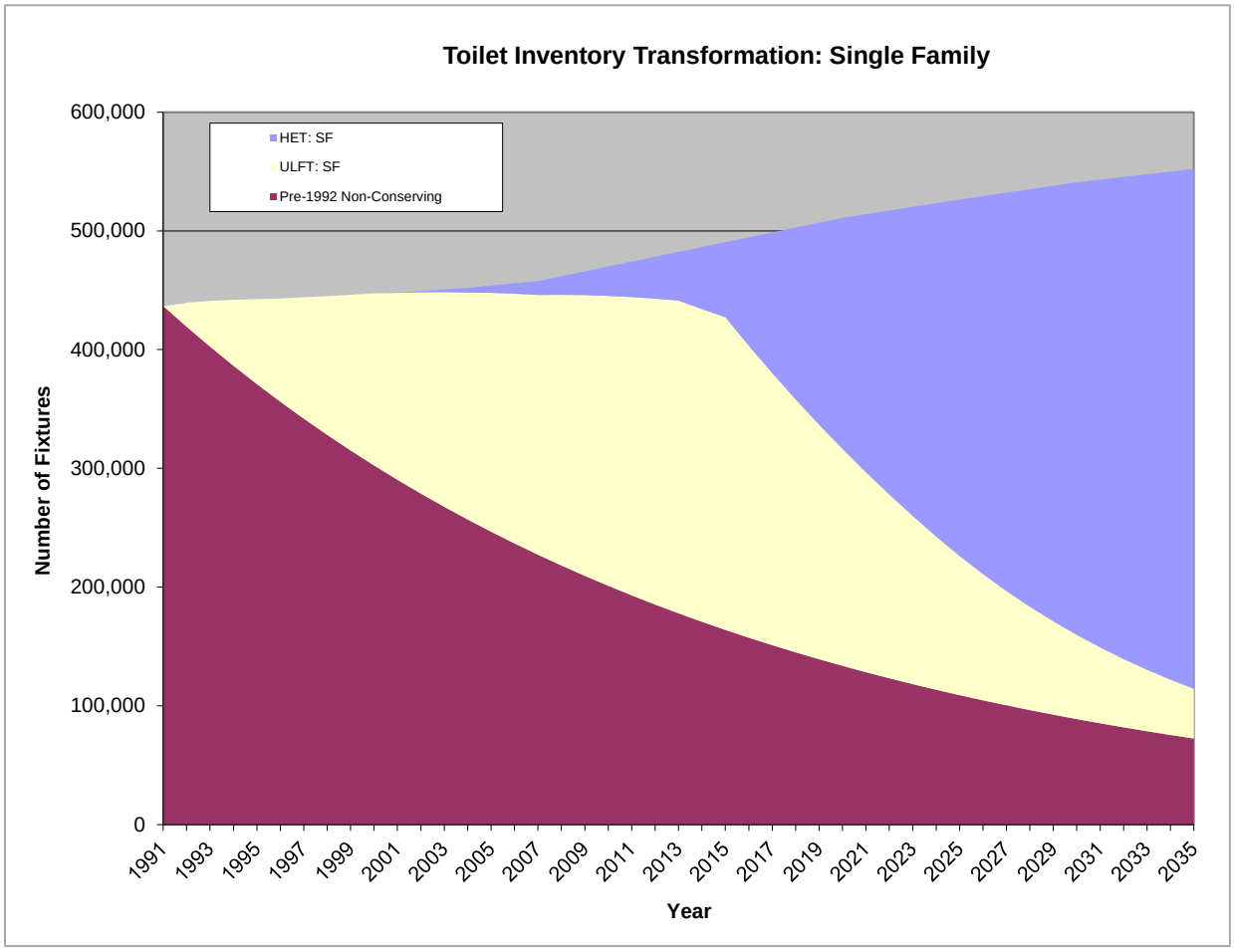

Figure 3-12 Toilet Inventory Transformation – Single Family

Table 3-5 shows the current toilet saturation rates for single- and multi-family sectors, and for single family HE washers.

Table 3-5 Upper District HE Toilet and HE Washer Saturation

Upper District Device Saturation	*Single Family Toilets*	*Multi-Family Toilets*	*Single Family HE Washers*
Total Devices	478,190	98,276	189,752
Devices Actively Retrofitted	26,822	8,398	10,050
Devices Passively Retrofitted	358,433	71,305	12,985
Remaining (Non-Efficient) Devices	92,936	18,573	166,717
Saturation	81%	81%	12%
Total Water Savings Potential AF/Year	**3,180**	**1,238**	**5,756**

Demand Forecast

Figure 3-13 shows the demand forecast results (in terms of production) from the accompanying Integrated Resources Plan. Historical production has dropped dramatically due to the severe economic recession and lingering effects of drought. The future forecast is projected under normal weather and economic conditions. Note that the historical production was based on a detailed assessment of Watermaster records preformed for the IRP analysis. The production records are not broken down by customer class. In contrast, the UWMP data that was summed is end use consumption rather than production.

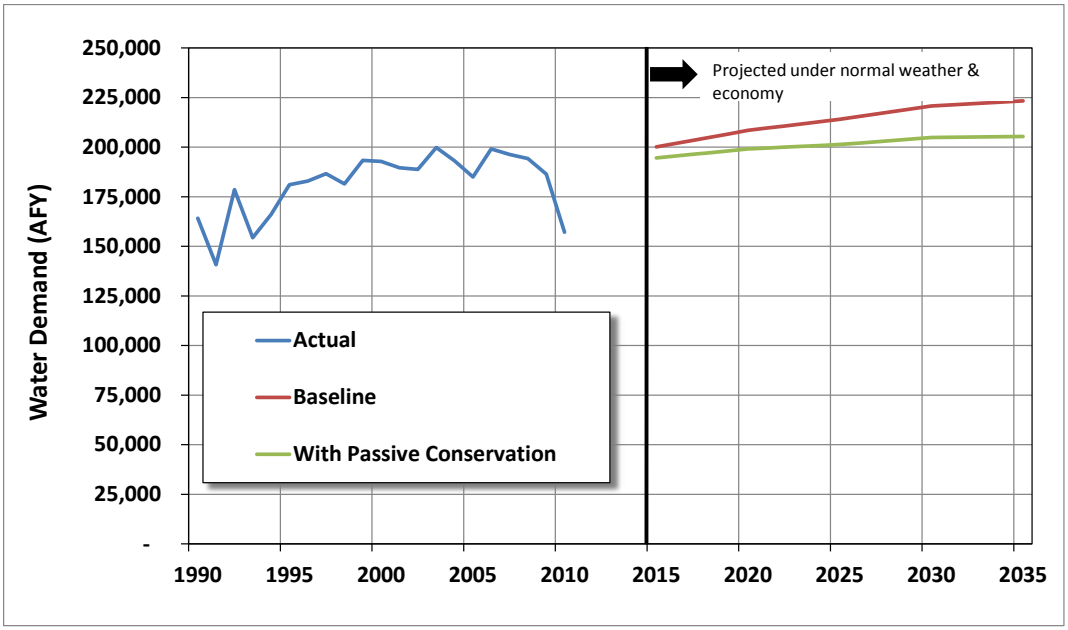

Figure 3-13 Integrated Resource Plan Demand Forecast Results

Overall Opportunities and Targets

Potential conservation opportunities were identified as a result of the data evaluation. The analysis of water demand by market type revealed the following:

- Landscape water use comprises a large share of total water use – as much as 48 percent overall.
- Single family landscape represents the highest landscape water use among sectors.
- Restaurants, office buildings and public sector sites represent a significant number of customers.
- There are some industrial opportunities, such as in the food preparation category.

The analysis of device saturation and savings potential yields the following information:

- Landscape measures, including smart controllers, high efficiency nozzles, and turf removal offer extremely high water savings.
- Clothes washers afford a reasonable opportunity. The high adoption rate by customers currently needs to be considered when designing future programs.
- Toilets (from all sectors) still offer some savings despite their high saturation rate. The impact of the impending regulations must be factored, as well as the ability to target high volume units.

Chapter 4: Existing Conservation and Compliance

Over the past two decades, Upper District has been successful in delivering high volume water savings at a low cost. The following programs are currently being offered, or have recently been offered, to Upper District customers:

- High Efficiency Toilet Distribution Program
- SoCal Water$mart Residential Rebate Program
- Save A Buck Commercial Rebate Program
- Large Landscape Water Survey and Retrofit Program

The following programs are set in the overall conservation program at Upper District to promote water conservation and public education on water issues:

- Smart Gardening Classes
- Watering Index and Calculator Tools on Website
- Community and Youth Programs
- Watershed Restoration Programs

Past Achieved Conservation

Data from Upper District program activities, as well as Metropolitan Save a Buck and SoCal Water$mart programs, were collected to summarize past achieved conservation. The number of devices installed, or measures completed, was compiled. The past achievements are incorporated into the WUE planning process to better understand remaining conservation potential. Table 4-1 shows the total number of active conservation activities implemented from 1993 to present.

Table 4-1 Active Conservation Activities

Upper District Conservation Activity	*Number Implemented (1993-2011)*
Indoor	
Faucet Aerators	32,700
Flow Restrictors	643
High Efficiency Clothes Washers	13,507
High Efficiency Toilets[a]	16,805
High Efficiency Urinals	6
Showerheads	72,373
Ultra Low Flush Toilets[a]	24,713
Ultra Low Flush Urinals	1
Zero Water Urinals	1,264
Outdoor	
Central Computer Irrigation Controllers	9
High Efficiency Nozzles	2,556
Synthetic Turf (sq ft)	2,111,785
Turf Removal (sq ft)	1,146
Weather Based Irrigation Controllers	292
Commercial	
Cooling Tower Conductivity Controllers	22
Cooling Tower ph Controllers	14
Food Steamers	2
Pre-Rinse Nozzles	11
Supermarket Condensers	1
Waterbrooms	24
X-Ray Film Processor Recycling Systems	3
Total	2,277,877
Notes: a) Includes all residential and CII toilets for all programs.	

Figure 4-1 shows the savings that resulted from these active conservation activities. Over their entire lifetimes, these activities in total will save 45,756 acre-feet (nearly 15 billion gallons) or 33,820 acre-feet in net savings terms (11 billion gallons beyond what would have been achieved otherwise by plumbing and energy code).

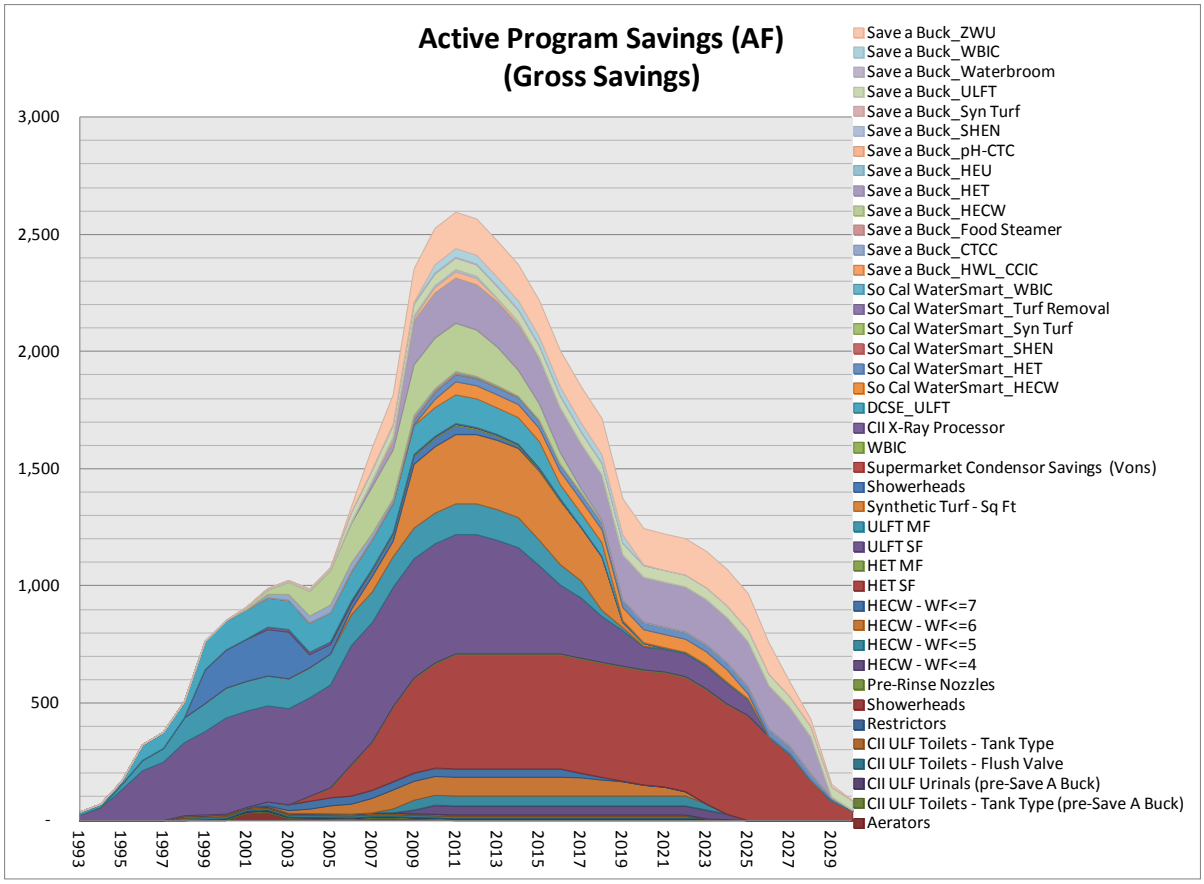

Figure 4-1 Active Program Savings (AF)

Compliance Analysis

CUWCC. Upper District is a long standing member of the CUWCC and is signatory to its MOU to implement BMPs. As described in the recent 2010 UWMP (Chapter 5)[3], Upper District is in compliance with the BMPs and submits BMP reports biennially. The recommended portfolio of conservation programs in this Master Plan strengthens the conservation program and its fulfillment of BMP requirements by, for example, building substantial landscape conservation programs in all sectors.

[3] Upper San Gabriel Valley Municipal Water District Urban Water Management Plan, June 2011 (2010 UWMP).

AB 1420. Assembly Bill 1420, which amended the Urban Water Management Planning Act, made eligibility for state financial assistance programs for water-related projects conditional on compliance with Demand Management Measures (DMMs). The DMMs correspond to the CUWCC BMPs listed in the MOU and are equated with DMMs for loan and grant funding eligibility purposes.[4] As part of any loan or grant application, urban water suppliers must separately submit to DWR a legally binding AB 1420 Self-Certification Statement. Urban water suppliers must also submit hard copies of any reports that support or substantiate claims made on the Self-Certification Statement regarding past, current, and planned BMP implementation or alternative conservation approaches, as well as any documentation supporting a claim of exemption. These reports include urban water management plans and the most recent BMP reports to CUWCC as part of the MOU.

SBx7-7. In November 2009, Senate Bill SBx7-7 was approved, which requires all urban retail suppliers to reduce its per capita water use by 20 percent by 2020 and to make incremental progress towards this goal by reducing per capita water use by at least 15 percent on or before December 31, 2015. In addition, Senate Bill SBx7-7 requires urban wholesale water suppliers to "... include in the urban water management plans ... an assessment of their present and proposed future measures, programs, and policies to help achieve the water use reductions required by this part." [5]

Upper District has recently completed its 2010 UWMP and it includes the assessment of water conservation measures that will assist its retail agencies with reducing per capita water demands to achieve the Senate Bill SBx7-7 requirements. Water conservation activities are addressed in the 2010 UWMP Chapter 5 (Demand Management Measures) and Chapter 8 (Recycled Water Opportunities). BMPs implemented by Upper District are discussed in Chapter 5.

The UWMP includes a calculation of SBx7-7 water use reduction goals in the aggregate for its complete service area for the purpose of demand forecasting (even though compliance rests with the retailers). The highest gallon per capita per day period, using the SBx7-7 methodology, is estimated to be 179.2 gallons per capita per day (gpcd). The 2010 UWMP assumes that the reduction goals are met by 2020 (2010 UWMP, pgs. 10-1 and 10-2).

For the purpose of this WUE Master Plan we conducted a SBx7-7 analysis with the updated population and production data. Table 4-2 shows the results of this analysis.

[4] See "Enclosure 1 Compliance with AB1420 Requirements," http://www.water.ca.gov/wateruseefficiency/docs/compliance-ab1420.pdf and "AB 1420 Frequently Asked Questions," http://www.water.ca.gov/wateruseefficiency/docs/compliance-ab1420-faq.pdf.

[5] Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan, California Department of Water Resources, March 2011, pg. i-iv.

Table 4-2 SBx7-7 Analysis

Item	*Gallons per Capita per Day (gpcd)*
Baseline (highest historical gpcd) is the 1995-2004 Average	198.7
2020 Target is based on a 20% reduction	159.0
The 2009 actual one year gpcd	179.6
5 most recent years' average gpcd	187.4 (2005 to 2010)
Reduction needed from 2009	20.6, which is an 11.5% reduction
Reduction needed from the 5-Year average	28.4, which is a 15.8% reduction

In the development of the IRP, water resources were developed to meet compliance and planning goals, including:

1. WUE Active Programs – offering customers a program portfolio with cost-effective water efficiency measures (described in this plan);
2. WUE Passive Policy Initiatives – including building codes and landscape ordinances; and
3. Recycled Water Supply – reducing demand for potable water by increasing recycled water supply.

The target for water use efficiency active programs was chosen as 5,000 AFY in savings. For this reason we developed this WUE Master Plan to achieve 5,000 AFY by the year 2020.

To achieve the WUE active programs' goal, Upper District will implement several programs that deliver savings through 2020. Table 4-3 is an overview of the acre-feet per year savings in the target year of 2020 for each of the programs.

Table 4-3 Lifetime Water Savings by WUE Active Programs

WUE Active Program	*Estimated Savings in target year 2020 (AFY)*
SoCal Water$mart Residential Rebate Program	294
Save A Buck Commercial Rebate Program	883
HET Distribution Program	192
Large Landscape Survey and Retrofit Program	749
FreeSprinklerNozzles.com Voucher Program	1,600
HOA Sprinkler Direct Installation Program	367
Smart Controller Voucher Program	633
Urinal Retrofit Program	389
Total	5,108*
***Column does not foot due to rounding**	

Other Compliance Policies

Although the Upper District is not charged with building ordinances related to water conservation, it supports the cities within its service area in their water resource planning efforts. The following items are important to consider when planning overall water use efficiency:

- AB 1881. California's Updated Model Water Efficient Landscape Ordinance AB1881 was approved by the Office of Administrative Law on September 10, 2009. This bill was aimed at new construction, renovations, and commercial landscapes and came into effect in 2010.
- Indoor Water Efficiency. Ordinances related to cutting-edge indoor water use efficiency can also contribute to the WUE goals for new and existing construction.

Chapter 5: Potential and Recommended Programs

The next step in the process was to create a broad list of potential conservation programs that address the unique needs and characteristics of the Upper District service area. Remaining market opportunities were examined, including the predominant customer sectors, technologies available, and retail water agency needs. Since many of the existing programs continue to be successful and have remaining market opportunity, all of the existing programs were evaluated.

Table 5-1 summarizes the potential programs evaluated for the Upper District. Each of these programs was evaluated in terms of costs and savings using the AWE Tracking Tool. The table includes the Program Name and Activity Name for reference in the Tracking Tool.

Table 5-1 Potential Programs

Potential Programs		
Program Name	***Administrator***	***Activity Name***
Aerators	Upper District	Aerators
Showerheads	Upper District	Showerheads
High Efficiency Clothes Washers (HECW)	Upper District	HECW – Water Factor <=4
High Efficiency Toilet (HET) SF	Upper District	HET Distribution Program
Large Landscape Grant Program	Upper District	Large Landscape Grant Program (Turf Removal)
Weather Based Irrigation Controllers (WBIC)	Upper District	WBIC
Large Landscape Water Surveys and Retrofits	Upper District	Water Surveys, Repairs and Retrofits
SoCal Water$mart	Metropolitan	SoCal Water$mart HECW
SoCal Water$mart	Metropolitan	SoCal Water$mart HET
SoCal Water$mart	Metropolitan	SoCal Water$mart High Efficiency Nozzle (HEN)
SoCal Water$mart	Metropolitan	SoCal Water$mart Synthetic Turf (Syn Turf)
SoCal Water$mart	Metropolitan	SoCal Water$mart Turf Removal
SoCal Water$mart	Metropolitan	SoCal Water$mart WBIC <1 Acre
SoCal Water$mart	Metropolitan	SoCal Water$mart WBIC >= 1 Acre
Save a Buck	Metropolitan	Save a Buck HWL Central Computer Irrigation Controllers (CICC)
Save a Buck	Metropolitan	Save a Buck Cooling Tower Conductivity Controller (CTCC)
Save a Buck	Metropolitan	Save a Buck Food Steamer (per Compartment)
Save a Buck	Metropolitan	Save a Buck HECW
Save a Buck	Metropolitan	Save a Buck HET (Flushometer, Tank, Dual Flush)
Save a Buck	Metropolitan	Save a Buck Ultra Low or Zero Water Urinal (ZWU)
Save a Buck	Metropolitan	Save a Buck Cooling Tower pH Controller (pH-CTC)
Save a Buck	Metropolitan	Save a Buck Large Rotary Nozzles (Set of 2)
Save a Buck	Metropolitan	Save a Buck Pop Up Spray Heads

Save a Buck	Metropolitan	Save a Buck Syn Turf
Save a Buck	Metropolitan	Save a Buck Waterbroom
Save a Buck	Metropolitan	Save a Buck WBIC
Save a Buck	Metropolitan	Save a Buck ZWU
Save a Buck	Metropolitan	Save a Buck Dry-Vacuum Pumps
Save a Buck	Metropolitan	Save a Buck Ice Making Machines
HEN Voucher Program (FreeSprinklerNozzles.com) (MA Allocation)	Western MWD	FreeSprinklerNozzle.com Voucher Program (MA Allocation)
HEN Voucher Program (FreeSprinklerNozzles.com)	Western MWD	FreeSprinklerNozzle.com Voucher Program
HOA Pressure Regulated HEN Direct Installation Pilot Program	Upper District	HOA High Efficiency Nozzle Direct Installation Pilot Program
High Efficiency Urinal Retrofit Program - Pilot	Upper District	Urinal Valve Retrofit Program
Large Landscape Water Budget Program	Upper District	Large Landscape Water Budget Program
Smart Controller Voucher Program (MA Allocation)	Upper District	Smart Controller Voucher Program (MA Allocation)
Smart Controller Voucher Program	Upper District	Smart Controller Voucher Program
Commercial Incentive Outreach Program	Upper District	Commercial Incentive Outreach Program
Rainwater Catchment	Upper District	Rain Barrel Incentive
Rainwater Catchment	Upper District	Cistern System
Gray Water	Upper District	Basic Gray Water System Incentive
Gray Water	Upper District	Advanced Gray Water System Incentive

The 41 conservation activities, within the 14 program designs, were further evaluated on the basis of cost, savings, external funding opportunities, market transformation, and programmatic strategy. Combinations of programs were packaged together into strategic "portfolios" for comparison. A recommended portfolio of programs was developed with the input of member agencies and in a collaborative process between the research team and Upper District.

Program Approach

In creating the Upper District's recommended portfolio of water use efficiency programs, the following principal objectives were identified:

- 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

Landscape use for all sectors combined is estimated to be as much as 48% (Table 3-3). Among sectors, the largest water using customer sector is single-family residential use (88% of total water use), and landscape water use is 46% of consumption in this sector. Thus, single-family residential landscape use is an important source of savings potential.

Landscape water reduction for the commercial market is another viable prospect. 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. All parties need to be educated and invested in water efficiency in order to achieve persistent savings. Although programs for this sector are more complex to manage, if done successfully, the savings results are significant.

Indoor water use is not the major focus of the recommended programs at this time however there are niche markets and select products and technologies, such as high efficiency clothes washers, that will be employed to increase indoor efficiencies. Metropolitan has many existing incentives for residential and commercial measures. Instead of duplicating Metropolitan's programs, Upper District will seek to more actively draw customers into these programs. This can be done by continuing with augmented financial incentives and developing a targeted marketing campaign that yields higher participation.

Another key area for Upper District focus is commercial and public sector sites. Utilizing business-to-business outreach, commercial sites will be targeted for program participation. This includes food service, hospitality, office buildings, and public sector customers. Programs will dedicate resources to conduct meetings utilizing cost/benefit tools to determine best opportunities for energy and water efficiency incentives and programs. The Upper District will continue to offer increased incentives through the Save A Buck Program and will offer a urinal retrofit program.

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 controllers 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."

External Funding

There are many funding sources available to proactive and prepared water agencies. 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 Metropolitan.

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

- SoCal Water$mart Program for single-family residential water efficient measures;
- The Save A Buck Program for commercial water efficient measures;
- The Water Savings Performance Program for industrial process and irrigation system improvements; and
- Member Agency Administered Program Funding for local and regional programs and measures not offered through Metropolitan's regional rebate programs.

Marketing and Outreach for Successful Implementation and Expansion of Programs Over Time

When designing programs it is 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 in water efficiency brochures, which are 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 or consultants, 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 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.

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. Upper District will reduce overall water consumption and customers will benefit economically.

To this end, Upper District 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:

Sustained Outreach. In order for Upper District to effect change, the District must 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 by which the customer learns about the severity of the water supply problem and the proposed solutions.

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

Upper District will craft and deliver the message that:

- Imported water supplies are unreliable at times;
- Demand for quality water has increased over time;
- Conservation efforts and efficient use are highly effective means to stretch and extend water resources; and
- Upper District and its member agencies have 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 in a consistent manner rather than a one-time blitz.

In addition to general outreach, Upper District 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.

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:

1. 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.

2. District staff must be willing to assist the agencies in the complex and lengthy process to pass an ordinance.
3. The ordinance requirements need to be communicated to the parties affected by the ordinance.
4. There must be enforcement of the ordinance to ensure that requirements are being properly implemented.

Upper District will form strategic alliances and actively work to recommend and assist municipalities with the approval and implementation of new ordinances or update of existing ordinances. Through small group and one-on-one meetings, Upper District will offer help to each municipality within its area in designing effective ordinances and walking them through the various steps required for the board approval within their organizations. Example ordinances and codes include:

- No Water Waste
- Landscape Model
- New Construction
- Plumbing Codes

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 Upper District's programs have a well-documented history of high-yield water savings and positive customer satisfaction.

Upper District'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.

Recommended Programs

Based upon the analysis conducted of potential programs, several programs were considered of great value to the customers within Upper District's service territory. In addition to existing programs, urinal retrofits, free high efficiency nozzles and smart controller vouchers were added to the program mix. The recommended programs include:

1. SoCal Water$mart Residential Rebate Program
2. Save A Buck Commercial Rebate Program
3. HET Distribution Program
4. Large Landscape Water Survey and Retrofit Program
5. FreeSprinklerNozzles.com Voucher Program
6. HOA Sprinkler Direct Installation Program
7. Smart Controller Voucher Program
8. Urinal Retrofit Program

The rest of this chapter summarizes the expected savings and costs of the recommend portfolio of programs. The following chapter contains detailed stand-alone descriptions of each program that include: program descriptions, measures offered, market potential, measure cost per acre-foot, program budget, and water savings.

To achieve the WUE active programs goal of 5,000 AFY, Upper District will need to implement several programs that deliver savings at least through 2020. Table 5-2 provides s an overview of the acre-feet per year savings in the target year of 2020 for each of the programs:

Table 5-2 Lifetime Water Savings by WUE Active Programs

WUE Active Program	*Estimated Savings in target year 2020 (AFY)*
SoCal Water$mart Residential Rebate Program	294
Save A Buck Commercial Rebate Program	883
HET Distribution Program	192
Large Landscape Survey and Retrofit Program	749
FreeSprinklerNozzles.com Voucher Program	1,600
HOA Sprinkler Direct Installation Program	367
Smart Controller Voucher Program	633
Urinal Retrofit Program	389
Total	5,108*
***Column does not foot due to rounding**	

The annual conservation program cost to Upper District (including the requisite Education and Outreach budget and an estimate of the additional staff cost to run the identified programs) is about 2.4 million dollars per year on average over the nine years(Table 5-3). These costs are significant and must be compared to the benefits obtained from the water saved.

Table 5-3 Costs of the WUE Master Plan to the Upper District Service Area

Costs of the Upper District WUE Master Plan				
Program Year	**Programs Budget ($/Yr)**	**Education and Outreach ($/Yr)**	**Staff Cost (approx. $/Yr)[§]**	**Total Annual Budget ($/Yr)**
2012	$2,004,755	$375,000	$344,000	$2,723,755
2013	$2,044,850	$375,000	$469,000	$2,888,850
2014	$2,085,747	$375,000	$469,000	$2,929,747
2015	$1,416,453	$375,000	$469,000	$2,260,453
2016	$1,444,782	$375,000	$469,000	$2,288,782
2017	$1,522,257	$100,000	$469,000	$2,091,257
2018	$1,575,226	$100,000	$469,000	$2,144,226
2019	$1,560,783	$100,000	$469,000	$2,129,783
2020	$1,591,998	$100,000	$469,000	$2,160,998
Average Annual	$1,694,095	$252,778	$455,111	
Grand Total: Sum of Average Annual Program Budget, Education and Outreach ,and Staff Cost ($/Yr)				**$2,401,984**

[§] Staff costs were estimated for one conservation manager, two conservation staff(one to coordinate indoor and commercial activities and the other responsible for landscape programs). Staff costs include salary and additional benefits. In addition, an outsourced marketing consultant would be responsible for the general outreach plan and activities as well as direct program level marketing. All costs are nominal dollars.

The Plan is estimated to save 50,841 acre-feet over the lifetime of its savings measures at a cost to Upper District of $386 per acre-foot (Table 5-4). This falls below Upper District's avoided supply cost of $896 per acre-foot, composed of Metropolitan Tier 2 untreated water, pumping costs, and avoided new supply (see Appendix B – Economic Analysis).

Table 5-4 Highlights of the Plan

Plan Overview	
Cost per Acre-Foot*	$386 /AF
Lifetime Water Savings	50,841 AF
Lifetime Net Benefits	$26,099,873
Average Annual Budget	$2,401,984
Recommended Staffing	4 FTEs
***Includes Education & Outreach Programs**	

Table 5-5 contains a snapshot for each of the recommended programs including: incentive offered, unit costs per acre-foot, measure life, and estimated lifetime savings.

Table 5-5 Recommended Programs Summary

Recommended Programs Summary				
Activity Name	***Incentive***	***Unit Cost ($/AF)***	***Savings Life***	***Lifetime AF***
HET Distribution Program	***Free to Customer***	$642	20	**3,563**
Large Landscape Water Survey and Retrofit Program	$2,000 *per site*	$587	10	**7,492**
SoCal Water$mart HECW	285 *per washer*	$866	15	**2,446**
SoCal Water$mart HENs	$4 per nozzle	$108	5	**260**
SoCal Water$mart WBIC	$180 *per controller*	$428	10	**560**
Save A Buck CTCC	$1,250 *per controller*	$209	5	**145**
Save A Buck Food Steamer	$935 *per compartment*	$213	10	**113**
Save A Buck HET	$100 *per HET*	$451	20	**293**
Save A Buck Ultra Low Volume Urinal	$300 *per urinal*	$78	20	**847**
Save A Buck HENs	$5 *per nozzle*	$108	5	**2,860**
Save A Buck WBIC	$50 *per station*	$229	10	**3,901**
FreeSprinklerNozzle.com Voucher Program	***Free to Customer***	$22	5	**12,000**
HOA HE Sprinkler Direct Installation Pilot Program	***Free to Customer***	$360	10	**3,672**
Urinal Valve Retrofit Program	***Free to Customer***	$398	20	**6,355**
Smart Controller Voucher Program with Metropolitan MA Funding	$180 *per customer*	$371	10	**4,782**
Smart Controller Voucher Program without Metropolitan MA Funding	$180 *per customer*	$599	10	**1,553**

Chapter 6: Recommended Program Details

This chapter contains a detailed stand-alone description of each of the recommended programs identified and summarized in the previous chapter.

1. SoCal Water$mart Residential Rebate Program
2. Save A Buck Commercial Rebate Program
3. HET Distribution Program
4. Large Landscape Water Survey and Retrofit Program
5. FreeSprinklerNozzles.com Voucher Program
6. HOA Sprinkler Direct Installation Program
7. Smart Controller Voucher Program
8. Urinal Retrofit Program

Program: SoCal Water$mart Residential Rebate Program

The SoCal Water$mart Program offers residential customer incentives for a menu of indoor and outdoor devices. The Upper District adds funds to each device to increase the uptake of customers swapping out their old devices for new efficient models. In the last 3 years water use efficiency devices have become more commonplace in the residential marketplace. Increased legislation, water rates, and social pressure for higher levels of efficiency have continued to push the homeowner agenda toward becoming more water efficient, however incentives are still necessary to drive customers to choose the most efficient devices.

The program is operated by Metropolitan's regional vendor. Metropolitan will continue the program through FY 2012/13 combining both SoCal Water$mart and the commercial Save A Buck incentive programs.

Last year, the SoCal Water$mart Program delivered the highest volume of savings of all programs. The advantages and disadvantages of the SoCal Water$mart Program are listed below.

Advantages:

- Majority of funding from Metropolitan.
- Ease of implementation for the Upper District.
- High efficiency clothes washer incentives provide good PR.
- Additional incentives provided by energy utility for some measures.

Disadvantages:

- Uncertain Metropolitan funding levels.
- Landscape products require aggressive marketing.
- Metropolitan does not continually market.

For the FY 2012/13 program, the Upper District will increase marketing efforts through customized point of purchase displays, store retailer outreach and training. It is anticipated that EGIA marketing subcontractor RSG will conduct these services.

Measures Offered

The following is a list of incentivized devices offered through the residential regional program. Each measure has a different market potential depending on the number of units available in the Upper District territory, the saturation of the technology and the savings per device. When available, the market description includes the market potential.

High efficiency clothes washers represent the majority of projected savings for the menu of measures offered under the SoCal Water$mart Program.

 High Efficiency Clothes Washers *(HECWs)*	Market Description: Although HECWs have been incentivized heavily in recent years the Upper District's market is far from saturated. An estimated potential of 166,717 units in the market have yet to be changed out. Cost per Acre-foot: **$866** per acre-foot.
 High Efficiency Sprinkler Nozzles (*HENs)*	Market Description: The market for high efficiency spray nozzles has only emerged in recent years and has a tremendous amount of potential. The Upper District service territory has a potential of nearly 800,000 inefficient units. Cost per Acre-foot: **$108** per acre-foot.
 Smart Controllers (Weather-Based Irrigation Controllers)	Market Description: The market for weather based irrigation controllers has been developing in recent years yet the residential market is estimated to have only a 10-20% saturation rate. The Upper District service territory has a potential of over 78,000 inefficient units. Cost per Acre-foot: **$428** per acre-foot.
MARKETING/OUTREACH	**FUNDING SOURCES and BUDGET**
Metropolitan has been cautious about	Metropolitan owns and administers the program, as

marketing the program due to the increased demand a couple of years ago and subsequent budget overruns. It will be necessary to augment Metropolitan marketing activities in order to ensure participation. Better point of purchase displays at the local home improvement stores as well as irrigation equipment suppliers should increase customer demand substantially.	well as providing the base funding for measures. Upper District adds specific funds for prioritized measures. **Average Annual Supplier Budget** $218,889 **Total 9 Year Supplier Budget** $1,970,000
IMPLEMENTATION	**WATER SAVINGS**
The SoCal Water$mart Program is currently administered through Metropolitan and requires no additional Upper District resources.	3,265 AF lifetime savings

Program: Save A Buck Commercial Rebate Program

The Save A Buck Program offers commercial customers incentives for a menu of indoor and outdoor devices. In the last 3 years the CII market has held water use efficiency projects, retrofits and capital improvement projects to be a lower priority due to the economic challenges presented. Although increased legislation, corporate mandates, and social pressure for higher levels of efficiency continue, CII projects have not increased due to fewer opportunities for funding assistance. Providing incentives for this customer segment is critical to help customers consider projects as the economy begins to improve. A comprehensive outreach program combined with direct face-to-face collaboration will help the District obtain higher levels of CII water savings. The advantages and disadvantages of the current Save A Buck program are listed below.

Advantages:

- Majority of funding from Metropolitan.
- Ease of Implementation for the Upper District.
- Cost effective.

Disadvantages:

- Uncertain Metropolitan funding levels.
- Trade allies do not market program equitably among all Metropolitan agencies.
- CII customers require a positive ROI before making a decision to participate.
- Many measures do not have significant savings potential in Upper District territory.

Measures Offered

Below is a list of the incentivized devices offered through the CII regional program. The potential customer base for some of the measures is limited; that factor, combined with the time a given technology has been on the market, provides differing savings potential.

Landscape measures are currently projected to represent the largest portion of savings for the Save A Buck Program.

 Ultra Low Water / Zero Water Urinals	Market Description: Urinal installations are highest in public, high-traffic areas. These entities often do not have the capital improvement budgets to change fixtures and thus present a high potential for retrofits. An estimated 24,492 potential urinals are available for retrofit. Cost per Acre-foot: **$78** per acre-foot.
 High Efficiency Toilet *(HETs)*	Market Description: High efficiency toilets are the highest use indoor fixture in many facilities. An estimated 81,639 potential toilets are available for retrofit. Cost per Acre-foot: **$451** per acre-foot.
 Rotating Nozzles for Pop Up Spray Heads	Market Description: The market for high efficiency spray nozzles has only emerged in recent years and has a tremendous amount of potential. An estimated potential of over 100,000 inefficient units. Cost per Acre-foot: **$108** per acre-foot.
 Large Rotary Nozzles	Market Description: An estimated 100,000 potential nozzles available for retrofit. Cost per Acre-foot: Not calculated due to anticipated low annual volume.
 Weather-Based Irrigation Controller or Central Computer Irrigation Controller	Market Description: The market for weather based irrigation controllers has emerged in recent years and has a tremendous amount of potential. The

	Upper District service territory has the potential of over 3,000 inefficient units installed in commercial sites. Cost per Acre-foot: **$229** per acre-foot.
 Dry-Vacuum Pumps	Market Description: An estimated 1,461 potential dry vacuum pumps available for retrofit. Cost per Acre-foot: Not calculated due to anticipated low annual volume.
 Connectionless Food Steamers	Market Description: An estimated 300 potential food steamers available for retrofit within the Upper District territory. Cost per Acre-foot: **$213** per acre-foot.
 Air-Cooled Ice Making Machines	Market Description: An estimated 1,500 potential ice machines available for retrofit with the Upper District. Cost per Acre-foot: Not calculated due to anticipated low annual volume.
 pH-Cooling Tower Controller	Market Description: An estimated potential 174 cooling towers available for retrofit within the Upper District. Cost per Acre-Foot: Not calculated due to anticipated low annual volume.
 Cooling Tower Conductivity Controller	Market Description: There is an estimated potential of 174 cooling towers available for retrofit. Cost per Acre-foot: **$209** per acre-foot.
New Devices for FY 2012/13	
Laminar Flow Restrictors	Market Description: Laminar flow restrictors limit flow by forcing the water through small openings to

	produce dozens of water streams reducing splash, thus making these restrictors optimal for installation in health care facilities regulated by OSHA and not allowed to install aerators.
 In-Stem Flow Restrictors	Market Description: In-stem flow restrictors allow for adjustment of flow in the stem of the pop-up riser. The adjustment can bring the spray from a 15 foot radius nozzle down to 5 feet.
MARKETING/OUTREACH	**FUNDING SOURCES and BUDGET**
In order to maximize savings it will be necessary to implement comprehensive outreach to commercial customers. The outreach would target specific sectors that have potential for high volume savings. These markets including: • Restaurants and Food Service Operations • Office Buildings • Schools • Businesses with "Green" Policies The outreach would include direct business-to-business outreach. This included phone calls and face-to-face meetings. The Upper District would create sales tools including a cost/benefit calculator to assist local vendors as well as customers.	Metropolitan owns and administers the program, as well as provides the base funding for measures. Upper District adds specific funds for prioritized measures. **Average Annual Supplier Budget** $137,653 **Total 9 Year Budget** $1,238,875
IMPLEMENTATION	**WATER SAVINGS**
The Save A Buck Commercial Rebate Program is currently administered through Metropolitan and requires no limited Upper District resources.	8,159 AF lifetime savings

Program: HET Distribution Program

Upper District has been implementing the High Efficiency Toilet Distribution Program since 1995. The events are held twice per year targeting residential customers throughout the Upper District territory. Customers are required to replace only toilets using 3.5 or

more gallons per flush. At the distribution events customers are provided with free HETs. Customers are required to return the old toilet(s) at a scheduled return event. As a long running program, the HET Distribution Program is well known in communities that the Upper District serves and garner high levels of recognition and positive feedback from the public.

In 2014, all toilets sold in California are required to be HET models (AB 715). At that time the Upper District will discontinue HET Distribution Program. The program advantages and disadvantages are as follows.

Advantages:

- Cost effective long term savings.
- Provides funds for local schools.
- Great public relations

Disadvantages:

- Market is becoming saturated.
- Requires tremendous amount of staff time to implement.
- Upcoming legislation renders the program obsolete.

Measures Offered

 High Efficiency Toilet *(HETs)*	Market Description: Statistical analysis estimates 111,508 potential high efficiency toilets available for retrofit with the Upper District within the single family and multifamily sectors. Cost per Acre-foot: **$642** per acre-foot.
MARKETING/OUTREACH	**FUNDING SOURCES and BUDGET**
The Upper District, local water agencies, and the sponsoring site promote the program.	The Upper District uses Metropolitan MA funds to partially fund program. **Average Annual Supplier Budget:** $570,000 **Total 3 Year Budget:** $1,710,000
IMPLEMENTATION	**WATER SAVINGS**
The Upper District contracts with a vendor to conduct the distribution and return events. The host site also provides resources.	3,563 AF lifetime savings

Program: Large Landscape Water Survey and Retrofit Program

The Large Landscape Water Survey and Retrofit Program targets large landscapes s schools and parks and includes:

- Diagnostic study and report of customer site conditions
- Geo tag locations of controllers, irrigation zones, valves, and sprinkler heads
- Smart controller installations
- High efficiency nozzle installations
- Irrigation system repairs

By conducting a diagnostic study, identifying all water savings opportunities and then performing those recommendations, the site achieves the maximum water savings. This approach is more comprehensive than most landscape water use efficiency programs because it does not leave the retrofits up to the customer and includes system repairs. The program is new and in the startup phase within the Upper District's service territory. Costs and savings are still being evaluated for this program.

Advantages:

- Provides comprehensive irrigation upgrade to the site.
- Targets high water use sites with limited capital for improvement projects.
- Turn-key program increases participation.
- Provides job training opportunities.

Disadvantages:

- Unknown water savings for system repairs.
- Audit and full service program is expensive.
- Requires significant staff time to review and approve each project.

Measures Offered

<table>
<tr><td>  Landscape & Irrigation Diagnostic Study</td><td rowspan="4">Market Description: Using the assumption that 25% of commercial sites would be eligible 7,086 sites would be eligible for the Large Landscape Water Survey and Retrofit Program.

Cost per Acre-foot: $587 per acre-foot.</td></tr>
<tr><td>  High Efficiency Sprinkler Nozzles</td></tr>
<tr><td>  Smart Controllers</td></tr>
<tr><td>  Irrigation System Repairs</td></tr>
<tr><td>MARKETING/OUTREACH</td><td>FUNDING SOURCES and BUDGET</td></tr>
<tr><td>The marketing and outreach plan will utilize a number of avenues to elevate the profile of the program, including:</td><td>The Upper District uses some Metropolitan MA Allocation funds.</td></tr>
</table>

• Program brochure and website. • Direct outreach to large landscape customers.	**Average Annual Supplier Budget** $413,680 **Total 9 Year Budget** $3,723,123
IMPLEMENTATION	**WATER SAVINGS**
The Upper District will target large landscape high water use sites. The program consultant contacts targeted sites to enroll them in the program and schedule their evaluations. The program consultant then conducts the evaluation identifying all opportunities for water savings. A site-specific report is generated describing all recommendations and the associated savings. Upper District reviews each report and approves recommendations. The program consultant then conducts the repairs and measure installations.	7,492 AF lifetime savings

Program: FreeSprinklerNozzles.com Voucher Program

Freesprinklernozzles.com is a web-administered voucher program for free high efficiency sprinkler nozzles owned and administered by Western Municipal Water District. The program provides up to 25 free nozzles for single family customers and up to 100 free nozzles for commercial customers (this may increase in FY 12/13).

Customers sign on to the FreeSprinklerNozzles.com website and login utilizing their customer information. Customers then watch a 7 minute mandatory video explaining 1) how the nozzles work 2) how to identify the appropriate nozzles for their irrigation system and 3) proper nozzle installation.

For customers that agree to program terms, a voucher is forwarded via e-mail. In addition each customer is provided with forms to assist them in sketching the layout of their irrigation system(s) and conducting an inventory for nozzle replacements.

The customer then takes the voucher to a participating equipment supplier for redemption of the nozzles. Distributors invoice Western for the redeemed vouchers and Western invoices the participating agency in turn.

Advantages:

- Most cost effective program.
- Largest potential of units available for retrofit.
- Easy retrofit.
- Aids in customer education regarding irrigation efficiency.
- Turnkey program requires limited staff resources.

Disadvantages:

- Requires local water agency to provide subset of customer data.
- Local agencies must market the program.

Measures Offered

 High Efficiency Sprinkler Nozzles (*HENs)*	Market Description: The market for high efficiency spray nozzles has only emerged in recent years and has a tremendous amount of potential. The Upper District service territory has a potential of over 800,000 inefficient units. Cost per Acre-foot: **$22** per acre-foot.
MARKETING/OUTREACH	**FUNDING SOURCES and BUDGET**
The program can be marketed through a variety of outreach mechanisms. There has been proven success through: • Direct Mail Postcards • Agency Newsletters • Bill Stuffers Sample materials are available from Western.	The majority of the program will be paid for out of member agency funds provided by Metropolitan. These funds will cover the $3 per nozzle cost. The Upper District or its member agencies will fund the remaining $0.25 per nozzle for program administration. **Average Annual Supplier Budget** $68,889 **Total 9 Year Budget** $620,000
IMPLEMENTATION	**WATER SAVINGS**
The program is offered as a turnkey design. Agencies sign a Memorandum of Understanding with Western and provide customer data, sample bills and agency logo. Western administers all program operations including: website development, updates, maintenance, and	12,000 AF lifetime savings

hosting. Toro provides support in equipment supplier recruitment and training. Western secures purchase orders with participating suppliers and pays supplier invoices weekly. Western, in turn, invoices the participating agencies and provides regular reporting. The program has experienced an extremely high customer satisfaction rating. In a recent survey 90% of participants stated they would recommend the program to family and friends: 50% already had. The current price is $3.25 per nozzle.	

Program: HOA High Efficiency Sprinkler Direct Installation Program

The Homeowner Association High Efficiency Sprinkler Direct Installation Pilot would offer HOAs free high efficiency sprinkler head installations in their common area landscape. The program would replace both pop up spray and rotor type sprinklers. Each sprinkler head would be pressure regulating and include a check valve.

Many HOA common areas are slopes or hard to irrigate therefore the replacement of the sprinkler heads with high efficiency models is the best way to assure water savings and reduce run off. In addition, HOAs often leave their irrigation to landscape management companies who are not accountable for irrigation water consumption. The installation of efficient fixtures within the landscape helps to negate irresponsible watering practices.

The pilot program would include an evaluation of both the customer acceptability of the offer as well as the water savings.

Advantages:

- Targets high water use customer segment.
- Free offer increases participation.
- Study of pressure regulation would provide industry water savings potential.
- Reduces run-off.

Disadvantages:

- More expensive than traditional nozzle programs.

Measures Offered

 High Efficiency Pop Up Sprinkler Nozzle and Pressure Regulating Heads	Market Description: An estimated 50,000 potential HOA spray heads available for retrofit (rotor and popup combined) Cost per Acre-foot: $360 per acre-foot *(rotor and popup combined)
 High Efficiency Rotor Sprinkler and Pressure Regulating Head	Market Description: An estimated 50,000 potential HOA spray heads available for retrofit (rotor and popup combined). Cost per Acre-foot: $360 per acre-foot*(rotor and popup combined)
MARKETING/OUTREACH	**FUNDING SOURCES and BUDGET**
This program will target market HOAs via direct customer contact. A contracted vendor would make presentations as needed to HOA boards and members.	Upper District would attempt to secure third party funding from Metropolitan and USBR. If outside funding is not obtained, Upper District and/or its member agencies would fully fund the pilot. **Average Annual Supplier Budget** $124,200 **Total 9 Year Budget** $1,117,800
IMPLEMENTATION	**WATER SAVINGS**
The Upper District would proceed through the bid process, or sole source the project dependent upon the number of qualified and applicable vendors. Upon securing a vendor the Upper District would administer, provide target customers and proceed with marketing. The Upper District would hire a landscape contractor to market the program to HOAs, inventory the heads at the site and	3,672 AF lifetime savings

conduct the installations.	

Program: Smart Controller Voucher Program

Smart controllers automatically adjust irrigation schedules based upon local weather. Most customers are:

- Unaware of the technology.
- Do not understand the site's watering needs.
- Typically struggle with programming their irrigation controller.

Low participation in Metropolitan's Save A Buck and SoCal Water$mart Programs suggest that a standard rebate with limited marketing is not addressing these issues.

The Smart Controller Voucher Program offers the customer a point of purchase discount. The Program would also require eligible manufactures to have educational tools and support for the installation and programming of their new smart controller. This may include: YouTube videos, picture based on-line support, and customer hotlines.

Property owners, property managers and landscape contractors typically purchase needed products from their irrigation equipment supplier and rely on them for information about new equipment and technologies. Understanding that the supplier is a critical link to the customer, the voucher program would primarily utilize landscape contractors to promote the program to their customers. Figure 5-1 is a depiction of the irrigation product distribution channel.

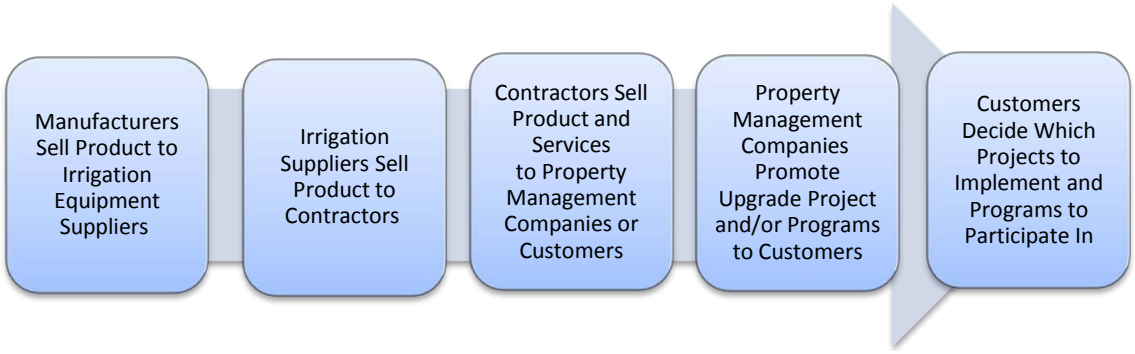

Figure 6-1 Irrigation Product Distribution Channel

The Upper District would hire a vendor to conduct program operations including: irrigation equipment supplier outreach, enrollment and training, landscape contractor outreach and training, voucher processing and payment.

The vendor would conduct direct outreach and training for landscape contractors. Through phone calls, supplier workshops, and in-person meetings the vendor would promote the program to landscape contractors. The business benefits of participation

would be explained to each contractor as well details of participation.

Customers or their contractor would apply online for the voucher. The customer or contractor would redeem the voucher at the local irrigation equipment supplier. Monthly the irrigation equipment supplier would invoice the Upper District for vouchers redeemed.

Advantages:

- Removes cash outlay barrier for customers.
- Offers voucher to customers and contractors which increases participation.
- Works within current irrigation product distribution channel.
- Requires additional manufacturer support to ensure correct installation and programming.

Disadvantages:

- Requires significant staff time to start up program.

Measures Offered

 Smart Controller	Market Description: Although the technology has been around for over a decade, smart controllers have not been adopted into mainstream homeowner irrigation markets to date. An estimated 80,000 potential controllers are available for retrofit. Cost per Acre-foot: **$371** per acre foot with co-funding and $599 without.
MARKETING/OUTREACH	**FUNDING SOURCES and BUDGET**
The program will be marketed through: • Direct mail to target high water use customers. • Point of purchase materials at participating irrigation equipment suppliers. • Outreach to local landscape contractors. • Marketing support and materials provided to landscape contractors. • E-mail blasts to participants in freesprinklernozzles.com program.	Upper District would fund the pilot. **Average Annual Supplier Budget** $319,533 **Total 9 Year Budget** $2,875,800
IMPLEMENTATION	**WATER SAVINGS**

The Upper District would hire a vendor to conduct program operations including: irrigation equipment supplier outreach, enrollment and training, landscape contractor outreach and training, voucher processing and payment.	6,334 AF lifetime savings

Program: High Efficiency Urinal Retrofit Program

Currently replacing an entire urinal, flush valve and porcelain, with a high efficiency or ultra low volume urinal is cost prohibitive for many customers. Many times the physical "footprint" of the new urinals does not match that of the old urinal and requires additional construction and added costs.

Low participation in Metropolitan's Save A Buck Rebate Program suggests that innovative marketing as well as a turnkey program approach is necessary in order to establish a base of interested customers and increase installation within Upper District's service area. For these reasons, Upper District has designed a retrofit program vs. full replacement.

The retrofit is a replacement of the flush valve only. The Upper District would hire a vendor to enlist commercial customers in the program, assess site conditions, inventory sites and conduct installations. The program will target sites with large volumes of urinals including public sector facilities (schools, cities, counties and state sites) as well as restaurants, bars, office buildings, sporting venues, and other high-traffic locations.

Advantages:

- Less expensive than traditional urinal replacements.
- Urinal market has low saturation.
- Free offer increases participation.
- Targets public sector sites in need of upgrade projects.

Disadvantages:

- Lower water savings than full replacement.

Measures Offered

	High Efficiency Urinal	<u>Market Description:</u> Urinal installations are strongest in public, high-traffic areas including schools, government buildings, etc. These entities often do not have the capital improvement budget to change fixtures and thus present a high potential

	for retrofits. An estimated 24,000 potential urinals are available for retrofit. Cost per Acre-foot: $398 per acre-foot.
MARKETING/OUTREACH	**FUNDING SOURCES and BUDGET**
The marketing and outreach plan will utilize a number of avenues to elevate the profile of the project, including: • Project brochure • Project website and dedicated customer service phone number • Direct outreach to commercial customers	Upper District would fully fund the program. **Average Annual Supplier Budget** $210,000 **Total 9 Year Budget** $1,890,000
IMPLEMENTATION	**WATER SAVINGS**
The Upper District would proceed through the bid process. Upon securing a vendor the Upper District would administer the program and provide target customers. The vendor would conduct a site survey, procure product and then conduct installations.	6,355 AF lifetime savings

Chapter 7: Implementation Plan

Program implementation is forecast for five years based upon expected regional funding and available technologies. Some of these components are well established and easily measurable, while others are pilot initiatives with savings results that are not yet fully established. Upper District will track performance and, as necessary, will make modifications along the way in order to maximize effectiveness. At the conclusion of each calendar year, Upper District will conduct a comprehensive assessment of the plan and overhaul or replace any underperforming elements in advance of the prior fiscal year budget process.

The following section outlines:

- Implementation and Outsourcing Strategies
- Organizational Structure, Staffing and Roles
- Projected Annual Activity by Program
- Implementation Schedule and Tasks
- Annual Budgets and Funding Sources

Implementation details for each program including: program descriptions, measure(s) offered, target customer segments, marketing methods, delivery mechanisms, program costs and economic evaluation results are included in the program overviews provided in Chapter 6.

The launch dates for fiscal year 2012/2013 are documented in Table 7-1. There may be minor modifications as final details come to light.

Table 7-1 Program Launch Dates

Program	*Start Date*
SoCal Water$mart Residential Incentives	Ongoing Program
Save A Buck Commercial Incentives	Ongoing Program
HET Distribution Program	Ongoing Program
Large Landscape Water Survey and Retrofit Program	Ongoing Program
FreeSprinklerNozzles.com Voucher Program	Start October 2012
HOA High Efficiency Sprinkler Direct Installation Program	January 2013
Smart Controller Voucher Program	March 2013
High Efficiency Urinal Retrofit Program	November 2012

Upper District Role

Over the upcoming years, Upper District and Metropolitan will administer the regional programs. This role will encompass several duties including:

- Efforts to secure outside funding through local, state and federal grants.
- Obtaining outside vendors when necessary.
- Developing operation plans, procedures and schedules for each program.
- Monitoring start up and on-going activities for each program.
- Tracking and reporting production and progress towards goals for each program.

In addition, Upper District will act as liaison between Metropolitan and Upper District member agencies. Since Metropolitan funding is limited and often based on a first-come/first-serve basis, Upper District will need to be aggressively positioned with Metropolitan to ensure placement in the funding queue

Upper District Staffing

To effectively implement and oversee the identified programs 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 and irrigation efficiency
3. Marketing and customer communication
4. Programmatic tracking, analysis and reporting

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

Conservation Manager

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

Conservation Specialist – Commercial/Indoor

- Indoor residential/business program coordination
- CII audits and incentives
- Plumbing fixture incentives

- HET Distribution Program implementation
- Urinal Retrofit Program implementation
- BMP reporting and tracking (program specific)
- Plumbing codes

Conservation Specialist – Landscape/Outdoor

- Outdoor program coordination
- Landscape measure incentives
- Large Landscape Water Survey and Retrofit Program
- FreeSprinklerNozzle.com Voucher Program implementation
- HOA Sprinkler Direct Installation Program Implementation
- Smart Controller Voucher Program Implementation
- BMP reporting and tracking (program specific)
- Outdoor landscape planning
- New construction ordinances

Marketing Consultant - Communications and Outreach

- Direct "sales" to customers for all CII and large landscape programs
- Coordinate information line/e-mail messaging (toll-free help)
- Write RFPs and solicit vendors for outsourcing of new programs and pilots
- For residential programs create and manage marketing campaigns
- Generate website content including: web tips, web training, articles, irrigation schedules
- Develop technical content for media releases
- Coordinate workshops to educate customers, vendors, etc. on conservation and available programs
- Conduct presentations to HOAs, industry groups, home shows, etc.

Retail Agency Role

With the retail agencies carrying the responsibility to meet the 20x2020 per capita water use reduction, they have a vested interest in aggressively pushing forward with a plan that builds on Upper District's regional plan. . To obtain the real water savings needed to meet the 20x2020 targets, retail agencies will need to fund the real costs of the WUE programs that create water savings. This will mean supporting Upper District WUE program costs and potentially additional retail agency WUE program costs.

To bolster the success rate of the plan, retail agencies need to post programs on their website, print literature and promote the program vigorously. Additionally, developing targeted lists and direct marketing should be initiated to further increase program participation.

Program Implementation Strategy

Due to staffing limitations and specific expertise required for certain programs the programs listed in Table 7-2 will be outsourced to industry vendors.

Table 7-2 Outsourced Programs

Program
HET Distribution Program
Large Landscape Water Survey and Retrofit Program
FreeSprinklerNozzles.com
HOA High Efficiency Sprinkler Direct Installation Program
Smart Controller Voucher Program
High Efficiency Urinal Retrofit Program

Program Activity Implemented by Year

The projected number of Program Activities to be implemented per year for fiscal years 12/13 – 16/17 are shown in Table 7-3. Please note that many of the selected programs consist of multiple devices and activities. For example, the SoCalWater$mart Program consists of HE clothes washers, HE nozzles, and WBICs.

Table 7-3 Program Activities Per Year

Program Activities	*FY12/13*	*FY13/14*	*FY14/15*	*FY15/16*	*FY16/17*	*5 Yr Total*
SoCal Water$mart HE Clothes Washers	900	900	900	900	900	4,500
SoCal Water$mart HE Nozzles	1,000	1,000	1,000	1,000	1,000	5,000
SoCal Water$mart WBIC	150	150	150	150	150	750
Save A Buck Cooling Tower Conductivity Controllers	5	5	5	5	5	25
Save A Buck Connectionless Food Steamers	5	5	5	5	5	25
Save A Buck High Efficiency Toilets	55	55	55	55	55	275
Save A Buck Ultra Low	55	55	55	55	55	275

Volume Urinals						
Save A Buck HE Nozzles	11,000	11,000	11,000	11,000	11,000	55,000
Save A Buck WBICs	140	140	140	140	140	700
HETs	2,000	2,000	2,000	0	0	6,000
Large Landscape Water Survey and Retrofit Program*	56	56	56	56	56	278
FreeSprinklerNozzles.com Vouchers	50,000	50,000	50,000	50,000	50,000	250,000
HOA High Efficiency Sprinkler Direct Install	6,000	6,000	6,000	6,000	6,000	30,000
Smart Controller Vouchers	1,700	1,700	1,700	1,700	1,700	8,500
High Efficiency Urinal Retrofits	1,000	1,000	1,000	1,000	1,000	5,000
***** ***Involves multiple measures including surveys, high efficiency nozzles, sprinkler repairs and smart controller installations.***						

Upper District's Master Plan has been modeled over nine fiscal years through FY20/21 to project savings and assess compliance with 20x2020. It is unlikely that the plan will include the same group of programs or measures in five years. New technologies and delivery mechanisms as well as more solid water savings assumptions will likely change the program offering. This model was created with the best information available at this time.

Changes to the model for FY17/19 – FY20/21 include:

- HET Distribution program ends in FY14/15
- SoCal Water$mart High Efficiency Nozzle activity doubles to 2,000 per year
- Save A Buck High Efficiency Nozzle activity double to 22,000 per year
- FreeSprinklerNozzles.com activity increases to 100,000 in FY17/18 and 150,000 in FY18/19 then cuts back to 50,000 per year for FY19/20 and FY20/21

The total number of activities for all nine years is provided in table 7-4.

Table 7-4 Total Program Activities for Nine Years

Program Activity	*Total Through FY20/21*
SoCal Water$mart HE Clothes Washers	8,100
SoCal Water$mart HE Nozzles	13,000
SoCal Water$mart WBIC	1,350
Save A Buck Cooling Tower Conductivity Controllers	45
Save A Buck Connectionless Food Steamers	45
Save A Buck High Efficiency Toilets	495
Save A Buck Ultra Low Volume Urinals	495
Save A Buck HE Nozzles	143,000
Save A Buck WBICs	1,260
HET Distribution	6,000
Large Landscape Water Survey and Retrofit Program	500
FreeSprinklerNozzles.com Vouchers	600,000
HOA High Efficiency Sprinkler Direct Install	54,000
Smart Controller Vouchers	15,300
High Efficiency Urinal Retrofits	9,000

The plan is projected to get significant savings from high efficiency nozzles. The actual market potential and delivered savings will need to be assessed each year.

Implementation Tasks

Table 7-5 lists the major tasks required to start up, or continue operating, each program. Each task is assigned a resource group responsible for implementing the task.

Table 7-5 Program Tasks

Task	*Resource*
SoCal Water$mart	
Meet with EGIA (RSG) to strategize Upper District specific marketing	Upper District Staff
Create Upper District specific point of purchase materials with enhanced incentive amounts **-HEW materials for big box and appliance stores** **-Landscaper measure materials for home improvement and irrigation equipment suppliers**	Consultant

Generate and prioritize stores within Upper District's area **-Big box, local hardware and appliance stores** **-Irrigation equipment suppliers**	Consultant
Conduct outreach to Upper District stores to distribute materials and conduct training	Consultant
Build list of local landscape contractors	Consultant
Conduct workshops for local landscape contractors and other interested parties	Consultant
Track and report performance	Upper District Staff
Save A Buck	
Purchase list of targeted businesses – property owners and managers **-Restaurants and food service operations** **-Office Buildings** **-Schools**	Consultant
Research businesses with green initiatives	Consultant
Work with retail agencies to build list of targeted businesses	UD Conservation Coordinator
Generate specific materials with Upper District enhanced incentive amounts and average paybacks	Consultant
Send email out to targeted businesses	Consultant
Conduct direct outreach to high priority target businesses	Consultant
Track and report performance	Upper District Staff
HET Distribution Program	
Submit project funding request to Metropolitan	Upper District Staff
Select sites for events	Upper District Staff
Secure vendor to conduct events	Upper District Staff
Conduct outreach	Upper District Staff
Hold events	Consultant
Track and report performance	Upper District Staff
Submit invoice to Metropolitan for funding	Upper District Staff
Large Landscape Water Survey and Retrofit Program	
Approve sites to be retrofitted	Upper District Staff
Conduct installations for approved sites	Consultant
Gather pre- and post- installation water consumption for installation sites	Upper District Staff
Build list of target customers for audits	Upper District Staff
Work with retail agencies to finalize target customers	Upper District Staff
Conduct audits	Consultant
Evaluate cost and savings for audited sites	Consultant

Approve sites to be retrofitted	Upper District Staff
Conduct installations for approved sites	Consultant
Assess water savings	Consultant
FreeSprinklerNozzles.com	
Meet with retail agencies to obtain interest and ability to provide customer data	Upper District Staff
Submit project funding request to Metropolitan	Upper District Staff
Secure MOU with Western Metropolitan	Upper District Staff
Obtain customer data, sample bill and logo from participating agencies	Upper District Staff
Provide agencies with marketing template materials and collect marketing activities	Western MWD
Issue and redeem vouchers	Western MWD
Generate monthly invoices and reports	Western MWD
Submit invoice to Metropolitan for funding	Upper District Staff
HOA High Efficiency Sprinkler Direct Installation Pilot	
Generate RFP for pilot project	Consultant
Secure contractor to survey sites, procure and install product	Consultant
Build and prioritize list of HOAs in Upper District area	Consultant
Conduct outreach to target HOAs	Consultant
Survey site and conduct installations	Consultant
Gather pre- and post- installation water usage	Upper District Staff
Evaluate savings	Consultant
Smart Controller Voucher Program	
Submit project funding request to Metropolitan	Upper District Staff
Generate RFP for voucher program including marketing and voucher processing	Consultant
Secure contractor to implement voucher program	Upper District Staff
Enlist local irrigation equipment suppliers	Consultant
Generate marketing materials	Consultant
Work with retail agencies and irrigation equipment suppliers to promote program	Consultant
Process vouchers	Consultant
Compare cost vs. benefits of voucher and rebate style programs	Upper District Staff
High Efficiency Urinal Retrofit Program	
Generate RFP for urinal retrofit services including product procurement and marketing	Consultant
Secure contractor for urinal retrofit services	Upper District Staff

Build list of high traffic sites to target for retrofits: restaurants and public use facilities	Consultant
Conduct site surveys and valve replacements	Consultant
Gather pre- and post- installation water consumption for installation sites and evaluate savings	Upper District Staff

Implementation Schedule

Table 7-6 is a snapshot of the Five Year Timeline for recommended programs:

Table 7-6 Five Year Implementation Timeline

WUE Active Program	*Year 1*	*Year 2*	*Year 3*	*Year 4*	*Year 5*
SoCal Water$mart Residential Incentives	Implemented all Five Years				
Save A Buck Commercial Incentives	Implemented All Five Years				
HET Distribution Program	Ends Year 3 FY14/15				
Large Landscape Water Survey and Retrofit Program	Implemented All Five Years				
FreeSprinklerNozzles.com Voucher	Implemented All Five Years				
HOA High Efficiency Sprinkler Direct Installation Pilot	Implemented All Five Years				
Smart Controller Voucher Program	Implemented All Five Years				
High Efficiency Urinal Retrofit Program	Implemented All Five Years				
Annual Water Savings (AF)	688	1,368	2,039	2,618	3,194
Annual Program Budget	$2,214,955	$2,214,955	$2,214,955	$1,544,955	$1,544,955
Recommended Staffing	3	3	3	3	3

Program Budgets

Table 7-7 is the annual budget for active and educational programs.

Table 7-7 Annual Budget

Year	*Education & Outreach Budget*	*Programs Budget*	*Total-Budget*
FY 2012/13	$375,000	$2,214,955	2,589,955
FY 2013/14	$375,000	$2,214,955	2,589,955
FY 2014/15	$375,000	$2,214,955	2,589,955
FY 2015/16	$375,000	$1,544,955	1,919,955
FY 2016/17	$375,000	$1,544,955	1,919,955
FY 2017/18	$375,000	$1,648,955	2,023,955
FY 2018/19	$375,000	$1,648,955	2,023,955
FY 2019/20	$375,000	$1,648,955	2,023,955
FY 2020/21	$375,000	$1,588,955	1,963,955
Total	**$1,875,000**	**$9,734,777**	**11,609,777**

Member Agency Administered Program Funding

Upper District is projected to receive $286,000 in Member Agency Administered (MAA) Program funding from Metropolitan in FY 2012/13. Because single family and multi-family high efficiency toilets are no longer under Metropolitan's SoCal Water$mart and Save A Buck programs, Upper District may use a significant amount of the funds for the HET Distribution Program. Funds may also be used for the Large Landscape Water Survey and Retrofit, High Efficiency Nozzle and Smart Controller Voucher Programs.

In addition, Upper District projects will utilize Metropolitan funds for incentives processed through the SoCal Water$mart and Save A Buck Programs.

Conclusion

The purpose of the Upper District Water Use Efficiency (WUE) Master Plan is to:

- Create a strategy and set forth a blueprint to meet water demand reduction targets[6];
- Deliver customized tools required to track performance and to adapt to changing circumstances.

The required programs needed to meet the IRP determined target of 5,000 acre feet per year of water savings are thoroughly documented and the implementation steps meticulously detailed. This is a significant increase in WUE efforts in the Upper District and will require a higher level of financial and implementation support from the retail providers in the San Gabriel Valley.

The Upper District WUE Master Plan is designed to be an adaptable and flexible plan that can be changed to meet new circumstances and challenges.

[6] Senate Bill SBx7-7 (approved in November 2009) requires all urban retail suppliers to reduce per capita water use by 20 percent by 2020 (and an interim target of 15 percent by 2015.) This law contains consequences for urban retail suppliers who do not meet the mandated target:

- Conditions eligibility for state water grants and loans on compliance as of January 1, 2016
- Failure to meet targets establishes a violation of law for administrative or judicial proceedings after January 1, 2021

Upper District WUE Master Plan Appendixes

Appendix A: Demand and Data

Table A-1 Number and Percentage of Parcels by Land Use Category

Parcels by Land Use Category		
Land Use Digit 1	***Freq.***	***Percent***
Residential	167,870	91.37
Commercial	7,223	3.93
Industrial	4,748	2.58
Miscellaneous	2,955	1.61
Institutional	699	0.38
Recreational	153	0.08
Unknown	52	0.03
Irrigated Farm	20	0.01
Dry Farm	1	0
Total	**183,721**	

Table A-2 Commercial Land Use Frequency

Commercial Land Use		
Land Use Digits 1-2	***Freq.***	***Mean Acres***
Store	1,483	0.4
Office Building	974	0.7
Parking Lot	849	0.4
Store Combination (w/Office or Residence)	736	0.5
Commercial	671	1.0
Auto, Recreation, and Construction Equipment Sales	621	0.6
Restaurant, Cocktail Lounge	493	0.4
Professional Building	422	0.5
Shopping Center, Neighborhood	344	1.6
Service Station	154	0.5
Hotel and Motel	119	1.0
Bank, Savings & Loan	97	0.6
Service Shop (Radio, Refrigeration, Paint, Electric)	70	0.3
Supermarket	59	1.7
Shopping Center, Regional	51	2.6
Nursery or Greenhouse	38	3.3
Department Store	21	6.1
Animal Kennel	9	0.3
Open	7	0.7
Wholesale and Mfg Outlet	5	1.3
Total	**7,223**	**0.7**

Table A-3 Industrial Land Use Frequency

Industrial Land Use		
Land Use Digits 1-2	*Freq.*	*Mean Acres*
Light Manufacturing	2,301	1.0
Warehousing ,Distribution, Storage	1,390	1.7
Industrial	674	1.9
Heavy Manufacturing	102	3.6
Mineral Processing	85	15.4
Parking Lot, Industrial	83	0.6
Open Storage	55	6.4
Food Processing Plant	39	8.9
Lumber Yard	10	2.9
Motion Picture, Radio, TV Industry	9	2.0
Total	**4,748**	**1.8**

Table A-4 Institutional Land Use Frequency

Institutional Land Use		
Land Use Digits 1-2	*Freq.*	*Mean Acres*
Cemetery, Mausoleum, Mortuary	44	34.6
Children's Day Care Center	5	76.7
Church	410	1.2
College, University (Private)	7	10.5
Homes for Aged & Others	91	1.4
Hospital	47	3.0
School (Private)	94	2.6
Senior Day Care Center	1	0.5
Total	**699**	**4.3**

Table A-5 Recreational Land Use Frequency

Recreational Land Use		
Land Use Digits 1-2	*Freq.*	*Mean Acres*
Athletic/Amusement Facility	16	5.2
Bowling Alley	6	2.3
Camp	1	160.8
Club, Lodge, Fraternal Organizations	61	0.9
Golf Course	51	14.6
Race Track	6	60.9
Skating Rink	1	0.1
Theater	11	3.6
Total	**153**	**9.6**

Table A-6 Residential Land Use Frequency

Residential Land Use		
Land Use Digits 1-2	**Freq.**	**Mean Acres**
Duplex	7,124	0.2
Five or More Units	2,971	0.5
Four Units	1,743	0.3
Manufactured Home Park	116	3.0
Manufactured Homes	3	0.2
Open	1	0.3
Rooming/Boarding House	6	0.5
Single	153,652	0.4
Three Units	2,254	0.3
Total	**167,870**	**0.4**

Table A-7 Summary of Business Type Data

Summary of Business Type Data (at the 2-digit NAICS code level)		
NAICS	***Freq.***	***NAICS2 Description***
11	52	Agriculture, Forestry, Fishing and Hunting
21	14	Mining, Quarrying, and Oil and Gas Extraction
22	39	Utilities
23	1644	Construction
31	357	Manufacturing
32	414	Manufacturing
33	973	Manufacturing
42	2474	Wholesale Trade
44	3596	Retail Trade
45	1103	Retail Trade
48	483	Transportation and Warehousing
49	74	Transportation and Warehousing
51	443	Information
52	1595	Finance and Insurance
53	1200	Real Estate and Rental and Leasing
54	2168	Professional, Scientific, and Technical Services
55	14	Management of Companies and Enterprises
56	1309	Administrative and Support and Waste Management and Remediation Services
61	727	Educational Services
62	1925	Health Care and Social Assistance
71	347	Arts, Entertainment, and Recreation
72	1932	Accommodation and Food Services
81	3536	Other Services (except Public Administration)
92	299	Public Administration
99	605	UNCLASSIFIED ESTABLISHMENTS

Appendix B: Economics

This appendix documents the avoided supply cost forecast for Upper District, and the key assumptions that underlie that forecast. The analysis is based upon input provided by District staff and Stetson Engineers.

Avoided Cost Analytical Framework

The avoided cost is a measure of the reduction in supply and infrastructure costs that the water utility will experience per unit (e.g. acre-foot) of demand reduction due to conservation programs.[7] The tool that was used to develop Upper District avoided cost forecasts is the California Urban Water Conservation Council/Water Research Foundation Avoided Cost Model (CUWCC/WRF ACM). CUWCC/WRF ACM is an Excel spreadsheet that estimates two avoided cost components:

- Short-run Avoided Costs. These are the costs that are immediately avoided due to the reduced water production, purchase, treatment, and transport that result from conservation-induced demand reductions.
- Long-run Avoided Costs. Conservation-caused demand reductions may also allow the deferral and/or downsizing of planned supply or facility additions and expansions. The model estimates the economic value of these investment modifications.

Each of these components is estimated for each year of a user-defined planning period. The model combines these to estimate each year's total avoided costs per unit of demand reduction in user-defined peak and off-peak seasons.

These avoided costs will be combined with each conservation program's savings assumptions to develop a forecast of annual program benefits. The present value of this stream of benefits will be compared to the present value of the program's costs to compute the program's benefit-cost ratio.

It should be noted that the avoided costs documented in this memorandum are from the perspective of the Upper District service area. That is, they include costs avoided by Upper District itself as well as by its retail producers.

Common Assumptions

Table B-1 shows a portion of the model's Common Assumptions worksheet. The common assumptions are used in various ways by the model in its calculation of short-run and long-run avoided costs. Key assumptions for Upper District include:

- The avoided costs are estimated for the years 2011-2040.
- All cost assumptions are expressed in 2011 dollars.
- Lost and unaccounted for water is estimated at 6%.

[7] All references in this memo to 'conservation' refer to direct conservation programs, rather than local conservation of storm water flows.

- The peak-season is defined as including the months June-September.
- The interest rate, which is used to calculate the value of investment deferral, is assumed to be 6%. The future annual inflation rate is assumed to be 2%.

Table B-1 Common Assumptions

Common Assumptions	
Analysis Start Year	2011
Planning horizon (year)	2040
Cost Reference Year	2011
Lost and Unaccounted for Water (%)	6%
Peak-Season Start Date	1-Jun
Peak-Season End Date	30-Sep
Projected Interest Rate	6.00%
Projected Inflation Rate	2.00%

Short-Run Avoided Cost Forecast

Short-run avoided costs are the variable operating costs that are reduced as a result of producing, purchasing, treating, and/or transporting less water. The assumptions in Table B-2 are based on discussions with District staff and Stetson Engineers.

Table B-2 Variable Operating Costs (2011 $/AF)

Component Name	*Power Costs*	*Chemical Costs*	*Purchase Costs*
MWD Untreated Water Purchase			$722 *
Water Pumping from Basin	$70		
Annual Real Escalation Rates:	1%	0%	2%
* Includes $70 Upper District surcharge.			

The table includes two short-run avoided cost components:

- Upper District purchase of untreated water from Metropolitan. For each acre-foot of water conserved by a local producer, it is assumed that the District would purchase one less acre-foot of untreated water from Metropolitan for purposes of basin replenishment.[8]
- Local producer pumping costs. Local producers will avoid the cost of pumping each unit of conserved water from the basin.

[8] Because of a very efficient secondary market in water rights, it is assumed that the purchase of untreated imported water is avoided whether or not the producer is exceeding its own water right.

Based on the foregoing assumptions, Table B-3 shows the forecast of short-run avoided costs expressed in constant 2011 dollars. The figures reflect the assumed lost and unaccounted-for rate of 6% shown in Table B-1; the steady increase in these avoided costs is due to the real escalation rates assumed for the cost components as shown in Table B-1.

Table B-3 Short-Run Avoided Cost Forecast (2011 $/AF)

Year	*Short-Run Avoided Cost*
2011	$843
2012	$859
2013	$875
2014	$892
2015	$909
2016	$926
2017	$944
2018	$962
2019	$981
2020	$999
2021	$1,019
2022	$1,038
2023	$1,058
2024	$1,078
2025	$1,099
2026	$1,120
2027	$1,142
2028	$1,164
2029	$1,186
2030	$1,209
2031	$1,232
2032	$1,256
2033	$1,280
2034	$1,305
2035	$1,330
2036	$1,356
2037	$1,382
2038	$1,408
2039	$1,436
2040	$1,463

Long-Run Avoided Cost Forecast

Long-run avoided costs result from the ability to defer or downsize planned future investments as a result of conservation-induced demand reductions. In the case of Upper District, four recycled water projects were identified that were deferrable. Those projects, and the associated assumptions regarding capital and fixed operating costs are shown in Table B-4.

Table B-4 Deferrable Recycled Water Projects (2011 dollars)

Project Name	*Online Year*	*Capital Cost ($ millions)*	*Fixed O&M Cost ($/yr)*
Phase II B - Industry (Package 3)	2012	$6.0	$65,100
Phase II B - Industry (Package 4)	2012	$5.5	$44,100
Direct Use Future Extensions	2016	$12.5	$105,000
Phase III (MBR)	2015	$10.0	$105,000
Annual Real Escalation Rates:		1%	1%
Financing Term (yrs): 20			

The underlying assumption is that the on-line date for each of these investments is determined by peak-day customer demand, and that for each unit of peak-day demand reduction, each of these investments will be deferred for precisely the period that will maintain the supply-demand balance. Table B-5 shows the Upper District peak-day demand forecast,[9] along with the deferral periods associated with a 1 mgd demand reduction. For example, a 1 mgd peak-day demand reduction in 2012 would enable a deferral of 0.216 years for an investment scheduled to come on-line in that year. Due to these deferrals, the present value of the 20-year stream of debt service payments is reduced, which forms the basis of the long-run avoided costs.

[9] Forecast provided by Stetson Engineers.

Table B-5 USGVMWD Demand Forecast and Unit Deferral Periods

Year	Annual Demand (mgd)	Annual Demand Growth (mgd)	1 mgd Deferral Periods (years)
2011	356.9	4.6	0.216
2012	361.6	4.6	0.216
2013	366.2	4.6	0.216
2014	370.8	4.6	0.216
2015	375.4	2.5	0.395
2016	378.0	2.5	0.395
2017	380.5	2.5	0.395
2018	383.0	2.5	0.395
2019	385.6	2.5	0.395
2020	388.1	2.2	0.461
2021	390.3	2.2	0.461
2022	392.4	2.2	0.461
2023	394.6	2.2	0.461
2024	396.8	2.2	0.461
2025	398.9	2.3	0.431
2026	401.3	2.3	0.431
2027	403.6	2.3	0.431
2028	405.9	2.3	0.431
2029	408.2	2.3	0.431
2030	410.5	2.3	0.431
2031	412.9	2.3	0.431
2032	415.2	2.3	0.431
2033	417.5	2.3	0.431
2034	419.8	2.3	0.431
2035	422.2	2.3	0.431
2036	424.5	2.3	0.431
2037	426.8	2.3	0.431
2038	429.1	2.3	0.431
2039	431.4	2.3	0.431
2040	433.8	29.0	0.431

Table B-6 shows the long-run avoided costs that result from the foregoing assumptions. Note that, since deferrals of capital investments are driven by peak-day demands, the long-run avoided cost for the off-peak season is zero.

Table B-6 Long-Run Avoided Cost Forecast (2011 $/AF)

Year	*Peak-Season*	*Off-Peak Season*
2011	$0	$0
2012	$38	$0
2013	$37	$0
2014	$36	$0
2015	$97	$0
2016	$172	$0
2017	$169	$0
2018	$166	$0
2019	$164	$0
2020	$161	$0
2021	$158	$0
2022	$156	$0
2023	$153	$0
2024	$151	$0
2025	$148	$0
2026	$146	$0
2027	$144	$0
2028	$142	$0
2029	$139	$0
2030	$137	$0
2031	$135	$0
2032	$110	$0
2033	$109	$0
2034	$107	$0
2035	$69	$0
2036	$21	$0
2037	$21	$0
2038	$21	$0
2039	$22	$0
2040	$22	$0

Finally, Table B-7 combines the short-run and long-run avoided costs to produce the total constant-dollar avoided cost forecast.

Table B-7 Total Avoided Cost Forecast (2011 $/AF)

Year	Peak Season			Off-Peak Season		
	Short-Run	Long-Run	Total	Short-Run	Long-Run	Total
2011	$843	$0	**$843**	$843	$0	**$843**
2012	$859	$38	**$896**	$859	$0	**$859**
2013	$875	$37	**$912**	$875	$0	**$875**
2014	$892	$36	**$928**	$892	$0	**$892**
2015	$909	$97	**$1,006**	$909	$0	**$909**
2016	$926	$172	**$1,098**	$926	$0	**$926**
2017	$944	$169	**$1,113**	$944	$0	**$944**
2018	$962	$166	**$1,129**	$962	$0	**$962**
2019	$981	$164	**$1,144**	$981	$0	**$981**
2020	$999	$161	**$1,160**	$999	$0	**$999**
2021	$1,019	$158	**$1,177**	$1,019	$0	**$1,019**
2022	$1,038	$156	**$1,194**	$1,038	$0	**$1,038**
2023	$1,058	$153	**$1,211**	$1,058	$0	**$1,058**
2024	$1,078	$151	**$1,229**	$1,078	$0	**$1,078**
2025	$1,099	$148	**$1,248**	$1,099	$0	**$1,099**
2026	$1,120	$146	**$1,266**	$1,120	$0	**$1,120**
2027	$1,142	$144	**$1,286**	$1,142	$0	**$1,142**
2028	$1,164	$142	**$1,305**	$1,164	$0	**$1,164**
2029	$1,186	$139	**$1,325**	$1,186	$0	**$1,186**
2030	$1,209	$137	**$1,346**	$1,209	$0	**$1,209**
2031	$1,232	$135	**$1,367**	$1,232	$0	**$1,232**
2032	$1,256	$110	**$1,366**	$1,256	$0	**$1,256**
2033	$1,280	$109	**$1,389**	$1,280	$0	**$1,280**
2034	$1,305	$107	**$1,412**	$1,305	$0	**$1,305**
2035	$1,330	$69	**$1,399**	$1,330	$0	**$1,330**
2036	$1,356	$21	**$1,377**	$1,356	$0	**$1,356**
2037	$1,382	$21	**$1,403**	$1,382	$0	**$1,382**
2038	$1,408	$21	**$1,430**	$1,408	$0	**$1,408**
2039	$1,436	$22	**$1,457**	$1,436	$0	**$1,436**
2040	$1,463	$22	**$1,485**	$1,463	$0	**$1,463**

The avoided cost forecast in Table B- B-7 was used in the economic analysis of Upper District conservation programs.