

Water Conservation in Austin:
An Overview and Update for CMO and Council

Prepared June 2009 by AWU staff



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Introduction

The City of Austin, through the Austin Water Utility (AWU), has a wide range of water conservation programs, including: a water use management ordinance passed in 2007; rebates for high efficiency clothes washers, toilets, and rainwater harvesting systems; free high efficiency toilets; a residential irrigation audit program for large users; educational programs; and a fast growing reclaimed water program.

The City Manager recently challenged AWU to do more to promote water conservation. As a first step in responding to that challenge, AWU would like to present information on the history and current state of water conservation in Austin, existing plans to strengthen conservation efforts, and options for expanding programs even further.

The City of Austin has extensively considered its conservation options. A 2006 analysis by Alan Plummer Associates examined 161 potentially feasible water conservation strategies to identify those that could both reduce peak-day water use and conserve a significant amount of water during the next five years. Twelve strategies were selected for the initial phase of the study; others will be reconsidered in the second phase of the Alan Plummer study that will include an examination of average-day water savings. The study is currently in progress.

City Council has approved a “road map” for water conservation efforts. After the 2006 Plummer study, the Council empanelled the Water Conservation Task Force (WCTF) which carefully considered the costs and feasibility of implementation for these strategies. The WCTF, incorporating public input, developed a package of recommendations that the City Council adopted in May 2007. Staff is proceeding with the established implementation plan for these strategies, while continuing to manage existing incentive and education programs and explore new opportunities for conservation.

Austin’s water conservation efforts have significantly reduced water use and AWU is committed to continuous improvement of its conservation programs. Austin has a long history of water conservation, beginning in the 1980s. Austin has implemented the majority of the Best Management Practices (BMPs) issued in 2004 by the Texas Water Development Board, and was in fact central to the development of these BMPs. Careful planning is critical to avoid implementation problems, review and confirm theoretical savings projections against actual savings achieved, and ensure programs are cost-effective. New positions in AWU’s Water Conservation Division have been created to better monitor and measure success, and over the past year AWU has seen program participation increase while costs per gallon saved decrease. Additional resources granted to the division are being fully utilized in implementing the task force recommendations and managing current programs.

AWU is prioritizing the WCTF measures predicted to bring the largest savings. While following through on implementation of all the WCTF recommendations, AWU is prioritizing the measures that will bring the largest water savings as estimated by the task

force. Those include: day and time restrictions on outdoor watering; expansion of the reclaimed water system; efforts to reduce water loss; and conservation billing. This resulted in first year water savings beyond what was estimated in the WCTF report.

AWU is also achieving increased savings by strengthening existing programs, like the free toilet program, while also preparing to launch new initiatives like the Direct Install contract and HELP plumbing assistance program for low income citizens – programs modeled after successes in other cities, including San Antonio.

Additional data is needed to make good planning decisions. Only one summer has passed since Austin implemented the first of the WCTF recommendations. While the watering ordinance and plumbing code changes appear to have had an impact, it is too early to predict with confidence how they will affect long-term demand.

AWU considers water conservation to be an essential part of Austin’s climate initiative. Conserving water also conserves the energy required to treat and deliver water. The water conservation program is a way that citizens can work with their City government to conserve water and reduce their carbon footprints. This is part of the spirit with which AWU approaches water conservation.

Water Conservation Task Force

History of the Water Conservation Task Force (WCTF)

The City Council passed Resolution #20060824-061 on August 24, 2006 that:

- Set a goal of reducing peak day water use by 1% per year for 10 years;
- Created a Water Conservation Task Force with a goal of drafting a policy document within 90 days that would detail ways to achieve the savings goal; and
- Named the members of the task force.

The members of the WCTF were (titles reflect positions during the time the task force was convened): Mayor **Will Wynn**; Council Member **Lee Leffingwell (chair)**; Council Member **Sheryl Cole**; Environmental Board Chair **Dave Anderson**; Planning Commission Member **Chris Riley**; Resource Management Commission Member **Christine Herbert**; and Water and Waste Water Commission Member **Michael Warner**.

On September 28, 2006, Council extended the time for the WCTF to report back to the Council from 90 to 120 days (Resolution #20060928-071).

WCTF Process

At the first task force meeting, it was established that:

- The task force would review relevant research, hold discussions with staff, take input from stakeholder groups and individuals, hold public meetings and work sessions, and ultimately produce the policy document.
- The task force would announce and broadly publicize meeting schedules in order to maximize public education and participation. The task force would provide an opportunity for public testimony at each public meeting.
- In addition to public meetings, the task force would need several work sessions to receive briefings and analysis from AWU staff.

WCTF Meeting Schedule

The task force adopted the following schedule to meet the 120 day timeframe:

- Meeting 1: September 29, 2006 – Organizational Meeting and Overview
- Receive staff reports on suggested conservation strategies
 - Adopt timetable for meeting task force milestones
 - Public testimony

Meeting 2: October 13, 2006 – Indoor Strategies

- Receive staff reports on conservation strategies relating to plumbing fixtures, metering, cooling towers, etc.
- Invited Testimony
- Public Testimony

Meeting 3: October 27, 2006 – Indoor Strategies

- Deliberation and initial adoption of strategies
- Public Testimony

Meeting 4: November 3, 2006– Landscape Irrigation Strategies

- Receive staff reports on conservation strategies relating to irrigation system efficiency, landscape design, watering schedules, rainwater collection, etc.
- Invited Testimony
- Public Testimony

Meeting 5: November 17, 2006 – Landscape Irrigation Strategies

- Deliberation and initial adoption of strategies
- Public Testimony

Meeting 6: December 8, 2006 – City and Utility Strategies

- Receive staff reports on leak repair, water reuse program, rate structures, public education, etc.
- Invited Testimony
- Public Testimony

Meeting 7: December 15, 2006 – City and Utility Strategies

- Deliberation and initial adoption of strategies
- Public Testimony

Final Meeting: January 12, 2007 – City and Utility Water Conservation Recommendations

- Public Testimony
- Deliberation and Final Adoption of Strategies

The task force met eight times between September, 2006 and January, 2007. The City Council unanimously adopted the final policy recommendations on May 3, 2007. The Council also created the Citizens Water Conservation Implementation Task Force (CWCITF) as a temporary advisory group for the early years of implementation of the WCTF recommendations. The group has met 18 times since its creation in December 2007.

In addition to working with the CWCITF, the division regularly reports to the Water and Wastewater Commission, the Resource Management Commission, and on occasion to the Environmental Board.

Budget and Water Savings Increases

The WCTF also recommended budget and staff increases for the Water Conservation Division which have been approved by the Council. As shown below, the Division's budget has increased steadily since FY 05-06.

Austin Water Utility Water Conservation Five Year Budget History

Water Conservation Division	Actual 2005-06	Actual 2006-07	Actual 2007-08	Estimated 2008-09	Proposed 2009-10
Water Conservation	\$2,585,462	\$3,150,668	\$5,080,392	\$6,223,718	\$6,679,999
Reclaimed Water	82,133	85,007	87,983	91,062	91,062
Total	2,667,595	3,235,675	5,168,375	6,314,780	6,771,061

Total AWU Operating and Other Requirements	\$133,959,464	\$ 137,848,713	\$ 151,374,528	\$ 169,802,278	\$175,554,442
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Conservation as % of Total AWU Operating & Other Requirements	1.99%	2.35%	3.41%	3.72%	3.86%
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Total Water Service Revenue	\$163,934,088	\$ 136,423,073	\$ 178,265,788	\$ 195,497,547	\$ 206,124,796
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Conservation as % of total Water Service Revenues	1.63%	2.37%	2.90%	3.23%	3.28%
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The table below shows the amount of water saved including the staff cost broken down by peak day gallon saved. Note that the table includes only measurable savings for conservation programs and does not include savings from mandatory watering restrictions. Savings were more than double previous years, higher than budget increases.

Year	Yearly reduction through conservation/reuse (AF)	Staff cost per peak day gallon saved
FY07	1,113	\$1.15
FY08	2,352	\$1.09

WCTF Recommendations & Implementation Progress

The WCTF laid out annual savings goals for individual measures. AWU is pursuing these goals, but made a strategic decision to prioritize the measures with the biggest potential

savings. The following measures are reported on in the order of savings magnitude predicted by the WCTF, with projected and estimated savings summarized in a table on page 12.

Enhanced Water Use Management

The revised water use management ordinance took effect October 1, 2007. It limits watering to two days per week year-round for commercial and multifamily customers, and from May through September for residential customers. It prohibits daytime watering and water waste, and sets forth progressive restrictions to respond to increased demand or decreased supply. The ordinance has been in place for a limited time, but water use trends appear to show a high level of compliance.

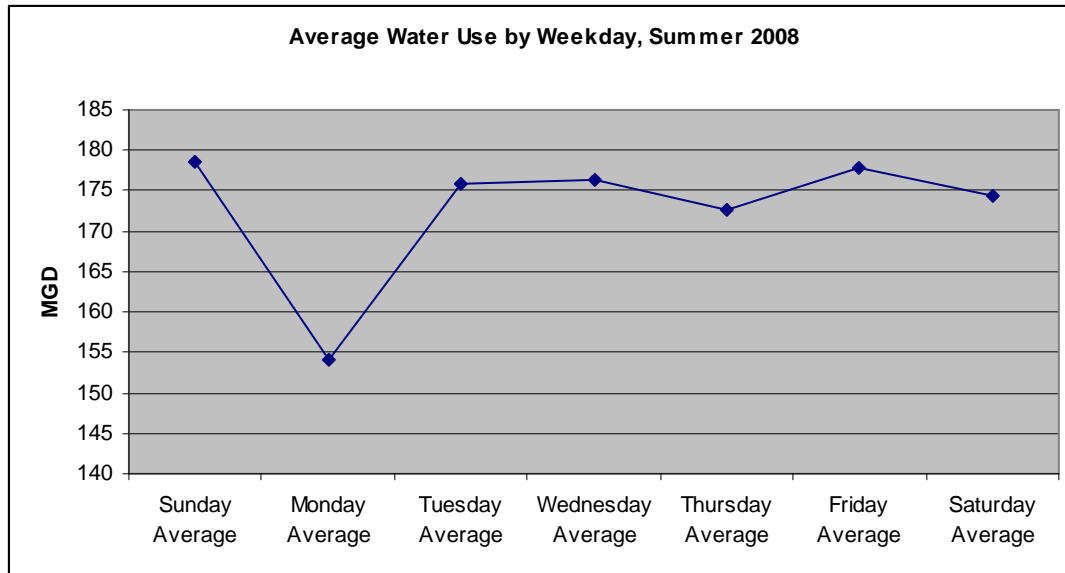
For example, prior to mandatory restrictions going into effect in October 2007, Monday was the highest water use day of the week. Following implementation of the new ordinance (which prohibits watering on Monday), Mondays became the day of lowest water use; the utility pumped an average of 19 million gallons per day (MGD) less on Mondays than on any other day of the week.

Additionally, peak day use for 2008 was lower than expected given the hot and dry conditions. According to the LCRA, for example, the Highland Lakes received the smallest amount of inflow since the lakes were built in the 1940s.

The task force saw 2008 as an implementation year and did not set a 2008 savings goal for this measure. The ten-year savings goal from the Water Use Management Ordinance is 6.16 MGD. The savings goal for 2009 is 2.67 MGD. Preliminary analysis indicates that during the first year of the ordinance savings were in a range of 5 to 9 MGD, approaching or exceeding the 6.16 MGD (over 10 years) projected in the task force recommendations.¹

On the cautionary side, despite the drought, Austin did receive some amount of periodic rainfall last year, roughly every ten days to two weeks. Though the rains were slight and scattered, water use decreased or stopped climbing on those days, and the intermittent rains likely prevented demand from climbing higher. The toughest test will be a Texas summer with high temperatures and little to no rain. So far 2009 appears to be that type of summer – especially since extremely high temperatures for June came on top of already dry conditions resulting from the ongoing drought.

¹ An analysis was conducted by water conservation staff to determine the impact of the new watering ordinance last summer. Actual per capita usage in May – September 2008 was compared with expected usage numbers generated by using linear regression with actual 2008 temperature and precipitation acting as predictors. Four plausible explanatory factors (mandatory watering restrictions, rate increases, general economic conditions, and AWU's other conservation programs) were also analyzed. The watering savings spectrum due to the ordinance ranges from 5 – 9 MGD. This analysis was reviewed by managers in water conservation, finance, and systems planning.



Reclaimed Water Use

Of the WCTF recommendations adopted, reclaimed water projects were expected to have the second largest impact on water demand, 5.95 MGD over ten years. The largest saving among those projects, an estimated four MGD, is the reclaimed water line to the University of Texas' (UT) main campus. Key projects necessary to get reclaimed water to UT are underway. The 51st Street elevated reclaimed water tank is under construction, on schedule, and due for completion in February 2010.

In January the City Council awarded a construction contract for the 51st Street Reclaimed Transmission Main and the contractor is nearing completion on the project. The 51st Street Transmission Main is a key segment in bringing reclaimed water from the Walnut Creek Wastewater Treatment Plant to the 51st Street Tank and then to UT.

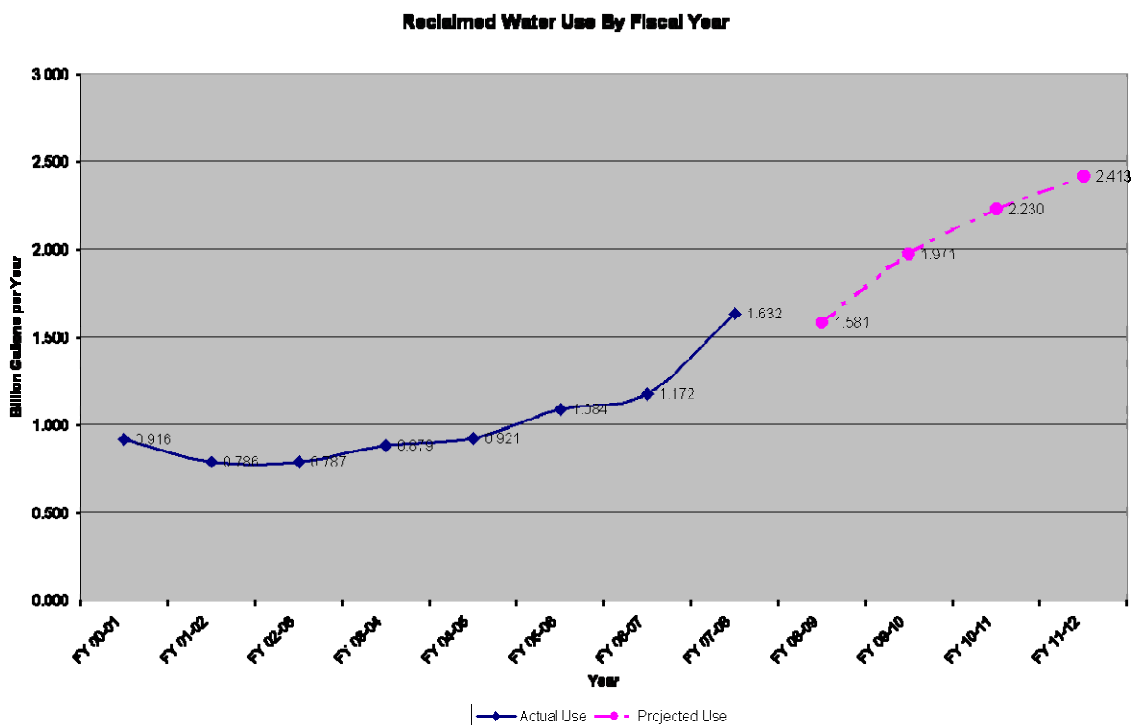
The final key link in providing service to UT is the UT Transmission Main which will run from the intersection of 51st Street and Interstate 35 to the University. (While not included in the WCTF's recommendations, extensions of this main could eventually serve the Capital complex and downtown). Design of the UT Transmission Main is complete and the project is out to bid. The UT Transmission Main will enable the City's Hancock Golf Course to convert to reclaimed water and also serve the East Avenue Development. Reclaimed water is scheduled to reach UT in January 2011. In anticipation of using reclaimed water, UT already has several thousand feet of purple reclaimed pipe in place.

The second largest reclaimed project in the WCTF recommendations is the main to Roy Guerrero Park. PARD and AWU have signed a MOU for bringing reclaimed water to the park with PARD to build the project and AWU to reimburse. The line will also help AWU serve potential industrial and multi-family customers in the Montopolis area.

The WCTF recommendations call for reclaimed service to Austin Bergstrom International Airport (ABIA). AWU and the Aviation Department have reached agreement for on-site and off-site improvements needed to provide service. AWU has hired an engineering firm who is approaching the project in two phases. Phase 1 focuses on marking/identification of the airport irrigation system, and the design and construction of backflow and cross-connection measures – fundamental measures in protecting public health and safety in reclaimed projects. These must be complete before ABIA can obtain reclaimed water service. Phase 2, also under design, will be the construction of a main to the airport and connection to the reclaimed system. ABIA already has installed several thousand feet of purple pipe and several thousand purple sprinkler heads in anticipation of connection. This project is expected to be advertised for bid in August 2009.

Due to the lead time needed to hire an engineer and then design and construct the proposed projects, the WCTF recommendations list a savings goal for the reclaimed water program starting in 2011. The reclaimed program has, however, seen increased usage during FY 2008 and thus far in FY 2009. In FY 2008, for example, reclaimed customers used 1.63 billion gallons of reclaimed water, compared to 1.17 billion gallons in the FY 2007 base year. This equates to an estimated peak day potable water system reduction of 2.5 million gallons for FY 2008.

The reclaimed water program is now coordinated from within the AWU Water Conservation Division to provide additional support and resources for the program. As indicated in the table below, reclaimed water use exceeded projections in FY 2008. Goals going forward are being adjusted upward.



Utility Water Rates

AWU has completed a Cost of Service (COS) study to evaluate changes on allocation of water rates. A fifth block residential rate, as recommended by the WCTF, is in AWU's proposed budget for FY 2010. During the COS study, which featured a Public Involvement Committee representing all rate classes, a decision was made by AWU management to delay the entire COS package, including the fifth residential block, until the FY 2010 budget. Consequently, there will not be savings from rate changes from the new fifth block until FY 2010.

Development and implementation of a new commercial rate structure and water budgeting was not included in the COS process due to current economic conditions and limitations of the current billing system. Also, commercial customers cover a broad range of uses, thus making it much more difficult to determine what constitutes high or excessive usage by individual customers. AWU plans to engage in a public input and participation process in an attempt to reach an equitable arrangement for conservation pricing for commercial customers. AWU plans to initiate a facilitated process during FY 2010.

Austin is already a national leader in conservation based residential rates as shown in the chart in the BMPs section of this report, page 21. Also, Austin's rate structure since 1995 has resulted in more of the rate burden being put on larger users; for detail on this see Appendix A.

Reducing Water Loss

AWU has implemented a number of measures to reduce water loss, including system-wide leak detection, meter accuracy testing, and efforts to improve response times to reported leaks and breaks. The Utility is also implementing annual water loss analyses to minimize the loss of treated water. AWU chose to focus on this issue earlier than called for in the WCTF recommendations and consequently achieved savings in FY 2008 that were not anticipated in the task force report.

Mandatory Toilet Retrofit

Implementation of this recommendation has been postponed due to the Council's decision on Austin Energy's retrofit at resale recommendations. Austin Energy has included checks for water efficiency in its audit process that was passed instead of the point of sale ordinance. AWU does not expect this to result in the level of savings called for in the WCTF recommendations and is consequently pursuing other methods of achieving the savings. AWU has increased its focus on toilet replacement incentives with increased marketing for the free toilet program and a pending proposal for direct-installation of efficient toilets in multifamily properties. The free toilet program was revived in 2008, and has experienced increasing popularity. AWU has also applied for federal stimulus funding for a direct install program to address toilet replacements in multifamily properties which is expected to accomplish at least 20% of the 10-year projected savings for a mandatory multifamily retrofit.

Annual Irrigation System Analyses

Mandatory irrigation audit requirements were put on hold awaiting staff restructuring and the outcome of proposed state legislation that would affect irrigation design requirements. The bill did not pass and AWU will now move forward on these requirements.

Residential & Commercial Irrigation Standards, Cooling Towers, Car Washes, Other Fixture Efficiency Requirements

Changes to the Universal Plumbing Code enacted on October 18, 2007 implemented several of the WCTF recommendations. The plumbing code now limits the water use of in-bay car washes, establishes efficiency requirements for cooling towers, reduces the flush volume of urinals and prohibits new commercial garbage disposals and medical/dental liquid-ring vacuum pumps. Efficient design requirements and mandatory water budgets for new irrigation systems were also included in the code revisions. AWU's Water Conservation Division funded two additional inspectors in WPDR's Permit Inspection Division to assist with the required inspections for new residential irrigation systems.

Enhanced Irrigation Audit Program

An additional irrigator was hired in the spring of 2008, increasing the irrigation staff from two to three employees; the number of irrigation audits conducted in the first two quarters of FY09 was more than three times the number conducted during the same months in FY08 – 318 audits from October to March FY09 compared to only 95 the year before.

Submetering

Requirements for the installation of submeters were included in local amendments to the plumbing code. However, the revisions did not include a requirement that properties use submeters for billing. Staff is currently investigating the issue to determine whether submetered properties bill customers for actual water use, and whether additional action is needed to fully implement this recommendation.

Pressure Reduction Program

The plumbing code revisions mandated a maximum pressure of 65 psi in new construction, and the Water Conservation Division now offers a \$100 incentive for existing customers to reduce high pressure.

Enhanced Public Education

The high degree of compliance with the watering schedule can be attributed, in part, to extensive television and radio marketing efforts conducted in the summer of 2008, built around a song written and performed by renowned Austin musician Ray Benson. There were also targeted direct mailings which focused first on the mandatory watering schedule and then on the revived free toilet program. AWU also began to move into newer advertising markets, specifically online advertising, and also produced materials in Spanish. Additionally, a speakers bureau was created and the Water Conservation increased its number of community events. Marketing and advertising efforts continue, as does Austin's participation in the WaterIQ regional partnership with the LCRA.

Estimated Savings from WCTF Measures

Listed in order of Peak Day Savings Amounts	Ten Year Estimated Peak Day Savings	FY 2008 Projected	FY 08 Actual
Enhanced Water Use Management	6.16	0.00	5.0 to 9.0 ^a
Reclaimed Water Use	5.95	0.00	0.00 ^b
Utility Water Rates	5.00	0.00	0.00
Reducing Water Loss	4.80	0.00	1.31
Mandatory Toilet Retrofit (Total)	2.10	0.29	0.00
Multifamily Toilet Retrofit		0.18	0.00 ^c
ICI toilet retrofit		0.11	0.00 ^c
Annual Irrigation System Analyses	1.47	0.45	0.00 ^d
Residential Irrigation Standards	1.32	0.13	0.07 ^e
Cooling Tower Management	0.95	0.00	0.00 ^e
Plumbing Code Changes	0.94	0.00	0.00 ^e
Commercial Irrigation Standards	0.74	0.07	0.00 ^e
Enhanced Irrigation Audit Program	0.63	0.21	0.04 ^f
Tenant Water Metering and Billing	0.40	0.00	0.00 ^e
Residential Landscape Ordinance	0.44	Program scheduled for initiation in FY 2010	
Commercial Clothes Washers	0.43	Program scheduled for initiation in FY 2010	
City Facility Conservation	0.37	0.00	0.00
Winter Leak Detection Program	0.31	Program scheduled for initiation in FY 2011	
Pressure Reduction Program	0.29	0.03	0.001 ^g
WaterWise Landscape Option	0.21	Program scheduled for initiation in FY 2010	
Car Washes	0.15	0.00	0.00 ^e
Enhanced Public Education	n/a	Drives participation in other programs with associated savings	
TOTALS (MGD)	32.65	1.18	6.421 to 10.421

a Based on a preliminary analysis of reduction from expected demand and factors affecting water use; additional data is essential to predicting overall impact and future trends.

b Projects cited by WCTF not built yet, but reclaimed peak day water use increased by approximately 2.5 MGD from FY07 to FY08.

c Postponed due to the Council's decision not to pursue a point of sale energy audit. Proposals for an alternative approach are in development. The Utility has increased focus on toilet replacement incentives with increased marketing for the free toilet program and a pending proposal for the direct-installation of efficient toilets in multifamily properties.

d Mandatory irrigation audit requirements have been put on hold. The outcome of this year's legislative session may affect irrigation design requirements.

e Enacted January 1, 2008 as part of plumbing code changes, some lag expected in savings due to construction.

f New irrigators started April 08. Increase of 37,000 gpd savings over previous two years.

g Savings from PRV rebate program, which began May 08. Savings from change in plumbing code requiring PRVs on homes with pressure greater than 65 psi not realized yet due to lag between permitting and construction.

Current Programs and Accomplishments

Education and Incentive Programs

AWU's water conservation program began in 1983 with emergency demand management measures, and the program has been steadily expanding since that time. The program addresses a comprehensive array of water users (single-family residential, multi-family residential, industrial, commercial, institutional, municipal, utility) and water uses (indoor, outdoor, leakage). Current programs include:

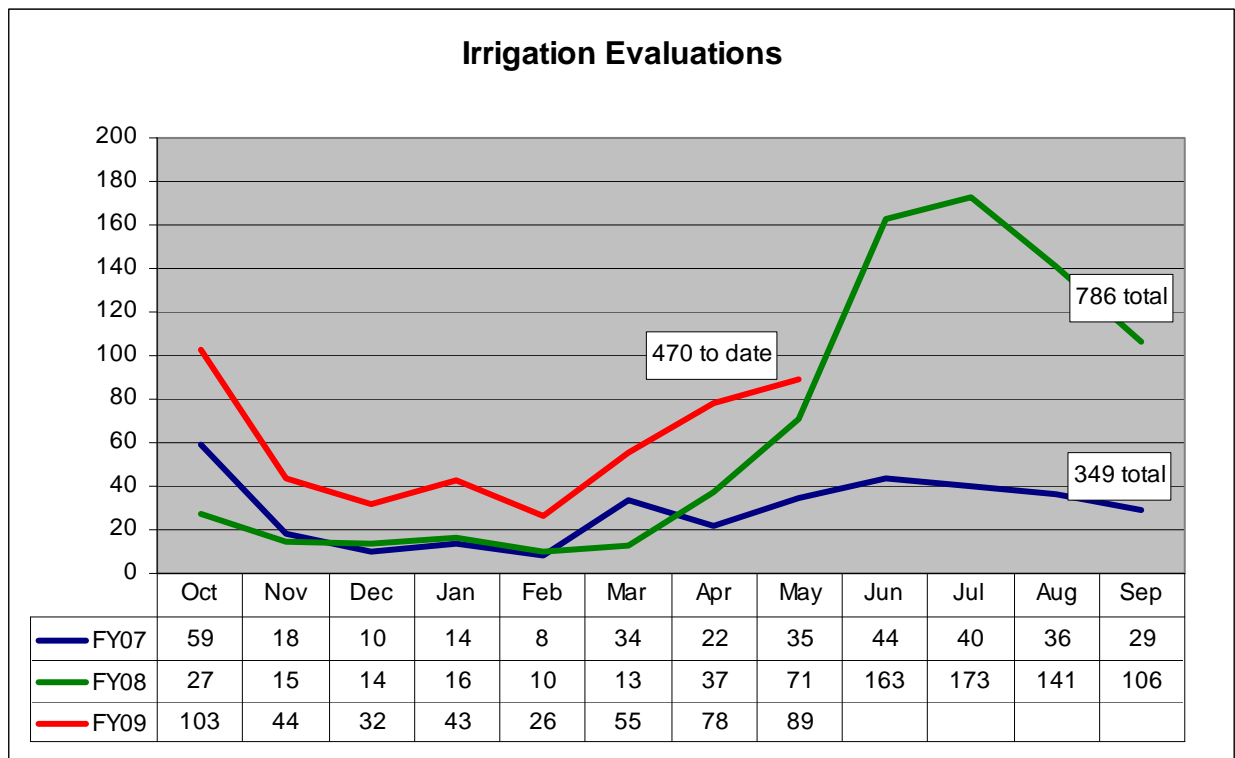
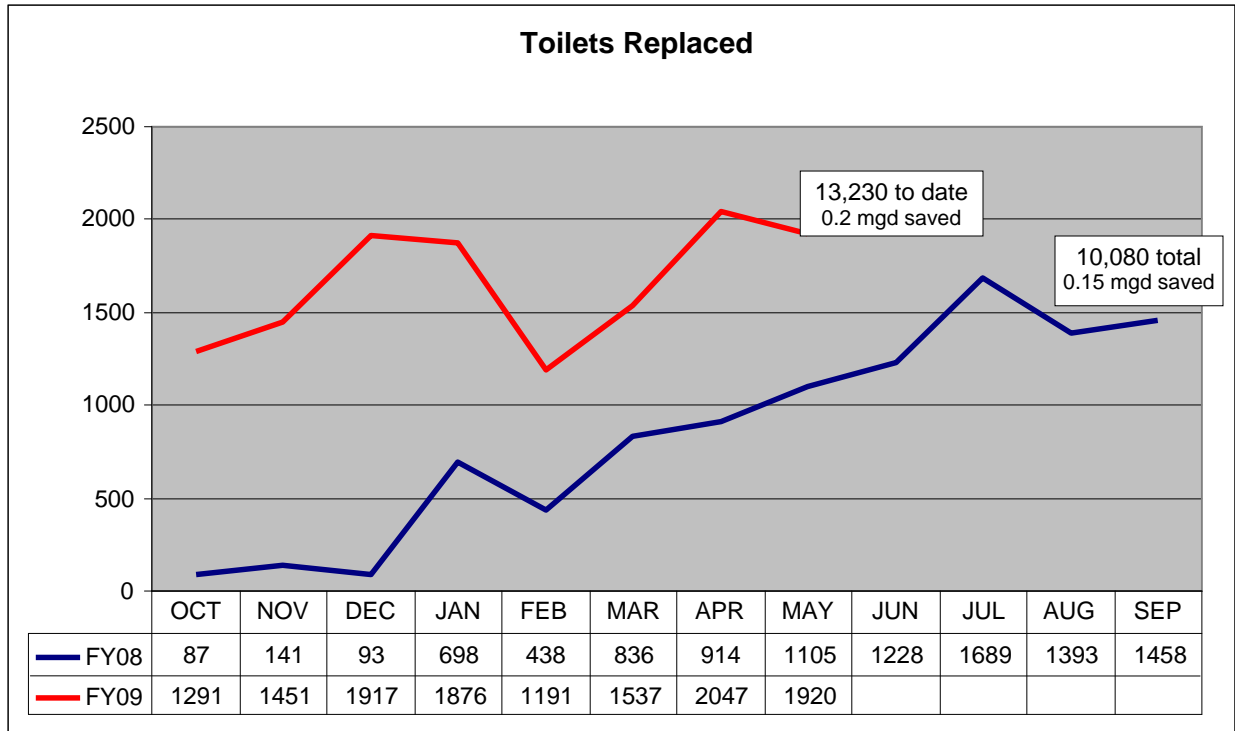
- Water waste investigation
- Toilet replacement programs (free and rebate)
- Clothes washer rebates
- Free irrigation audits and rebates for needed repairs
- Rainwater harvesting rebates
- Pressure reduction valve (PRV) rebates
- Rebates for reducing water in commercial processes
- Adult and elementary education and outreach programs

AWU management has taken several steps over the past 18 months to improve the efficiency and productivity of the Water Conservation Division. Organizational changes in the Water Conservation Division have led to significant and measurable improvements such as faster processing times for rebates, three times as many irrigation audits conducted, and a fourfold increase in participation for toilet replacement programs.

In 2008, AWU partnered with Austin 3-1-1 to give customers a 24-hour venue to report water waste complaints. Reports of water waste increased dramatically, and the 3-1-1 system provides improved tracking and transparency in the enforcement process.

Water Conservation staff now work closely with LCRA on conservation. For example LCRA's voluntary watering days are now the same as Austin's mandatory schedule, making for better coordination regionally on water conservation. AWU partners with LCRA on the Water IQ program, a joint effort to promote conservation throughout the region. And, AWU worked closely with LCRA on the City's drought contingency plan which for the first time features triggers for water conservation stages which are tied to lake levels, in addition to the already existing demand based triggers.

The following graphs illustrate the marked increase in productivity and participation.



Water Loss Reduction Efforts

Though required to do so only once every five years by TWDB, AWU is conducting annual water loss estimates to reduce unaccounted-for water. The Utility is improving response times to repair leaks faster, and conducting proactive leak detection to identify and repair subsurface leaks. AWU is also undertaking efforts to measure and improve meter accuracy and prevent water theft, and will continue to use the annual loss estimates to identify opportunities to reduce lost water and prioritize capital improvements.

Expanding Conservation

Current Plans

AWU is planning to implement several new conservation efforts in addition to those recommended through the WCTF. AWU Water Conservation has shifted from a focus primarily on large irrigators, who data show tend to be concentrated in more affluent areas. There has been an effort to expand the focus to include much broader segments of the community which is reflected below.

Multifamily Direct-Install Program

This initiative will remove barriers to toilet replacement for a market segment with historically low participation in AWU programs by providing high-quality, high-efficiency toilets and qualified installation at no cost to multifamily properties. Bids for this program have been solicited and reviewed, with the award recommendation expected before Council in July or August 2009. AWU also submitted an application for grant funding under the American Recovery and Reinvestment Act (ARRA) for this program. If awarded, the grant could double the scope of the program.

HELP (Home Efficiency Leak repair Program)

Modeled on Austin Energy's free weatherization program and SAWS' Plumbers to People initiative, HELP will provide free water-saving plumbing repairs for low-income AWU customers in single-family homes and duplexes. The program will reduce utility bills for low-income residents and prevent unnecessary water loss. No responsive bids were received for the initial solicitation; AWU is currently revising the scope to make the program more understandable and attractive to potential contractors.

Online water audit tool

AWU is preparing a scope of work for an online water audit tool that will help customers analyze their water use, identify conservation opportunities and take action to save water, energy and money. The information collected will allow AWU to focus water conservation programs to more precisely meet customer needs.

Industry-Specific Conservation Programs

AWU intends to create conservation programs and outreach efforts for specific industry sectors similar to the successful efforts at SAWS. AWU will begin with programs to

improve efficiency in non-profits, and continue to other sectors, including hospitals, hotels and schools.

Enhanced Water Theft Prevention

Water Conservation is sharing staff and marketing resources with AWU's Consumer Services Division to evaluate the prevalence of and prevent water theft.

Areas for Exploration

Pressure Reduction

Some communities have been successful in dramatically reducing water loss by monitoring and manipulating system-wide pressure. This technique requires the creation of district metering areas (DMAs) that essentially submeter neighborhoods. Pressure within those DMAs can be reduced when water needs are lowest, reducing background water loss. Additional study is needed to determine if this technology is feasible for Austin.

Graywater Reuse

The three primary sources of graywater allowed by the state are shower/bath, laundry and lavatory sink. Graywater reuse would depend on the choices of individual homeowners and would also require plumbing changes by homeowners. A staff report for management review is forthcoming.

Automatic Meter Reading

AWU is exploring Automatic Meter Reading (AMR) technology. AMR technologies could give AWU additional tools to capture real time data on water use and present this information to customers in new ways to give them more timely information on water use patterns.

Austin in Comparison

Challenges in Comparing Cities

Comparisons between programs are complicated by the variety of factors that influence the selection and success of water conservation strategies. Climates and water costs vary dramatically, so a program that works well in one area of the country may be ineffective in another. Additionally, weather varies by region from year to year; one city or region may have a wet year or series of wet years while another region goes through a dry spell.

In addition to differing climates and varying weather patterns, there are other important variables among utilities, such as widely different customer bases – meaning differing levels of commercial, industrial, multi-family, and single family in a utility’s customer base, resulting in vastly different mixes of water use demand.

There is no comprehensive, national benchmarking tool for water conservation. Both the American Water Works Association and Alliance for Water Efficiency are aware of the need for such a tool, but acknowledge the lack of resources to develop such a report. Most comparisons are anecdotal and often outdated. Information on conservation programs is generally limited to what can be found on websites, self-published annual reports, and periodic reports to state agencies. AWU is working to gather data on various cities to produce a comprehensive report by the end of 2009.

A 2006 report by Alan Plummer and Associates, commissioned by AWU, compared AWU’s water conservation and reclamation programs with those of the San Antonio Water System (SAWS), El Paso Water Utilities (EPWU) and Dallas Water Utilities (DWU). The report found that “[b]ased on the number and types of programs, AWU and SAWS have comprehensive programs that address most types of water users and water uses. EPWU has fewer programs and targets a more limited range of water users and water uses. DWU’s current programs are broad measures such as conservation-oriented water rates, a water waste ordinance, and a Public Awareness Campaign. DWU is in the process of implementing additional water conservation programs that will target certain types of water users and water uses.”

Among the preliminary findings of research on other cities is that, not surprisingly, some of the American cities which are the most aggressive and successful in water conservation tend to be in the desert or dry lands of the western United States. These are also cities that citizens frequently mention at Council and board and commission meetings as having strong programs. They include: Albuquerque; Tucson; and the Southern Nevada Water Authority (SNWA) which serves Las Vegas; while AWU research shows Santa Fe to be a successful program. Another city frequently invoked as a water conservation leader is San Antonio.

A staff comparison for several cities shows that Austin has a relatively comprehensive package of programs:

Utility	Austin Water Utility	SAWS	El Paso Water Utility	Dallas Water	SNWA	Albuquerque	City of Santa Fe	City of Tampa	EBMUD
Toilets -- Rebates	✓	✗	✗	✓	✓	✓	✗	⊖	✓
Toilets -- Free Distribution	✓	✓	✗	✓	✗	✗	✓	✗	✗
Toilets -- Direct Installation	✗	✓	✗	✗	✗	✗	✓	✗	✗
Plumbing Repair Assistance	①	✓	✗	✓	✗	✗	✗	□	✗
Clothes Washer Rebates	✓	✓	⊖	✗	✗	✓	✓	□	✓
Showerhead -- Free Distribution	⊖	✓	✗	✗	✗	✗	✗	✓	✓
Faucet Aerators -- Free Distribution	⊖	✓	✗	✗	✓	✗	✗	✓	✓
Irrigation Audits	✓	✓	✗	✓	✗	✓	✗	?	✓
Irrigation Upgrade Rebates	✓	✗	✗	✗	✗	✗	✗	?	✓
Irrigation -- Free Rain Sensor	⊖	✗	✗	✗	✓	✓	✗	✓	✗
Irrigation -- Smart Controller Rebates	✓	✗	✗	✗	✓	✓	✗	?	✓
Landscape Conversion Rebates	⊖	✓	✗	✗	✓	✓	✗	?	✓
Landscape Design Restrictions	✓	✓	✗	?	✓	✗	✓	?	?
Hot Water on Demand Rebates	⊖	✓	✗	✗	✗	✓	✓	?	✗
Whole House Audits	✗	✓	✗	✗	✗	✗	✗	?	✓
Rainwater Harvesting Incentives	✓	✗	✗	✗	✗	✓	⊖	✓	✗
Watering Restrictions	✓	✓	✓	✓	✓	✓	✓	✓	✓
Water Waste Regulations	✓	✓	✓	✓	✓	✓	✓	?	✗
Commercial Facility Audits	✓	✓	✗	✗	✗	✗	✗	✓	✓
Commercial Process / Large Scale Rebates	✓	✓	✗	✗	✗	✗	✗	✗	✓
Air-Cooled Ice Machine	✗	✓	✗	✗	✓	✗	✓	?	✓
Commercial Dishwasher	✗	✗	✗	✗	✗	✗	✓	?	✓
Pre-Rinse Spray Nozzle	⊖	✓	✗	✗	✗	✗	✓	?	✓
Garbage Grinder rebate	⊖	✗	✗	✗	✗	✗	✗	?	✓
Medical/Dental Dry Vacuum Rebate	⊖	✗	✗	✗	✗	✗	✗	?	✓
Restaurant water-serving restrictions	✓	✓	✓	?	✓	✗	✓	?	✗
Signage Requirements	✗	✗	✗	✗	✗	✗	✓	?	✗
Hotel/Motel Restrictions	✗	✓	✓	✗	✓	✗	✓	?	✗
Conservation Rate Structure	✓	✓	✓	✓	✓	✗	✗	✓	✓
Neighborhood Saving Challenges	✗	✓	✗	✗	✗	✗	✗	?	✗
Golf Course Program	✗	✓	✗	✗	✓	✗	✗	?	✗
Reclaimed Water Program	✓	✓	✓	?	✓	?	✗	✓	✓
Elementary Education	✓	✓	✓	✓	✓	✓	✓	?	✓
Secondary Education	✗	✓	✓	✗	✓	✓	✓	?	✓
Adult Education	✓	✓	✓	✓	✓	✓	✓	?	✓

in planning ①
 discontinued ⊖
 program in place ✓
 no program in place ✗
 no information ?

All the cities mentioned here appear to meet the description of comprehensive programs that the Plummer study uses to describe Austin and San Antonio. All have clothes washer rebates like Austin except SNWA. Austin, San Antonio and Santa Fe have free toilet programs. San Antonio and Santa Fe have direct install programs, an approach AWU is adopting – and has applied for stimulus funding on as well. San Antonio is the only utility that offers plumbing repair assistance to low income customers, a program AWU is also developing. All except Santa Fe have reclaimed water programs.

Most cities with water conservation programs also have some sort of restrictions on irrigation. These ordinances vary as to whether they are mandatory or voluntary and as to whether they address hours and number of days of watering or are limited to just hours. Austin's two day per week mandatory restrictions, with mandatory time of day restrictions as well, could be called moderately restrictive or arguably more restrictive than most.

San Antonio, due to low aquifer levels, is now in Stage 2 restrictions, meaning watering is only allowed one day per week and then only between 3-8 am and 8-10 pm. Stage 1 limits watering to one day per week, but allows it anytime between 8 pm and 10 am. When the aquifer is at normal levels San Antonio allows watering on any day of the week, but prohibits watering between 10 am and 8 pm.

SNWA/Las Vegas and surrounding communities allow one watering day per week in winter, three in spring and fall and "any day" in the summer. Albuquerque has time of day restrictions from April 1 to October 31, 11 am to 7 pm, but no set watering days. Santa Fe limits watering hours, but not the number of days. El Paso allows watering three proscribed days per week.

Tucson has a recommended schedule of two days per week, like Austin's, but unlike Austin it is not mandatory. Tucson does have an emergency ordinance which allows the City to ban all outdoor watering during supply crises.

Landscaping

One area where several desert cities are doing more than Austin is landscaping, particularly reducing or eliminating the use of turf grass and encouraging the use of native and drought-tolerant plants. Some cities limit how much turf grass can be installed as a lawn. Both Santa Fe and Las Vegas have these limits, and Las Vegas also pays residents to remove existing turf grass. Here, as well, Austin's situation is different than that of other cities.

The Las Vegas/SNWA landscape conversion program is one good example of how conditions vary from utility to utility and region to region. SNWA offers customers \$1 per square foot for converting turfgrass to native landscape. However, SNWA pays a much higher cost for water: the 55.8 gallons/ft² saved by a xeriscape conversion would normally cost SNWA \$1.63/ft². Based on a 2005 staff analysis, the same amount of water

would cost Austin Water Utility less than \$0.15. The incentive is even less beneficial in Austin since, due to rainfall and watering habits, Austin homeowners use roughly 40% of the water on their lawns that SNWA customers use, dramatically reducing the potential water savings from landscape use.

In Austin, a water conservation landscape reduction program was discontinued in early 2007 after poor participation and limited water savings. The Watershed Protection Department currently runs the Grow Green Program which encourages native and drought tolerant landscaping and Water Conservation works with Grow Green.

A landscape based water conservation program would be unlikely to bring major savings, especially in the short and medium term, but landscape programs can have additional benefits. Native landscapes, since they are natural to the region, should require fewer, if any, chemicals and/or fertilizer. This can mean less pollution in area streams. And, native landscapes help preserve and enhance the natural beauty of Texas.

Gallons per capita per day (GPCD)

Gallons per capita per day (GPCD) is sometimes used as a means of comparing water consumption in different cities. While GPCD is a good measure for internal year-to-year comparisons within one utility, there is no standard accepted methodology for calculating GPCD. There is no central clearinghouse for annual GPCD reporting, and even in the 5-year conservation plans filed with the Texas Water Development Board (TWDB) utilities do not report how they calculated the reported GPCD.

The Texas Water Conservation Advisory Council (TWCAC) formed by the Legislature under the jurisdiction of TWDB has a working group to make recommendations for standardizing GPCD reporting, including reporting in more detailed categories like residential GPCD or agricultural GPCD. However, detailed reporting can be complicated for cities that may not have different rate classes or billing systems that differentiate by customer type. Some cities even report GPCD by dividing total system pumpage by population, which factors in lost water and water required for routine maintenance. That GPCD figure could not be fairly compared to the GPCD reported by a city that uses only water billed to residential customers in its GPCD calculation. Population estimates provide an additional opportunity for variance; some cities calculate population by assuming 2.5 residents per meter while others attempt to determine population using census data for their service area boundaries.

In its December 2008 report to the 81st Texas Legislature, the TWCAC concluded that: “The tendency of the media or individuals to use gallons per capita per day as a way to compare conservation efforts of communities is also problematic when the metric is not uniformly defined. Therefore, the [Water Conservation Advisory] Council has determined that it should be a priority to develop standard methodologies for water use metrics and water conservation metrics and definitions.” The WCAC plans to have a recommendation ready during 2009.

Texas Water Development Board Best Management Practices

The following section examines how AWU's water conservation strategies reflect the Best Management Practices (BMPs) recommended by Report 362 of the Texas Water Development Board. It should be noted that these BMPs were developed with assistance of conservation staff when the BMPs were released in 2004.

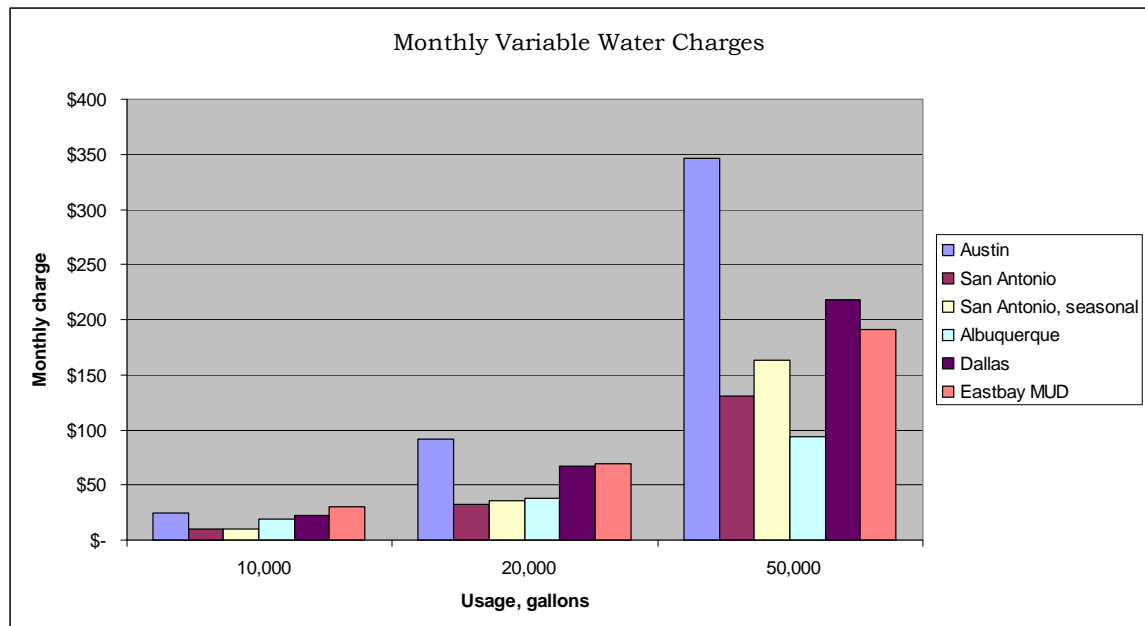
BMPs for Municipal Water Users

2.1 System Water Audit and Water Loss

AWU implemented this measure following the audit recommendations. The Utility scored in the highest performance range on the recent FY07 water loss analysis. Although the Texas Water Development Board requires reporting only once every 5 years, AWU is committed to producing annual water loss reports with an emphasis on improving data quality and recommending cost-effective ways to reduce lost water.

2.2 Water Conservation Pricing

AWU's current inclined block rate structure has been in place since FY 2001-02. Austin is a national leader in conservation pricing. The figure below shows monthly variable water charges at three levels of monthly consumption in Austin versus selected utilities across the U.S.



2.3 Watering Restrictions and Prohibition of Wasting Water

Austin enacted its first water use management ordinance in 1983, permitting watering restrictions in response to supply constraints. Austin enacted a permanent water waste prohibition in 2001, making it a Class C misdemeanor to

waste water through poorly designed irrigation systems or by failing to repair leaks. In 2007, Austin revised its ordinance to institute mandatory watering restrictions, allowing watering only twice per week for commercial customers at any time during the year, and to limit residential watering to two days per week during the summer months. The ordinance also restricts daytime watering, and contains additional restrictions triggered by supply and demand conditions.

2.4 Showerhead, Aerator, and Toilet Flapper Retrofit

In 1985, the Water Conservation Division teamed with the electric utility's Residential Energy Efficiency audit program to install low-flow showerheads. The program resulted in the distribution of 37,903 low-flow showerheads between 1984 and 1990. Between 1986 and 1990, the Water Conservation Division expanded the retrofit effort to residential customers offering door-to-door installation of low-flow showerheads and faucet aerators. After the implementation of the Free Toilet Program in 1993, showerheads were distributed to all free toilet participants, and aerators were available upon request. However, since installation of and savings from the devices could not be verified, AWU stopped distributing showerheads and aerators in 2008.

2.5 Residential Toilet Replacement Programs

Since FY92-93, Austin has helped replace over 130,000 toilets through a combination of free toilet distributions and toilet rebates. The BMP recommends that toilet programs continue until 50% of eligible toilets have been replaced with efficient models; Austin is nearing that mark based on the estimated number of inefficient toilets in 1991. The BMP also indicates that "free ridership" is an issue with toilet rebate programs. While AWU toilet programs have been successful, further evaluation is needed to determine cost-effectiveness, rates of free-ridership, and possible diminishing returns.

2.6 Residential Clothes Washer Incentive Program

AWU has issued rebates for over 28,000 clothes washers since 1992. Participation has increased over the years, with 2,490 rebates during the current fiscal year alone. This popular program conforms to TWDB guidelines; however, additional cost-efficiency analyses are needed. BMP guidelines warn against free ridership, yet surveys indicate that the majority of AWU's rebate recipients (around 60%) would have bought a high efficiency washer anyway. The marginal impact of the program has also not been reevaluated following the higher federal efficiency standards that took effect in 2007 and the incorporation of a water factor into EnergyStar labeling for clothes washers.

2.7 School Education

For over 14 years, AWU operated an award-winning education program ("Dowser Dan") targeting 1st through 4th graders, complimented by curriculum-based programs for 5th and 6th grades ('Water in Our World' and 'Down the Drain'). In 2008, AWU altered its educational programming to more closely match the BMP, focusing resources on more cost-effective curriculum-based

programs and hiring one FTE, a former teacher, dedicated to community educational programs and the development of a curriculum for secondary grades.

2.8 Water Survey for Single-Family and Multi-Family Customers

AWU is preparing a scope of work for an online water audit tool that will help customers analyze their water use, identify conservation opportunities and take action to save water, energy and money. The information collected will allow AWU to focus conservation programs to more precisely meet customer needs.

2.9 Landscape Irrigation Conservation and Incentives

Three licensed irrigators conduct irrigation audits for residential and commercial customers, resulting in substantial water savings. So far this year 468 residential and 63 commercial audits were conducted, for a total of more than 7,700 audits over the life of the program.

2.10 Water Wise Landscape Design and Conversion Programs

Austin has used several programs to encourage native landscapes, beginning with the “Xeriscape It” education program launched in 1984. By 1994, it was evident that outreach efforts were not very successful, with most residential and commercial landscapes comprised of thirsty turfgrass. In response, two new initiatives were introduced: a residential rebate program for installing water-wise landscapes and an ordinance requiring native or adapted plants in all new commercial landscapes and establishing standards for commercial irrigation systems.

Both of these initiatives met with mixed success. The landscape conversion rebate had minimal participation (on average, only 50 customers per year) and attracted customers with already-low water use. In 2004, the program was modified to limit participation to customers with above average water use, and make rebates contingent on measured water savings. Interest in the program dropped off completely following this change, and the program ended in 2006.

The commercial landscape ordinance was a compromise, as it was based on an existing ordinance intended to promote beautification. The revised ordinance retained most of these beautification elements, even though they sometimes conflicted with water-wise management practices. For example, the ordinance required irrigation systems for all landscapes whether or not the plants needed irrigation, and required raised islands for landscape areas in parking lots although ground-level plants could have taken advantage of water draining from the pavement. The WCTF recommended additional changes to the commercial landscape requirements that have not yet been implemented.

2.11 Athletic Field Conservation

AWU does not have a specific program to address conservation on athletic fields; however, athletic fields are subject to the twice-weekly watering schedule all year unless a variance has been approved.

2.12 Golf Course Conservation

Several area golf courses receive reclaimed water from AWU, reducing potable demand. As noted earlier in this report, the UT reclaimed transmission line will bring reclaimed water to the City's Hancock Golf Course.

2.13 Metering of All New Connections and Retrofit of Existing Connections

Austin currently meters all customer connections.

2.14 Wholesale Agency Assistance Programs

AWU requires its wholesale customers to implement conservation measures, and allows customers of wholesale districts supplied by Austin to participate in AWU conservation incentives. AWU eagerly shares information with and provides assistance to its wholesale customers who are interested in implementing new conservation programs.

2.15 Conservation Coordinator

AWU has 20 full-time staff dedicated to conservation programs.

2.16 Water Reuse

As suggested by TWDB, AWU has an extensive water reclamation and reuse program focusing on industrial and commercial customers. Additional resources were allocated to the program in 2009 through a Utility reorganization, and development continues on several pipeline and storage projects to expand reclaimed water capacity, though efforts remain focused on commercial and industrial customers.

2.17 Public Information

As suggested by TWDB, AWU educates the public on the importance and practices of water conservation through TV, radio, and print advertising, a well-designed Web site, press releases and other public outreach efforts. AWU partners with LCRA and Cedar Park to promote the TWDB-developed Water IQ campaign.

2.18 Rainwater Harvesting and Condensate Reuse

AWU provides rainwater harvesting rebates on large capacity systems. An expert on rainwater harvesting speaks to community groups as part of the water conservation speakers bureau. AWU distributed over 13,000 rainbarrels over five years before ending the program due to a poor cost-benefit ratio, the increased availability of rain barrels at retail outlets, and an out of proportion carbon impact

caused both in production of the barrels and by delivery and transport of the rain barrels.

2.19 New Construction Graywater

Currently staff is reviewing programs in other cities. The potential savings from graywater reuse is unknown. Preliminary research indicates that savings would not be of a large magnitude, at least not in early years. A report is forthcoming for management review.

2.20 Park Conservation

Several of Austin's most visible parks, including Zilker Park, use raw water from Lady Bird Lake to irrigate, reducing potable water demand. AWU has also helped convert wading pools into water-efficient playscapes and partially funded improved irrigation systems for park facilities.

2.21 Conservation Programs for Industrial, Commercial, and Institutional Accounts

The majority of Austin's residential conservation programs are also available to institutional, industrial and commercial customers, including toilet retrofit incentives and free irrigation audits. AWU has offered rebates for specific equipment upgrades such as dental vacuum pumps, although those rebates have been discontinued due to lack of participation.

2.22 Cost- Effectiveness Analysis for Municipal Water Users

Though cost-benefit analyses were likely performed for most conservation programs the original research was not well documented, and AWU cannot determine whether cost and savings assumptions are still valid. AWU has recently hired a research analyst with a background in statistics and finance to help complete savings analyses and cost-benefit calculations for all conservation programs.

Industry-specific BMPs

TWDB recommends BMPs specific to commercial and agricultural water users. Austin does not have an agricultural rate, and so cannot identify which customers may be using water for agricultural needs. Most of AWU's conservation programs are open to commercial users (including toilet replacement programs and free irrigation audits), and commercial customers may apply for up to \$100,000 per project to install water-saving equipment or to complete reuse projects for water from manufacturing or cooling processes.

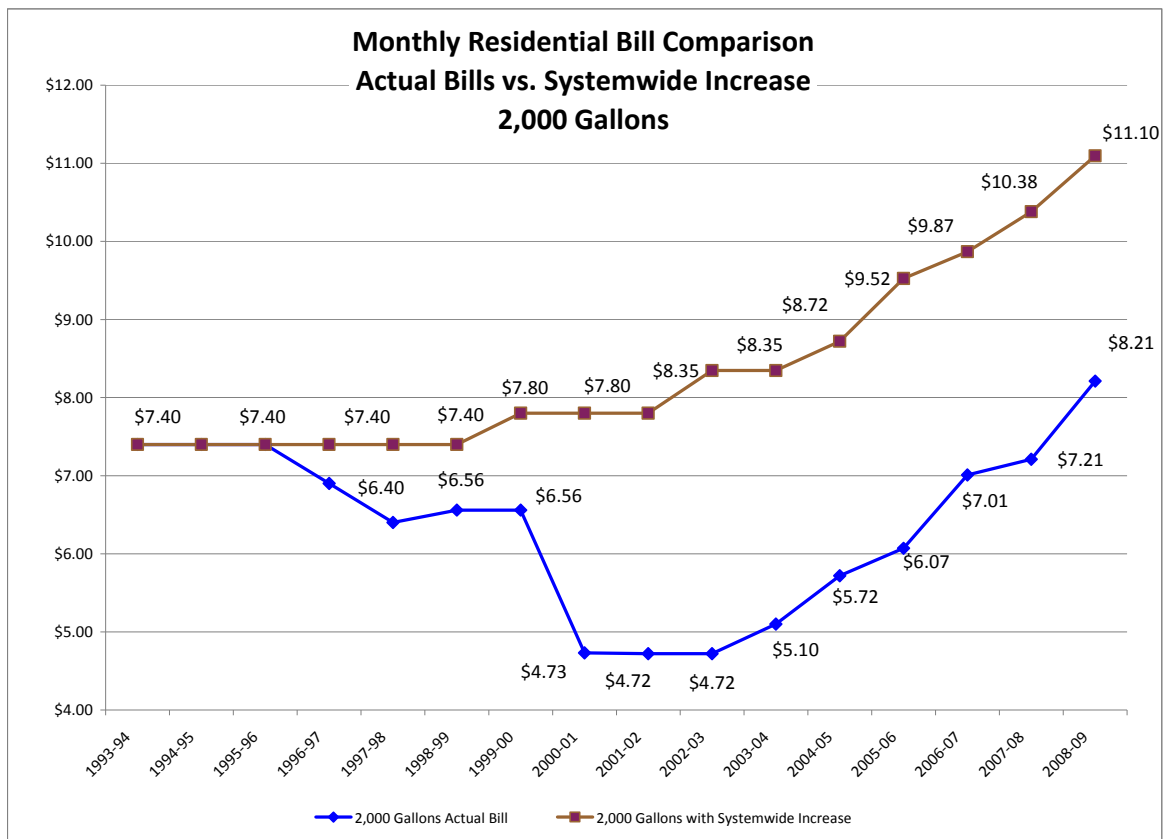
Appendix A

Conservation Incentive – Residential Water Rate Structure

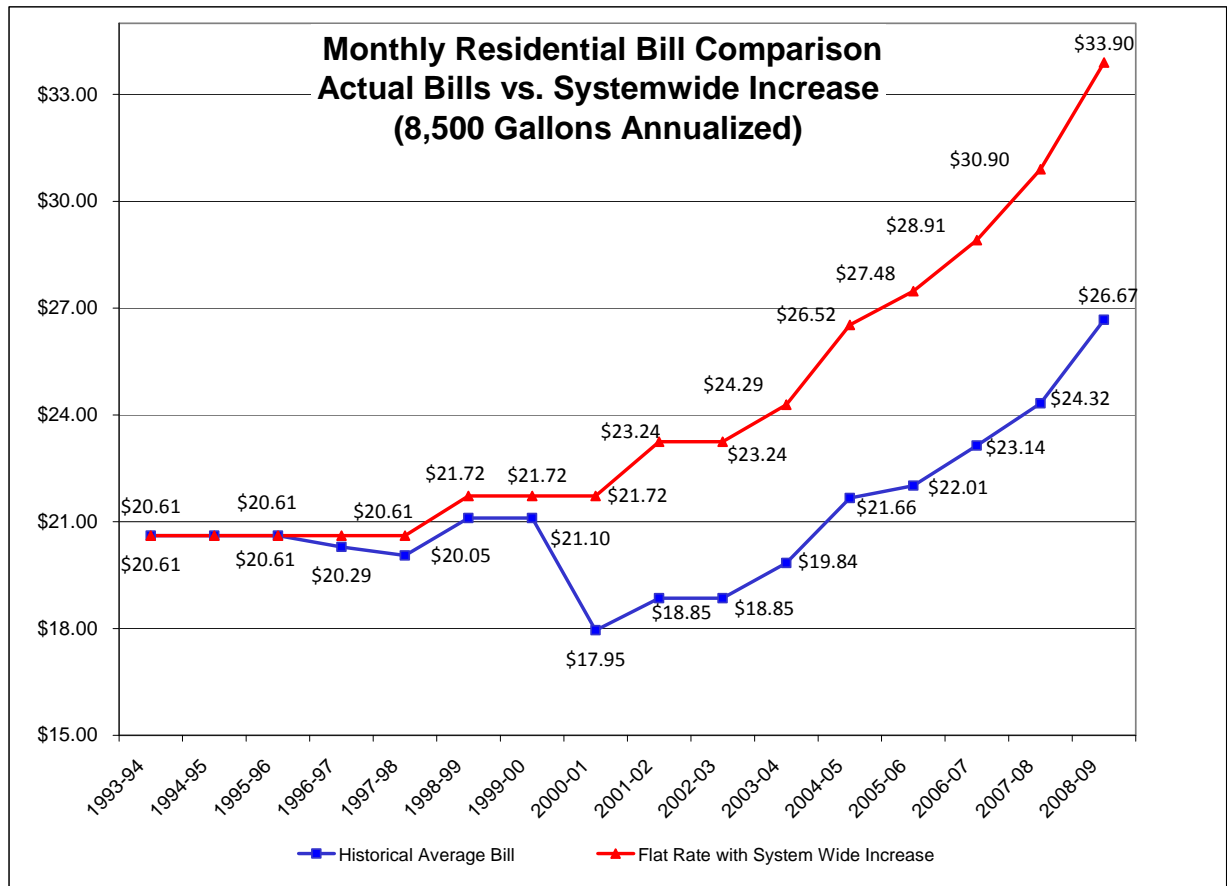
Prior to April 1994, the Austin Water Utility had uniform rates for its residential customers. The cost of all water consumed was the same price per 1,000 gallons, whether a customer used 8,000 gallons a month or 100,000 gallons a month. In April 1994, the AWU implemented its first inclining rate blocks for residential water rates. This rate structure provides for a higher cost of water as a customer uses more water. This change was intended to provide significant price incentives for customers to conserve water. Over the years, AWU has successfully implemented multiple adjustments to its inclining block residential rate structure that has further enhanced our water conservation incentives.

While an inclining rate structure provides an incentive for high water users to conserve, it also provides a mechanism to reduce the bills for customers that are at or below the average water users. AWU has consistently structured rates to provide a significant incentive to high water users to conserve water while benefiting low water users with lower than average water bill increases.

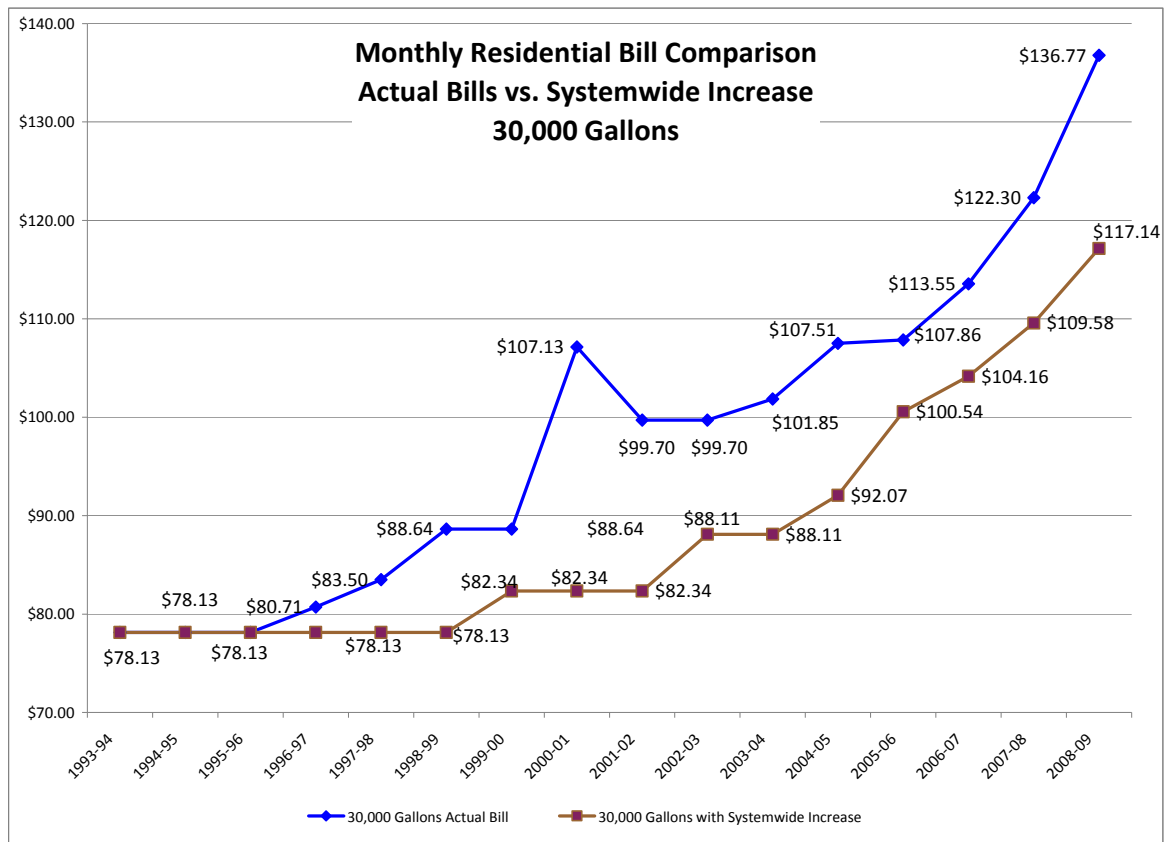
The following graphs illustrate AWU's history of residential water bills at varying water consumption levels.



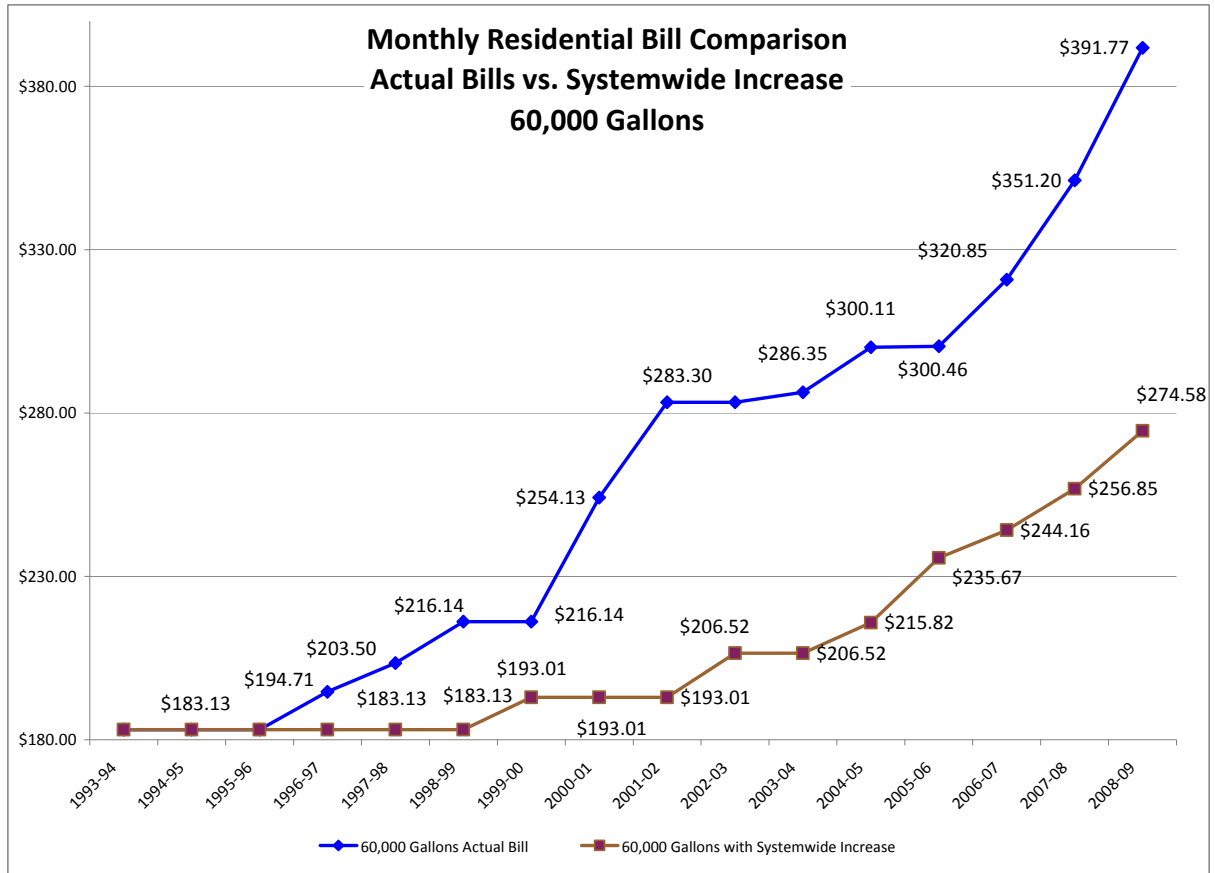
The above graph shows a comparison of historical monthly residential bills for a customer that uses 2,000 gallons per month. Based on actual rates from 1993 to the present, the blue line illustrates actual monthly bills at 2,000 gallons. The red line illustrates what the monthly bills would have been for 2,000 gallons if AWU had increased the residential block rates at the system-wide rate increase levels. Since the actual bills are lower than what would have been at the system-wide levels, this shows that AWU has used the inclining block rate structure to benefit the lower water consumption customers.



The above graph shows a comparison of historical monthly residential bills for AWU average residential customer that uses an average of 8,500 gallons per month. This graph annualizes 12 months of consumption in which some months are lower, while other months during the summer are higher. Based on actual rates from 1993 to present, the blue line illustrates actual monthly bills at the annualized 8,500 gallons per month. The red line illustrates what the monthly bills would have been for this same consumption pattern if AWU had increased the residential block rates at the system-wide rate increase levels. Since the actual bills are lower than what would have been at the system-wide levels, this shows that AWU has used the inclining block rate structure to benefit the average water consumption customers.



When the same graphic analysis is used for the higher water users, the results are much different. The above graph shows a comparison of historical monthly residential bills for a customer that uses 30,000 gallons per month. Based on actual rates from 1993 to present, the blue line illustrates actual monthly bills at 30,000 gallons. The red line illustrates what the monthly bills would have been for 30,000 gallons if AWU had increased the residential block rates at the system-wide rate increase levels. Since the actual bills are much higher than what would have been at the system-wide levels, this shows that the AWU has used the inclining block rate structure to provide a water conservation incentive for higher water consumption customers. AWU has set its inclining block rates over the years so as to increase rates at higher than the system-wide rates for the higher water use blocks above 15,000 gallons. The resulting higher bills for high water use customers provides the financial incentive to conserve water.



As the volume of use grows, the financial incentive for high water users to use less is even greater. When you complete the same graphic comparison for even higher water users, the financial incentive for the high water users is even greater. The above graph shows a comparison of historical monthly residential bills for a customer that uses 60,000 gallons per month. Based on actual rates from 1993 to present, the blue line illustrates actual monthly bills at 60,000 gallons. The red line illustrates what the monthly bills would have been for 60,000 gallons if the AWU had increased the residential block rates at the system-wide rate increase levels. Since the actual bills are much higher than what would have been at the system-wide levels, this shows that AWU has used the inclining block rate structure to provide a water conservation incentive for higher water consumption customers. AWU has set its inclining block rates over the years so as to increase rates at higher than the system-wide rates for the higher water use blocks above 15,000 gallons. The resulting higher bills for high water use customers provides the financial incentive to conserve water.

With this analysis, AWU could also estimate the water conservation impacts of the rate structure changes over the years based on price elasticities. The total estimated gallons of conserved water and estimated peak day demand reductions could be calculated. This analysis is currently ongoing.