



# 2019 5 YEAR WATER CONSERVATION PLAN





**Dear Reader:**

Thank you for taking an interest in water conservation in San Antonio. We created the SAWS Five-Year Conservation Plan to describe how we plan to reach our per capita reductions. The plan is a companion to our long-term SAWS 2017 Water Management Plan, which can be found at [saws.org](https://saws.org).

This document provides a comprehensive look at our water use patterns, conservation targets and strategies associated with water conservation in San Antonio. The plan also meets requirements put forth by the Texas Commission on Environmental Quality (TCEQ) and the Texas Water Development Board (TWDB).

The process of putting together this document provides an opportunity to highlight the targets our community has already set and to discuss the investments being made to meet them. We could not include every program currently in place nor all of the programs that may be implemented in the next five years. Instead, we used the report to highlight our key program initiatives, indicate what is next for these strategies and discuss how we evaluate programs and track success over time.

We hope this plan will stimulate discussion among stakeholders, customers and other interested parties. For more information on current SAWS Conservation activities, please visit us at [saws.org/conservation](https://saws.org/conservation) and [GardenStyleSA.com](https://GardenStyleSA.com). We can also be reached by calling **(210) 704-SAVE**.



Karen Guz  
Conservation Director  
San Antonio Water System

Conservation staff loves working with our community to save water! Look for their colorful trucks in your neighborhood, read their gardening tips on [GardenStyleSA.com](https://GardenStyleSA.com) or call (210) 704-SAVE to speak with them.

**Look for their colorful trucks in your neighborhood!**



**2019 SAWS CONSERVATION TEAM**

- |                                    |                                     |
|------------------------------------|-------------------------------------|
| Adolph Garcia, Consultant          | Irma Flores, Customer Associate     |
| Brad Wier, Consultant              | Juan Soulas, Planner                |
| Brandon Leister, Planner           | Karen Guz, Director                 |
| Chad Coper, Planner                | Kathy Martinez, Customer Associate  |
| Cleveland Powell, Consultant       | Leslie Ehlinger, Customer Associate |
| Dana Nichols, Manager              | Mark Peterson, Coordinator          |
| David Abrego, Consultant           | Martha Wright, Analyst              |
| Dominic Silva, Planner             | Nathan Riggs, Coordinator           |
| Donna Fossum, Planner              | Patricia Jensen, Customer Associate |
| Edward Chagoya, Customer Associate | Sarah Galvan, Consultant            |
| Heather Ginsburg, Consultant       | Sasha Kodet, Planner                |

# HIGHLIGHTS

**Water conservation remains a high priority in San Antonio.** Conservation investments have helped to maintain low water costs and reduced the need for supplemental water supplies. We are asked, “**Can we save more?**” **The answer is YES!** San Antonio Water System is passionate about new water efficiency opportunities and dedicated to quantifying results through rigorous evaluation.



## Recent initiatives include:

- ◆ Conservation program management platform for efficiencies and improved customer experience
- ◆ Electronic WaterSaver coupons received and redeemed by mobile device
- ◆ Residential Custom Irrigation Design Rebates tailored to savings opportunities
- ◆ Performance rebates for irrigation technology and management at large-use sites
- ◆ Use of analytics to identify leaks for low-income households before a high bill crisis
- ◆ Scientific pilot programs to test savings from new technology, such as flow sensors and app-based irrigation controllers

## Future water savings will come from customized programs and outreach.

- ◆ Two-thirds of households have used at least one conservation program, but this will increase.
- ◆ Newcomers to San Antonio will be introduced to our water conservation culture early.
- ◆ We will use more analytics to assess needs and offer water-saving solutions before people ask.
- ◆ Designing programs for low-income customers will remain a priority.

## Collaborative partnerships will continue to increase awareness of the many benefits of conservation.

- ◆ Our many community partner organizations will help us reach our growing population.
- ◆ GardenStyleSA landscapes will save water and enhance beauty, improve habitat for pollinators and wildlife, and mitigate carbon in our atmosphere.

## Total water savings and education contacts will expand as they did in 2018 when we:

- ◆ Documented over one billion gallons of water savings.
- ◆ Educated over 200,000 people and introduced over 20,000 newcomers to water conservation.
- ◆ Introduced new technology, new programs and new tools to engage our community.

***Water conservation in San Antonio is not slowing down. The next five years will bring exciting new options and build an even more water-savvy San Antonio.***



# TABLE OF CONTENTS

## Highlights 4

## How We Use Water Today 8

- Characteristics of the SAWS Customer Base 10
- Who Watches Over Conservation Progress in San Antonio? 14
- Advancing Conservation with Technology and Analysis 15

## Helping Our Customers Save Water 17

- We Did the Easy Stuff. Can We Save More? 17
- GardenStyleSA.com: A Guide to Landscape Transformation 20
- New Home Program 26
- Conservation for Customers in Poverty 26
- Home Reports: Conservation Delivered to You 28
- Industrial and Commercial Water Conservation 29
- Finding the Next Savings: Pilot Programs 33

## Water Education Is a Team Effort at SAWS 36

- Conservation Education Initiatives 36
- School Education 39
- Community Education Programs 40
- Community Outreach 42
- Uplift Team Outreach 43

## Plan Evaluation: How Do We Evaluate and Measure Savings? 43

- Have a Plan and Flexibility 43
- Measuring and Tracking Success 43
- Other Success Metrics 43
- Where Do We Get Savings Estimates? 44



## Drought Contingency Plan 45

- Implementation and Enforcement 45
- Drought Rules 46
- Water Reduction Goals for the Drought Contingency Plan 50
- Variances 50

## Operations Side Conservation Opportunities 51

- Producing and Delivering Water to Meet Year-Round Needs 51
- Water Loss Control Program 53

## Operations Side Conservation: Water Loss and Leak Detection 56

- What Is a Water Loss Audit and Water Loss Control Program? 56
- What Water Loss Challenges Are Unique to SAWS? 57
- Rate Structure 61

## Attachments 68

- Attachment A: TWDB Water Conservation Plan Requirements Checklist 69
- Attachment B: TCEQ Water Conservation Plan Requirements Checklist 72
- Attachment C: TWDB Best Management Practices Decoded 76
- Attachment D: TWDB Utility Profile 80
- Attachment E: TCEQ Utility Profile 93
- Attachment F: Letter to Region L 110
- Attachment G: SAWS Board Approval 111
- Attachment H: Summary of Public Comments 113





# How We Use Water Today

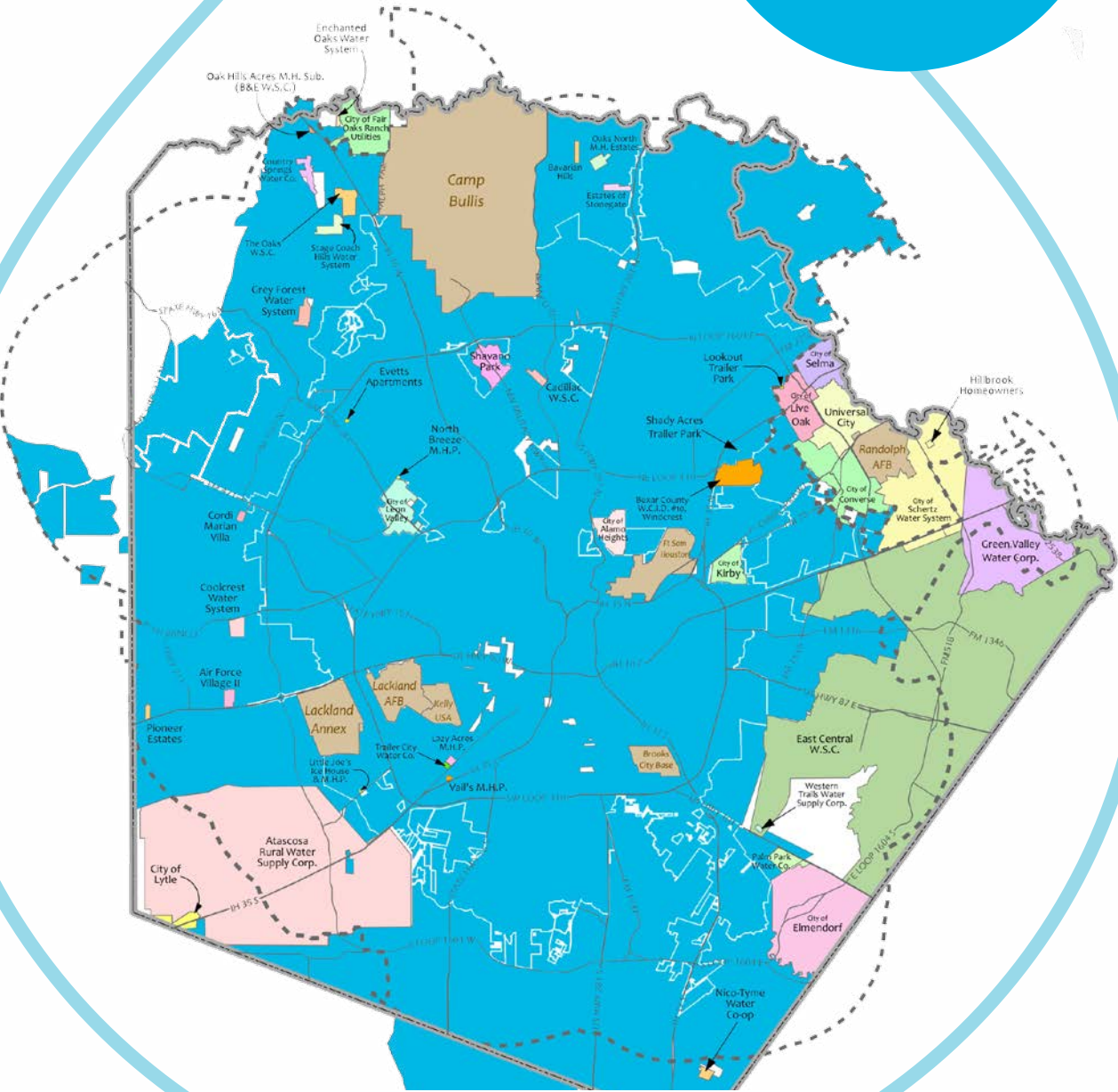
San Antonio, the seventh largest city in the United States, has also been identified as the fastest-growing large city in the United States. Located in south-central Texas, residents enjoy a moderate climate and beautiful setting. San Antonio can be extremely hot and dry with dramatic rainfall episodes that can result in flash floods.

Our community sits atop four major aquifers with a bounty of associated springs and rivers, which have supported human habitation for at least 10,000 years. The Edwards Aquifer is notable as a vast and prolific karst limestone formation that has been the primary source of secure, clean water supplies for generations. In recent decades, the Edwards Aquifer has been the subject of regional disputes, lawsuits referencing the Endangered Species Act and evolving regulation.

A successfully negotiated regional Habitat Conservation Plan to address endangered species concerns has brought stability to how Edwards Aquifer water is shared in the region. A mature groundwater permit system and stable drought regulations have underscored the importance of diversified water supply planning and continued use of water conservation as a way to meet the needs of growing populations.

Conservation was the first strategy SAWS deployed to manage the challenges of weather, growth and regulations. Conservation investments over the last 26 years have secured more water than any other SAWS water supply investment. While new water supply projects continue to reduce reliance on the Edwards Aquifer, water conservation remains a critical component of long-term planning.

## SAWS Water Service Areas





## Planning for Growth

San Antonio's population is projected to increase from today's 1.8 million to 3.3 million by 2070.

## Characteristics of the SAWS Customer Base

### Growth of San Antonio Region

Population growth projections are a cornerstone of water planning. SAWS revisits population forecasts at least once every five years. The 2017 forecasts project that the SAWS customer base is expected to increase from the current estimate of 1.8 million to 3.3 million people.

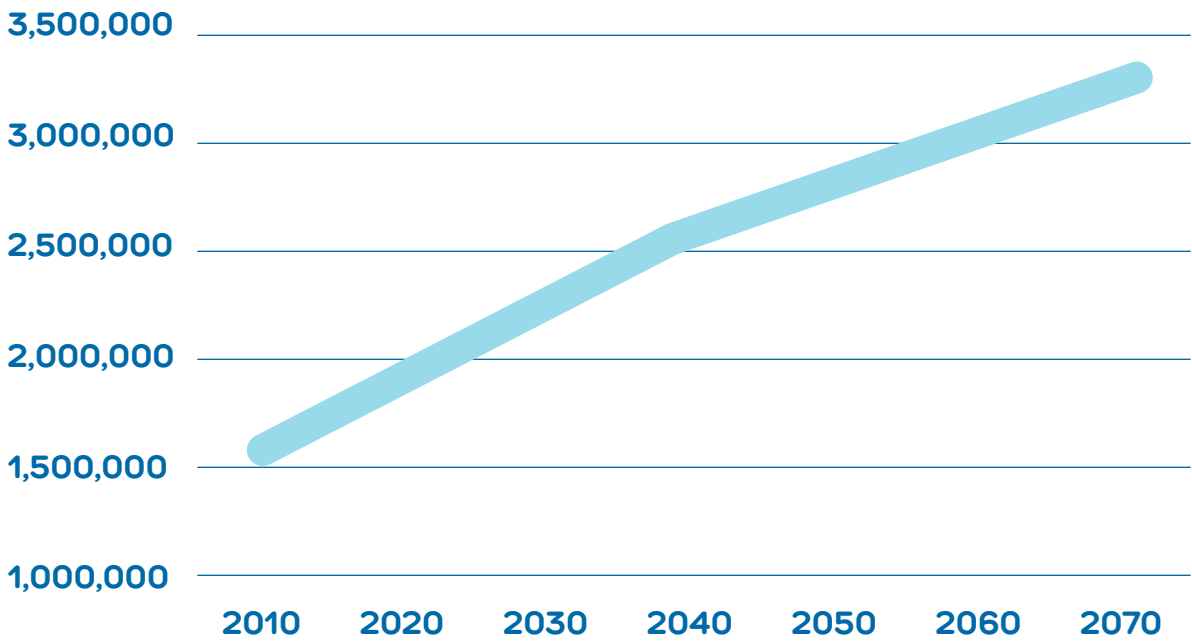


Figure 1: SAWS 2017 Water Management Plan population projection

## 2018 Analysis of Meter Type and Billed Consumption

SAWS serves a wide variety of water customers. The vast majority of metered accounts are single family residences. Residential meters represented 92 percent of the total number of SAWS accounts. Many of these accounts use small amounts of water each month. For this reason, residential accounts used only 56.8 percent of the total billed water in 2018. Commercial meters made up 4.8 percent of the total number of accounts, but many represent very large operations. It is not surprising that these accounts used 22.8 percent of the water. Apartment meters represent only 1 percent of the total SAWS meters, but used 14 percent of the water sold in 2018. Most dedicated landscape irrigation meters are found at commercial properties and have been required for new commercial irrigation systems since 2002. Only 2 percent of SAWS meters serve irrigation accounts, but these used 6 percent of the water sold in 2018. The direct use recycled water system has contributed to reduced per capita consumption by providing non-potable water for landscape irrigation, industry, and other large uses within the community.

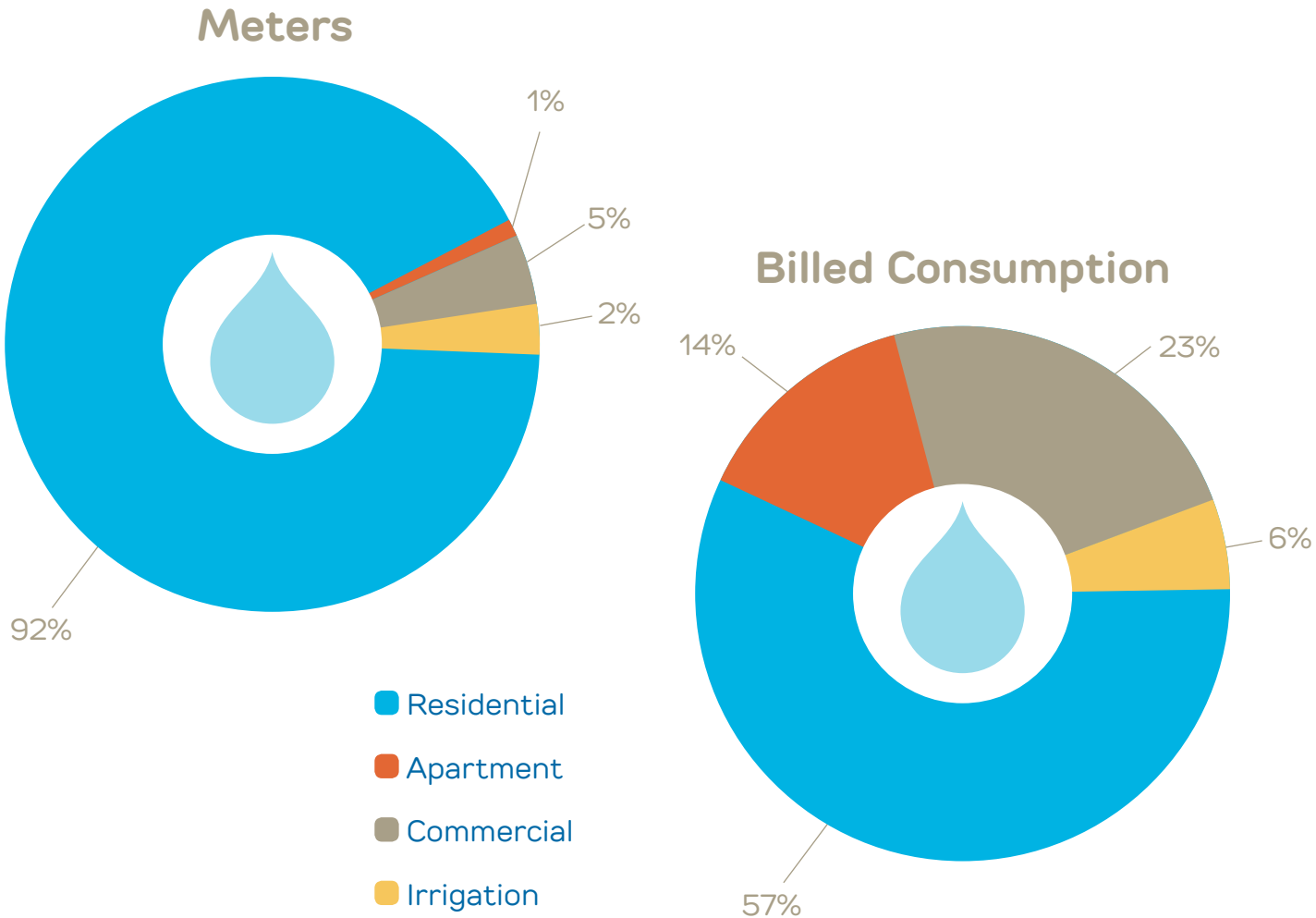


Figure 2: Percent of meters and billed consumption by customer class (2018)



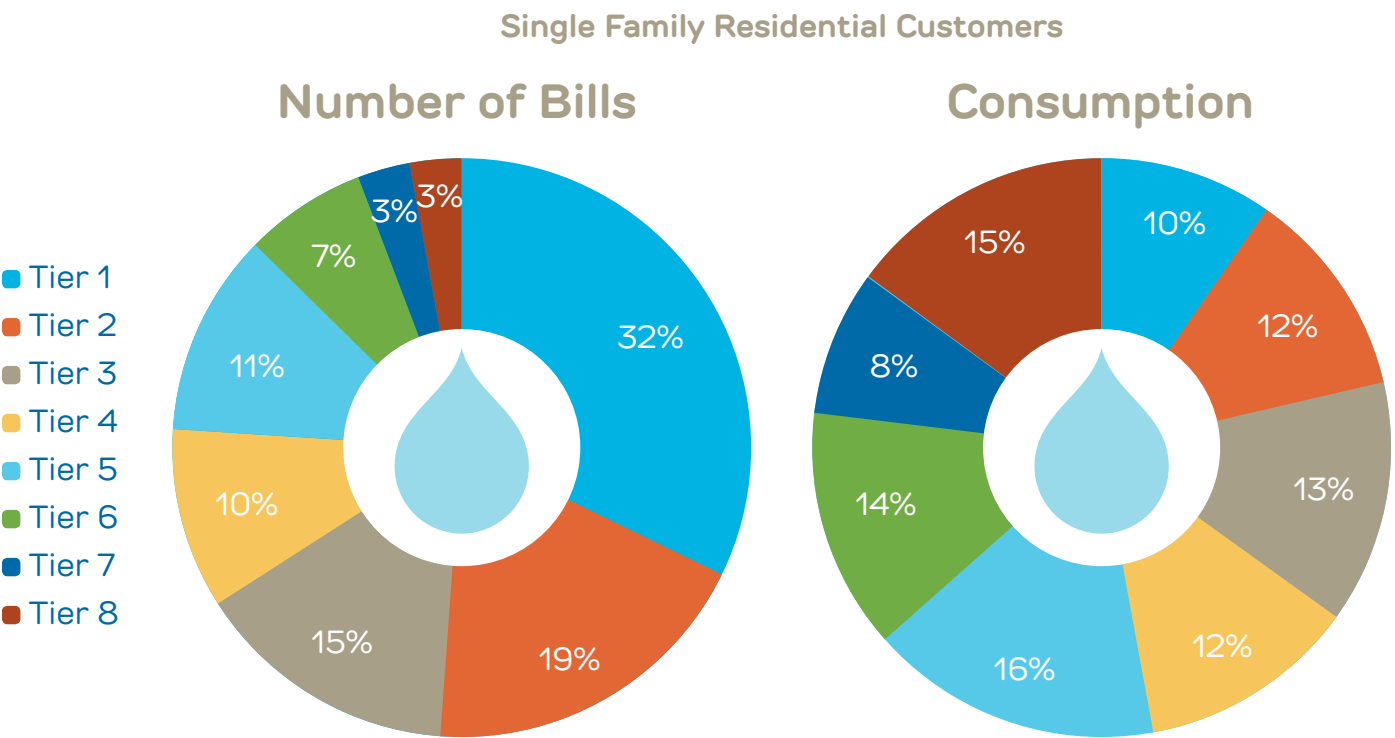
Water Use Patterns

Water use patterns vary greatly within each class of customers served. Water use varies widely from home to home as well as business to business and among large landscapes. This diversity is driven by a wide range of factors, some of which can be mitigated through behavioral or technical changes.

While residential households are relatively easy to compare due to the sheer number of customers and relative similarity of property type, commercial properties have proven to be more difficult. Commercial properties can vary from a small coffee shop to a large office building to industrial manufacturing, and everything in between. A recent effort to assign North American Industry Classification System (NAICS) codes to properties will help us to better track and compare water use across commercial properties in the future.

Residential Households

San Antonio includes many households that are careful with their monthly water use. In 2018, two-thirds of all the monthly bills sent to single family homes were for use under 6,000 gallons a month. Equally striking is that 32 percent of bills sent to single family homes in 2018 received the lifeline discount, a monthly discount for consumption under 2,992 gallons. A higher percentage of customers fall in the lower billing tiers, while the higher billing tiers consume proportionally larger amounts of the total volume of water within the single family residential billing class, as shown in Figure 3. The graphic represents percent of household consumption by rate tier, where the total amount of household water use is shown in the indicated billing tier.



12 Figure 3: Percent of single family residential bills and and consumption by rate tier (2018)

Rate Tier	Usage Gallon Block Threshold
1	2,992
2	4,489
3	5,985
4	7,481
5	10,473
6	14,962
7	20,199
8	Over 20,199

SAWS serves an increasing number of homes with builder-installed automatic irrigation systems. Irrigation systems make it easy to use water, so it is not surprising that households that use irrigation systems often have higher consumption patterns. Irrigation systems can be confusing to use. Strategies addressing irrigation inefficiencies, better management of irrigation schedules and reducing the scope of irrigation all result in peak water savings.

The SAWS Conservation Department analyzes water use patterns to target programs to households with high use, which are more likely to benefit from our Irrigation Consultation service. SAWS Conservation also identifies households with high winter use, which generally indicates irrigation during the wetter winter months. Approaching customers to offer services based on their usage patterns has been a surprisingly effective strategy for increasing savings and is well-received by customers.

Helping High-Use Customers Save

As Figure 3 shows, only 3 percent of single family residential monthly bills reached the highest billing tier, total usage from those bills accounted for 15 percent of residential water in 2018. Focusing conservation opportunities on these households is an important conservation strategy. It is encouraging that many of these households are very receptive to conservation.



## Who Watches Over Conservation Progress in San Antonio?

### Public Input

Water planning is a very public process in San Antonio. As a municipally owned utility, SAWS is accountable to our customers in ways that include public meetings, public documents and review by the City Public Utility Office. The San Antonio City Council appoints the SAWS Board of Trustees and the Mayor is an ex officio board member. In 2017, the SAWS 50-Year Water Management Plan was discussed extensively in community meetings and approved by the Board. This 2019 Five-Year Conservation Plan was made available in draft form for public comment through the SAWS website and through extensive notification of stakeholder groups. The draft was recommended for approval by the Board-appointed Community Conservation Committee (CCC) on March 20, 2019. It was approved by the Board on April 2, 2019 (attachment G shows executed Board resolution 19-092).

### Community Conservation Committee: 22 Years of Input Going Strong

The Board created the CCC in 1997 and appoints members from across the SAWS service area. The committee meets monthly to generate and refine conservation program ideas, and help build support for those programs throughout the community. In addition, members provide input to the Board on current and future conservation planning. The CCC has played a major role throughout its 22 year history, resulting in the completion of indoor household programs and the maturation of outdoor programs. Committee members provide critical input on how Conservation can tailor programs across all segments of our service area.

### Enforcement of Plan and Program Oversight

Conservation is tasked with meeting the targets and goals set forth in the SAWS 2017 Water Management Plan and the 2019 Five-Year Conservation Plan. Funding needed to implement conservation programs is provided through dedicated funds set aside in the SAWS rate structure. The annual budget is approved by the Board. Progress on program implementation is reviewed by the CCC, annual water savings are reviewed by Executive Management and an Annual Conservation Report is submitted to TWDB each May.

## The Community Conservation Committee, 22 Years Strong

*Providing critical input on how Conservation can develop and tailor programs across all segments of our service area.*

## Updating Conservation Targets

SAWS revisits its Water Management Plan approximately every five years. As part of this process, Conservation's success at accelerating gallons per capita per day (GPCD) reductions and mitigating peak demand is evaluated by the Water Management Plan Task Force, comprised of SAWS leadership from across the company. Per capita targets, population forecasts, drought risks and integrated supply strategies, including water conservation, are all updated with each new SAWS Water Management Plan.

## Advancing Conservation with Technology and Analysis

Today, if a program is not accessible online, it might as well not exist. Over the years as our programs and customer interactions expanded, we became frustrated by the challenges of using multiple sets of data and platforms for program administration. We needed efficiencies in administering programs and the ability to communicate with customers using electronic tools.

### Our requirements included:

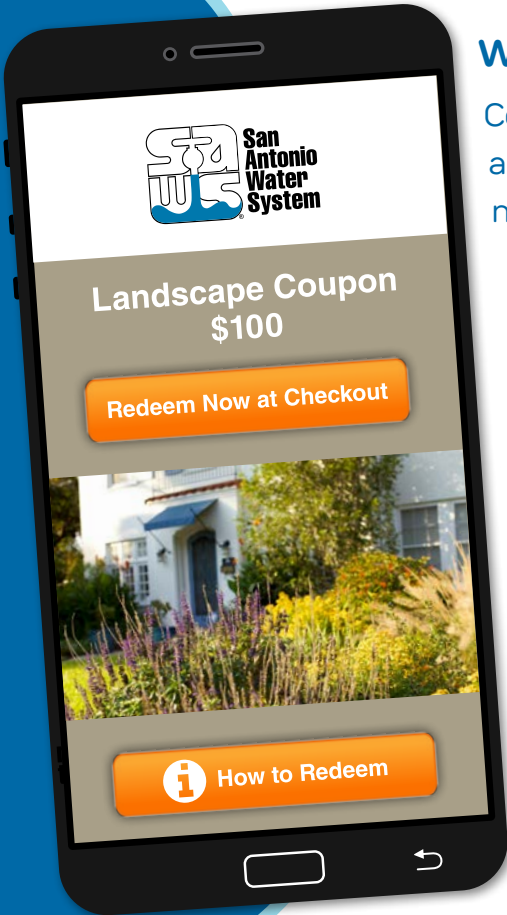
- ◆ Easy online applications and back-end data management
- ◆ Single platform to combine diverse data sets
- ◆ Business intelligence and process tools to enhance customer interactions
- ◆ Campaign and communication features
- ◆ Flexible platform not requiring custom computer programming for all changes





# Implemented Salesforce Customer Relation Management (CRM) Platform Solution in 2017:

- ◆ **Integrated data:** Customer account data, property appraisal data and historical program participation in one place.
- ◆ **Program management:** Each program has business intelligence processes and dashboards reflecting real-time progress.
- ◆ **Enhanced customer communications:** Templates for email and printed letters enable fast, personalized communications with customers.
- ◆ **Easy application management:** Posting applications online takes minutes and data feeds directly into CRM account records and program processing lists.
- ◆ **Digital coupons:** In 2018, we began using digital coupons for several programs. These are redeemed on the phone and reconciled to the correct vendor on the platform within minutes. In our survey, over 80 percent of customers like them and find them easy to use.



## What's Coming Next?

Conservation will continuously improve our program administration and better understand customer needs with new technology.

- ◆ Smart “One Application” access for all customer programs
- ◆ Text message communication options, such as appointment and program step reminders
- ◆ Data-driven, semi-automated customer outreach based on real-time usage
- ◆ Integration with data analytics package for program savings calculations
- ◆ Customer use profile analysis
- ◆ Using advanced campaign features and evaluation tools

# Helping Our Customers Save Water We Did the Easy Stuff. Can We Save More?

Early investments in water conservation accelerated San Antonio's drop in per person water use. Citizens became more aware of water as a valuable resource by participating in programs, events and workshops. Kids who were part of our first school-aged education programs are now part of our workforce and purchasing their first homes.

San Antonio boasts incredible participation in conservation. Recent analysis shows that a full 66 percent of San Antonio households have used at least one conservation program. With this long history of success, is there more to be accomplished? Can proactive conservation programs continue to accelerate reductions in water use? The answer is a resounding YES!

We know that there are more opportunities to save because we work with customers every day and are aware that water use patterns can change. Some surprising facts:

## San Antonio boasts incredible participation in conservation.

*A full 66 percent of households have used at least one conservation program.*

- ◆ On average, 14 percent of total residential indoor water use in the United States can be attributed to undetected leaks, according to the 2016 Water Research Foundation's Residential End Uses of Water, Version 2.
- ◆ Most people underestimate how much water they use daily and have little understanding of what accounts for their usage.
- ◆ Households that have an irrigation system grossly underestimate how much of their monthly usage comes from landscape watering. Most believe it is less than 30 percent of their use instead of up to the 60 percent that is typical, according to the 2019 Alliance for Water Efficiency Landscape Transformation Executive Summary.
- ◆ Many households and businesses water landscapes as much during wet, cool months as they do during hot, dry ones.
- ◆ Business customers care about their water use and bills. More than half of our water savings each year comes from commercial customers participating in conservation programs.
- ◆ When people become more aware of their water usage patterns, they use less without even realizing it.

**More than half of our water savings each year comes from commercial customers participating in conservation programs.**

Conservation Programs Tailored to Customer Needs and Interests

The time-tested combination of education, incentives and reasonable regulation still works to save water. However, we no longer rely on broad-based programs that work for everyone. Today we analyze segments of our customers to understand their use patterns and what they care about before creating tailored programs and education messages to meet their needs and save water. SAWS does not assume customers will find our programs on their own. We reach out to customers using bill inserts, direct mail, e-newsletters, social media and community and trade group organizations. Finally, we have worked with experts in Behavioral Economics to analyze what works to engage our customers in savings.

New Metrics

We are delighted to have engaged the majority of households in water conservation at least once. But there is still water to be saved. Now it’s time to circle back to those households with new opportunities. We have defined a new category of customers, “conservation newcomers,” as anyone who has not engaged with us in the last five years. This includes residents who have not interacted with us and people who moved to San Antonio during that time period. We have started tracking our new metric. In 2018, we engaged 30,374 households in something new. The use of data analytics and tailored programs will continue to improve our “market share” of conservation-engaged citizens.

Five and Ten-Year Targets:

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Total GPCD	120	119	117	115	114	112	111	110	109	108
Residential GPCD	76	76	75	74	74	73	72	72	71	70

Table 2: Normal-weather targets for water savings

Long-Term Goals:

SAWS expects to reduce its total per capita consumption to 88 GPCD by 2070. We expect to reduce our residential per capita consumption to 55 GPCD by 2070. These targets were selected to ensure conservation continues to make a significant water supply contribution. These targets can be found online in the SAWS 2017 Water Management Plan at [saws.org/wmp](https://saws.org/wmp).

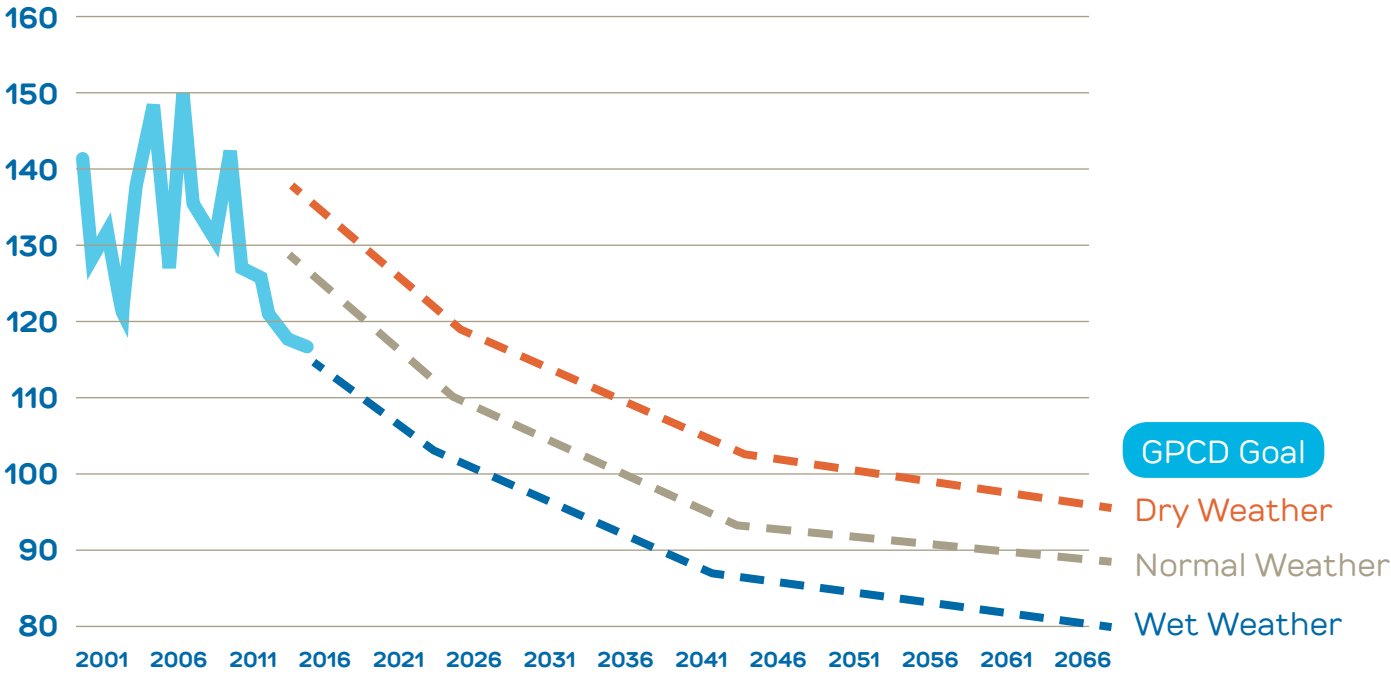


Figure 4: Total GPCD Goals

Why Three GPCD Projection Lines



San Antonio weather has been described as “**drought punctuated by flood.**” The upper and lower lines reflect GPCD which is expected to vary from one year to the next depending on precipitation, temperature and drought restrictions in place.

Holistic Approach to Achieving Annual Savings Goals

Each year Conservation strives to document at least one billion gallons of proactive and lasting water savings. These savings are from program participation we can document and measure. We watch the long-term trends in per capita usage, but we do not expect the per capita to drop each year. If the multiple year trend is consistently not matching the forecast, the Conservation Department will adjust program offerings to maintain downward trajectory needed. Our weather patterns are so variable that in some years we will see lower usage due to ample rainfall. Exceptionally hot and dry years will have an expected increase in per capita water consumption, but not as high as predicted without conservation.



## GardenStyleSA.com: A Guide to Landscape Transformation

SAWS coined the term Garden Style San Antonio ([GardenStyleSA.com](http://GardenStyleSA.com)) to convey the beauty and resilience of landscapes that can be maintained in our community with little or no supplemental water. While saving water and reducing peak water demands is the priority goal for SAWS, there are many co-benefits we gain from the widespread adoption of GardenStyleSA landscapes.



- Landscapes including native plants provide ecosystem support for pollinators and other wildlife.
- Holistic landscape design means that GardenStyleSA landscapes can double as rain gardens, improving water quality and reducing local flooding by slowing and filtering storm water.
- Increased plant biomass and deep roots help mitigate and sequester carbon in our atmosphere through photosynthesis and healthy soil microbes.

### Landscape Transformation: A Joyful Work in Progress

SAWS has contracts with seven locally owned landscape retail companies which accept SAWS incentive coupons for GardenStyleSA landscape plants and other materials. Since 2013, thousands of customers have taken advantage of coupons that offset some of the costs associated with transforming grass-dominated yards into resilient, diverse gardens and patios. Despite this significant progress, we know there is more work to be done. A recent survey of customers gave us insight about the challenges customers still face when they want to reduce grass in their home yards.

- Over 80 percent of customers applying for the WaterSaver Coupons self-reported they were brand-new or very new to gardening.
- Over 60 percent of customers said they would like more help in the form of landscape designs, advice on planting, education and how to maintain their GardenStyleSA landscape.

- Native plants and outdoor living space are the top two elements customers want to include in their landscape transformation.

### What's Coming Next for Landscape Transformation?

Several of our landscape transformation programs are highlighted in this plan. Efforts to accelerate the adoption of resilient landscapes will grow in the next five years. A few of the ideas we expect to build on include:

- Enhancing [GardenStyleSA.com](http://GardenStyleSA.com) with more designs and more of a “starter gardener focus”
- Continuing partnerships with nonprofit organizations to expand landscape education
- Expanding WaterSaver Rewards to gamify conservation and gardening education
- Exploring contractor landscape coupons for customers that would like landscape assistance
- Expanding education for newcomers to San Antonio and gardening in general
- Documenting multiple benefits of landscape transformation by SAWS and other community organizations



**San Antonians surveyed** want to transform their yards into a landscape with native plants and outdoor living space.

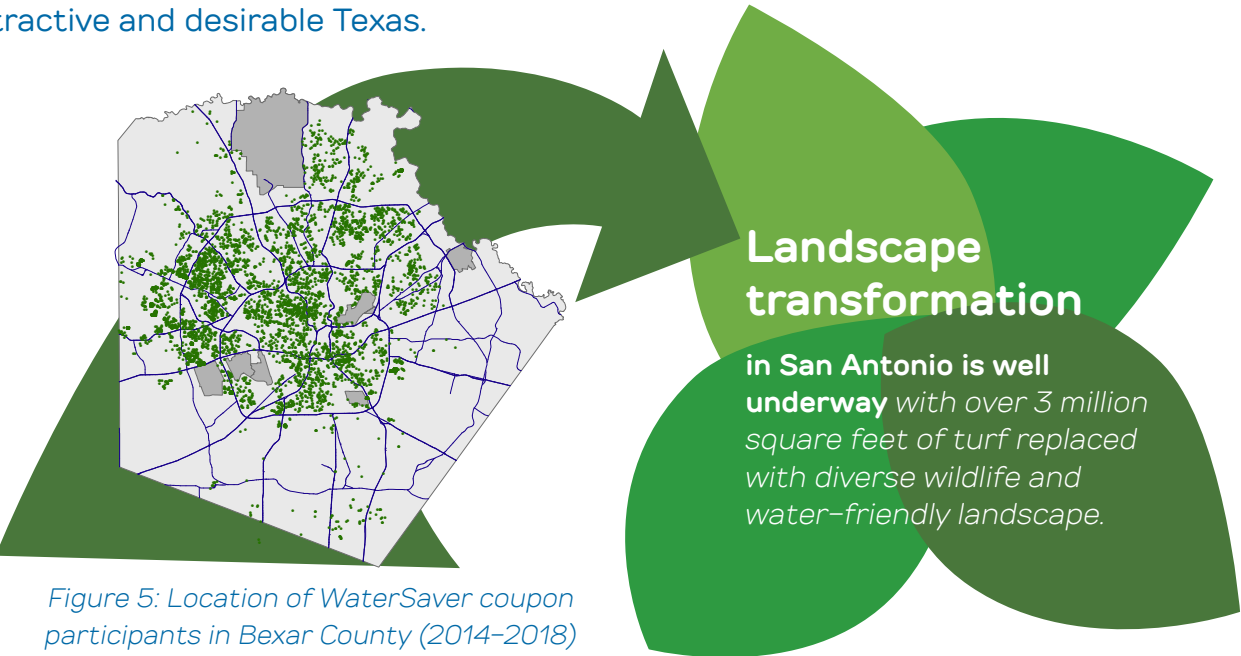


WaterSaver Coupons

SAWS created a grass removal incentive program allowing customers to receive coupons to replace grass with WaterSaver Landscapes and Patioscapes. The WaterSaver Landscape coupon is used to replace grass with beds composed of attractive plants, resulting in a resilient, diverse GardenStyleSA landscape. Customers use the Patioscape coupon to replace grass with a permeable patio, perfect for outdoor living.

- ◆ Each coupon redeemed requires the removal of 200 square feet of grass in a contiguous area.
- ◆ Coupons provide a \$100 discount on the cost of plants or patio materials at participating locally owned vendors.
- ◆ There is a lifetime program limit of eight coupons for up to 1,600 square feet of grass removal.
- ◆ All homeowners with an in-ground irrigation system are required to schedule a free SAWS Irrigation Consultation regardless of coupon type.
- ◆ Customers with irrigation systems must cap all irrigation heads in the coupon area.
- ◆ Customers may qualify for an additional incentive using the SAWS Irrigation Design Rebate to cap zones or their entire irrigation system.

Since 2013, customers have replaced over 3 million square feet of grass with more diverse plant material and functional outdoor living spaces. These landscapes need less water and are more resilient, increasing wildlife habitat and sequestering carbon in deep roots, woody stems and leafy foliage. These gardens will change the perception of what is an attractive and desirable Texas.



22 Figure 5: Location of WaterSaver coupon participants in Bexar County (2014–2018)

Conservation Irrigation Consultations

Conservation Consultations are the cornerstone of our outdoor conservation efforts. Today the SAWS Conservation Consultation team is made up of six people who are licensed irrigators and passionate about GardenStyleSA landscapes. Our consultants meet one-on-one with customers and give homeowners the confidence they need to make permanent changes knowing their garden will be healthier and more beautiful. The free one-hour service includes:

- ◆ Documenting how much water the irrigation system uses at the customer’s settings and the consultant’s recommended settings
- ◆ Documenting any repairs needed and recommending efficiencies that will meet the landscape goals of the homeowner
- ◆ Offering a custom rebate to convert spray heads to drip, eliminate all or portions of the system, and other irrigation system efficiencies





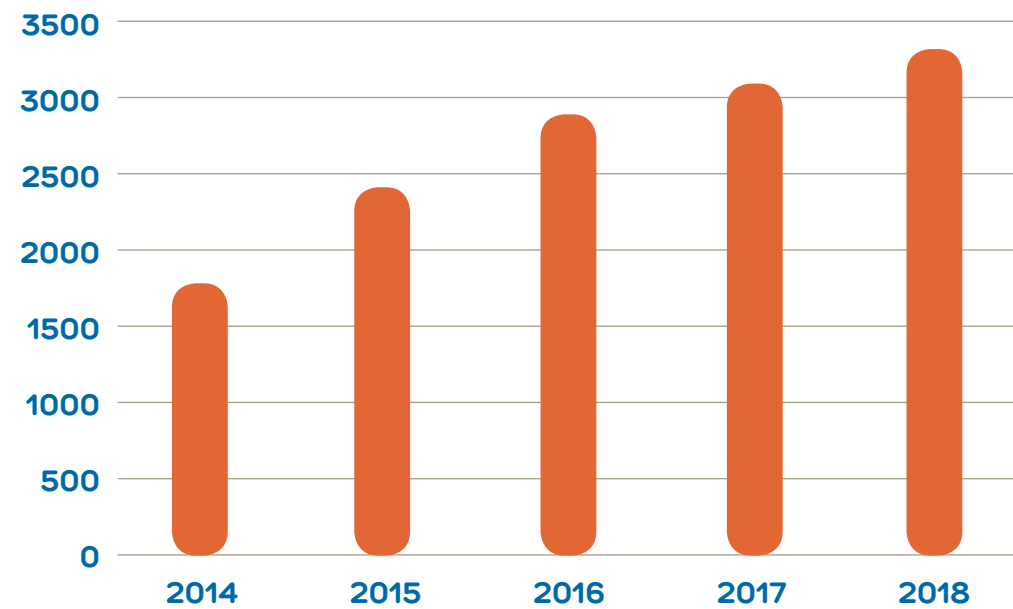


Figure 6: Number of irrigation consultations by year

The average post-consultation savings was 1,360 gallons per month in 2018. With these results, it is not surprising that this popular program can have a six-week waiting period during summer months. While the capacity for total annual consultations has likely been reached at current staffing levels, Conservation continues to look for new opportunities to expand our irrigation education. We are certain that our one-on-one interactions and ability to speak with the customer directly has resulted in a quantifiable, sustainable reduction in customer use.

#### What's Coming Next for Consults?

- ◆ Evaluate options for expanding the number of appointments we can offer with current staffing.
- ◆ Text appointment confirmation to reduce no-show customer appointments.
- ◆ Continue process improvements to determine what tools we can leave with the customers.

#### Irrigation System Rebates

Irrigation system use is by far the largest discretionary use of water in homes that run them. At commercial properties, large irrigation systems can use hundreds of thousands of gallons each month. With such large water quantities at stake, it is critical that irrigation systems operate as efficiently as possible and only cover priority areas of landscapes.

Years of experience in working with irrigation systems at homes and businesses has taught us some fundamental principles we apply to our rebate programs.

- ◆ **Get our hands on the system first:** An irrigation consultation documenting the current condition of the irrigation system before work begins on rebate-eligible improvements is always required.
- ◆ **It's about water flow:** Our fundamental goal is reducing the total flow of the systems. Many systems put out more water than is necessary and cover a larger area than needed. The biggest savings in irrigation changes are from reducing the flow and scope of system, and in some cases, combining landscape changes that reduce the overall need for irrigation systems.
- ◆ **More use = more money:** We make a custom rebate offer to each customer based on the measured size and flow of their system. The more water the system uses, the greater the cash rebate offered to make permanent structural changes.
- ◆ **Most money for most permanent savings:** While improving operation of systems is helpful, the most reliable change is to reduce the scope and flow of irrigation. Rebate offers are the most generous for removing all or part of systems, and lower for efforts such as conversion to drip irrigation or another lower-flow technology.



Since implementing a custom rebate, our program has expanded from 169 rebates in 2015 to over 500 in 2018 and continued growth is projected. It is clear that a cash check rather than a credit on the water bill, along with offering a 10 percent bonus for completing changes quickly, increases customer interest.

### What's Coming Next for Irrigation Design Rebates?

- ◆ Analysis of 1,000+ rebates to determine what changes lead to the best savings
- ◆ Pilot program for master valve rebates to reduce main line leak losses
- ◆ Continue to evaluate app-based controller use for water savings

### Outdoor Programs Will Continue to Expand and Evolve

Conservation expects to continue and expand programs that target discretionary water use and over-reliance on irrigation systems for landscape maintenance. We will continue our focus on facilitating landscape transformations to water-saving, wildlife-friendly, resilient and beautiful Garden Style San Antonio landscapes.

### New Home Program

Beginning in 2019, Conservation will be working with local home builders to educate them on the current city requirements regarding new home construction and landscapes. As is typical with all new programs Conservation develops, we will strive to include incentive packages for home builders that will save water, resources, time and money for both SAWS, home builders, and home buyers. We also plan to engage the Realtor community in this process as we see them as an important partner ensuring the success of this effort.

In addition, Conservation plans to work with the City of San Antonio Developmental Services Department on their processes of ordinance enforcement and the current Unified Development Code (UDC) update cycle to ensure that the water conservation regulations passed in 1996 and 2003 in Chapter 34, Article 4 of city code are reflected in the UDC.

### Conservation for Customers in Poverty

San Antonio is a diverse, culturally dynamic community. This diversity includes stark differences in socio-economic conditions across our customer base. Most of the outdoor discretionary over-use of water is by our higher-income customers. San Antonio has a significant number of customers who do not contribute to high summer production levels, but they have other challenges managing their water use. We have a suite of programs for this important population.

### Plumbers to People: Emergency Plumbing Assistance

We are proud that Plumbers to People (PTP) was the first conservation program launched by SAWS in 1994. The program was designed to provide water leak repair services for low-income customers. While it is an administratively complex program, it has provided emergency plumbing repair for many households, preventing waste. The repairs also stop the cycle of water disconnection that can occur if a family cannot afford either plumbing repairs or the high cost of continued water waste from leaks.

#### Some of the key program guidelines for PTP include:

- ◆ Household must be documented as falling within 125% of federal poverty guidelines.
- ◆ Account holder must own and reside in the home (no rentals).
- ◆ Leak must result in potable water waste.


### Conservation Makeover: Finding Leaks Early

Early versions of Conservation Makeover focused on ensuring that high-flow fixtures were retrofitted in low-income neighborhoods. Over time home visits revealed few high-flow fixtures and plenty of low-level leaks. Conservation Makeover transitioned to using analysis for early leak detection and proactive offers of assistance. While pilot program analysis and outreach efforts were successful, they were time intensive and too challenging to replicate monthly.

In 2018, staff was able to use our new program management platform to automate much of the data compilation and customer communication portions of Conservation Makeover. Every month staff analyzes water use for households in the SAWS Uplift Program. Those whose use is significantly higher than expected receive a letter asking if they need help. When customers respond, they are offered plumbing assistance. When the plumber is deployed, 85 percent of the households are confirmed to have a leak needing repair.

### What's Coming Next for Conservation for Customers in Poverty?

- ◆ Analysis assessing leak challenges faced by single family home renters
- ◆ Development of per unit water efficiency metrics to assess relative water cost to low-income households living in multifamily units
- ◆ Continued outreach efforts to determine why some households do not respond to assistance offers



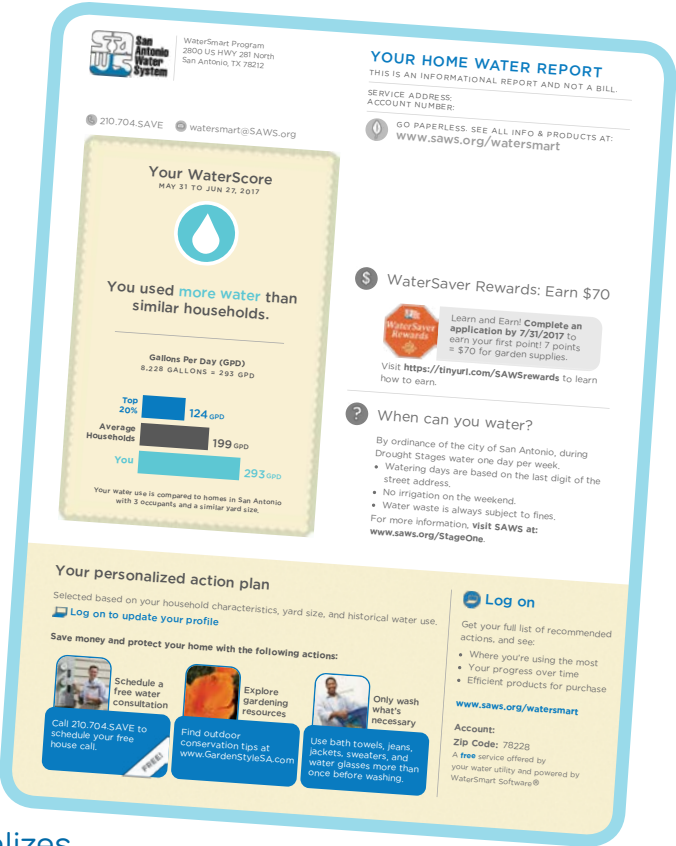
SAWS has enrolled over 30,000 households in Uplift assistance programs through proactive outreach.



## Home Reports: Conservation Delivered to You

Sending personalized home water reports is a program that can be expanded to thousands of households. SAWS piloted this strategy in 2017 to assess its effectiveness. We selected reports that provide peer comparisons and efficiency suggestions, and then chose two target audiences to conduct a scientific pilot program to assess changes in water usage. The two groups selected were:

- ◆ **Hard to reach high-use customers:** Some customers are in the “hard to reach” category. They have not recently used an incentive or educational program despite marketing efforts.
- ◆ **Low-income customers:** We are always looking for more options to help our customers who struggle financially. We wanted to find out if sending personalized water reports to households in our assistance programs could show a measurable decrease in their generally already low consumption.



We deployed reports by working with a company called WaterSmart Software that specializes in water home reports and by generating our own in-house. We wanted to compare savings from the two strategies. The results revealed that the reports yielded a solid 2 percent reduction in annual usage even among unengaged high-use households. The savings were somewhat lower for low-income households but still statistically significant. It did not matter if the report came from SAWS or a contractor; savings were similar.

### What's Coming Next for Home Reports?

- ◆ Enrollment in home reports expanded to over 35,000 households in 2018 and will be available to an unlimited number of households in 2019.
- ◆ Integration of home report access and data with the SAWS My Account Portal which is popular with customers for bill payment
- ◆ A pilot program making dashboard reports available to commercial customers who have multiple meters to track

## Industrial and Commercial Water Conservation

Commercial, industrial and institutional customers account for 5 percent of SAWS meters but consume 23 percent of the total water delivered. This is not unexpected because many of those SAWS meters represent significant operations that promote economic activity. Thirty percent of the annual savings documented by SAWS customers each year comes from commercial customers.

### Funding Commercial Conservation

Commercial stakeholders were early supporters of investments in water conservation. The San Antonio Manufacturers Association advocated for a modest portion of commercial meter fees to be dedicated to a commercial conservation fund starting in 1998. This dedicated funding has helped to develop one of the most robust commercial conservation programs in the United States.

### Commercial Stakeholder Education

Stakeholder organizations are key to helping SAWS reach commercial customers. We stay engaged with groups that represent facility managers, cooling tower management, heating and cooling, and construction and manufacturing. Conservation consultations at facilities are available upon request. These often result in operations changes or in participation in custom incentive programs.

## Commercial Laundry Custom Rebate Focus

Fourteen percent of laundry is done at commercial laundromats. Efficient machines reduce water use per load of laundry by nearly half.

- Custom rebate amounts are directly proportional to water savings.
- A rebate contract ensures equipment stays in operation or funds must be returned.
- Rebate checks are only issued after savings are measured and confirmed.

### Outcomes of Laundry Focus:

- 1,600 washing machines retrofitted
- 20 million gallons of water saved per year
- Under \$450 per acre-foot of water saved

**Incentives**

Early incentive programs helped to retrofit bathroom and kitchen fixtures at commercial properties across the SAWS service area. While commercial customers can still apply for a custom rebate for these changes, we have largely reached saturation. The commercial custom rebate program provides incentives for a wide range of retrofits and process changes that can document water savings.

**Reasonable Regulation**

SAWS has worked with commercial stakeholders to develop reasonable efficiency regulations codified in San Antonio Municipal Code. A few examples include:

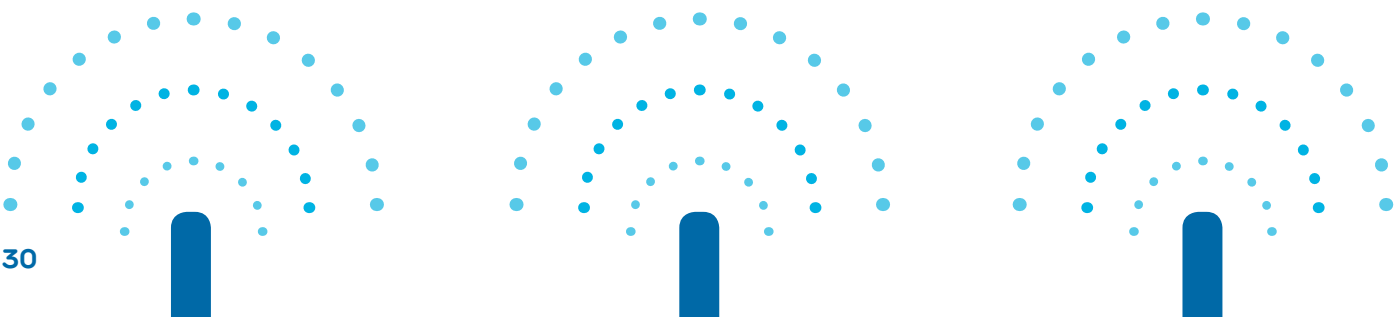
- ◆ Cooling towers must operate at a minimum of four cycles of concentration.
- ◆ Newly installed shared-use laundry facilities must install water-efficient machines.
- ◆ Builders may only install approved drought tolerant grass and provide an optional WaterSaver landscape package to buyers defined as less than 50% grass and drought tolerant plants.

**Custom Rebates for Commercial Outdoor Efficiency**

Through the Commercial Custom Rebate program, SAWS has worked with businesses that installed or modified technology which resulted in a reduction in irrigation water use. Projects have included irrigation removal, converting parking lot islands to xeriscape and installing artificial turf fields.

**Some key accomplishments are:**

- ◆ Properties retrofitted to reclaim water onsite for irrigation saved 19.98 acre-feet or 6,186,069 gallons annually.
- ◆ Conversion of turfgrass athletic fields to artificial turf saved 49.73 acre-feet or 16,202,996 gallons annually.
- ◆ Businesses that removed or capped parts of their irrigation system and converted parts of their turfgrass to resilient landscapes saved 31.38 acre-feet or 10,224,298 gallons annually.



**Commercial Irrigation Checkups: A Regulation That Works!**

Commercial irrigation systems present unique maintenance and management challenges. Water bills from commercial irrigation can quickly spike up to amounts that surprise the facility manager or homeowners association (HOA) responsible.



**Reasons include:**

- ◆ Significant underground infrastructure that is prone to leaks as soils shift, vehicles drive over it or construction disturbs it.
- ◆ Irrigation controllers may be spread out over large properties, making it unlikely someone will manage to change schedules seasonally or with weather changes.
- ◆ Operation of the system is not taking place where it is easy for a manager to observe it for problems.
- ◆ Bills for irrigation water are sometimes paid by a corporate office. This eliminates the price signal associated with poor management or unrepaired leaks.
- ◆ Large irrigation system owners often have no idea how much their irrigation system should use when it is in good working order.

**What is the Checkup and Who Does It?**

The Irrigation Checkup regulation was introduced to city ordinance in 2006 to combat some of these challenges. It is focused on large irrigation properties and large-use irrigation sites. The ordinance requires large irrigation properties and large-use properties to provide an “Irrigation Checkup” to SAWS by May 1 of each year. The Checkup itself consists of documentation that the system can be operated without waste and how much water each meter associated with the system is expected to use in summer months. Large Property is defined as 5 acres or larger and Large Use (irrigation consumption greater than one million gallons in the prior calendar year). Approximately 3,000 irrigation customers meet the requirement on an annual basis. They are mostly commercial customers but it does include some residential customers.



Results Are Impressive

Evaluations of the regulation have documented impressive savings of more than 10,000 gallons per month per property upon reaching compliance, with some properties saving significantly more. The immediate savings seen stem from repairing leaks and replacing broken parts. Additional savings come from educating the owner of the system about how much water they should expect the system to use when it is in good working order.

There are other tangible benefits to implementation of the Irrigation Checkup. The reports include current contact information associated with the irrigation system. When water waste is reported, it is easy to follow up with the correct party.

Irrigators and property managers become interested in improving their irrigation systems when they document their usage. Often customers work with staff to review their data and then decide to make efficiency upgrades that earn them a custom rebate.

Improved Compliance from Rate Impact

In 2016, SAWS approved a measure that failure to comply with the annual irrigation checkup resulted in additional charges on the irrigation system account. This includes a late fee for not complying by May 1 and an additional noncompliance rate to be assessed on all monthly irrigation consumption that continues until compliance is met. As a result, compliance with the irrigation checkup requirement by the May 1 deadline and overall compliance have improved significantly, as shown in Figure 7.

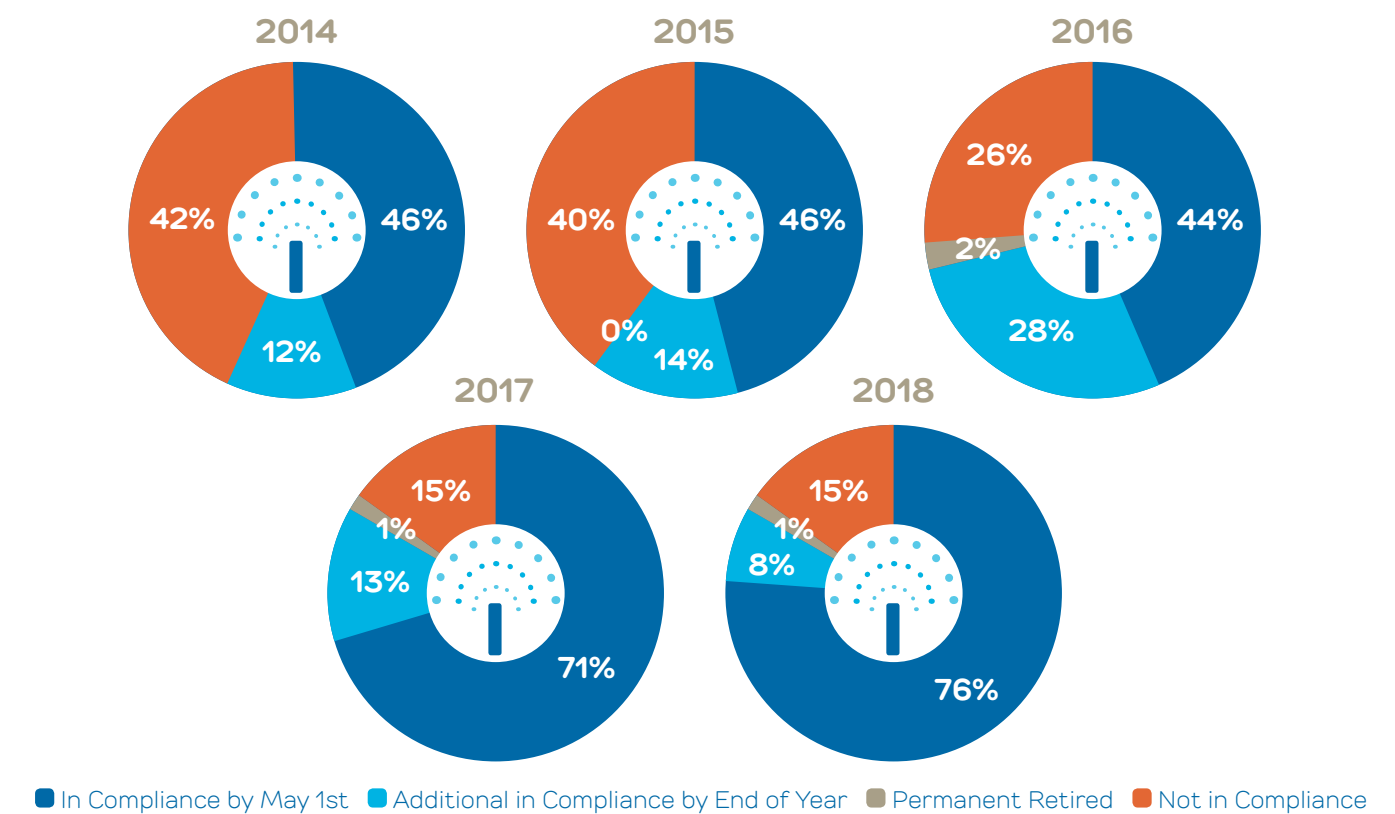


Figure 7: Compliance rates for irrigation checkup program (2014-2018)

To meet compliance, there is a growing trend for older properties struggling to maintain aging systems to permanently retire them instead of making costly repairs or retrofits. Permanent removal reduces the scope of the irrigation system and leads to permanent water savings. Customers who permanently retire their system no longer fall onto the irrigation checkup list each year.

What's Coming Next for Commercial Conservation?

- Custom rebates: Continue to market and negotiate custom rebates for industrial processes, retrofits and large outdoor projects.
- Pilot new technologies: Test efficacy of technology such as flow sensors that may aid in management of water and early detection of leaks.
- San Antonio 2030 District: Work with volunteer property owners and stakeholders to assess the savings potential of existing commercial buildings within a downtown area.
- North American Industry Classification System Analysis: SAWS has applied an NAICS code to each of our 40,000 commercial accounts. It will now be possible to sort commercial customers into categories to develop benchmarking standards and to identify outliers for analysis.

Finding the Next Savings: Pilot Programs

Many of our future conservation opportunities will depend on customer behavior to succeed. We know from experience that not everything we try will have the outcome we expect. It was a surprise to discover that our rain barrel incentive pilot program, while popular with customers, did not result in either water savings or enhanced participation in other programs. In contrast, we were delighted to find that even unengaged customers used less water when we sent them personalized water reports.

Challenges of Program Evaluation for Landscape Conservation

It is extremely challenging to evaluate water savings for programs designed to influence behavior patterns or adjust to weather patterns, water rates and other community messages. Comparing water use prior to program participation and after program participation is complicated by too many confounding variables that also influence use. For existing programs, we manage this challenge through evaluation tools that use a randomly selected control group to compare to those in the program. We used a complex analysis of this kind to assess savings from the 2018 residential Irrigation Consultations. This is an accepted practice in program evaluation; however, the results will never be as firm as those from the random control trial (RCT) method, which is only appropriate for new programs.

The Gold Standard of Program Evaluation: Random Control Trial Method

Whenever possible, we roll out new program options using a random control trial design. In concept, an RCT is much like a medical trial that uses a random placebo in comparison to a new treatment to determine efficacy. Our RCT pilots follow this process:

- Step 1:** Determine the target audience and identify them by characteristics, such as use pattern or property size, from within our customer base.
- Step 2:** Explain the pilot study to the target audience and ask who would like to participate.
- Step 3:** Randomly select which participants will get the conservation treatment and which will be part of the control group from everyone who opted in.
- Step 4:** Compare water use between the treatment and control group to determine if any savings were achieved.

Example: Rachio App-Based Irrigation Controllers

Irrigation controllers are changing fast. New technology allows users to program their irrigation systems from mobile devices and adjust to local weather data. Early deployments of similar technology in San Antonio actually increased usage. Because the app-based controllers have improved and could be adjusted for San Antonio use patterns, we decided to try them again with a company that agreed to our pilot study terms.

Rachio Pilot Deployment Process:

- Step 1:** SAWS invited 6,600 high-use customers to replace their traditional controllers with Rachio. Customers were told they would have a 50 percent chance of being selected to receive the new product.
- Step 2:** Nine hundred customers indicated that they would like to participate.
- Step 3:** A treatment group of 300 homes and a control group of 300 homes were randomly selected from those who indicated they wanted to participate.
- Step 4:** The treatment group had the new products installed after signing a user agreement of study terms.
- Step 5:** Water use of the two groups was compared before and after the controller installation.

Results of the pilot indicate an average savings of 1,469 gallons per month per home over the course of the first year. Figure 8 shows how the treatment and control group performed before and after the installation of the Rachio device. Further analysis showed that while about 75 percent of the treatment group decreased consumption relative to the control group, the best savings were seen in properties with smaller lot sizes. Surveys of participants and further analysis will help develop targets for a next program.

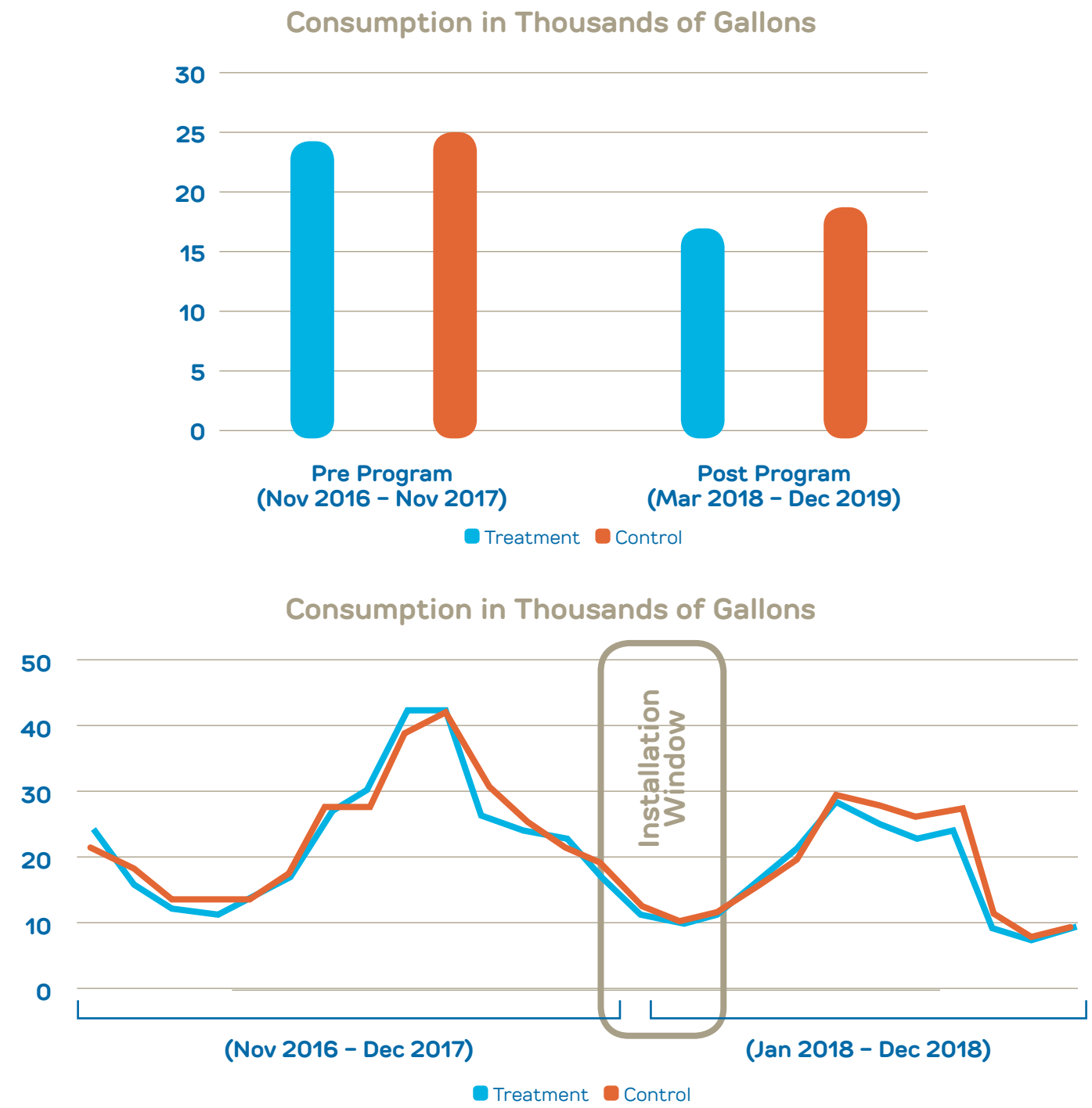


Figure 8: Comparison of treatment and control group for Rachio pilot program



## Water Education Is a Team Effort at SAWS

Educating our community on all things water is a big priority at SAWS. The effort includes many experts from Conservation and Communications but all departments at SAWS have a role.

**Conservation Team:** Staff offers educational programs and events for the community. We also contract with several nonprofit organizations to provide educational activities and programs directly related to water conservation.

**Education Team:** A professional and award-winning team of SAWS educators has crafted educational programs and curricula aimed at adults and school-aged children.

**Community Outreach Team:** Our Community Outreach Team engages in “community conversations” about water by participating in unique events in person and on social media.

**Social Media Team:** Digital engagement experts build our social media presence and use digital campaigns to spread the word on water news, including timely conservation messages.

**Uplift Team:** The Uplift Team works tirelessly to enroll low-income and other at-risk customer groups in our suite of assistance programs.

## Conservation Education Initiatives

### WaterSaver Rewards Program

SAWS has gamified conservation engagement through WaterSaver Rewards. Customers earn points for attending qualified education events and for completing conservation programs. The calendar of events can be viewed at [GardenStyleSA.com](https://GardenStyleSA.com). Points earn coupons that can be redeemed at local vendors for landscape conservation supplies and materials. The program was piloted in 2018. Over 2,000 people signed up to participate. The next step is to increase the number of points people earn each year.

### Spring Bloom Annual Event

This annual event is held at SAWS headquarters to kick off the San Antonio gardening season. Approximately 1,600 people attend the half-day event, and learn from speakers and participating education organizations. Surveys of people attending the event indicate that each year about 30 percent are new to the event and another 30 percent are new to water conservation programs.

## SAWS Running Toilet

SAWS has adopted a new mascot to spread the word about indoor leaks and how much water can be wasted. Our mascot is the “Running Toilet” using the tagline “Stop the Running Toilet!”

## High Bill Help

A new web tool helps customers solve the mystery of their high water use. Short videos help troubleshoot common culprits of high bills.

## GardenStyleSA.com

- ◆ **All things gardening in San Antonio:** Find a plant, download a design, “Ask a Garden Geek” your gardening questions and more.
- ◆ **Garden blog:** E-newsletter includes weekly watering advice and timely gardening articles.
- ◆ **Conservation programs:** Key place to apply for Conservation programs.

## Community Partner Contracts

SAWS has formalized contracts with seven nonprofit groups that receive performance payments based on preapproved education activities related to water conservation. This cost-effective program has multiplied our education impact by thousands of contacts each year. The following organizations are currently on contract and helped us reach over 225,000 people with water education in 2018.

- ◆ Bexar County Master Gardeners
- ◆ Build San Antonio Green
- ◆ Eco Centro, Alamo Colleges District
- ◆ Gardening Volunteers of South Texas
- ◆ Green Spaces Alliance
- ◆ Mitchell Lake Audubon Center
- ◆ San Antonio Botanical Society



Stakeholder Education Partnerships

Collaborations with many regional organizations help to create cohesive community messages. Some of these partnerships include:

- ◆ Alamo Area Master Naturalists
- ◆ Texas A&M AgriLife Extension Service
- ◆ Native Plant Society of Texas
- ◆ San Antonio Parks and Recreation Department
- ◆ Texas A&M University–San Antonio
- ◆ Trinity University

Professional Stakeholders

We keep close relationships with industry specific organizations to obtain feedback on trends, program design and ensuring reasonable and effective regulation. Some of the organizations that have been helpful include:

- ◆ Association of Pool and Spa Professionals
- ◆ Greater San Antonio Builders Association
- ◆ Green Industry Alliance
- ◆ Plumbing, Heating and Cooling Contractors Association
- ◆ San Antonio Apartment Association
- ◆ San Antonio Board of Realtors
- ◆ San Antonio Irrigation Association
- ◆ San Antonio Manufacturers Association
- ◆ Southwest Car Wash Association
- ◆ Texas Nursery and Landscape Association
- ◆ Texas Turf Irrigation Association

The tap-root of the SAWS Education concept is that local citizens can live compatibly with nature and act equitably toward each other.

School Education

SAWS education and outreach efforts focus on water supply and wastewater treatment issues with the goal of helping community members of all ages develop their knowledge, skills and sense of environmental stewardship and civic responsibility. SAWS Education Department programs are designed to help students and adults make their own meaningful connections to our water resources and support their efforts to conserve through targeted initiatives.

Helping community members of all ages develop their knowledge



PreK–12th Grade Education

The SAWS education team offers pre-K through 12th grade presentations and field investigations aligned with the Texas Essential Skills and Knowledge (TEKS) curriculum standards. Age-appropriate programs engage students in direct experiences and help them make local connections, develop life skills and examine the larger social context in order to make informed decisions as a citizen. These programs are available free of charge.

Mini grants are available for 3rd grade classes participating in the Wet and Wild: Wetland Researchers program at Mitchell Lake Audubon Center. Schools in the SAWS service area are eligible to apply for up to \$2,000 per school per calendar year. The funds can be used for transportation, admission, program costs and substitute costs.





### Impact Teams

High schools are invited to form Impact Teams and work on community awareness projects or develop products designed to solve water issues they have identified. Teams display their work at an annual high school conference called Confluence. Topics rotate annually between Water Access, Water Quality, Water Conservation and Water Resources. Approximately 25 schools participate annually with almost 600 students involved in projects.

Teachers can find additional lesson plans, activities, a virtual classroom, and background information on a variety of water-related topics at [SAWS.org](http://SAWS.org).

### Community Education Programs

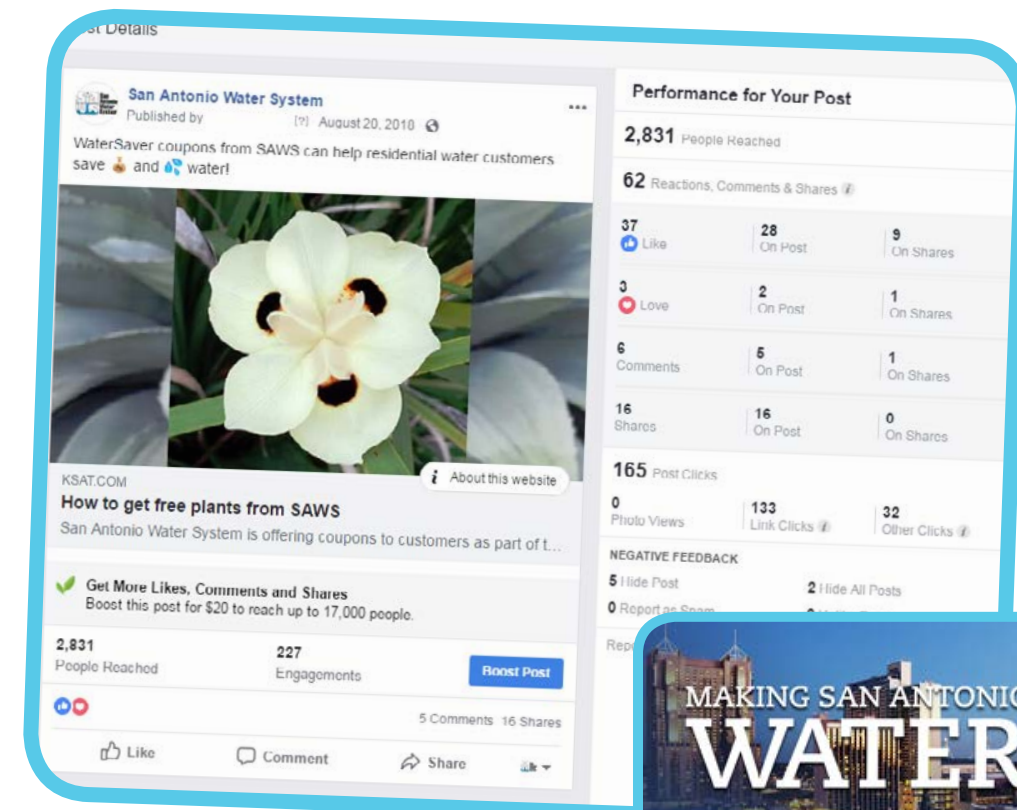
SAWS strives to build the water literacy of community members with engaging educational experiences. The wildly popular Rain to Drain Tour takes lucky participants on a tour of an Edwards Aquifer recharge cave, stops by a SAWS water production facility and tours a water recycling plant during the day-long field trip.

The Education Speakers Series includes topics like Rain to Drain, Sole Source to Diversity (water supplies) and Conservation. In 2018, the education team gave 186 presentations to schools reaching 21,223 students and conducted 83 community programs with 6,307 adult participants.

### SAWS Annual Communications Plan Includes Conservation

SAWS develops an annual communication plan which includes strategies for sharing key conservation messages with target audiences.

Topics include drought management, customer conservation programs and public information campaigns supporting local and national initiatives. Engagement is accomplished through the SAWS website and Conservation webpage, press releases, social media, print and digital ads, billboards, car wraps and more.



### WaterfulSA Campaign

Building brand awareness, increasing customer perception of SAWS value and reaching new audiences is the focus of the WaterfulSA campaign. Online engagement is critical to any communications strategy. The WaterfulSA 3.0 campaign targeted younger new customers and was executed primarily on digital and social media channels, using SAWS social media platforms and the Google ad network.

The campaign ran from August to November 2018 and featured 72 pieces of content focused on drought management, resource development, infrastructure, and water quality. Through the WaterfulSA campaign, SAWS added 2,000 followers and had more than 806,000 video views. The success of this social media program validates SAWS plans to utilize this format for future important community messaging.



Community Outreach

The Outreach Team focuses on fun, innovative ways to bring national conversations around water to the community, always with a San Antonio spin through social media and to where they live, work and play.

During National Fix a Leak Week, SAWS shared leak messages with the #FixALeak hashtag that was used nationally. During National Drinking Water Week, SAWS partnered with local restaurants, coffee shops and breweries to offer pop-up events with the related messages, “No Water, No Tea,” “No Water, No Coffee,” “No Water, No Paletas” and “No Water, No Beer.” In 2018, National Drinking Water Week’s efforts reached 618 citizens in person and 75,861 engagements on social media. SAWS also reached out to the community during summer with #SAWSsummer, which included visits to the San Antonio Zoo, Splashtown waterpark, and Morgan’s Wonderland and Missions baseball games, among other locations. The Team engaged with 2,790 people in person and had 113,988 social media engagements.

A community favorite is when the SAWS Tanker Truck makes an appearance, providing water at community events and creating an opportunity to share the conservation message. Whether online or in-person, SAWS public relations and outreach efforts spark conversations and help make conservation as a social norm.

A community favorite is when the SAWS Tanker Truck makes an appearance!



Uplift Team Outreach

SAWS Uplift is an opportunity to reach out to neighbors in need. The Uplift team promotes 14 program options through bill inserts, VIA bus ads and periodic print and email newsletters. Assistance options include affordability discounts, payment arrangements, emergency assistance, Laterals to People and Plumbers to People.

In 2018, the Uplift team gave presentations and attended 245 community events at schools, churches, fairs and district events. This intensive outreach resulted in increased Uplift enrollment, assisting over 30,000 households.

Plan Evaluation: How Do We Evaluate and Measure Savings?

Have a Plan and Flexibility

The SAWS Conservation Plan is implemented annually. Programs are outlined in advance to determine budget and resources needed and available to achieve planned savings. The annual plan is adjusted quarterly to account for real-time weather conditions, new opportunities and customer response patterns. Unlike most utility operations, individuals must opt in to our programs and take personal action in order for Conservation to succeed. A program may be expanded if doing well and another one may be discontinued or changed to make it more attractive to customers while achieving conservation results. The goal is to end the year with at least one billion gallons of water saved.

Measuring and Tracking Success

There are several metrics we use to measure our success. Each year we compile data that indicates if we are pace to achieve the savings necessary to continue a downward trend in per capita consumption. We compile a summary report each year that shows how many customers participated in each program and how much water savings we believe was achieved as a result. Education metrics ensure us that we are keeping people engaged in water conservation.

Other Success Metrics

**Top-down analysis:** This uses broad water use patterns over time to determine if changes are occurring. Total GPCD should trend downward over time. Residential GPCD should also track downward over time.

**Bottom-up analysis:** This adds up the savings of individual customers who participated in programs to determine if net savings are high enough to achieve GPCD reductions in the plan.



**Program participation:** Each week we track participation in active programs. Dashboards in our Salesforce Program Management Platform give instant feedback on the number of customers completing each program. This allows us to adjust marketing or offer a new program before the year is over, if necessary.

**Conservation market share:** At the end of 2018, we analyzed participation and found that 66 percent of customers had used at least one conservation program. As San Antonio continues to grow, adding new customers every day, our goal is to expand our conservation market share and meaningfully interact with all new and existing customers at least once every 5 years.

**Conservation education and outreach:** We track how many customers participate in the programs we offer and ones our contracted education partners offer. Our goal is to reach over 100,000 people with face-to-face conservation education each year.

**Digital education and outreach:** We track our digital engagement each month. [GardenStyleSA.com](https://www.gardenstyle.com) total visits and time per visit are tracked through Google Analytics. We also monitor the types of users to the site. Other digital engagement includes social media and a monthly e-newsletter tracked for open and click-through rates. We also track our marketing emails to determine open and uptake rates.

## Where Do We Get Savings Estimates?

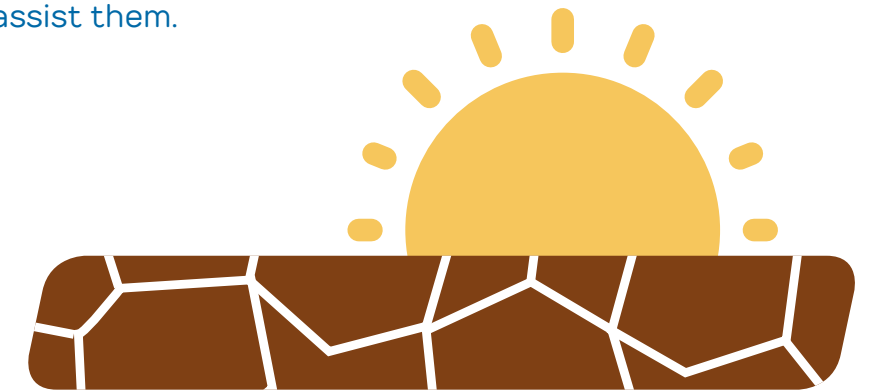
Savings estimates are first derived from theoretical analysis of programs. We use our knowledge of water use patterns and the conservation change being implemented to estimate what savings should be. This theoretical savings is later tested against actual savings achieved by conducting a program evaluation. Because program evaluation is a rigorous and time-consuming process, we cannot do a full analysis on each program every year. We select several that we focus on each year for detailed analysis.

### Example: Irrigation Consultations

**Theoretical savings:** We record the customer's irrigation controller settings at the start of an Irrigation Consultation and the settings we leave at the end of the visit, if approved by the customer. This data gives an easy calculation of theoretical savings that will be true if the customer never adjusts the irrigation controller again. The average theoretical savings recorded for 2018 was 8,371 gallons per home per month.

**Actual savings:** We do not expect all customers to leave their irrigation settings alone. This is especially true for high-end customers using irrigation companies for regular maintenance. It is very difficult to do an in-depth analysis of actual water use changes

among consultation customers because we must account for many other factors that influence usage. The resulting analysis suggests that actual savings is much lower than the theoretical at 1,101 gallons per home per month. While the actual savings is not as high as the theoretical savings, it is still a strong result. Our next step will be to learn more about the characteristics of customers who keep our recommendations and those who do not, so we can better assist them.



## Drought Contingency Plan

Reasonable regulations are a cornerstone of the SAWS overall conservation strategy along with education and incentive programs. Year-round watering rules as well as additional short-term drought rules are in place to facilitate the overall strategy. Year-round rules and the robust education and incentive programs described in this plan prepare the community for deeper restrictions.

Both year-round and drought rules are passed by the San Antonio City Council in consultation with SAWS. The last update occurred in 2014. The full rules are contained in Chapter 34, Article 4 of the San Antonio municipal code. Violation of the rules are a Class C criminal misdemeanor that can result in fines of not less than \$50 and up to \$2,000 for repeat offenders. They are adjudicated in San Antonio Municipal Court. As a result of state legislation, these rules apply to everyone who lives within city limits regardless of water source, including private wells, and people who live in the city's extraterritorial jurisdiction who are SAWS water and/or sewer customers. Civil penalties are made available if needed.

### Implementation and Enforcement

SAWS Conservation Department is primarily responsible for the implementation and enforcement of the city ordinance once the San Antonio city manager declares that a Drought Stage (1–4) is in effect. An official public notice is required in the paper of record and press releases are sent to all local media. SAWS web sites and radio announcements are used to get the word out. All local irrigators, HOA property managers and other stakeholders are individually notified. Social media sites, such as Nextdoor, Facebook and Instagram, are also utilized as well as the [GardenStyleSA.com](https://www.gardenstyle.com) weekly e-newsletter and the bill insert.

SAWS has four to five part-time police officers who work on water waste cases year-round. This number increases to 10–15 police officers during drought. Officers are able to write tickets if they witness a violation of the rules. These tickets are treated much like a speeding ticket. No warnings are generally given by the officer during drought stages. In addition, SAWS has an online water waste reporting system. These reports result in a warning as a citation can only be given if the violation is witnessed by a police officer. In our last significant drought of 2011–2015, approximately 3,000 citations and 15,000 warnings were issued annually. We found that more than 90 percent of people who received a citation changed their habits and never received a second citation. Commercial properties and absentee high-end homeowners were the most likely to get a second citation.

Drought Rules

Drought rules are triggered when the Edwards Aquifer level and/or spring flow at Comal and San Marcos Springs reach certain levels. There are four stages of drought, each associated with increasingly restrictive water use that is primarily focused on outdoor water use. There are provisions to trigger the various stages as a result of water quality issues; however, this has never been needed.

Year-Round Conservation Rule Highlights

- You can only water with a sprinkler, spray irrigation or soaker hose before 11 a.m. and after 7 p.m. any day.
- You may water with a hand-held hose or drip any day and any time.
- Water waste is prohibited at all times. This includes overspray and runoff from lawn watering.
- Restaurants may serve water only on request (to reduce dishwashing).
- Charity car washes allowed only at commercial car wash facilities.



Stage 1

Stage 1 restrictions begin when the 10-day rolling average of the Edwards Aquifer level drops to 660 feet mean sea level at the monitored well. Coming out of drought stages can be considered 15 days after the aquifer is above the trigger.

- Watering with an irrigation system, sprinkler or soaker hose is allowed only once a week before 11 a.m. or after 7 p.m. on your designated watering day, as determined by the last number of your street address.
- Watering with a sprinkler is not allowed on the weekends.
- Water waste is prohibited at all times. Water waste includes allowing water to run off into a gutter, ditch, or drain; or failing to repair a controllable leak.
- Watering days begin and end at midnight; overnight watering is not allowed.
- All residential fountains and indoor commercial fountains can operate at any stage of drought.
- Outdoor commercial fountains must have a SAWS variance in order to operate during drought stages 1 through 4.
- All non-public swimming pools must have a minimum of 25 percent of the surface area covered with evaporation screens when not in use.
- Watering with a hand-held hose, drip irrigation, bucket or watering can is permitted any time and any day.
- Washing impervious cover such as parking lots, driveways, streets or sidewalks is prohibited. Health and safety variances to this rule may be requested from SAWS.
- Residential car washing allowed once per week on Saturday or Sunday as long as there is no water waste.
- The use of SAWS-certified commercial car wash facilities is allowed any day.



- ◆ Operators of golf courses, athletic fields and parks must submit a conservation plan to SAWS. Golf courses, athletic fields and parks may not irrigate between the hours of 11 a.m. and 7 p.m.
- ◆ Landscape areas on golf courses not directly “in play” are required to follow one-day-per-week watering based on address unless otherwise instructed by SAWS.
- ◆ The use of recycled water, with no potable water backup for irrigation is allowed – without waste – any day during the restricted hours if the customer has posted proper signage approved by SAWS.

Stage 1 restrictions continue until there is an announcement in the newspaper that Stage 1 has been canceled or that Stage 2 is in effect.

## Stage 2

Stage 2 restrictions begin when the 10-day rolling average of the Edwards Aquifer level reaches 650 feet mean sea level at the monitored well. Coming out of drought stages can be considered 15 days after the aquifer is above the trigger.

- ◆ All restrictions from Stage 1 remain in effect, unless added to or replaced by Stage 2 rules.
- ◆ Landscape watering with an irrigation system, sprinkler or soaker hose is allowed only once a week from 7–11 a.m. and 7–11 p.m. on your designated watering day, as determined by your address.
- ◆ Watering with drip irrigation or 5-gallon bucket is permitted any day, but only between 7–11 a.m. and 7–11 p.m.
- ◆ Hotels, motels and other lodging must offer and clearly notify guests of a “linen/towel change on request only” program.

Stage 2 restrictions continue until there is an announcement in the newspaper that Stage 2 has been canceled or that Stage 3 is in effect.

## Stage 3

Stage 3 restrictions may begin when the 10-day rolling average of the Edwards Aquifer level drops to 640 feet mean sea level at the monitored well and a review of conditions on the ground determine whether SAWS is able to comply with the applicable regulations governing water supply withdrawals based upon consideration of water supplies, pumping trends, seasonal adjustments and current and forecasted precipitation.

- ◆ All restrictions from Stage 1 and Stage 2 remain in effect, unless added to or replaced by Stage 3 rules.
- ◆ Landscape watering allowed only every other week with an irrigation system, sprinkler or soaker hose from 7–11 a.m. and 7–11 p.m. on your designated watering day, as determined by your address. Weeks when no watering is allowed will be announced via local media and online.
- ◆ Watering with drip irrigation is allowed every Monday, Wednesday and Friday, but only from 7–11 a.m. and 7–11 p.m.

## Stage 4

Stage 4 may be declared if the total supply of water from the Edwards Aquifer and other sources is insufficient to meet customer demand, even while complying with lesser restriction stages. Stage 4 restrictions may be declared at the discretion of the San Antonio city manager upon completion of a 30-day monitoring period following Stage 3 declaration. While under Stage 4, Stage 3 landscape irrigation restrictions remain in effect. Stage 4 restrictions continue until there is an announcement in the newspaper that Stage 4 has been canceled.

During Stage 4, a drought surcharge is assessed on all accounts for water used or assumed to be used for landscape irrigation. Surcharge remains in effect for a minimum of one complete billing month and will remain in effect if Stage 4 is still in effect at the beginning of the next billing month.

Additional restrictions on water use may be established at the discretion of the City Council.

Water Reduction Goals for the Drought Contingency Plan

The overriding goal of drought restrictions is to make sure SAWS does not violate its permit with the Edwards Aquifer Authority. There are prorated reductions in the permit as the aquifer level drops. While SAWS has made strides in diversifying its water sources, the Edwards Aquifer will continue to be the predominant source of water for SAWS customers. Rules in place are primarily focused on reducing peak production increases that would otherwise occur during drought periods. Figure 9 shows how each of the Edwards Aquifer Stage triggers affects City of San Antonio drought rules.

EAA Stage	EAA Trigger (MSL)	EAA Permit Reduction	City of San Antonio Drought Rules
Stage 1	<660	20%	Landscape Water 1X / Week
Stage 2	<650	30%	Landscape Water 1X / Week Reduced Hours 7–11am/7–11pm
Stage 3	<640	35%	Landscape Water 1X / Every Other Week Reduced Hours 7–11am/7–11pm
Stage 4	<630	40%	Landscape Water 1X / Every Other Week Surcharge on Excess Usage

Figure 9: Edwards Aquifer Authority stages and City of San Antonio drought rules

Variances

Variances are available but have specific detailed requirements for each one. A full description can be found in Chapter 34, Article 4 of the San Antonio City Ordinance. A summary of the variances include:

**New landscapes (not for additions to existing landscapes):** The variance allows daily watering for up to five weeks after installation. Watering must be done during drought hours Monday through Friday with a sprinkler. All other drought rules, such as no runoff, must be followed. Variances must be requested through the SAWS online variance request. The bulk of requests come from home builders.

**Outdoor non-residential fountains:** Water features with more than 1,000 square feet of pool surface area can get a Basic Fountain Variance that allows eight hours of run time daily during Stage 1 and 2, and four hours during Stage 3 and 4. An Advanced Fountain Variance allows for more hours but requires a sophisticated fountain management system. Those with less than 1,000 square feet of pool surface area must also apply for a Basic Outdoor Water Feature Variance but run times are not limited.

**Athletic fields:** Athletic field managers may apply for either a basic or advanced variance to once per week athletic field watering restrictions. The Basic Athletic Field Variance allows for each field to be watered on an assigned day designated in the variance. The Advanced Athletic Field Variance requires additional documentation regarding the condition and management of the field. Those receiving advanced variances may split their watering over three assigned days per week.

**Large properties:** Large property managers may request a variance to water their property more than one day a week but each zone may only be watered once per week. An extensive plan that is verified by SAWS along with specific signage throughout the property is required. This ensures that as much conservation as possible takes place on the site. On average, four Large Property Variances are given in any particular drought year. These are often properties whose landscape is integral to their business.

**Power washers:** Commercial power washers must register with SAWS. During drought, they are required to get a variance from SAWS for each of their jobs. These requests are done online. Homeowners who rent power washers to use at their home during drought must also request a variance from SAWS. Only those activities that are health or safety related, or required to facilitate painting are allowed. No water is allowed to drain into the street or storm drain.

Operations Side Conservation Opportunities  
Producing and Delivering Water to Meet Year-Round Needs

SAWS produces water from eight sources, including the Edwards Aquifer, Trinity Aquifer, Western Canyon, Carrizo Aquifer, Medina Lake, Lake Dunlap and through a brackish water desalination plant which came online in early 2017. In addition, the SAWS Aquifer Storage and Recovery (ASR) project, located at H2Oaks, has reached a record storage volume of more than 143,000 acre-feet, enough for more than six months of potable water demand. Production from the Vista Ridge project is expected to begin in the spring of 2020.



During the summer, average pumping typically increases (Figure 10). Maximum daily pumping of more than 310 million gallons was recorded during the months of July and August in 2013 and 2016.

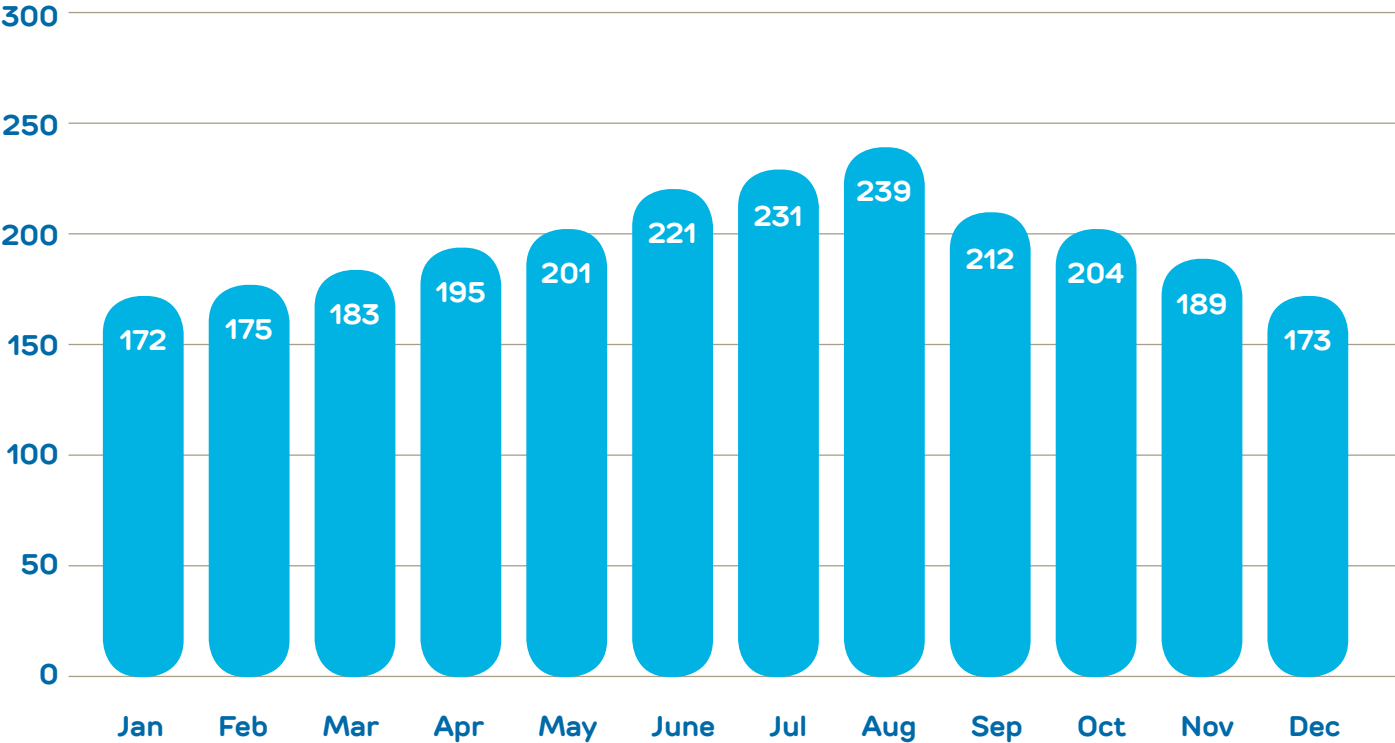


Figure 10: Average monthly total production levels in millions of gallons by month (2007-2018)

Strategic Importance of Peak Summer Savings

Water systems are designed and built to ensure that customer water demand can be supplied on every day of the year. When summer daily use levels spike up much higher than winter daily use levels, it triggers the need for additional infrastructure and supplies. Since infrastructure and extra supplies are only needed some of the time, this is an expensive challenge. For this reason, SAWS Conservation programs that reduce peak summer usage are a priority. Reducing peak use levels saves money for individual customers but also keeps the cost of operations less expensive for everyone.

Water Conservation Equity

Helping all customers manage their water usage and resulting bill payments is a priority for SAWS. For households concerned with the cost of water and sewer bills, our programs offer a way to help monitor and manage bills. Plumbers to People and Conservation Makeover assist households with documented financial challenges. WaterSaver Coupons help households over our entire service area transform their properties to make them attractive and drought resilient. WaterSmart monthly reports have been shown to reduce bills for households with high and low usage levels. Conservation programs will continue to be designed to meet the needs of our diverse community.

Water Loss Control Program

The first step in developing SAWS water loss strategy is measuring water as it flows through the system. Master meters are used to track inputs to the system while customer meters measure the water delivered to the customer.

Master Meters: Measuring Production of Water Supplies

All system inputs, whether owned or purchased water sources, are metered before entering the SAWS distribution system. Production from utility-owned wells is metered at the wellhead. Water purchased from another supplier is metered prior to entering the distribution system. Most current wholesale and municipal connections are mechanically metered, with the exception of some large meters servicing large industrial customers such as Boeing and PortSA. Testing performance data is gathered through the SAWS in-house large meter program.

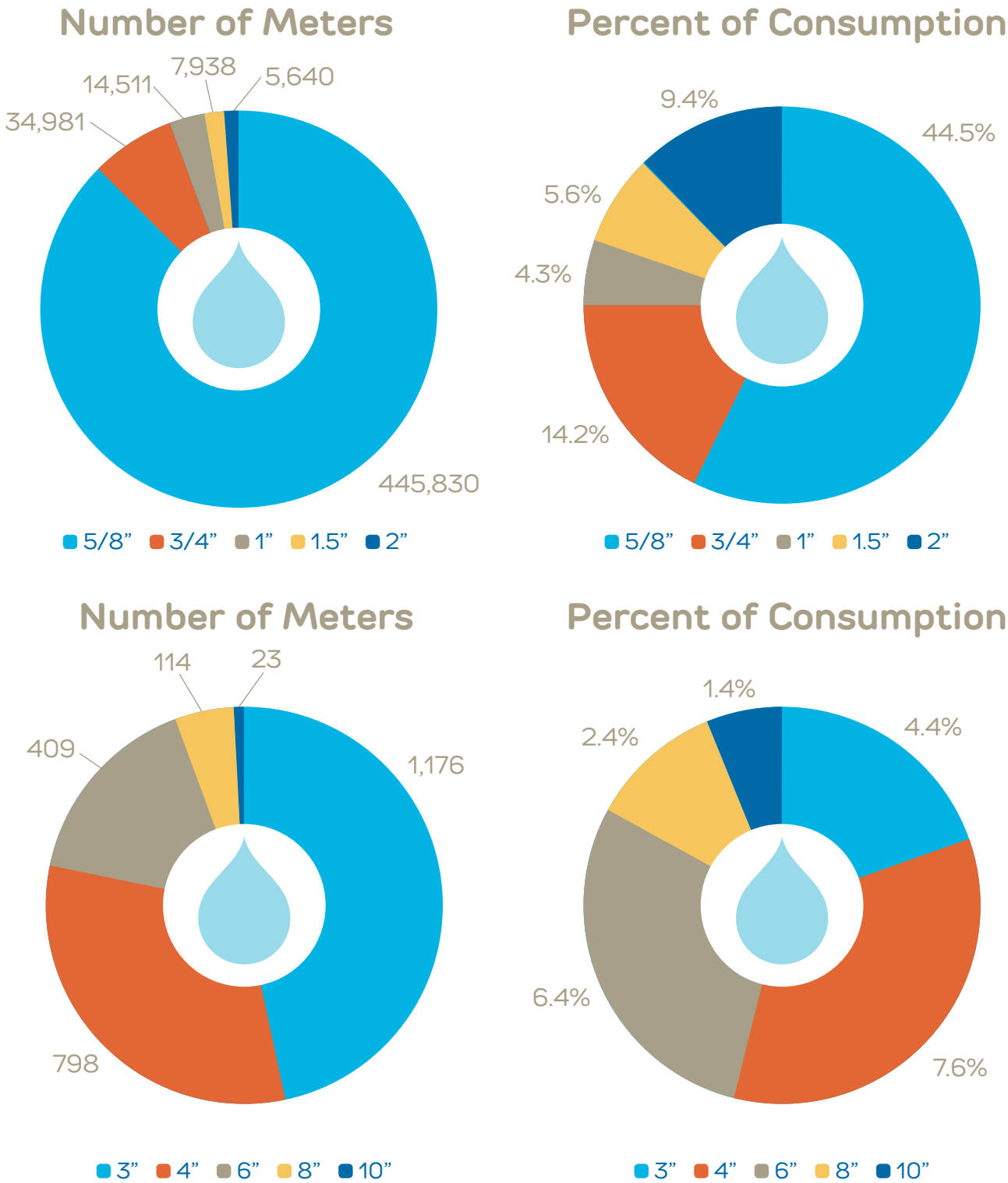
SAWS has a diverse array of water supplies and meters. Our unusually large number of supply meters and the integration of many supplies complicates production measurement processes. Unlike many water systems that have only one or two supply input points, our decentralized supply system, while allowing for redundancies, is a challenge to accurately measure. To combat this challenge, these assets are run through a verification process as needed, comparing them to factory calibration. Since our production facilities are varied and complicated, on occasion we have tested these very large supply meters over the years. Results have indicated that some production meters record more water than is actually produced while others record less water than was produced. The challenge this presents is being analyzed to quantify this effect before making intervention decisions.

There are two methods currently being utilized for daily reading of production meters: manual and via Supervisory Control and Data Acquisition (SCADA) system. Production meters brought into the SAWS system from the former Bexar Metropolitan Water District service area are read each day by Production Technicians because upgraded equipment is not yet available. The readings are provided to data analysts for entry into a database reserved for former Bexar Metropolitan Water District production meter readings. Meters in the original SAWS service area are read remotely via a SCADA system. The readings are recorded and monitored daily in the SAWS Control Center in a database.

Production reports are aggregated from all production meters to track production over time.

Customer Metering, Testing, Repair and Replacement

There are over 565,000 active customer meters within the SAWS system. All are critical assets that must be monitored and maintained for proper operation. Customer meters are managed in two categories: small (up to 2") and large (more than 2"). Testing, replacement and repair regimes differ significantly due to unit cost and revenue potential for customer metering assets. Figure 11 shows the count and percentage.



In the small meter category, the current meter replacement program is performed by SAWS staff as meters are identified that are slowing down or failing to read any water flow. These are referred to as sick meters within the water industry. Sick or broken meters are reset as needed by SAWS through service requests and work orders. When data or customer reports raise questions about meter performance, pulled meters may be tested by the SAWS Meter Shop.

As part of annual water loss management efforts, there is a goal to run cost effective statistical sampling of 250–500 meters per year. A sampling plan that outlines random selection of different size meters are coordinated for reset and testing. This business practice provides an understanding of meter registration performance. Over time this information will allow SAWS to make more nuanced replacement program decisions and keep a pulse of how well all meters in the system are performing.

Large meters are those over two inches in size and come in a wide variety of types, including turbine, displacement, magnetic and compound meters. In this category, SAWS has a testing schedule where all meters are tested at least once every 18 months, with certain high-use meters tested on a 12-month rotation. Some large meters are flow tested but not accuracy tested, often because the service is not able to be taken down for the time needed to conduct an in-situ accuracy test. Broken or sick meters are tested as needed based on service requests and work orders. Meters are tested by SAWS staff and those that fail at one of the three flow levels (high, medium, low) are repaired or replaced as needed, and re-tested. There is no targeted replacement program for meters of this size. Instead, meters are replaced as needed when repairs are not possible or feasible. Very large meters (those over two inches in size) are replaced with coordination from staff in the SAWS Distribution and Collections Department.

Figure 11: Number and percent of consumption for small and large meters





# Operations Side Conservation: Water Loss and Leak Detection

## What Is a Water Loss Audit and Water Loss Control Program?

SAWS invests heavily in programs that help our customers manage their water consumption and also makes it a priority to pursue all financially feasible operations side conservation opportunities. Conducting an annual Water Loss Audit and having a Water Loss Control Program is critical to this focus.



**The purpose of a Water Loss Audit is to account for and understand how much water is non-revenue in nature and determine how much of it can be eliminated in an economically feasible manner.**

Within the water industry, water losses refers to “nonrevenue water.” Any water that is produced by the utility but does not result in revenue falls into this category. For this reason, water losses go beyond water that leaks out of the distribution system, commonly referred to as main breaks. Water losses also include water that may be delivered to and used by customers but not paid for by anyone. Other water losses may come from firefighting or operations such as flushing lines, internal process water used in water treatment facilities or backwashing pumps to keep them cool. The purpose of a Water Loss Audit is to account for and understand how much water is nonrevenue in nature and determine how much of it can be eliminated in an economically feasible manner.

A Water Loss Control Program is a complex and ongoing effort that involves all SAWS departments. The annual Water Loss Audit reflects a compilation of data and analysis from Production, Metering, Distribution & Collection, and Finance. Placing a value on the nonrevenue water helps SAWS determine which investments to reduce water losses will likely have the best yield.

## What Water Loss Challenges Are Unique to SAWS?

SAWS is not only one of the largest water utilities in the United States. It is also one of the most complex. How?

- ◆ There are more than 7,100 miles of potable water pipes, more than 100,000 valves and more than 565,000 customer meters to maintain in the SAWS water system.
- ◆ Being one of the older cities in the country means that we have water infrastructure of varied materials, ages and construction types.
- ◆ Having eight different water sources builds resilience but it also adds complexity in how water is managed, distributed and measured.
- ◆ The ability to produce water in our system from over 175 wells is unique. Most utilities produce from one source or only a handful of sources.
- ◆ The distribution complexity hampers the ability to implement some typical simple water management strategies, such as district managed areas and pressure management controls. SAWS will be exploring opportunities to control system water loss on complex water delivery systems while maintain system reliability to its customers.
- ◆ Our service area covers a geographical area with significant elevation changes, resulting in a large number of distinct pressure zones.

SAWS calls on a wide array of technology, data analysis and expertise to manage these challenges. This section of the 2019 Five-Year Conservation Plan is an introduction to the Water Loss Control program at SAWS. SAWS continues to build an informed cost justified water loss program that is a strategic high priority.

SAWS typically repairs approximately 7,700 to 9,900 potable water pipes and services each year. SAWS also finds approximately 14,000 meter leaks each year with the significant majority of those being customer leaks. Identifying which infrastructure is most vulnerable to breaks is a priority component of the SAWS Water Loss Control Program.

### San Antonio Weather Challenge

Typical North American main break frequencies are approximately 25 failures per 100 miles of main per year. SAWS recent data indicates a similar failure rate in San Antonio. However, in any one year our water line failure rate is significantly impacted by acute extreme weather influences. Dry weather, strong production and elastic soils stress pipes in drought years, resulting in very busy “main break seasons”.

Water pipe repairs, such as the one shown below, are a costly and critical activity in any water system. SAWS typically repairs up to 9,900 potable water pipes each year. Identifying which infrastructure is most vulnerable to breaks is a priority component of the SAWS Water Loss Control Program.



**SAWS Water Loss Control Program**

While SAWS staff bring a great deal of expertise and system knowledge to our water loss control efforts, SAWS also works with water loss control experts and anticipates continued professional support for the next five years. SAWS completes annual TWDB water loss balances and audits that have been reviewed by multiple third-party processes in accordance with the American Water Works Association (AWWA) M36 guidelines. Third-party reviews by a consultant and peers provide perspective on the data validity scores assigned as part of our water loss audits as well as guidance on how to improve our data validity.

SAWS has completed a full, proactive acoustic sweep of its potable water distribution system twice over the last four years. SAWS will pilot the use of satellite leak detection and acoustic logging. Additionally, SAWS is piloting the use of remote leak detection robots that can assist in finding smaller leaks within the distribution system which cannot

be found acoustically. The SAWS meter shop utilizes a fully equipped MARS gravimetric testing bench and mobile testing units to monitor the registration health of the customer meter along with informing water audit registration adjustments. Apparent (meter accuracy) loss testing programs will continue and be optimized based on findings. The next five years will explore a few specific technologies and process improvements that will help SAWS continue to define and eventually cost effectively control instances of water loss.

**The Future of SAWS Water Loss Control Programs**

SAWS is moving forward on multiple parallel tracts that continue a water balance approach with annual auditing and reporting as required by the state. SAWS best business practices include field tests and verifications to better inform process, data and audit improvements. A suite of potential specific interventions will be evaluated for implementation during the next five years. These include:

- ◆ Potential capital expenditures on production metering specific for water loss control
- ◆ Information technology projects critical to processing data efficiently
- ◆ Working with key staff to improve data collection and analysis

**Some of the strategies SAWS will continue in the next five years are:**

- ◆ Data and process improvements
  - Continue to update and enhance data-related Standard Operating Procedures for the Water Loss Audit which will improve audit validity and value
  - Formalize a cross-functional task force on water loss control under the coordination of the Water Resources Department
- ◆ Proactive Leak Detection
  - Evaluate the full system sweeps to increase efficiency through improved, efficient technologies.
  - Pilot the use of quarterly satellite data to target hidden leak investigations.

**SAWS has completed a full, proactive acoustic sweep of its potable water distribution system twice over the last four years.**



◆ Apparent (Customer Meter Accuracy) Loss Testing

- Continue conducting periodic random stratified testing of customer meters.
- Continue to work with Water Loss Consultants who can advise on improved testing schedules and new technologies for large meters.
- Improve data sets associated with large meter testing to enhance analysis and program management options. Continue testing approximately 2,500 new and used meters for quality control meter program.

◆ Further Exploration of Technologies

- Pilot Advanced Meter Infrastructure (AMI) to improve our understanding of nonrevenue water by aligning production and usage data.
- Continue to collaborate with peer utilities on topics such as workflow process and technology advances that may improve water loss control.

◆ Intervention Analysis

- Review the feasibility for enhanced metering of our largest production facilities where over-registration may be resulting in inaccurate and higher water loss reports. This is challenging for SAWS due to the high number of Edwards Aquifer master meters and diversity of other supplies in SAWS portfolio.
- Continue to work with staff to improve work order data that will enhance our understanding of the condition of the potable water infrastructure.
- Continue analysis that will help move potable water improvements into proactive capital projects and reduce reactive, expensive repairs from failure.

SAWS plans to continue curbing instances of real loss, monitoring meter health and incorporating field data into standard reporting. SAWS will continue to identify strategic options to improve cost effective loss control that may develop in the coming years.

Use of Satellite Technology Assistance to Find Leaks

SAWS is using the same technology used to find water on other planets. Satellite imagery coupled with advanced radar technology that is able to distinguish specific characteristics of potable water can assist SAWS in locating hidden sub-surface leaks that cannot be detected acoustically. A sweep of key portions of the SAWS system highlights areas where technicians can check for leaking pipes in our large distribution system.

Water Loss Goals and Targets: Expectations Vary From Year to Year

Water loss variability is exacerbated in San Antonio by our extreme weather conditions and use of different sources to meet high production levels in summer months. Innovations like Aquifer Storage and Recovery, desalination and the use of multiple water sources have given our community tremendous water supply redundancy. They also complicate our measurements within a complex distribution system. Finding cost effective means to improve measurements is one of the focal points of water loss auditing.

We express our water loss improvement goals by year as required by Texas reporting requirements. However, readers of this plan should be aware that we are more concerned with trends over time than water losses in a particular year, which could be strongly influenced by weather or other factors.

	Historical					Goals	
	2014	2015	2016	2017	2018	2023	2028
GPCD	18	18	16	16	20	16.5	16.5
Percentage	14.81%	5.18%	13.49%	13.59%	17.38%	14%	14%

Table 3: Water loss as total GPCD and percentage, historical and goals

SAWS continues to benchmark better than average against national validated data, such as those collected in the American Water Works Association’s Water Audit and Data Initiative. However, SAWS will continue to strive for optimized, cost-effective interventions.

Rate Structure

SAWS designed its rate structure to recover the costs of production and delivery for each type of customer served. The rate structure is also intended to send a price signal that will motivate customers to conserve water. The affordability of water for residential customers who are economically challenged is also a consideration. SAWS conducts a formal review of cost of service and rate design approximately every five years. This review involves a Rate Advisory Committee of citizens, the expertise of industry rate analysts and extensive community input. SAWS intends to conduct a cost of service and rate design review beginning in 2019. The San Antonio City Council must approve any rate change proposed by SAWS.

Customers are billed monthly based on water usage measured in 100 cubic foot (CCF) increments. The current rate structure consists of rate classes for residential class, general class, landscape irrigation service, wholesale water service and recycled water service. Residential, general and landscape rates are explained below. Wholesale and recycled service are charged with an availability fee and a volume charge. Rates also vary depending on whether the customer is located inside or outside the city limits.

A water supply fee is assessed to fund the development of and production from new water sources. Other pass-through fees are charged through cooperative agreements with government agencies, including the Texas Commission on Environmental Quality and the Edwards Aquifer Authority.

Residential Class Service

Customers are charged a monthly service availability charge based on meter size, as shown in Table 4.

Meter Size	Inside City Limits	Outside City Limits
5/8"	\$12.82	\$16.67
3/4"	\$16.97	\$22.06
1"	\$25.22	\$32.79
1 1/2"	\$45.85	\$59.61
2"	\$70.58	\$91.75
3"	\$128.34	\$166.84
4"	\$210.83	\$274.06
6"	\$417.07	\$542.18
8"	\$664.55	\$863.89
10"	\$953.27	\$1239.24
12"	\$1,778.20	\$2,311.67

Table 4: Residential class monthly service availability charge (2019)

A lifeline discount is provided to customers with usage that does not exceed 2,992 gallons in a month, whereby the service availability charge is reduced by \$2.57 inside city limits or \$3.34 outside city limits. The monthly volume charge is measured per 100 gallons of water usage and billed in threshold blocks as shown in Table 5.



Usage Gallon Block Threshold	Inside City Limits	Outside City Limits
2,992	\$0.0740	\$0.0962
4,489	\$0.1295	\$0.1683
5,985	\$0.1665	\$0.2165
7,481	\$0.2034	\$0.2645
10,473	\$0.2405	\$0.3125
14,962	\$0.2775	\$0.3607
20,199	\$0.3329	\$0.4328
Over 20,199	\$0.4809	\$0.6253

Table 5: Residential class monthly volume charge (2019) – rate per 100 gallons

An affordability discount is offered to customers who meet an income eligibility requirement. The discount is based on the type of service provided (water, sewer, or both) and annual income level in relation to the federal poverty guidelines.

Sewer rates are charged for all metered residential connections using winter averaging for the volume charge. The average water usage of three consecutive billing periods from November 15 to March 15 is computed and residential sewer rates are charged based on this winter average. Customers are encouraged to shut off irrigation systems and conserve water during winter averaging to reduce their sewer charges for the year to come.



General Class Service

Business customers are grouped into a general class rate category that includes apartment, commercial, industrial and municipal customers. A multi-step, base-excess use structure is used. The base amount is 100 percent of a customer’s average annual usage and increased unit rates apply as usage exceeds the base amount. Similar to the Residential Class Rates, a monthly service availability fee is charged as shown in Table 6 below. The monthly volume charge is shown in Table 7.

Meter Size	Inside City Limits	Outside City Limits
5/8"	\$13.86	\$16.94
3/4"	\$19.79	\$24.12
1"	\$31.66	\$38.45
1 ½"	\$61.29	\$74.27
2"	\$96.79	\$117.20
3"	\$179.74	\$217.47
4"	\$298.19	\$360.65
6"	\$594.32	\$718.67
8"	\$949.73	\$1,148.31
10"	\$1,364.34	\$1,649.54
12"	\$2,548.96	\$3,081.65

Table 6: General class monthly service availability charge (2019)

Sewer rates are charged for all metered general class connections based on 100% of their monthly water usage. If the general class customer has an irrigation system connected to the meter, a portion of water will be billed at irrigation rates. The portion deemed irrigation use would be subject to sewer charges.

Usage Blocks	Inside City Limits	Outside City Limits
Base	\$0.1810	\$0.2354
>100–125 % of Base	\$0.2084	\$0.2710
>125–175 % of Base	\$0.2717	\$0.3533
>175 % of Base	\$0.3171	\$0.4121

Table 7: General class monthly volume charge (2019) – rate per 100 gallons

Landscape Irrigation Service

Rates are charged to customers with “landscape irrigation” accounts, excluding meters that use water as a part of their business function or for health and safety reasons (e.g., process water, nurseries, school athletic fields). In the early 2000s, commercial customers were required to separately meter irrigation according to the City of San Antonio Unified Development Code. Accounts started prior to that time are charged based on a percentage of estimated irrigation water use.

Meter Size	Inside City Limits	Outside City Limits
5/8"	\$13.86	\$16.94
3/4"	\$19.79	\$24.12
1"	\$31.66	\$38.45
1 ½"	\$61.29	\$74.27
2"	\$96.79	\$117.20
3"	\$179.74	\$217.47
4"	\$298.19	\$360.65
6"	\$594.32	\$718.67
8"	\$949.73	\$1,148.31
10"	\$1,364.34	\$1,649.54
12"	\$2,548.96	\$3,081.65

Table 8: Landscape irrigation monthly service availability fee (2019)

Charges for service availability and volume charges are shown in Table 8 and Table 9, respectively.

Usage Gallon Block Threshold	Inside City Limits	Outside City Limits
8,229	\$0.3292	\$0.4279
17,954	\$0.4607	\$0.5991
162,316	\$0.5925	\$0.7702
Over 162,316	\$0.7570	\$0.9841

Table 9: Landscape irrigation monthly volume charge (2019) – rate per 100 gallons

No sewer charges are billed on irrigation accounts.

Wholesale Contracts

SAWS currently has three wholesale contracts with East Central Special Utility District, The City of Elmendorf and The Oaks WSC. In 2018, the wholesale contracts totaled just over 942 acre–feet in sales. These contracts are managed by the SAWS Water Resource staff. All wholesale contracts require the wholesale purchaser to “develop and implement a water conservation plan using the applicable elements of 30 TAC Chapter 288.” The approved Conservation Plan can be requested by SAWS as needed.

Water Supply Fee

The water supply fee is assessed as a volumetric charge only to fund the development of and production from new water sources. There are separate water supply fee charges for residential, general class, irrigation and wholesale class customers, respectively. These rates are assessed in addition to the regular water delivery charges and rates described above for each of these classes.

Residential customers are charged the water supply fee based on their usage.

Usage Gallon Block Threshold	Water Supply Fee
2,992	\$0.1040
4,489	\$0.1819
5,985	\$0.2338
7,481	\$0.2859
10,473	\$0.3379
14,962	\$0.3899
20,199	\$0.4678
Over 20,199	\$0.6756

Table 12: Residential class water supply fee (2019) – rate per 100 gallons

General class customers include apartments, commercial businesses, industrial facilities and municipal customers. A multi–step, base–excess use structure is used. The base amount is 100 percent of a customer’s average annual usage and increased unit rates apply as usage exceeds the base amount.

Usage Gallon Block Threshold	Water Supply Fee
Base	\$0.1961
125% of Base	\$0.2256
175% of Base	\$0.2941
Over 175% of Base	\$0.3433

Table 13: General class water supply fee (2019) – rate per 100 gallons

Landscape irrigation customers are charged the water supply fee based on their usage.

Usage Gallon Block Threshold	Water Supply Fee
8,229	\$0.2566
17,954	\$0.3592
162,316	\$0.4619
Over 162,316	\$0.5903

Table 14: Irrigation water supply fee (2019) – rate per 100 gallons

Wholesale class customers are charged the water supply fee, determined by their base use, as defined in their contract with SAWS or as 100% of the annual average consumption.

Usage Gallon Block Threshold	Water Supply Fee
Base	\$0.2554
Over Base	\$0.7665

Table 15: Wholesale water supply fee (2019) – rate per 100 gallons





## Attachment A: TWDB Water Conservation Plan Requirements Checklist

As the plan is finalized, we will include the page number of each of the checklist items below.

- A. **Page 8** – An evaluation of the Applicant’s water and wastewater system and customer use characteristics to identify water conservation opportunities and potential targets and goals. Completion of the Water Conservation Utility Profile, T W DB – 1 9 6 5 as part of the evaluation is required and should be submitted with the Plan. The utility profile should include the water sales and use for the following classifications: residential (both for single family and multi-family), commercial, institutional, industrial, agricultural, and wholesale; as appropriate.
- B. **Page 18** – Inclusion of five-year and ten-year targets that are specific and quantified for water savings and include goals for water loss programs in gallons per capita per day, and goals for municipal use and residential use, in gallons per capita per day. A base use figure should be included to be able to calculate your savings. Consider state and regional targets and goals, local climate, and demographics. Consider the anticipated savings that can be achieved by utilizing appropriate best management practices and other conservation techniques.
- C. **Page 14** – A schedule for implementing the plan to achieve the applicant’s targets and goals.
- D. **Page 43** – A method for tracking the implementation and effectiveness of the plan. The method should track annual water use and provide information sufficient to evaluate the implementation of conservation measures. The plan should measure progress annually, and evaluate the progress towards meeting the goals.
- E. **Page 53** – A master meter to measure and account for the amount of water diverted from the source of supply.
- F. **Page 53** – A program of universal metering of both customer and public uses of water, for meter testing, repair and for periodic replacement.
- G. **Page 53, 56** – Measures to determine and control water loss; for example, periodic visual inspections along distribution lines; annual or monthly audit of the water system to determine illegal connections; abandoned services, etc.
- H. **Page 56** – A continuous program of leak detection, repair, and water loss accounting for the transmission, delivery, and distribution system in order to control water loss.

I. **Page 36** – A program of continuing education and information regarding water conservation. This should include providing water conservation information directly to each residential, industrial and commercial customer at least annually, and providing water conservation literature to new customers when they apply for service.

J. **Page 61** – A water rate structure which is not “promotional,” i.e., a rate structure which is cost-based and which does not encourage the excessive use of water. Include copy of the rate structure.

K. **Page 43, Attachment G** – A means of implementation and enforcement, evidenced by adoption of the plan:

1. a copy of the ordinance, resolution, or tariff indicating official adoption of the water conservation plan by the applicant and
2. a description of the authority by which the applicant will implement and enforce the conservation plan.

L. **Page 66** – If the Applicant will utilize the project financed by the TWDB to furnish water or wastewater services to another supplying entity that in turn will furnish the water or wastewater services to the ultimate consumer, the requirements for the water conservation plan also pertain to these supplier entities. To comply with this requirement the applicant shall:

1. submit its own water conservation plan;
2. submit the other entity’s (or entities) water conservation plan;
3. require, by contract, that the other entity (or entities), adopt a water conservation plan that conforms to the board’s requirement and submit it to the board. If the requirement is to be included in an existing water or wastewater service contract, it may be included, at the earliest of the renewal or substantial amendment of that contract, or by other appropriate measures.

M. **Attachment F** – Documentation that the regional water planning group for the service area of the applicant has been notified of the applicant’s water conservation plan.

Note: The water conservation plan may also include other conservation methods or techniques that the applicant deems appropriate.

N. **Page 45** – The Drought Contingency Plan (for Financial Assistance Programs) shall include:

1. Trigger conditions. Describe information to be monitored. For example, reservoir levels, daily water demand, water production or distribution system limitations. Supply source contamination and system outage or equipment failure should be considered too. Determine specific quantified targets of water use reduction.
2. Demand management measures. Actions that will be implemented by the utility during each stage of the plan when predetermined triggering criteria are met. Drought plans must include quantified and specific targets for water use reductions to be achieved during periods of water shortage and drought. Supply management measures typically can be taken by the utility to better manage available water supply, as well as the use of backup or alternative water sources. The demand management measures should curtail nonessential water uses, for example, outdoor water use.
3. Initiation and termination procedures. The drought plan must include specific procedures to be followed for the initiation or termination of each drought response stage, including procedures for notification of the public.
4. Variances and enforcement. The plan should specify procedures for considering (approving and denying) variances to the plan. Equally as important is the inclusion of provisions for enforcement of any mandatory water use restrictions, including specification of penalties for violations of such restrictions.
5. Measures to inform and educate the public. Involving the public in the preparation of the drought contingency plan provides an important means for educating the public about the need for the plan and its content.

O. **Attachment G** – Adoption. No water conservation plan is complete without formal adoption by the governing body of the entity. For a municipal water system, adoption would be by the city council as an ordinance, or a resolution by an entity’s board of directors.

P. **Karen Guz and Martha Wright are responsible for reporting** – Reporting Requirement: Identify who will be responsible for preparing the annual report on the utility profile form TWDB-1965. Loan/Grant Recipients must maintain an approved water conservation program in effect until all financial obligations to the state have been discharged and shall report annually to the executive administrator of the TWDB on the progress in implementing each of the minimum requirements in its water conservation plan and the status of any of its customers’ water conservation plan required by contract. The content and format for the annual reporting is included in the forms: Water Conservation Plan Annual Report, TWDB-1966 for retail water suppliers, TWDB-1967 for non-water suppliers and TWDB-1969 for wholesale water suppliers.



# Attachment B: TCEQ Water Conservation Plan Requirements Checklist

As the plan is finalized, we will include the page number of each of the checklist items below.

A. **Page 11, 16** – Record Management System

The water conservation plan must include a record management system which allows for the classification of water sales and uses in to the most detailed level of water use data currently available to it, including if possible, the following sectors: residential (single and multi-family), commercial.

B. **Page 18** – Specific, Quantified 5 & 10-Year Targets

The water conservation plan must include specific, quantified five-year and ten-year targets for water savings to include goals for water loss programs and goals for municipal use in gallons per capita per day. Note that the goals established by a public water supplier under this subparagraph are not enforceable. These goals must be updated during the five-year review and submittal.

C. **Page 53** – Measuring and Accounting for Diversions

The water conservation plan must include a statement about the water suppliers metering device(s), within an accuracy of plus or minus 5.0% in order to measure and account for the amount of water diverted from the source of supply.

D. **Page 53** – Universal Metering

The water conservation plan must include and a program for universal metering of both customer and public uses of water, for meter testing and repair, and for periodic meter replacement.

E. **Page 53, 56** – Measures to Determine and Control Water Loss

The water conservation plan must include measures to determine and control water loss (for example, periodic visual inspections along distribution lines; annual or monthly audit of the water system to determine illegal connections; abandoned services; etc.).

F. **Page 36** – Continuing Public Education & Information

The water conservation plan must include a description of the program of continuing public education and information regarding water conservation by the water supplier.

G. **Page 61** – Non-Promotional Water Rate Structure

The water supplier must have a water rate structure which is not “promotional,” i.e., a rate structure which is cost-based and which does not encourage the excessive use of water. This rate structure must be listed in the water conservation plan.

H. **N/A – SAWS does not operate any reservoirs** – Reservoir Systems Operations Plan

The water conservation plan must include a reservoir systems operations plan, if applicable, providing for the coordinated operation of reservoirs owned by the applicant within a common watershed or river basin in order to optimize available water supplies.

I. **Page 43, Attachment G** – Enforcement Procedure and Plan Adoption

The water conservation plan must include a means for implementation and enforcement, which shall be evidenced by a copy of the ordinance, rule, resolution, or tariff, indicating official adoption of the water conservation plan by the water supplier; and a description of the authority by which the water supplier will implement and enforce the conservation plan.

J. **Attachment F** – Coordination with the Regional Water Planning Group(s)

The water conservation plan must include documentation of coordination with the regional water planning groups for the service area of the public water supplier in order to ensure consistency with the appropriate approved regional water plans.

K. **Last updated 2014** – Plan Review and Update

A public water supplier for municipal use shall review and update its water conservation plan, as appropriate, based on an assessment of previous five-year and ten-year targets and any other new or updated information. The public water supplier for municipal use shall review and update the next revision of its water conservation plan not later than May 1, 2009, and every five years after that date to coincide with the regional water planning group. The revised plan must also include an implementation report.

ADDITIONAL REQUIREMENTS FOR LARGE SUPPLIERS

Required of suppliers serving population of 5,000 or more or a projected population of 5,000 or more within the next ten years:

A. **Page 56** – Leak Detection and Repair

The plan must include a description of the program of leak detection, repair, and water loss accounting for the water transmission, delivery, and distribution system in order to control unaccounted for uses of water.

**B. Page 66 – Contract Requirements**

A requirement in every wholesale water supply contract entered into or renewed after official adoption of the plan (by either ordinance, resolution, or tariff), and including any contract extension, that each successive wholesale customer develop and implement a water conservation plan or water conservation measures using the applicable elements in this chapter. If the customer intends to resell the water, the contract between the initial supplier and customer must provide that the contract for the resale of the water must have water conservation requirements so that each successive customer in the resale of the water will be required to implement water conservation measures in accordance with the provisions of this chapter.

**ADDITIONAL CONSERVATION STRATEGIES**

Any combination of the following strategies shall be selected by the water supplier, in addition to the minimum requirements of 30 TAC §288.2(1), if they are necessary in order to achieve the stated water conservation goals of the plan. The commission may require by commission order that any of the following strategies be implemented by the water supplier if the commission determines that the strategies are necessary in order for the conservation plan to be achieved:

- 1. **Page 61** – Conservation-oriented water rates and water rate structures such as uniform or increasing block rate schedules, and/or seasonal rates, but not flat rate or decreasing block rates;
- 2. **Page 45** – Adoption of ordinances, plumbing codes, and/or rules requiring water conserving plumbing fixtures to be installed in new structures and existing structures undergoing substantial modification or addition;
- 3. **Page 26** – A program for the replacement or retrofit of water-conserving plumbing fixtures in existing structures;
- 4. **Page 11** – A program for reuse and/or recycling of wastewater and/or graywater;
- 5. A program for pressure control and/or reduction in the distribution system and/or for customer connections;
- 6. **Page 20, 45** – A program and/or ordinance(s) for landscape water management;
- 7. **Page 43** – A method for monitoring the effectiveness and efficiency of the water conservation plan; and

- 8. **Throughout the Plan** – Any other water conservation practice, method, or technique which the water supplier shows to be appropriate for achieving the stated goal or goals of the water conservation plan.

**WATER CONSERVATION PLANS SUBMITTED WITH A WATER RIGHT APPLICATION FOR NEW OR ADDITIONAL STATE WATER**

Water Conservation Plans submitted with a water right application for New or Additional State Water must include data and information which:

- 1. support the applicant’s proposed use of water with consideration of the water conservation goals of the water conservation plan;
- 2. evaluates conservation as an alternative to the proposed appropriation; and
- 3. evaluates any other feasible alternative to new water development including, but not limited to, waste prevention, recycling and reuse, water transfer and marketing, regionalization, and optimum water management practices and procedures.

Additionally, it shall be the burden of proof of the applicant to demonstrate that no feasible alternative to the proposed appropriation exists and that the requested amount of appropriation is necessary and reasonable for the proposed use.

## Attachment C: TWDB Best Management Practices Decoded

The Texas Water Development Board publishes best management practices (BMPs) on their website to aid utilities with achieving goals through conservation. SAWS Conservation strives to use many of the BMPs, a list of which are included below.

## Conservation Analysis and Planning

## Conservation Coordinator

- **Page 2** – Conservation Coordinator
- **Page 14** – Who Watches Over Conservation Progress in San Antonio?

## Cost Effective Analysis

- **Page 43** – Plan Evaluation: How Do We Evaluate and Measure Savings?

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

- **Page 23** – Conservation Irrigation Consultations
- **Page 27** – Plumbers to People: Emergency Plumbing Assistance
- **Page 20** – Commercial Irrigation Checkups: A Regulation That Works!

## Financial

## Water Conservation Pricing

- **Page 31** – Commercial Irrigation Checkups: A Regulation That Works!
- **Page 61** – Rate Structure

**N/A** – Wholesale Agency Assistance Programs

## System Operations

## Metering of All New Connections and Retrofit of Existing Connections

- Page 53 – Water Loss Control Program

## System Water Audit and Water Loss Control

- **Page 53** – Water Loss Control Program
- **Page 56** – Operations Side Conservation: Water Loss and Leak Detection

 Landscaping

## Athletic Field Conservation

- **Page 23** – Conservation Irrigation Consultations
- **Page 24** – Irrigation System Rebates
- **Page 29** – Industrial and Commercial Water Conservation
- **Page 45** – Drought Contingency Plan
- **Page 65** – Landscape Irrigation Service

## Golf Course Conservation

- **Page 23** – Conservation Irrigation Consultations
- **Page 24** – Irrigation System Rebates
- **Page 29** – Industrial and Commercial Water Conservation
- **Page 45** – Drought Contingency Plan
- **Page 65** – Landscape Irrigation Service

## Landscape Irrigation Conservation and Incentives

- **Page 12** – Water Use Patterns
- **Page 15** – Advancing Conservation with Technology and Analysis
- **Page 17** – Helping our Customers Save Water
- **Page 36** – Water Education is a Team Effort at SAWS
- **Page 43** – Plan Evaluation: How Do We Evaluate and Measure Savings?
- **Page 45** – Drought Contingency Plan
- **Page 65** – Landscape Irrigation Service

## Park Conservation

- **Page 23** – Conservation Irrigation Consultations
- **Page 24** – Irrigation System Rebates
- **Page 29** – Industrial and Commercial Water Conservation
- **Page 45** – Drought Contingency Plan
- **Page 65** – Landscape Irrigation Service

## Residential Landscape Irrigation Evaluation

- **Page 15** – Advancing Conservation with Technology and Analysis
- **Page 17** – Helping our Customers Save Water
- **Page 36** – Water Education is a Team Effort at SAWS
- **Page 43** – Plan Evaluation: How Do We Evaluate and Measure Savings?

 Education and Public Awareness

## Public Information

- **Page 15** – Advancing Conservation with Technology and Analysis
- **Page 20** – GardenStyleSA.com: A Guide to Landscape Transformation
- **Page 36** – Water Education is a Team Effort at SAWS
- **Page 43** – Plan Evaluation: How Do We Evaluate and Measure Savings?
- **Page 45** – Drought Contingency Plan



School Education

- **Page 39** – School Education

Partnerships with Nonprofit Organizations

- **Page 36** – Conservation Education Initiatives
- **Page 43** – Plan Evaluation: How Do We Evaluate and Measure Savings?

💧 Rebate, Retrofit and Incentive Programs

Conservation Programs for Industrial, Commercial and Institutional Accounts

- **Page 11** – 2018 Analysis of Meter Type and Billed Consumption
- **Page 29** – Industrial and Commercial Water Conservation
- **Page 43** – Plan Evaluation: How Do We Evaluate and Measure Savings?
- **Page 45** – Drought Contingency Plan

**N/A** – Residential Clothes Washer Incentive Program

Residential Toilet Replacement Program

- **Page 27** – Plumbers to People: Emergency Plumbing Assistance
- **Page 27** – Conservation Makeover: Finding Leaks Early
- **Page 43** – Plan Evaluation: How Do We Evaluate and Measure Savings?

Showerhead, Aerator and Toilet Flapper Retrofit

- **Page 27** – Plumbers to People: Emergency Plumbing Assistance
- **Page 27** – Conservation Makeover: Finding Leaks Early
- **Page 43** – Plan Evaluation: How Do We Evaluate and Measure Savings?

Water Wise Landscape Design and Conversion Programs

- **Page 12** – Water Use Patterns
- **Page 15** – Advancing Conservation with Technology and Analysis
- **Page 17** – Helping our Customers Save Water
- **Page 36** – Water Education is a Team Effort at SAWS
- **Page 43** – Plan Evaluation: How Do We Evaluate and Measure Savings?
- **Page 45** – Drought Contingency Plan

💧 Conservation Technology

**N/A** – New Construction Graywater

Rainwater Harvesting and Condensate Reuse

- **Page 29** – Industrial and Commercial Water Conservation
- **Page 43** – Plan Evaluation: How Do We Evaluate and Measure Savings?

Water Reuse

- **Page 29** – Industrial and Commercial Water Conservation
- **Page 43** – Plan Evaluation: How Do We Evaluate and Measure Savings?

💧 Regulatory Enforcement

Prohibition on Wasting Water

- **Page 45** – Drought Contingency Plan

Conservation Ordinance Planning and Development

- **Page 14** – Who Watches Over Conservation Progress in San Antonio?
- **Page 29** – Industrial and Commercial Water Conservation
- **Page 36** – Conservation Education Initiatives
- **Page 45** – Drought Contingency Plan

UTILITY PROFILE FOR RETAIL WATER SUPPLIER

CONTACT INFORMATION

Name of Utility:

San Antonio (SAWS)

Public Water Supply Identification Number (PWS ID):

TX0150018

Certificate of Convenience and Necessity (CCN) Number:

10640

Surface Water Right ID Number:

2144-D, 3867-A, 4768-B, 5549-C, 12096

Wastewater ID Number:

20285

Contact:

First Name:

Martha

Last Name:

Wright

Title:

Resource Analyst

Address:

2800 US Hwy 281 North

City:

San Antonio

State:

TX

Zip Code:

78212

Zip+4:

Email:

martha.wright@saws.org

Telephone Number:

2107047283

Date:

Is this person the designated Conservation Coordinator?

☐ Yes

☒ No

Coordinator:

First Name:

Karen

Last Name:

Guz

Title:

Conservation Director

Address:

2800 US Hwy 281 North

City:

San Antonio

Zip Code:

78212

Email:

karen.guz@saws.org

Telephone Number:

210-704-7283

Regional Water Planning Group:

L

Groundwater Conservation District:

Our records indicate that you:

☒ Received financial assistance of \$500,000 or more from TWDB

☒ Have 3,300 or more retail connections

☒ Have a surface water right with TCEQ

A. Population and Service Area Data

1. Current service area size in square miles: 930

UTILITY PROFILE FOR RETAIL WATER SUPPLIER

Attached file(s):

File Name	File Description
SAWSWaterServiceAreas_2017.pdf	SAWS Service Area

2. Historical service area population for the previous five years, starting with the most current year.

Year	Historical Population Served By Retail Water Service	Historical Population Served By Wholesale Water Service	Historical Population Served By Wastewater Water Service
2018	1,857,779	19,788	1,726,110
2017	1,819,116	30,603	1,691,943
2016	1,783,426	30,258	1,658,515
2015	1,743,559	30,603	1,638,361
2014	1,743,724	30,603	1,607,574

3. Projected service area population for the following decades.

Year	Projected Population Served By Retail Water Service	Projected Population Served By Wholesale Water Service	Projected Population Served By Wastewater Water Service
2020	1,919,271	20,514	1,784,845
2030	2,257,905	24,133	2,099,762
2040	2,596,769	27,755	2,414,892
2050	2,824,828	30,193	2,626,978
2060	3,052,026	32,621	2,838,263

UTILITY PROFILE FOR RETAIL WATER SUPPLIER

4. Described source(s)/method(s) for estimating current and projected populations.

Current population estimate is derived using active residential connections and active apartment connections with associated units. Active residential connections are multiplied by a persons per connection factor of 2.77 for the single family population estimate. Active apartment units are multiplied by the same person per connection factor and then multiplied by the multifamily occupancy rate for the City of San Antonio which generates a multifamily population estimate.

The utility developed the most current population projections using the 2017 End of Year population estimate and projected the population using annual growth rates from a county wide growth analysis developed by the Alamo Area Council of Governments and the Metropolitan Planning Organization, which generates this analysis every 5 years.

Population served by wholesale service was previously calculated including incorporated areas, provided water from SAWS. As of 2018, this calculation is updated.

B. System Input

System input data for the previous five years.  
Total System Input = Self-supplied + Imported – Exported

Year	Water Produced in Gallons	Purchased/Imported Water in Gallons	Exported Water in Gallons	Total System Input	Total GPCD
2018	74,133,669,895	10,813,687,561	6,735,648,871	78,211,708,585	115
2017	78,669,935,770	11,415,211,252	11,542,835,683	78,542,311,339	118
2016	78,919,414,272	8,743,119,165	11,508,199,840	76,154,333,597	117
2015	72,812,481,201	9,501,476,082	7,002,148,302	75,311,808,981	118
2014	65,390,270,682	13,533,782,852	1,898,891,319	77,025,162,215	121
Historic Average	73,985,154,364	10,801,455,382	7,737,544,803	77,049,064,943	118

C. Water Supply System

1. Designed daily capacity of system in gallons1,569,800,000
2. Storage Capacity

2a. Elevated storage in gallons:94,300,000

2b. Ground storage in gallons:171,800,000

UTILITY PROFILE FOR RETAIL WATER SUPPLIER

D. Projected Demands

1. The estimated water supply requirements for the next ten years using population trends, historical water use, economic growth, etc.

Year	Population	Water Demand (gallons)
2020	1,919,271	83,070,992,326
2021	1,953,134	83,321,100,925
2022	1,986,998	83,559,255,614
2023	2,020,861	83,785,703,405
2024	2,054,724	84,107,891,107
2025	2,088,588	84,626,174,460
2026	2,122,451	85,156,150,763
2027	2,156,315	85,672,469,069
2028	2,190,175	86,175,327,594
2029	2,224,041	86,664,921,468

2. Description of source data and how projected water demands were determined.

Projections and demands are from the 2017 Water Management Plan.



UTILITY PROFILE FOR RETAIL WATER SUPPLIER

E. High Volume Customers

1. The annual water use for the five highest volume  
**RETAIL customers.**

Customer	Water Use Category	Annual Water Use	Treated or Raw
H.E. Butt Grocery Company	Commercial	611,823,624	Treated
City of San Antonio	Commercial	567,822,344	Treated
San Antonio Housing Authority	Commercial	440,330,678	Treated
Bexar County	Commercial	406,290,094	Treated
Northside Independent School District	Commercial	310,023,062	Treated

2. The annual water use for the five highest volume  
**WHOLESALE customers.**

Customer	Water Use Category	Annual Water Use	Treated or Raw
East Central SUD	Municipal	220,418,758	Treated
City of Elmendorf	Municipal	73,078,774	Treated
The Oaks WSC	Municipal	14,746,349	Treated

F. Utility Data Comment Section

Additional comments about utility data.

In Part E. High Volume Customers, disregard the water use category assigned to the wholesale customers. Wholesale water use customers provide water to various water use categories within their service area.

UTILITY PROFILE FOR RETAIL WATER SUPPLIER

Section II: System Data

A. Retail Water Supplier Connections

1. List of active retail connections by major water use category.

Water Use Category Type	Total Retail Connections (Active + Inactive)	Percent of Total Connections
Residential - Single Family	509,737	65.74 %
Residential - Multi-Family	216,563	27.93 %
Industrial	262	0.03 %
Commercial	48,837	6.30 %
Institutional	0	0.00 %
Agricultural	0	0.00 %
Total	775,399	100.00 %

2. Net number of new retail connections by water use category for the  
previous five years.

	Net Number of New Retail Connections						
Year	Residential - Single Family	Residential - Multi-Family	Industrial	Commercial	Institutional	Agricultural	Total
2018	8,105	101	703				8,909
2017	8,027	26		4			8,057
2016	6,545		117				6,662
2015	7,549	83	416	4			8,052
2014	6,399	14	345				6,758

UTILITY PROFILE FOR RETAIL WATER SUPPLIER

B. Accounting Data

The previous five years’ gallons of RETAIL water provided in each major water use category.

Year	Residential - Single Family	Residential - Multi-Family	Industrial	Commercial	Institutional	Agricultural	Total
2018	35,431,024,410	10,025,544,441	2,558,702,397	15,307,206,054	0	0	63,322,477,302
2017	36,391,122,653	9,904,126,773	2,349,894,504	16,466,797,974	0	0	65,111,941,904
2016	35,697,998,946	9,726,468,789	15,474,643,134	2,349,176,839	0	0	63,248,287,708
2015	35,880,135,442	9,703,812,021	0	17,070,065,468	0	0	62,654,012,931
2014	37,567,045,988	9,150,570,316	17,217,695,998	0	0	0	63,935,312,302

C. Residential Water Use

The previous five years residential GPCD for single family and multi-family units.

Year	Residential - Single Family	Residential - Multi-Family	Total Residential
2018	69	60	68
2017	72	60	71
2016	71	59	71
2015	74	59	73
2014	78	57	75
Historic Average	73	59	72

UTILITY PROFILE FOR RETAIL WATER SUPPLIER

D. Annual and Seasonal Water Use

1. The previous five years’ gallons of treated water provided to RETAIL customers.

Month	Total Gallons of Treated Water				
	2018	2017	2016	2015	2014
January	4,689,917,662	4,647,301,745	5,087,801,783	5,405,209,714	5,178,054,696
February	4,502,436,766	4,455,685,675	4,493,500,680	4,166,083,740	4,399,427,169
March	4,402,536,864	4,509,119,533	4,730,198,222	4,079,021,107	4,297,553,946
April	4,893,006,715	4,770,362,637	4,750,001,045	4,457,721,534	4,991,926,505
May	5,439,591,935	5,451,736,874	4,611,223,294	4,718,040,799	5,746,262,707
June	6,345,165,144	5,751,669,141	4,787,445,960	4,675,878,400	5,460,726,944
July	6,407,353,875	6,520,368,035	6,660,590,254	5,426,946,471	5,818,184,153
August	6,221,992,206	6,872,027,584	6,676,949,552	6,604,535,001	6,094,585,383
September	6,516,445,609	5,922,369,683	5,687,845,131	6,905,492,321	6,421,798,233
October	4,928,896,834	5,728,379,128	5,345,103,690	5,987,143,802	5,645,125,217
November	4,390,647,835	5,139,853,717	5,141,758,855	5,339,483,177	5,159,916,649
December	4,613,947,511	5,201,984,481	5,138,091,454	4,933,057,278	4,798,378,129
Total	63,351,938,956	64,970,858,233	63,110,509,920	62,698,613,344	64,011,939,731

## UTILITY PROFILE FOR RETAIL WATER SUPPLIER

2. The previous five years' gallons of raw water provided to RETAIL customers.

Month	Total Gallons of Raw Water				
	2018	2017	2016	2015	2014
January	0	0	0	0	0
February	0	0	0	0	0
March	0	0	0	0	0
April	0	0	0	0	0
May	0	0	0	0	0
June	0	0	0	0	0
July	0	0	0	0	0
August	0	0	0	0	0
September	0	0	0	0	0
October	0	0	0	0	0
November	0	0	0	0	0
December	0	0	0	0	0
Total	0	0	0	0	0

3. Summary of seasonal and annual water use.

	Summer RETAIL (Treated + Raw)	Total RETAIL (Treated + Raw)
2018	18,974,511,225	63,351,938,956
2017	19,144,064,760	64,970,858,233
2016	18,124,985,766	63,110,509,920
2015	16,707,359,872	62,698,613,344
2014	17,373,496,480	64,011,939,731
Average in Gallons	18,064,883,620.60	63,628,772,036.80

## UTILITY PROFILE FOR RETAIL WATER SUPPLIER

### E. Water Loss

Water Loss data for the previous five years.

Year	Total Water Loss in Gallons	Water Loss in GPCD	Water Loss as a Percentage
2018	13,592,963,983	20	17.38 %
2017	10,674,314,093	16	13.59 %
2016	10,270,990,223	16	13.49 %
2015	11,433,519,050	18	15.18 %
2014	11,407,651,414	18	14.81 %
Average	11,475,887,753	18	14.89 %

### F. Peak Day Use

Average Daily Water Use and Peak Day Water Use for the previous five years.

Year	Average Daily Use (gal)	Peak Day Use (gal)	Ratio (peak/avg)
2018	173,566,956	206244687	1.1883
2017	178,002,351	208087660	1.1690
2016	172,905,506	197010714	1.1394
2015	171,777,022	181601737	1.0572
2014	175,375,177	188842353	1.0768

### G. Summary of Historic Water Use

Water Use Category	Historic Average	Percent of Connections	Percent of Water Use
Residential - Single Family	36,193,465,487	65.74 %	56.86 %
Residential - Multi-Family	9,702,104,468	27.93 %	15.24 %
Industrial	7,520,187,206	0.03 %	11.81 %
Commercial	10,238,649,267	6.30 %	16.08 %
Institutional	0	0.00 %	0.00 %
Agricultural	0	0.00 %	0.00 %



UTILITY PROFILE FOR RETAIL WATER SUPPLIER

H. System Data Comment Section

Section III: Wastewater System Data

A. Wastewater System Data

1. Design capacity of wastewater treatment plant(s) in gallons per day: 187,000,000
2. List of active wastewater connections by major water use category.

Water Use Category	Metered	Unmetered	Total Connections	Percent of Total Connections
Municipal		455,195	455,195	95.26 %
Industrial		169	169	0.04 %
Commercial		22,505	22,505	4.71 %
Institutional			0	0.00 %
Agricultural			0	0.00 %
Total		477,869	477,869	100.00 %

3. Percentage of water serviced by the wastewater system: 91.90 %

UTILITY PROFILE FOR RETAIL WATER SUPPLIER

4. Number of gallons of wastewater that was treated by the utility for the previous five years.

Month	Total Gallons of Treated Water				
	2018	2017	2016	2015	2014
January	3,786,611,046	4,363,824,738	4,006,676,842	3,851,605,827	3,609,835,670
February	3,577,682,701	4,258,927,887	3,619,849,236	3,299,688,362	3,291,546,555
March	4,113,558,876	4,645,768,677	4,192,418,655	4,045,352,997	3,666,083,420
April	3,809,575,073	4,210,446,976	4,251,285,881	4,210,855,042	3,483,502,228
May	3,990,058,182	4,106,280,106	5,227,739,090	5,038,605,103	3,841,541,809
June	3,858,845,490	4,022,833,588	5,144,513,107	4,815,524,445	3,809,061,096
July	4,140,928,444	4,067,319,016	4,268,297,302	4,236,884,903	3,813,216,827
August	4,077,095,963	4,324,440,582	4,721,391,281	3,987,477,203	3,818,882,996
September	5,100,134,796	3,998,884,438	4,403,213,074	3,823,690,826	3,727,527,100
October	4,951,771,408	3,983,897,629	4,111,119,751	4,170,358,154	3,699,774,063
November	4,373,799,850	3,768,884,262	4,048,861,610	4,093,038,826	3,868,689,285
December	4,389,713,089	4,038,878,242	4,920,241,699	3,991,749,031	3,631,178,062
Total	50,169,774,918	49,790,386,141	52,915,607,528	49,564,830,719	44,260,839,111

5. Could treated wastewater be substituted for potable water?

☐ Yes

☒ No

UTILITY PROFILE FOR RETAIL WATER SUPPLIER

B. Reuse Data

1. Data by type of recycling and reuse activities implemented during the current reporting period.

Type of Reuse	Total Annual Volume (in gallons)
On-site Irrigation	
Plant wash down	
Chlorination/de-chlorination	
Industrial	
Landscape irrigation (park,golf courses)	
Agricultural	
Discharge to surface water	1,742,077,650
Evaporation Pond	
Other	2,036,330,879
Total	3,778,408,529

C. Wastewater System Data Comment

Additional comments and files to support or explain wastewater system data listed below.

Regarding Table 2 of Wastewater System Data section, accounts listed as municipal are residential and apartment accounts. TWDB defines municipal as "The use of potable water provided by a public water supplier as well as the use of treated sewage effluent for residential, commercial, industrial, agricultural, institutional, and wholesale uses.", however industrial and commercial categories can be, and are, separated in the table.

Attachment E: TCEQ Utility Profile



Texas Commission on Environmental Quality  
Water Availability Division  
MC-160, P.O. Box 13087 Austin, Texas 78711-3087  
Telephone (512) 239-4691, FAX (512) 239-2214

Utility Profile and Water Conservation Plan Requirements  
for Municipal Water Use by Retail Public Water Suppliers

This form is provided to assist retail public water suppliers in water conservation plan development. If you need assistance in completing this form or in developing your plan, please contact the Conservation staff of the Resource Protection Team in the Water Availability Division at (512) 239-4691.

Water users can find best management practices (BMPs) at the Texas Water Development Board's website <http://www.twdb.texas.gov/conservation/BMPs/index.asp>. The practices are broken out into sectors such as Agriculture, Commercial and Institutional, Industrial, Municipal and Wholesale. BMPs are voluntary measures that water users use to develop the required components of Title 30, Texas Administrative Code, Chapter 288. BMPs can also be implemented in addition to the rule requirements to achieve water conservation goals.

Contact Information

Name of Water Supplier:	<u>San Antonio Water System</u>		
Address:	<u>2800 US Hwy 281 North</u>		
Telephone Number:	<u>(210) 704-7283</u>	Fax: (    )	
Water Right No.(s):	<u>2144-D, 3867-A, 4768-B, 5549-C, 12096</u>		
Regional Water Planning Group:	<u>L</u>		
Water Conservation Coordinator (or person responsible for implementing conservation program):	<u>Karen Guz</u>	Phone: (210) 704-7283	
Form Completed by:	<u>Martha Wright</u>		
Title:	<u>Resource Analyst</u>		
Signature:		Date:    /    /	

A water conservation plan for municipal use by retail public water suppliers must include the following requirements (as detailed in 30 TAC Section 288.2). If the plan does not provide information for each requirement, you must include in the plan an explanation of why the requirement is not applicable.

Utility Profile

I. POPULATION AND CUSTOMER DATA

A. Population and Service Area Data

- 1. Attach a copy of your service-area map and, if applicable, a copy of your Certificate of Convenience and Necessity (CCN).
- 2. Service area size (in square miles): 930  
(Please attach a copy of service-area map)
- 3. Current population of service area: 1,857,779
- 4. Current population served for:
  - a. Water 1,857,779
  - b. Wastewater 1,726,110

5. Population served for previous five years:

<i>Year</i>	<i>Population</i>
<u>2018</u>	<u>1,857,779</u>
<u>2017</u>	<u>1,819,116</u>
<u>2016</u>	<u>1,783,426</u>
<u>2015</u>	<u>1,743,559</u>
<u>2014</u>	<u>1,743,724</u>

6. Projected population for service area in the following decades:

<i>Year</i>	<i>Population</i>
<u>2020</u>	<u>1,919,271</u>
<u>2030</u>	<u>2,257,905</u>
<u>2040</u>	<u>2,596,769</u>
<u>2050</u>	<u>2,824,828</u>
<u>2060</u>	<u>3,052,026</u>



7. List source or method for the calculation of current and projected population size.

Current population estimate is derived using active residential connections and active apartment connections with associated units. Active residential connections are multiplied by a persons per connection factor of 2.77 for the single family population estimate. Active apartment units are multiplied by the same person per connection factor and then multiplied by the multifamily occupancy rate for the City of San Antonio which generates a multifamily population estimate.

The utility developed the most current population projections using the 2017 End of Year population estimate and projected the population using annual growth rates from a county wide growth analysis developed by the Alamo Area Council of Governments and the Metropolitan Planning Organization, which generates this analysis every 5 years. More details on population projects can be found in the 2017 SAWS Water Management Plan.

B. Customer Data

Senate Bill 181 requires that uniform consistent methodologies for calculating water use and conservation be developed and available to retail water providers and certain other water use sectors as a guide for preparation of water use reports, water conservation plans, and reports on water conservation efforts. A water system must provide the most detailed level of customer and water use data available to it, however, any new billing system purchased must be capable of reporting data for each of the sectors listed below. More guidance can be found at: <http://www.twdb.texas.gov/conservation/doc/SB181Guidance.pdf>

1. Quantified 5-year and 10-year goals for water savings:

	<i>Historic 5-year Average</i>	<i>Baseline</i>	<i>5-year goal for year 2023</i>	<i>10-year goal for year 2028</i>
Total GPCD	118	118	114	108
Residential GPCD	72	72	74	70
Water Loss GPCD	18	18	16.5	16.5
Water Loss Percentage	14.95%	14.95%	14%	14%

**Notes:**  
Total GPCD = (Total Gallons in System ÷ Permanent Population) ÷ 365  
Residential GPCD = (Gallons Used for Residential Use ÷ Residential Population) ÷ 365  
Water Loss GPCD = (Total Water Loss ÷ Permanent Population) ÷ 365  
Water Loss Percentage = (Total Water Loss ÷ Total Gallons in System) x 100; or (Water Loss GPCD ÷ Total GPCD) x 100

2. Current number of active connections. Check whether multi-family service is counted as ☐ Residential or ☒ Commercial?

<i>Treated Water Users</i>	<i>Metered</i>	<i>Non-Metered</i>	<i>Totals</i>
Residential	726,300	0	726,300
Single-Family	509,737	0	509,737
Multi-Family	216,563	0	216,563
Commercial	48,837	0	48,837
Industrial/Mining	262	0	262
Institutional	0	0	0
Agriculture	0	0	0
Other/Wholesale	3	0	3

3. List the number of new connections per year for most recent three years.

Year	2018	2017	2016
<i>Treated Water Users</i>			
Residential	8,206	8,053	6,545
Single-Family	8,105	8,027	6,545
Multi-Family	101	26	
Commercial	703		117
Industrial/Mining		4	
Institutional			
Agriculture			
Other/Wholesale			

4. List of annual water use for the five highest volume customers.

<i>Customer</i>	<i>Use (1,000 gal/year)</i>	<i>Treated or Raw Water</i>
H.E. Butt Grocery Company	611,823,624	Treated
City of San Antonio	567,822,344	Treated
San Antonio Housing Authority	440,330,678	Treated
Bexar County	406,290,094	Treated
Northside Independent School District	310,023,062	Treated

II. WATER USE DATA FOR SERVICE AREA

A. Water Accounting Data

1. List the amount of water use for the previous five years (in 1,000 gallons).

Indicate whether this is ☐ diverted or ☒ treated water.

<i>Year</i>	2018	2017	2016	2015	2014
<i>Month</i>					
January	4,689,917.662	4,647,301.745	5,087,801.783	5,405,209.714	5,178,054.696
February	4,502,436.766	4,455,685.675	4,493,500.680	4,166,083.740	4,399,427.169
March	4,402,536.864	4,509,119.533	4,730,198.222	4,079,021.107	4,297,553.946
April	4,893,006.715	4,770,362.637	4,750,001.045	4,457,721.534	4,991,926.505
May	5,439,591.935	5,451,736.874	4,611,223.294	4,718,040.799	5,746,262.707
June	6,345,165.144	5,751,669.141	4,787,445.960	4,675,878.400	5,460,726.944
July	6,407,353.875	6,520,368.035	6,660,590.254	5,426,946.471	5,818,184.153
August	6,221,992.206	6,872,027.584	6,676,949.552	6,604,535.001	6,094,585.383
September	6,516,445.609	5,922,369.683	5,687,845.131	6,905,492.321	6,421,798.233
October	4,928,896.834	5,728,379.128	5,345,103.690	5,987,143.802	5,645,125.217
November	4,390,647.835	5,139,853.717	5,141,758.855	5,339,483.177	5,159,916.649
December	4,613,947.511	5,201,984.481	5,138,091.454	4,933,057.278	4,798,378.129
Totals	63,351,938.956	64,970,858.233	63,110,509.920	62,698,613.344	64,011,939.731

2. Describe how the above figures were determined (e.g, from a master meter located at the point of a diversion from the source or located at a point where raw water enters the treatment plant, or from water sales).

Metered at points of sale

3. Amount of water (in 1,000 gallons) delivered/sold as recorded by the following account types for the past five years.

<i>Year</i>	2018	2017	2016	2015	2014
<i>Account Types</i>					
Residential	45,456,568.851	46,295,249.426	45,424,467.735	45,583,947.463	46,717,616.304
Single-Family	35,431,024.410	36,391,122.653	35,697,998.946	35,880,135.442	37,567,045.988
Multi-Family	10,025,544.441	9,904,126.773	9,726,468.789	9,703,812.021	9,150,570.316
Commercial	15,307,206.054	16,466,797.974	2,349,176.839	17,070,065.468	0
Industrial/Mining	2,558,702.397	2,349,894.504	15,474,643.134	0	17,217,695.998
Institutional	0	0	0	0	0
Agriculture	0	0	0	0	0
Other/Wholesale					

4. List the previous records for water loss for the past five years (the difference between water diverted or treated and water delivered or sold).

<i>Year</i>	<i>Amount (gallons)</i>	<i>Percent %</i>
2018	13,592,963,983	17.38
2017	10,674,314,093	13.59
2016	10,270,990,223	13.49
2015	11,433,519,050	15.18
2014	11,407,651,414	14.81

B. Projected Water Demands

1. If applicable, attach or cite projected water supply demands from the applicable Regional Water Planning Group for the next ten years using information such as population trends, historical water use, and economic growth in the service area over the next ten years and any additional water supply requirements from such growth.

III. WATER SUPPLY SYSTEM DATA

A. Water Supply Sources

1. List all current water supply sources and the amounts authorized (in acre feet) with each.

B.

<i>Water Type</i>	<i>Source</i>	<i>Amount Authorized</i>
Surface Water		
Groundwater	See attached	
Other		

Treatment and Distribution System (if providing treated water)

1. Design daily capacity of system (MGD): 1,569,800,000
2. Storage capacity (MGD):
- a. Elevated 94,300,000
- b. Ground 171,800,000
3. If surface water, do you recycle filter backwash to the head of the plant?
- ☐ Yes    ☐ No    If yes, approximate amount (MGD):

IV. WASTEWATER SYSTEM DATA

A. Wastewater System Data (if applicable)

1. Design capacity of wastewater treatment plant(s) (MGD): 187,000,000
2. Treated effluent is used for ☐ on-site irrigation, ☐ off-site irrigation, for ☐ plant wash-down, and/or for ☐ chlorination/dechlorination.
- If yes, approximate amount (in gallons per month):
3. Briefly describe the wastewater system(s) of the area serviced by the water utility. Describe how treated wastewater is disposed. Where applicable, identify treatment plant(s) with the TCEQ name and number, the operator, owner, and the receiving stream if wastewater is discharged.
- Water is treated at three different water recycling facilities, with ID numbers of WQ0010137003, WQ0010137033, WQ0010137040. All are owned and operated by San Antonio Water System.

Effluent is disposed by direct reuse and by discharge to receiving streams, as described below.

Dos Rios WRC:  
-Outfall 001 to the Medina River below Medina Diversion Lake in Segment No. 1903 of the San Antonio River Basin  
-Outfall 002 through approximately 15 miles of pipeline to the Upper San Antonio River in Segment No. 1911 of the San Antonio River Basin at a point approximately 600 feet northwest of the intersection of Tuleta Street and Broadway  
-Outfall 003 through approximately 14 miles of pipeline to the Upper San Antonio River in segment no. 1911 of the San Antonio River Basin at a point approximately 500 feet northwest of the intersection of Isleta Street and East Josephine Street.  
-Outfall 004 through approximately 20 miles of pipeline to Salado Creek in Segment No. 1910 of the San Antonio River Basin at a point approximately 100 feet south of the intersection of Salado Creek and Rittiman Road.  
-Outfall 005 through a pipeline to the Upper San Antonio River in Segment No. 1911 of the San Antonio River Basin at a point approximately 800 feet southeast of the intersection of South Alamo Street and East Market Street.  
-Outfall 006 to the Upper San Antonio River in Segment No. 1911 of the San Antonio River Basin

Leon Creek WRC:  
-Outfall 001 into Comanche Creek, thence to the Lower Leon Creek in Segment No. 1906 of the San Antonio River Basin  
-Outfall 002 via pipeline to Mitchell Lake, thence to Cottonmouth Creek, thence to the Medina River below Medina Diversion Lake in Segment no 1903 of the San Antonio River Basin

Medio Creek WRC:  
-Outfall 001 to an unclassified portion of Medio Creek, thence to an unclassified lake, thence to Medio Creek in Segment No. 1912 of the San Antonio River Basin

B. Wastewater Data for Service Area (if applicable)

1. Percent of water service area served by wastewater system: 91.90%
2. Monthly volume treated for previous five years (in 1,000 gallons):

<i>Year</i>	2018	2017	2016	2015	2014
<i>Month</i>					
January	3,786,611.046	4,363,824.738	4,006,676.842	3,851,605.827	3,609,835.670
February	3,577,682.701	4,258,927.887	3,619,849.236	3,299,688.362	3,291,546.555
March	4,113,558.876	4,645,768.677	4,192,418.655	4,045,352.997	3,666,083.420
April	3,809,575.073	4,210,446.976	4,251,285.881	4,210,855.042	3,483,502.228
May	3,990,058.182	4,106,280.106	5,227,739.090	5,038,605.103	3,841,541.809
June	3,858,845.490	4,022,833.588	5,144,513.107	4,815,524.445	3,809,061.096
July	4,140,928.444	4,067,319.016	4,268,297.302	4,236,884.903	3,813,216.827



August	4,077,095.963	4,324,440.582	4,721,391.281	3,987,477.203	3,818,882.996
September	5,100,134.796	3,998,884.438	4,403,213.074	3,823,690.826	3,727,527.100
October	4,951,771.408	3,983,897.629	4,111,119.751	4,170,358.154	3,699,774.063
November	4,373,799.850	3,768,884.262	4,048,861.610	4,093,038.826	3,868,689.285
December	4,389,713.089	4,038,878.242	4,920,241.699	3,991,749.031	3,631,178.062
<b>Totals</b>	<b>50,169,774.918</b>	<b>49,790,386.141</b>	<b>52,915,607.528</b>	<b>49,564,830.719</b>	<b>44,260,839.111</b>

## Water Conservation Plan

In addition to the utility profile, please attach the following as required by Title 30, Texas Administrative Code, §288.2. Note: If the water conservation plan does not provide information for each requirement, an explanation must be included as to why the requirement is not applicable.

*A. Record Management System*

The water conservation plan must include a record management system which allows for the classification of water sales and uses in to the most detailed level of water use data currently available to it, including if possible, the following sectors: residential (single and multi-family), commercial.

*B. Specific, Quantified 5 & 10-Year Targets*

The water conservation plan must include specific, quantified five-year and ten-year targets for water savings to include goals for water loss programs and goals for municipal use in gallons per capita per day. Note that the goals established by a public water supplier under this subparagraph are not enforceable. These goals must be updated during the five-year review and submittal.

*C. Measuring and Accounting for Diversions*

The water conservation plan must include a statement about the water suppliers metering device(s), within an accuracy of plus or minus 5.0% in order to measure and account for the amount of water diverted from the source of supply.

*D. Universal Metering*

The water conservation plan must include and a program for universal metering of both customer and public uses of water, for meter testing and repair, and for periodic meter replacement.

*E. Measures to Determine and Control Water Loss*

The water conservation plan must include measures to determine and control water loss (for example, periodic visual inspections along distribution lines; annual or monthly audit of the water system to determine illegal connections; abandoned services; etc.).

*F. Continuing Public Education & Information*

The water conservation plan must include a description of the program of continuing public education and information regarding water conservation by the water supplier.

*G. Non-Promotional Water Rate Structure*

The water supplier must have a water rate structure which is not “promotional,” i.e., a rate structure which is cost-based and which does not encourage the excessive use of water. This rate structure must be listed in the water conservation plan.

*H. Reservoir Systems Operations Plan*

The water conservation plan must include a reservoir systems operations plan, if applicable, providing for the coordinated operation of reservoirs owned by the applicant within a common watershed or river basin in order to optimize available water supplies.

*I. Enforcement Procedure and Plan Adoption*

The water conservation plan must include a means for implementation and enforcement, which shall be evidenced by a copy of the ordinance, rule, resolution, or tariff, indicating official adoption of the water conservation plan by the water supplier; and a description of the authority by which the water supplier will implement and enforce the conservation plan.

*J. Coordination with the Regional Water Planning Group(s)*

The water conservation plan must include documentation of coordination with the regional water planning groups for the service area of the public water supplier in order to ensure consistency with the appropriate approved regional water plans.

*K. Plan Review and Update*

A public water supplier for municipal use shall review and update its water conservation plan, as appropriate, based on an assessment of previous five-year and ten-year targets and any other new or updated information. The public water supplier for municipal use shall review and update the next revision of its water conservation plan not later than May 1, 2009, and every five years after that date to coincide with the regional water planning group. The revised plan must also include an implementation report.

**VI. ADDITIONAL REQUIREMENTS FOR LARGE SUPPLIERS**

Required of suppliers serving population of 5,000 or more or a projected population of 5,000 or more within the next ten years:

*A. Leak Detection and Repair*

The plan must include a description of the program of leak detection, repair, and water loss accounting for the water transmission, delivery, and distribution system in order to control unaccounted for uses of water.

*B. Contract Requirements*

A requirement in every wholesale water supply contract entered into or renewed after official adoption of the plan (by either ordinance, resolution, or tariff), and including any contract extension, that each successive wholesale customer develop and implement a water conservation plan or water conservation measures using the applicable elements in this chapter. If the customer intends to resell the water, the contract between the initial supplier and customer must provide that the contract for the resale of the water must have water conservation requirements so that each successive customer in the resale of the water will be required to implement water conservation measures in accordance with the provisions of this chapter.

**VII. ADDITIONAL CONSERVATION STRATEGIES**

Any combination of the following strategies shall be selected by the water supplier, in addition to the minimum requirements of 30 TAC §288.2(1), if they are necessary in order to achieve the stated water conservation goals of the plan. The commission may require by commission order that any of the following strategies be implemented by the water supplier if the commission determines that the strategies are necessary in order for the conservation plan to be achieved:

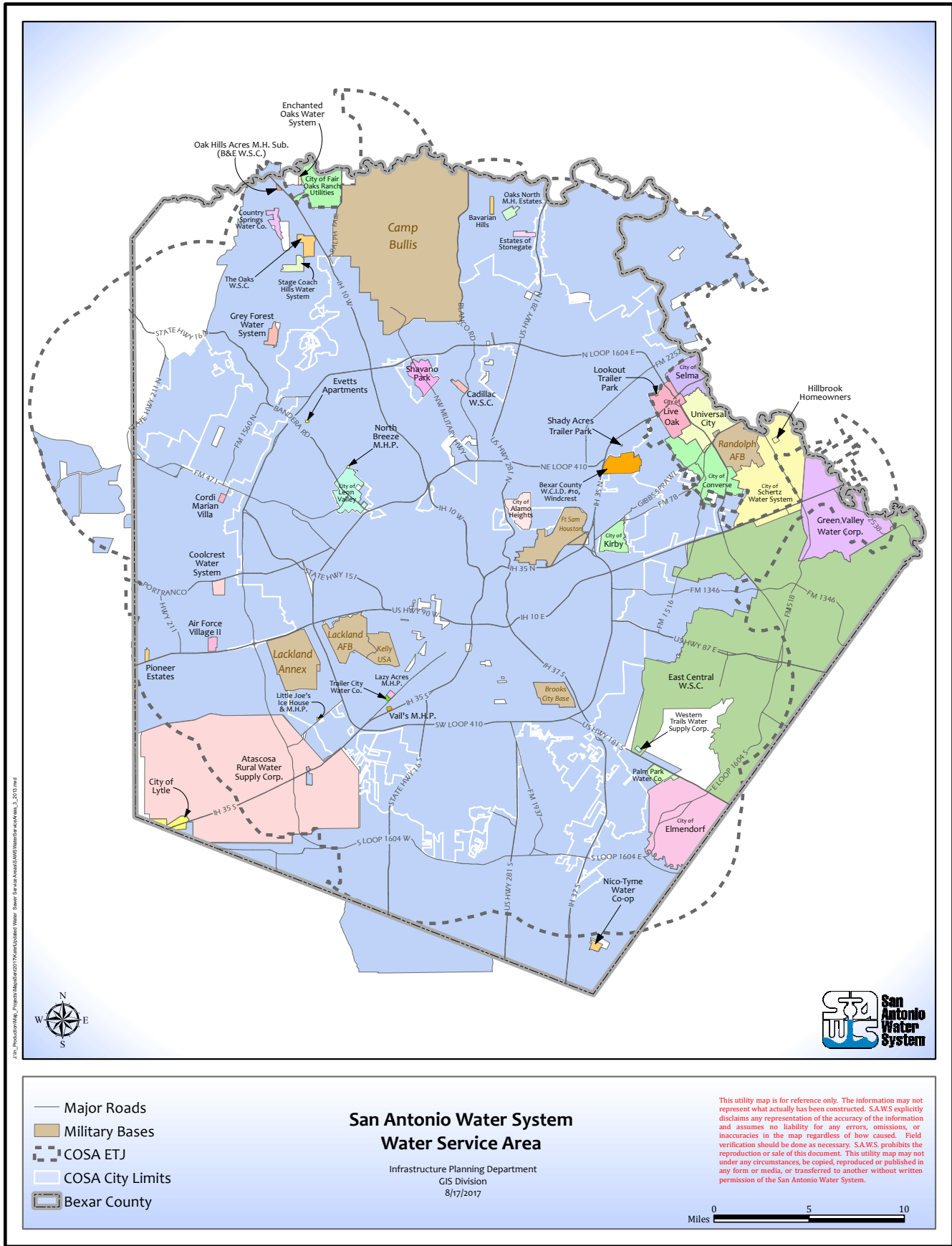
1. Conservation-oriented water rates and water rate structures such as uniform or increasing block rate schedules, and/or seasonal rates, but not flat rate or decreasing block rates;
2. Adoption of ordinances, plumbing codes, and/or rules requiring water conserving plumbing fixtures to be installed in new structures and existing structures undergoing substantial modification or addition;
3. A program for the replacement or retrofit of water-conserving plumbing fixtures in existing structures;
4. A program for reuse and/or recycling of wastewater and/or graywater;
5. A program for pressure control and/or reduction in the distribution system and/or for customer connections;
6. A program and/or ordinance(s) for landscape water management;
7. A method for monitoring the effectiveness and efficiency of the water conservation plan; and
8. Any other water conservation practice, method, or technique which the water supplier shows to be appropriate for achieving the stated goal or goals of the water conservation plan.

**VIII. WATER CONSERVATION PLANS SUBMITTED WITH A WATER RIGHT APPLICATION FOR NEW OR ADDITIONAL STATE WATER**

Water Conservation Plans submitted with a water right application for New or Additional State Water must include data and information which:

1. support the applicant's proposed use of water with consideration of the water conservation goals of the water conservation plan;
2. evaluates conservation as an alternative to the proposed appropriation; and
3. evaluates any other feasible alternative to new water development including, but not limited to, waste prevention, recycling and reuse, water transfer and marketing, regionalization, and optimum water management practices and procedures.

Additionally, it shall be the burden of proof of the applicant to demonstrate that no feasible alternative to the proposed appropriation exists and that the requested amount of appropriation is necessary and reasonable for the proposed use.



# Texas Commission On Environmental Quality

By These Presents Be It Known to All That  
**San Antonio Water System**

Having duly applied for certification to provide water utility service for the convenience and necessity of the public, and it having been determined by this commission that the public convenience and necessity would in fact be advanced by the provision of such service by this Applicant, is entitled to and is hereby granted this

## Certificate of Convenience and Necessity No. 10640

To provide continuous and adequate water utility service to that service area or those service areas in Atascosa, Bexar, Comal and Kendall Counties as by final Order or Orders duly entered by this Commission, which Order or Orders resulting from Application No. 35307-C are on file at the Commission offices in Austin, Texas; and are matters of official record available for public inspection; and be it known further that these presents do evidence the authority and the duty of San Antonio Water System to provide such utility service in accordance with the laws of this State and Rules of this Commission, subject only to any power and responsibility of this Commission to revoke or amend this Certificate in whole or in part upon a subsequent showing that the public convenience and necessity would be better served thereby.

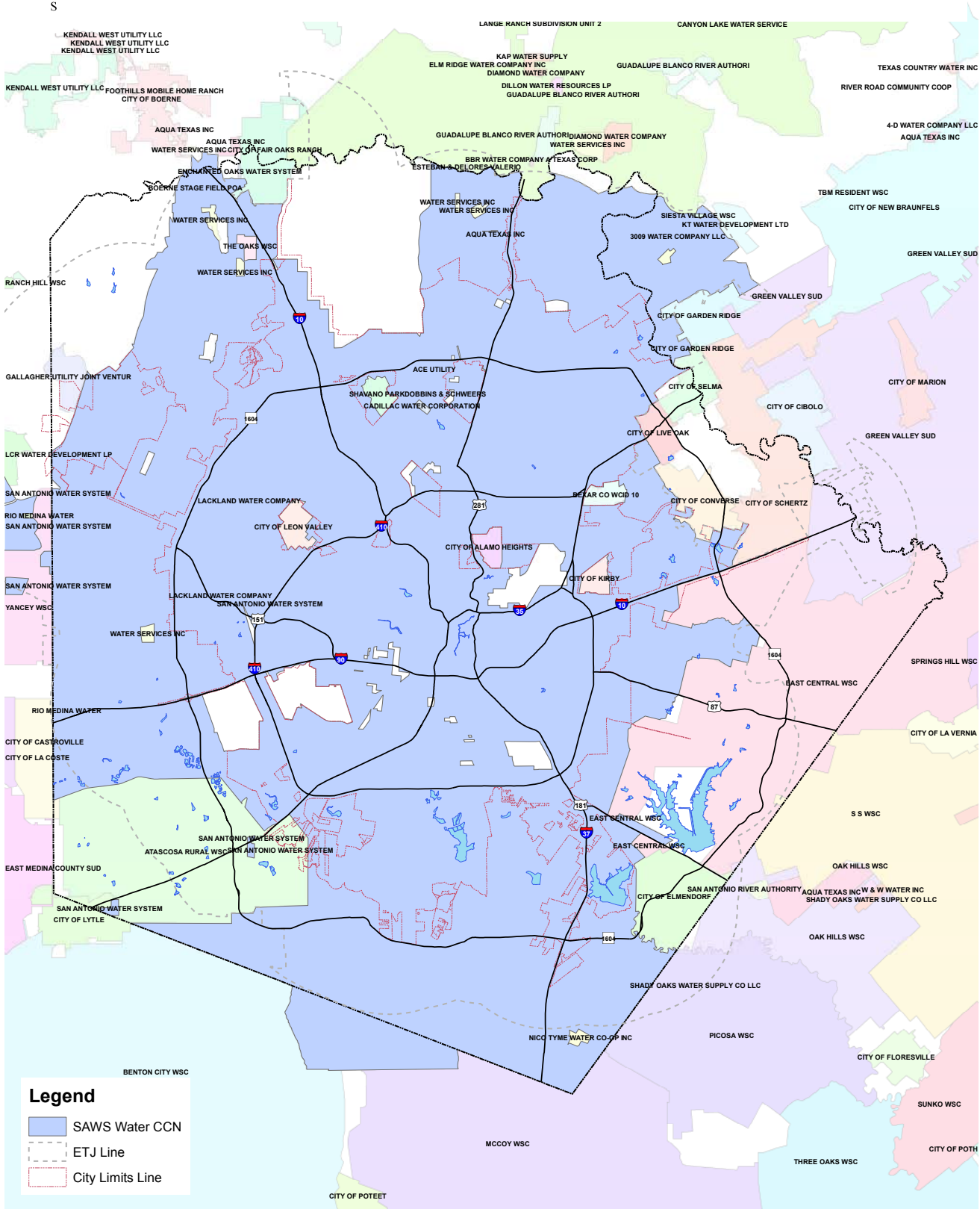
Issued at Austin, Texas, this **June 19, 2013**

For the Commission





# SAWS Water CCN #10640



## III. Water Supply System Data

### A. Water Supply Sources

Project	Yield (AFY)
Edwards Aquifer (Best) *	284,277
Edwards Aquifer (Worst) *	159,195
Regional Carrizo	11,557
Local Carrizo	9,900
GBRA Western Canyon	8,980
Trinity Oliver Ranch	2,000
Trinity WECO	16,467
Desal Phase I	13,440
Medina System	2,000
Canyon Regional Water Authority	6,300
Future Supplies	
Expanded Carrizo	21,000
Desal Phase II	13,440
Desal Phase III	6,720
Vista Ridge	50,000

\*Best: If there are no critical period cutbacks

\*Worst: If there are significant critical period cutbacks

Attachment F: Letter to Region L



Karen Guz  
San Antonio Water System  
2800 US Hwy 281 N  
San Antonio, TX 78212

April 19, 2019

Suzanne Scott, Chairman  
South Central Texas Regional Water Planning Group  
c/o San Antonio River Authority  
100 East Guenther St.  
San Antonio, TX 78204

Dear Chairman Scott,

As part of the requirements for the Five Year Conservation Plan for the Texas Commission on Environmental Quality and the Texas Water Development Board, I am sending you notice of the 2019 SAWS Five Year Water Conservation Plan. The plan will be posted to our website on May 1<sup>st</sup>, 2019 and can be found at [www.saws.org/conservationplan](http://www.saws.org/conservationplan).

If you have any questions, please feel free to contact me at (210)704-7283.

Thank you,

A handwritten signature in black ink, appearing to read "Karen Guz".

Karen Guz  
Conservation Resource Analyst

Attachment G: SAWS Board Approval

RESOLUTION NO. ~~29-092~~

**OF THE SAN ANTONIO WATER SYSTEM BOARD OF TRUSTEES ADOPTING THE SAN ANTONIO WATER SYSTEM 2019 WATER CONSERVATION PLAN; DIRECTING ADOPTION OF THE PLAN UPON APPROVAL; FINDING THE RESOLUTION TO BEEN CONSIDERED PURSUANT TO THE LAWS GOVERNING OPEN MEETINGS; PROVIDING A SEVERABILITY CLAUSE; AND ESTABLISHING AN EFFECTIVE DATE**

**WHEREAS**, Section 30 TAC Chapter 288 rules require an updated Water Conservation Plan every five years and the San Antonio Water System’s (the “System”) most recent Plan was completed in 2014; and

**WHEREAS**, the System included water conservation targets and strategies in the 2017 Water Management Plan; and

**WHEREAS**, the 2017 Water Management Plan covers the time period of 2017 to 2070, the conservation targets from the plan can be incorporated into the required five-year plans for the Texas Commission on Environmental Quality and the Texas Water Development Board; and

**WHEREAS**, the drought plan and enforcement activities are codified in the City of San Antonio ordinance; and

**WHEREAS**, Section 30 TAC Chapter 288 requires generation of a water system conservation five-year plan that compiles information regarding production measurement, customer meter testing, water loss strategies, leak detection efforts, public education and public input strategies, a non-promotional rate structure, drought management plans and enforcement; and

**WHEREAS**, the components required in the state water conservation plans have each been developed with extensive public input and input from the System’s Board of Trustees (the “Board”); and

**WHEREAS**, the compilation of the water conservation components must be approved by the System’s Board before it meets the requirements of state agencies; and

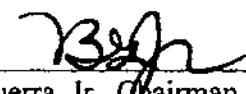
**WHEREAS**, the San Antonio Water System Board of Trustees desires to (i) adopt the San Antonio Water System 2019 Water Conservation Plan identifying goals for water use reduction, and (ii) provide required information on specific planning elements including metering of all production facilities and customer accounts, address water loss, an active leak detection program, public education and public input, a non-promotional rate structure, an active drought management and enforcement program; now, therefore:

19-092


**BE IT RESOLVED BY THE SAN ANTONIO WATER SYSTEM BOARD OF TRUSTEES:**

1. That the 2019 Water Conservation Plan is hereby adopted, identified as Attachment I.
2. That the Plan will be submitted to the Texas Commission on Environmental Quality and to the Texas Water Development Board with attached documentation regarding the board approval of the plan to fulfill the statutory requirements.
3. That the President/Chief Executive Officer or his duly appointed designee is hereby authorized to implement the Plan.
4. It is officially found, determined and declared that the meeting at which this resolution is adopted was open to the public, and that the public notice of the time, place and subject matter of the public business to be conducted at such meeting, including this resolution, was given to all as required by the Texas Codes Annotated, as amended, Title 5, Chapter 551, Government Code.
5. If any part, section, paragraph, sentence, phrase or word of this resolution is for any reason held to be unconstitutional, illegal, inoperative or invalid, or if any exception to or limitation upon any general provision herein contained is held to be unconstitutional, illegal, invalid or ineffective, the remainder of this resolution shall nevertheless stand effective and valid as if it had been enacted without the portion held to be unconstitutional, illegal, invalid, or ineffective.
6. This resolution takes effect immediately upon its passage.

PASSED AND APPROVED this 2<sup>nd</sup> day of April, 2019.

  
Berto Guerra, Jr., Chairman

ATTEST:

  
Amy Hardberger, Secretary

Attachment:

- I. 2019 Water Conservation Plan TCEQ Version
- II. 2019 Water Conservation Plan TWDB Version

## Attachment H: Summary of Public Comments

There were 281 views of the plan on SAWS.org and 183 views of article on GardenStyleSA.com weekly newsletter.

Organization	Comment	Staff Response
Citizen - Kent Page (Email)	"Vegetables and other food crops might use water at a higher rate but for landscaping please suggest natives. Use the expertise of the Texas Master Naturalists to suggest alternative native plants."	SAWS Conservation does not incentivize food crops but does incentivize the removal of non-native turfgrass to replace with native and well adaptive plants. Since 2013, over 3 million SF of turf have been replaced with native and adapted (non-invasive) plants.
Citizen- Nancy Purser (Facebook Live)	Great plan and Information!!	Viewed Facebook Live presentation of the plan.
Citizen - Andrew Oze (Facebook Live)	Awesome!	Viewed Facebook Live presentation of the plan.
Facebook Live Presentation	Presented on March 19, 2019 20,886 saw the feed and 12,000 people viewed at least part of the video	As a discussion of a state conservation plan, we believe these are very good outreach numbers.
Citizens Advisory Panel (CAP)	Presented on March 19, 2019	CAP is comprised of citizens from all council districts. In place since 1998, the CAP reviews and gives direction and benchmarks water resources related topics.
Community Conservation Committee (CCC)	Discussed and approved on March 20, 2019	CCC is comprised of citizens from all council districts. In place since 1996, the CCC reviews and gives direction on Conservation related topics.
Citizen - Prisilla Cope (Email)	Was disappointed SAWS did not emphasize rain catchment. "I grew up in South Texas, my abuelo had a ranch and he had pigs/cattle/chickens/gardens/fields of sorghum. He had 'rain barrels' all over his property...to collect as much rain water as he could. For his livestock, food, and us on occasion to bathe in."	SAWS distributed the most rain barrels of anyone in the US in a single day in Jan. 2017 (6,000). We continue to provide a \$30 coupon toward rain barrels through our WaterSaver Rewards Program and we have a RainSaver Cistern rebate for large systems currently being expanded and updated with our partners at EcoCentro ACCD.
Alamo Group of the Sierra Club	"Also laudable are the efforts to detect leaks and other water loss causes, especially those in system infrastructure. However, why has SAWS been unable to reduce substantial water losses, amounting to almost 18% last year? Much more aggressive action is needed to get these losses near 10%."	SAWS is committed to being a national leader in Nonrevenue Water reduction, aggressively working to reduce water loss in its 7,000+ miles of potable water pipes by increasing efforts and funding for leak detection along with engaging the nation's leading experts on nonrevenue water loss control. The 2018 Nonrevenue Water percentage is an aberration due to extenuating factors including a hotter and dryer than normal summer. Going forward, SAWS will continue to utilize the best



		and most cost-effective actions to be able to achieve the Water Management Plan goal and be the best in class for Nonrevenue Water reduction.
Alamo Group of the Sierra Club	"Per capita goals should reflect climate change needs. Suggest 30 GPCD in 50 years and 15-18 in a severe drought."	Per capita goals are revisited approximately every five years during the SAWS Water Management Plan (WMP) process. The last plan was updated and approved in 2017. The 2019 Five Year Conservation Plan supports the targets set in the 2017 WMP. SAWS would require substantial community input before considering per capita goals that would require the elimination all used water for landscape irrigation. The drought goals suggested would likewise require extreme measures by the community in terms of daily lifestyle. These would also require extensive community input before consideration.
Alamo Group of the Sierra Club	"Drought plans are mostly sound, but not strong enough to protect the Edwards Aquifer during a longer, deeper drought. Suggest more stages of restrictions. Suggest more drastic measures in deep droughts with consequences such as flow restrictions for high users."	Drought regulations are codified in the City of San Antonio ordinance. It is not possible to update these through a SAWS Conservation Plan. Suggestions regarding updated restrictions should be directed to the City of San Antonio. There is general language in the city ordinance that would allow an irrigation ban in an emergency, if required. This could also be discussed during the next update of the SAWS Water Management Plan.
Alamo Group of the Sierra Club	Rate Structure of 2015 should be changed per specific suggestions regarding heaviest residential users and general class rates.	Approximately every 5 years, the Finance department along with the Board and City Council select a Rate Advisory Committee (RAC) to review consultant-prepared SAWS cost of service analyses and recommend any changes or updates to its existing water and sewer rate structures consistent with these analyses. The most recent process conducted over a 17 month period ended in May 2015 and resulted in approximately 70 community meetings being held across the city for the purpose of receiving community input. The next RAC is scheduled to be formed later this year with an anticipated completion date in 2020. Any rate structure changes require the approval of the San Antonio City Council.

Alamo Group of the Sierra Club	Figure 3 Shows that 3% of residential bills account for 15% of water sales by volume. Has this improved at all since 2014? What are the conservation impacts of the current tiered rate structure?	The billing tiers have changed since the 2014 Conservation Plan was produced. In 2014 there were four billing tiers. The highest was for over 17,206 gallons per month. During 2014 the top tier bills made up 6% of bills received and the total water used by these bills accounted for 24% of the volume sold to single family residential water sales. It is interesting to note that now we have to drop down to usage of 14,962 gallons before we account for 23% of the residential water sales by volume. While the comparison is not perfect, it does appear that in comparing these two years, less water was sold in 2018 at the upper usage levels than in 2014.
Alamo Group of the Sierra Club	We applaud the measures for education promoting native plants and wildlife habitat.	SAWS regularly promotes native plants and wildlife habitat through their incentive programs and partnerships.
Alamo Group of the Sierra Club	We appreciate the much needed classes about irrigation management for residential and commercial irrigation.	Both classes and rebates are offered to encourage good management and reduction of irrigation by SAWS.
Alamo Group of the Sierra Club	The recycled water system is an excellent example of not wasting resources.	SAWS has the largest direct recycled water system in the country and was an early adopter of this technology.
Alamo Group of the Sierra Club	Why is there no mention of Climate Change? Specifically there should be mention of being prepared for hotter weather and more dry weather.	All of the outdoor programs offered by SAWS help our customers have landscapes that are resilient during hot, dry conditions. The plan also discusses these actions in terms of carbon sequestration which can assist with climate mitigation. The City Climate Action plan has identified water and wastewater activities as 0.072% of GHG contributions locally but our landscape resilience efforts can have a positive effect on the city's effort.
Alamo Group of the Sierra Club	SAWS should consider the reuse of AC condensate water and greywater as a valuable resource	1996 city ordinance requires most commercial buildings to collect their AC condensate and use in the landscape or direct to the wastewater system where it can be reused (previously it was directed to the street) . SAWS has offered custom rebates to encourage the use of AC condensate and greywater when it is possible. We have had several successful projects completed over the years and expect to have more in the future.

Alamo Group of the Sierra Club	SAWS should include climate mitigation strategies in this plan that include a greenhouse inventory. Would like to see plans for solar arrays and battery storage. Would like to see EV or hybrid vehicle use by SAWS.	Plans for energy consumption by SAWS are outside of the scope for the state plan on water conservation. However, SAWS is pleased to receive these comments and will consider them as part of its internal efficiency plans.
Alamo Group of the Sierra Club	Would like SAWS to restrict its CCN outside of the ETJ.	This is a policy question outside of the scope of a water conservation plan.
Alamo Group of the Sierra Club	Would like expansion of the urban forest canopy.	Though specifically not in the scope of this plan SAWS Conservation promotes trees generally through education, and coupons that allow for the purchase of small trees and educational activities. Three arborists are employed in the SAWS Conservation Department.
Alamo Group of the Sierra Club	Would like promotion of LID practices.	Low Impact Development (LID) is primarily a water quality tool. The Conservation Department at SAWS has sought ways to ensure that this strategy can also save water when it is employed. Co-education with the San Antonio River Authority has been one strategy for this. However, LID projects are not the primary focus of water conservation because they are primarily for water quality purposes.
Alamo Group of the Sierra Club	Would like to see strong restrictions on irrigation system deployments and operations.	A wide variety of restrictions and operations could be considered. This would be a City of San Antonio decision requiring significant changes in ordinance and development practices. SAWS would recommend significant community input before such measures are considered. Currently in code every large irrigation system must turn in a maintenance report to SAWS via CoSA ordinance which has resulted in savings.
Alamo Group of the Sierra Club	Would like to see restrictions on sale and use of high water consumptive plants in particular Bermuda and St. Augustine grasses	SAWS has encouraged reduced emphasis on turfgrass (3 million SF removed though coupons since 2013) and worked with the City of San Antonio when an ordinance was passed in 2006 that requires adequate soil under newly installed turfgrass and prohibits builders from installing St. Augustine grass. Commercial buildings are restricted to water-saving plants described in Appendix E of the Landscape section of the CoSA Unified Development Code. Grass is not required by city ordinance.

Alamo Group of the Sierra Club	Would like improved ordinances on several topics including landscape, appliances, and location of pipes.	This comment is not quite clear regarding exactly what the improved ordinances would be. Any ordinance on landscapes and appliances would need to be approved by the City of San Antonio. As is typical, SAWS would recommend substantial community input before such measures are considered. Many appliance and landscape ordinances are in place today.
--------------------------------	--	--





**5** YEAR  
WATER  
CONSERVATION  
**PLAN**

