



Water Conservation Plan:

Summary of Existing Program and Plan Forward



September 2022



ORANGE WATER AND
SEWER AUTHORITY

OWASA is Carrboro-Chapel Hill's not-for-profit public service agency delivering high quality water, reclaimed water, and wastewater services.

Water Conservation Plan: Summary of Existing Program and Plan Forward

September 8, 2022

Introduction

OWASA and the community we serve have a long history of water conservation. In the last two decades, our community has invested in a suite of water conservation strategies that have made us a leader in water conservation, efficiency, and reclaimed water use:

- Our utility has implemented policies, pricing structures and programs that encourage water conservation and efficiency.
- Our customers have installed water-saving products in their homes, yards, and businesses, making water conservation and demand management a way of life in Carrboro and Chapel Hill.
- The University of North Carolina at Chapel Hill, in partnership with OWASA, has made significant investments in water demand reduction, including an innovative reclaimed water system that now meets over 10 percent of system-wide water demand, freeing up the community's drinking water supply.

As a result of these and other efforts, drinking water sales are now 22 percent less than they were in 1995, despite increasing the number of accounts by about 50 percent.

In updating our Long-Range Water Supply Plan (LRWSP), staff evaluated the costs and benefits of various supply and demand management alternatives against social, environmental, and economic goals established and approved by the Board. ([Link to August 2020 evaluation.](#)) Based on this evaluation, OWASA determined that, at present, there are no individual or collective group of demand management strategies that, if pursued further, would prevent the need for additional supply in the long run.

Nonetheless, demand management through water conservation, water efficiency, and reclaimed water use remains a key value of the organization and our community, and we are committed to considering water demand management strategies as a companion document to the LRWSP. Developing a Water Conservation Plan is also a strategic initiative of the 2016 strategic plan. Sustainability is a core value of that plan: *the utility strives to make the highest and best use of our local water resources and promotes conservation of water, energy, and other natural resources.*

Purpose

The purpose of this document is to summarize existing policies, pricing structures, and programs that incentivize water conservation and efficiency, as well as the use of reclaimed water. It also provides a path forward to enhance our existing Water Conservation program.

This plan is intended to serve as a complementary document to OWASA's Long-Range Water Supply Plan (LRWSP), Water Shortage Response Plan, Affordability Program Plan, Energy Management Plan, and Communications and Community Engagement Plan. This plan captures OWASA's current water conservation and efficiency practices and ensures that demand management elements of these plans are well-coordinated. A full accounting of how these plans work together is included as Appendix A of this document.

Background

Historical System-wide Water Demand

OWASA and the community that we serve is a leader in water conservation, efficiency, and reclaimed water use.

Stretching our water supply and wisely managing our water resources makes good sense for the short-term and the long-term. Reductions in drinking water demand – and the associated reductions in wastewater flows – help defer the need for costly expansion of the capacities of our raw water supplies, water treatment plant, and wastewater treatment plant. More efficient use of water also helps reduce costs for energy and chemicals for water supply, drinking water treatment and water distribution, and wastewater collection and treatment.

Water demand management is also critical when responding to droughts. In 2001/2002 and again in 2007/2008, our community was hit with prolonged and severe droughts. Since then OWASA and the community have made investments in water conservation, efficiency and reclaimed water use that have resulted in significant and sustained declines in water consumption.

From 1995 to 2020, water sales decreased despite adding about 5,000 customer accounts (Fig. 1). This is due primarily to four key programs that demonstrate how policy changes, rate structures, and infrastructure and technology can positively influence water demand:

- 1) Federal efforts and initiatives, most notably the 1992 Energy Policy Act, changed national policy regarding water fixture efficiency. Utilities across the country have seen declines in per capita water use as a result this legislation. Since 1994, it has been almost impossible to purchase a toilet that does not meet the national standard for water use efficiency (at 1.6 gallons per flush). Now, models that are even more efficient (1.28 gallons per flush or less) are readily available. EPA Water Sense fixtures, dishwashers and washing machines are commonplace in

our community.

- 2) In 2002, OWASA established seasonal water rates for all customers. Subsequently, in 2007, the utility was one of the first in the state to implement a five-tiered increasing block rate structure for all individually metered residential customers. These rate structures are designed to encourage conservation.
- 3) In 2009, the reclaimed water system came online. This unique system, funded predominately by UNC-Chapel Hill, now meets over 10 percent of the community's water needs, freeing up the drinking water supply.
- 4) In 2019, OWASA's Advanced Metering Infrastructure (AMI) project was completed, and the corresponding Agua Vista web portal was launched. The program reads data hourly from roughly 22,000 new meters installed across the service area. This powerful data portal allows customers to know more about their water usage and suggests ways to conserve water. It also allows OWASA to send leak alert to customers much more quickly.

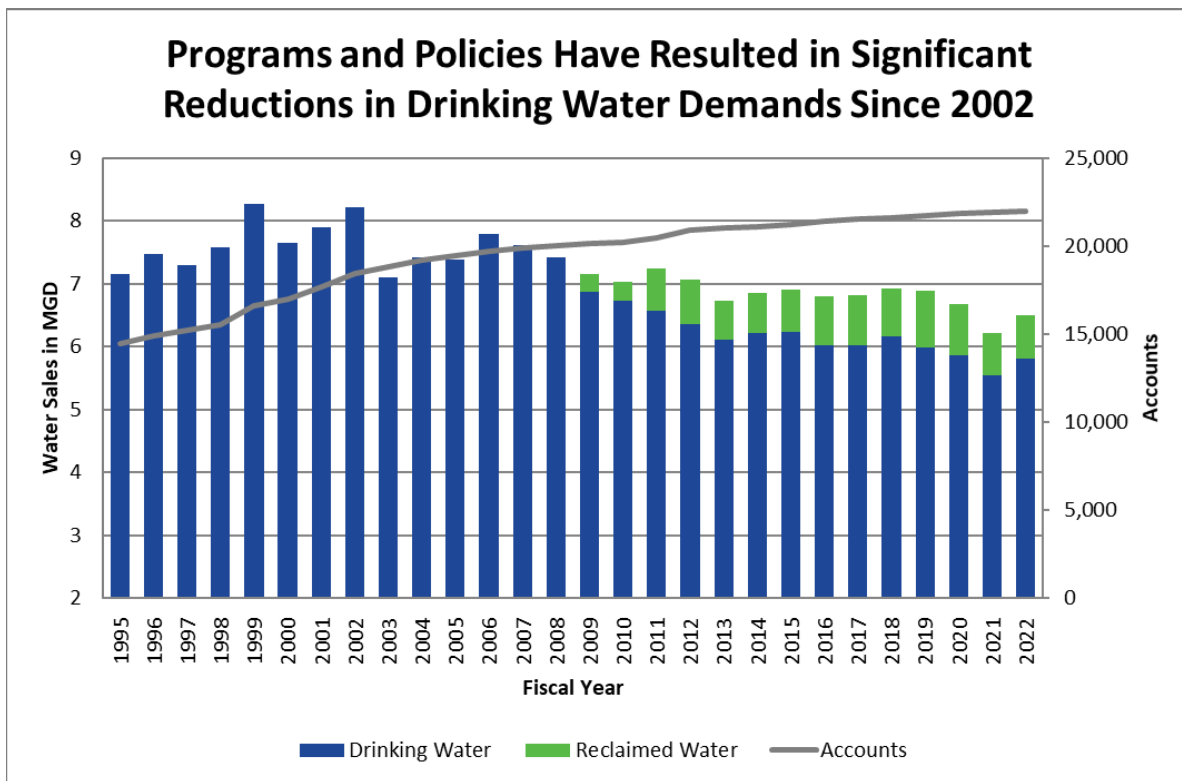


Fig. 1: Total potable water sales declined in 2003 and again in 2009. These declines correspond with droughts, as well as significant changes in OWASA's rate structure. Additionally, in 2009, when the reclaimed water system came online, OWASA's potable water sales decreased significantly and have remained at these lower levels.

In addition to direct water sales, it is also important to look at unbilled water that may be lost throughout the system. Every year, we conduct a system water audit using the American Water Works Association (AWWA) Water Audit Method and Water Audit Software. This analysis compares treated water pumped to the system to all billed water consumed by customers, as well as water used in flushing, Capital Improvements Program (CIP) projects, unbilled water from illicit connections, and water that leaks out of OWASA's nearly 400 miles of drinking water distribution pipes.

The Water Audit Software calculates an "infrastructure leak index" (ILI) as the ratio of real water losses (physical losses from the distribution system) to the unavoidable real water losses (an industry-calculated technical low limit of leakage for well-managed systems in good condition with aggressive active leak control). OWASA maintains a historical ILI at or around 1.0, which means that the water leaking from our distribution system is equal to the lowest limit technically (and economically) feasible to maintain.

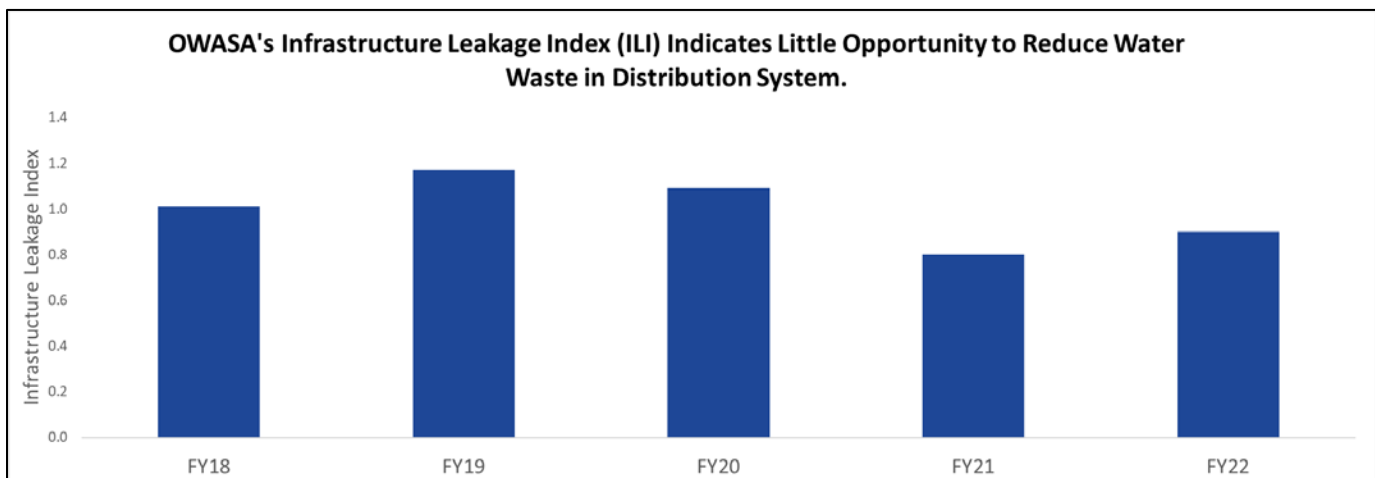


Fig. 2: OWASA's Infrastructure Leakage Index (ILI) has been consistently close to 1.0.

Finally, gallon per capita per day (gpcd) use by residential customers provides a useful way for primarily residential systems like OWASA's to benchmark water demand management. OWASA's residential customers used 48 gallons per capita per day in 2010. In 2017, they used 42.6 gpcd, a decrease of about 11 percent from 2010 levels.

OWASA's residential customers use less water per day than those in Raleigh, Durham, Cary, and Hillsborough. Our gallons per capita per day is also significantly less than the national average, which was calculated using data from 23 utilities across the country.

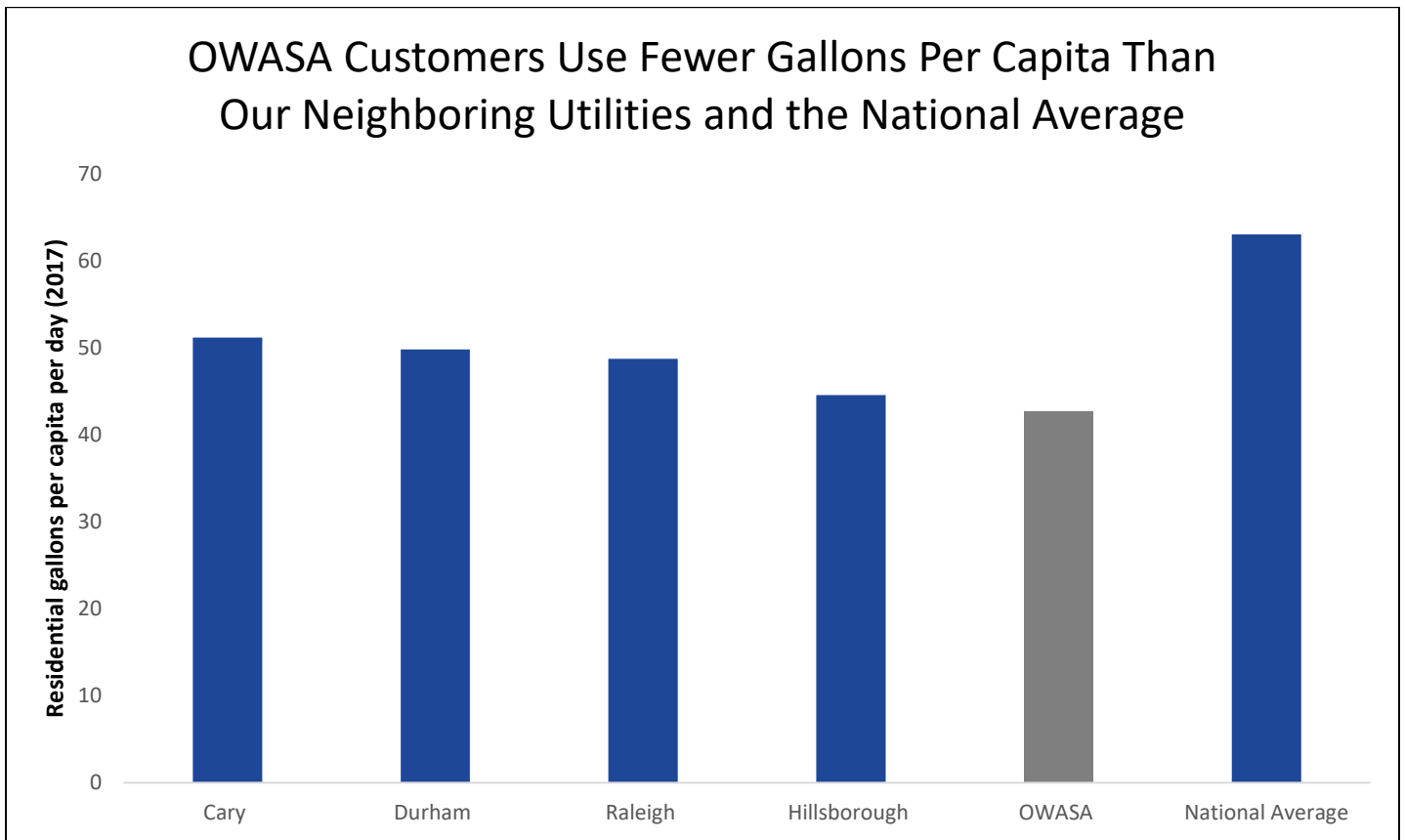


Fig. 3: OWASA residential customers used 42.6 gallons per capita per day in 2017. Neighboring utility data from the NC Division of Water Resources' Local Water Supply Plans. National average figure from the Water Research Foundation's Residential End Uses of Water, Version 2 (2016).

Customer Water Demands

Unlike many water utilities, one large customer is responsible for about 30 percent of OWASA's system-wide water use, when reclaimed water is included: UNC-Chapel Hill. The University has an out-sized impact on our water sales as is evident in the large drop in potable water sales when the reclaimed water system came on-line in 2009 and in the significant decline in water sales when the University moved to virtual instruction and work from home procedures due to the pandemic.

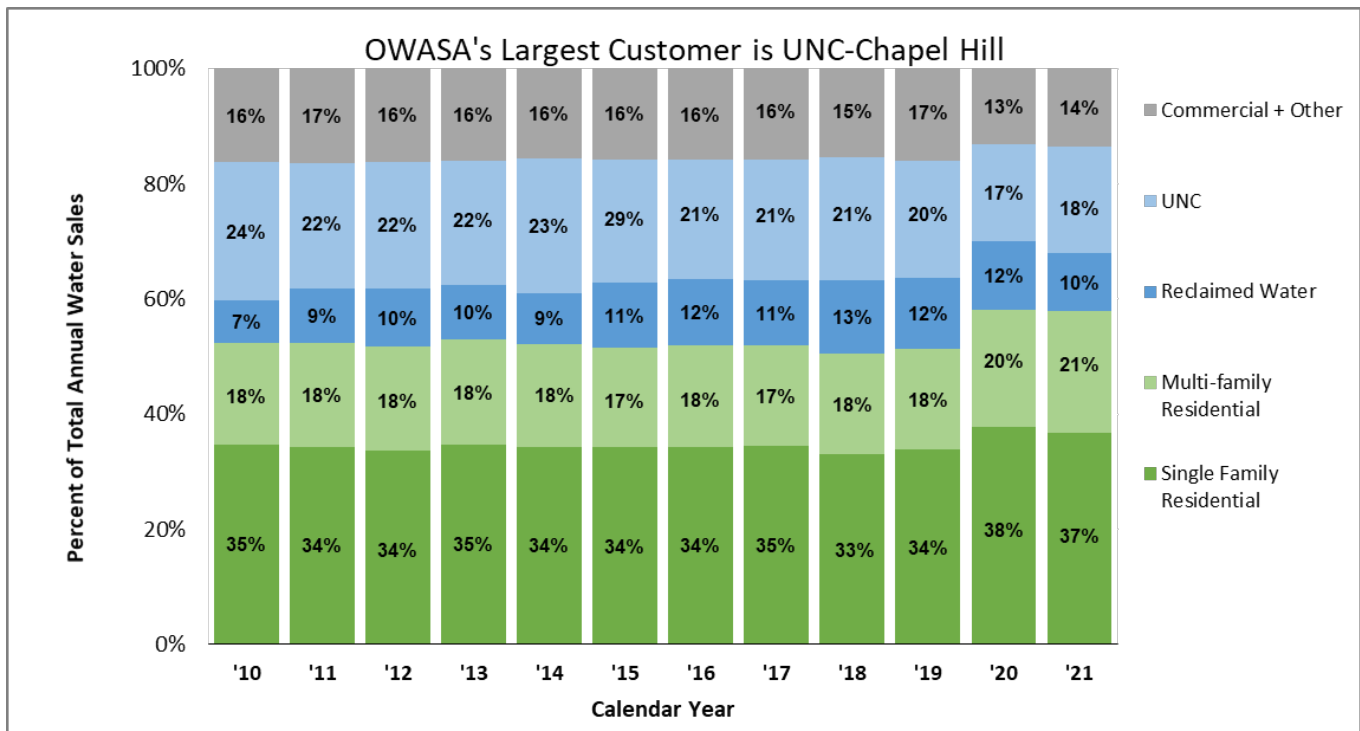


Fig. 4: Water Use by sector shows little change since 2010.

Next to UNC, and to a much lesser extent, the Chapel Hill-Carrboro City School System (CHCCS) is OWASA's largest customer.

OWASA'S Top 10 Largest Water Users

Name	Consumption FY22 (million gallons)	Sector
UNC-CH	441	UNC
CHCCS	26.9	Commercial
Mid-Atlantic Management	21.1	Multi-family residential
RA Properties	17.0	Multi-family residential
Triangle Communities	15.0	Multi-family residential
OWASA	14.2	*Not included in graph above
Northwood Ravin	12.8	Multi-family residential
CH Housing	12.0	Multi-family residential
ACV XVII LLC	12.0	Multi-family residential
Estes Part Apts.	11.9	Multi-family residential
CP Villages LP	11.7	Multi-family residential
Laramar Collins Crossing	11.3	Multi-family residential

While single family residential homes represent the largest percentage of our system-wide water use, growth and demand forecasts made as part of the LRWSP indicate that non-residential water use will become the dominant water use sector in the next 50 years. Multi-family master metered accounts are also projected to grow over this time-period, with single-family residential accounts remaining relatively stable.

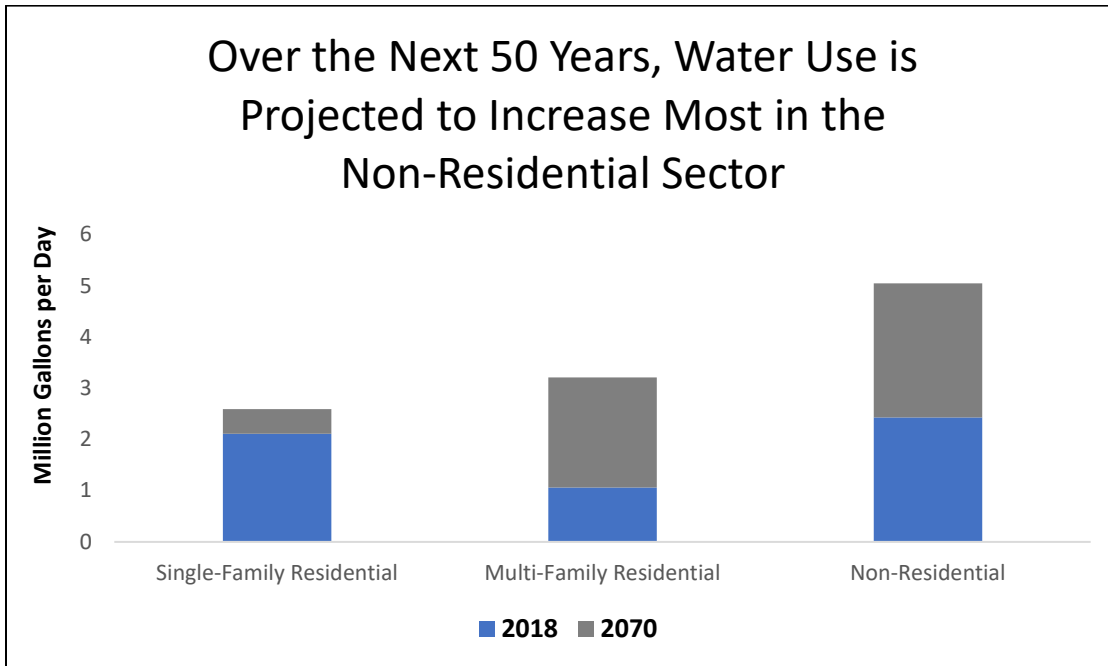


Fig. 5: Non-residential water use is projected to more than double between now and 2070, making it the largest water use sector in OWASA's system. Multi-family residential water consumption is also projected to increase, while single family residential is projected to have only a modest increase in consumption.

Water Demand by OWASA

One of OWASA's core values is stewardship, which includes making the highest and best use of our local water resources and promoting conservation of water, energy, and other natural resources. OWASA operations use a large amount of water. Figure 6 tracks water use across the top three water-using facilities: the Mason Farm Wastewater Treatment Plant (WWTP), the Rogerson Drive Pump Station (RDPS), and for use by the Distribution and Collection System. The graph does not capture drinking water use at the Water Treatment Plant. AMI meters will be installed at the plant in FY 2023 and will allow us to better monitor and manage drinking water use at this facility.

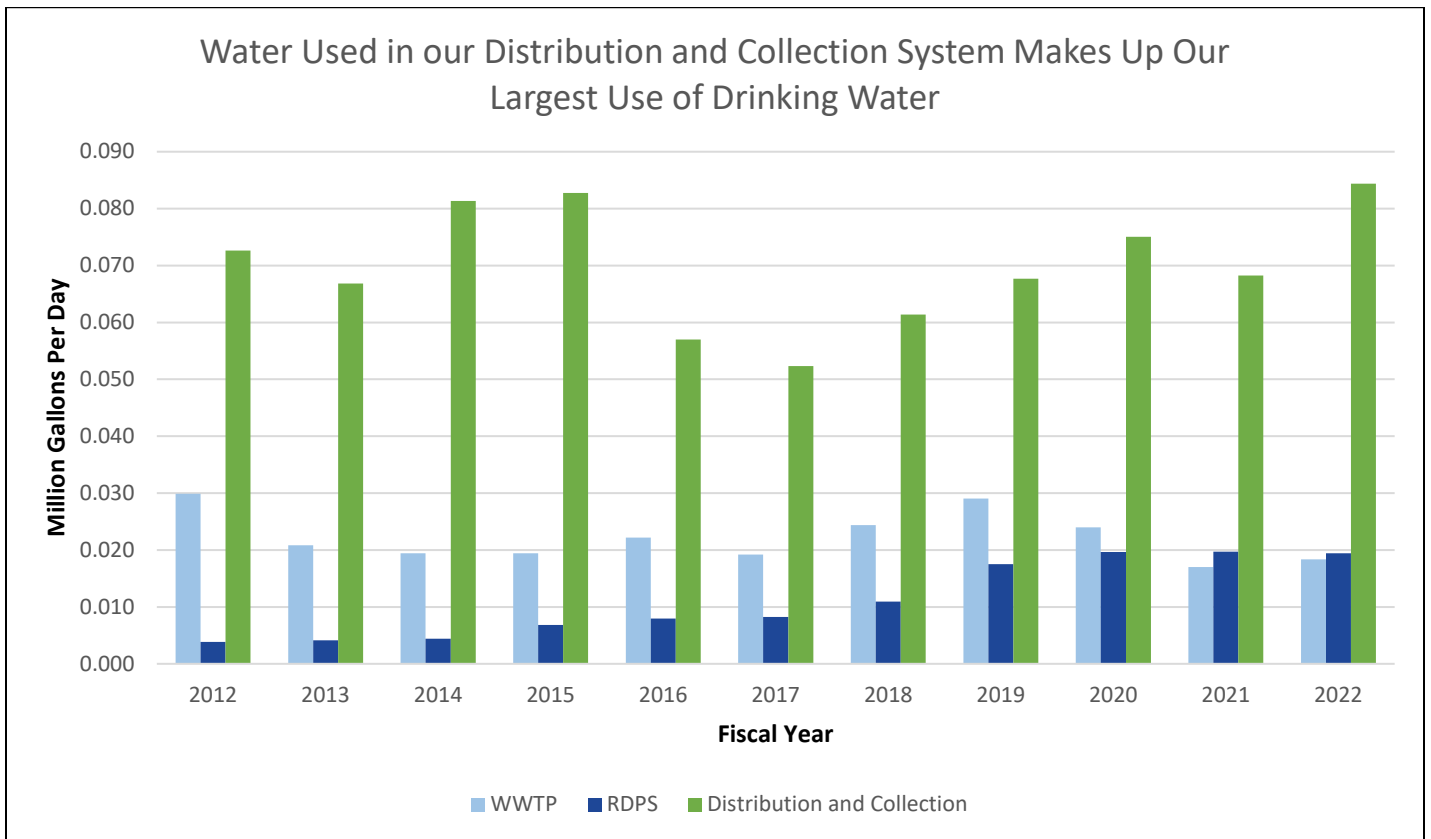


Fig. 6: Over the past 11 years, drinking water use for OWASA facilities has varied. Most recently, water use has increased at Rogerson Drive Pump Station (RDPS) and for the purposes of system flushing.

The largest water-using OWASA “facility” is distribution and collection for distribution system flushing and sewer cleaning. In early 2015 (mid-FY15), OWASA started a uni-directional flushing program that continued until late 2017 (mid-FY18). During these years, OWASA used less water for routine flushing. Since discontinuing the program, water use has increased for distribution system flushing. The LRWSP investigated a possible demand management strategy that would loop distribution lines, which would reduce the amount of water used in flushing. This was not determined to be economically viable. Additionally, in 2018, OWASA started using much more water at its Rogerson Drive Pump Station for the purposes of pump sealing. This is discussed further in existing strategies and initiatives.

Existing Strategies and Initiatives

OWASA has a long history of water conservation and a suite of active water conservation strategies. These strategies are outlined below and described later in detail.

Conservation Measure	Target Use Class
EDUCATION AND OUTREACH	
School-based Education and Community Events	Residential
Affordability Program	Residential
Water Conservation Kits	Residential
Agua Vista Leak Detection and AMI Technology	All
Agua Vista Water Use Data	All
REGULATORY	
Water Conservation Ordinances	All
Alternate Day Watering Ordinance	All – Outdoor
CONSERVATION-ORIENTED RATE STRUCTURES	
Increasing Block Rate Structure	Single Family Residential
Irrigation Rates and Metering	All – Outdoor
Seasonal Rate Structures	Commercial and Institutional
Drought Surcharges	All
RECLAIMED WATER	
Pumped to Customers (Offset Potable Water Use)	Commercial
OWASA’S INTERNAL WATER CONSERVATION EFFORTS	
Maintenance and Upgrade of Infrastructure	Internal
Water Main Break Repair	Internal
Leak Detection and Pressure Monitoring	Internal
Water Conservation and Reuse at the Wastewater Treatment Plant	Internal
Recirculation System at Rogerson Drive Pump Station	Internal
In-plant Recycling of Water Treatment Plant Process Water	Internal
Water Sense Fixtures and Equipment	Internal
Data Management	Internal

EDUCATION AND OUTREACH

School-based Education and Community Events

OWASA’s Communications and Community Engagement Plan identifies the provision of “unique educational experiences to get people interested and invested in OWASA and the water/wastewater system” as a key strategy. Water conservation is a topic thoroughly integrated into these experiences, including outreach through school programs and presentations, as well as the Youth Water Academy. In addition, messages of water conservation are integrated into our annual water quality report card and outreach at community events using the OWASA Water Wagon.

Affordability Program

The goal of OWASA's Affordability Program is to increase awareness of options to manage and reduce water and sewer bills and to empower low-income customers, and the local agencies that serve them, with information and tools to manage and reduce water and sewer bills. Over the years, this program has included a pilot toilet replacement program, home water audits, presentations to a wide range of community groups, community events, and co-publishing of water conservation tips with partner organizations. More recently, it included a pilot Home Water Report program; using information compiled and analyzed in the Agua Vista web portal, regular letters and emails were sent to low-wealth customers to summarize individual household water use and make recommendations on water conserving strategies.

Water Conservation Kits

OWASA offers free-of-charge water conservation kits, which include toilet leak detection tablets; low-flow showerheads; faucet aerators; shower timers; can caps; and grease scrapers, to any interested residential customers.

Agua Vista Leak Detection and AMI technology

OWASA finished upgrading all meters to AMI technology and deployed the Agua Vista Web Portal in 2019. These have become important tools in our water conservation toolbox. Before AMI technology, a customer would not notice a silent leak until they received a larger-than-expected bill. At this point, water may have been leaking for almost a month. National studies have estimated that 10 – 12 percent of water used across the country is lost due to leaks, with toilets, faucets, and outdoor spigots being the main culprits. Leaking water can cause huge amounts of property damage and can disrupt a family's finances, both of which are particularly devastating to low-wealth families, which is why this tool plays an important role in our Affordability Program. OWASA customers can now take control of their water usage and save money with the help of OWASA's Agua Vista program.

In 2020, Agua Vista detected 274 million gallons of water loss due to leaks. Over 9,900 leak alerts were sent to customers. The Agua Vista platform estimates that almost 74 million gallons were saved due to leak alerts (~0.2 MGD).

If OWASA has an email address for a customer, they will automatically receive a leak alert if the system detects a leak. For residential customers for whom we do not have email addresses, we pay an additional service to mail a printed leak alert.

Agua Vista Water Use Data

In addition to detailed hourly water use data and proactive leak notifications, the Aqua Vista web portal provides customized water conservation tips based on a customer's historical water

use. The portal even quantifies the savings that customers could expect from making changes to their behavior or by replacing a fixture.

Install High-Efficiency Toilets

+ Start action

★ Save for later

✓ I completed this

✗ Not for me

Savings up to... **20 GPD** **\$107/yr**



Did you know?
Toilets are the largest contributor to indoor water use (source: U.S. Environmental Protection Agency). Older toilets use about 3.6 gallons per flush, while high-efficiency toilets typically use 1.28 gallons or less per flush.

That's a **64% reduction** in water use! When you consider that each person flushes about 5 times per day, that can add up to **BIG** savings. High-efficiency toilets often pay for themselves in less than two years.

What to do next

- Figure out when your toilet was manufactured, or how many gallons per flush (gpf) it uses.
 - To do this, look for the manufacturer's date stamp or gpf label. On most toilets, one of these indicators can be found behind the seat hinge on the bowl, on the wall of

Fig. 7: Screenshot of a water saving recommendation our customers might see on their Agua Vista page.

OWASA customers can register for this free service through the web portal with their account number and zip code. Encouraging new and existing customers to register with Agua Vista and share either a phone number or email address so that they can receive timely leak alerts is an important objective of the Communication Plan, Affordability Plan, and the Customer Service team.

Currently, approximately 63% of OWASA's accounts are registered for Agua Vista.

REGULATORY

Water conservation ordinances

In 2003, the Towns of Carrboro and Chapel Hill both adopted local water conservation ordinances which include year-round conservation standards. The Town of Carrboro's Water Conservation Restrictions and The Town of Chapel Hill's Water Conservation Standards and Regulations are identical:

- Prohibit water waste
- Require year-round water restrictions for spray irrigation, that all irrigation systems be equipped with automatic controllers, rain or soil moisture sensors that prevent

irrigation during periods of rainfall or when there is sufficient moisture in the ground for plant health and survival

- Specify that all hoses used for hand watering, vehicle washing, or other uses must have a shutoff nozzle
- Require all indoor and outdoor water leaks to be repaired within 10 days of discovery
- Requires restaurants and dining facilities to serve water only on request, hotels, motels and other facilities change bed linens on upon request of the customer, upon customer changeover or every 5 days for long-term customers

If customers do not comply with these restrictions, OWASA may discontinue water service after notice of a prohibited use is delivered to the service address.

[Alternate day watering ordinance](#)

The Town of Chapel Hill's and the Town of Carrboro's identical ordinances state:

The following outdoor or exterior use requirements shall apply to all customers using OWASA-supplied potable water:

- Spray irrigation shall not occur more than three (3) days per week. Even-numbered properties may be irrigated with spray systems only on Sundays, Wednesdays, and/or Fridays. Odd-numbered properties may be irrigated with spray systems only on Tuesdays, Thursdays, and/or Saturdays. All spray irrigation shall occur only between the hours of 6:00 p.m. and 10:00 a.m. and shall apply no more than one (1) inch of water in any given week. These restrictions shall not apply to properties using underground, drip irrigation, micro spray, low precipitation bubblers, soaker hoses, hand watering, tree or shrub watering bags, or where watering of containerized plants and commercial plant stock in trade is maintained for resale.
- No exterior use of OWASA-supplied potable water shall result in the flow of water onto adjacent property or public right-of-way, and all irrigation systems shall be designed and maintained to prevent to the extent practicable water from flowing onto paved or other impervious surfaces.
- Owners of public purpose athletic fields, recreational fields, and/or public purpose botanical sites shall not be subject to the year-round limitations of subsections (a)(1)— (5) if those facilities are operated in compliance with an OWASA-approved water conservation plan that specifies the conservation measures and irrigation operating modes to be employed at that facility year-round and during successive stages of a declared water shortage.

CONSERVATION-ORIENTED RATE STRUCTURES

In providing essential drinking water, wastewater, and reclaimed-water services to our customers, OWASA charges “cost-of-service” rates. Water pricing can have a significant impact on water use. One of the most effective ways to reduce water use (and waste) is by charging higher prices. Given that water demands track back to the size and operation of costly infrastructure, OWASA has implemented rate structures that both align with utility costs and promote water conservation.

Increasing Block Rate Structure

In 2007, OWASA implemented a 5-tiered increasing block rate structure for individually metered residential customers. Block pricing incentivizes water conservation by maintaining low cost for small-volume users but charging more for high-volume users.

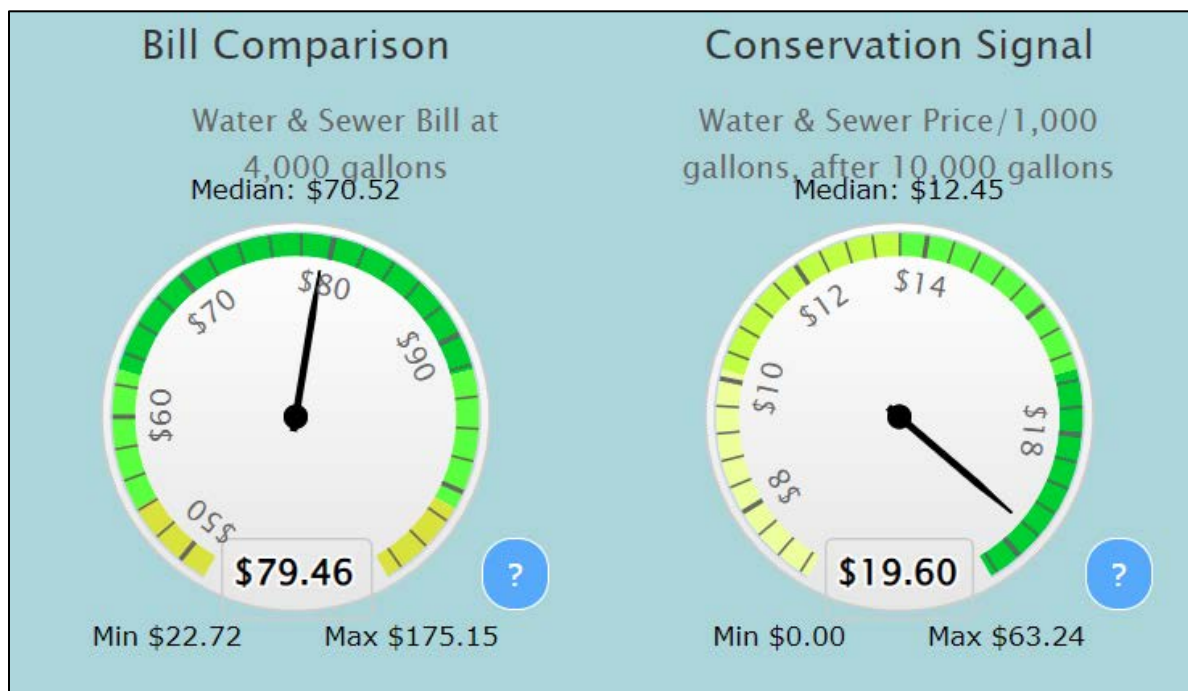


Fig. 8: The Environmental Finance Center at UNC School of Government’s NC Water and Wastewater Rates Dashboard indicates that OWASA’s conservation signaling is high compared to other NC utilities and our rates are about average. Conservation signaling looks at the charge for the next 1,000 gallons after a customer uses 10,000 gallons/month. It affects single family residential customers with high water use.

Irrigation rates and metering

To further incentivize wise water use, irrigation-only accounts are charged a higher monthly charge than all other customers and a more expensive rate than the average individually-metered residence. There is no block rate structure for irrigation accounts. In effect, irrigation is

charged at one of the highest rates to discourage overwatering and encourage water-saving landscape design and maintenance. In addition, in accordance with state law, any newly platted land that installs in-ground irrigation is required to be separately metered and billed for irrigation water use.

Seasonal rates

Peak seasonal rates for all non-residential commercial and institutional accounts begin in May and end in September. These rates are designed to encourage conservation in times of peak system-wide water demand. Residential and Multi-family Master Meter (MFMM) accounts are not charged these higher rates in the warmer months to help address affordability and billing challenges.

Drought surcharges

Starting in Stage 1 of declared water shortages, OWASA begins to apply a drought surcharge to certain levels of water use. These multipliers and the level of water use against which they are applied increase as drought conditions worsen.

Individually Metered Residential						Multi-family master-metered residential	Non-residential and irrigation-only
Block:	Res. Block 1	Res. Block 2	Res. Block 3	Res. Block 4	Res. Block 5		
Use level (gallons)	1,000 to 2,000	3,000 to 5,000	6,000 to 10,000	11,000 to 15,000	16,000 and up		
Stage 1	No surcharge	No surcharge	1.25 times normal Block 3 rate	1.5 times normal Block 4 rate	2 times normal Block 5 rate	1.15 times year-round rate	1.15 times seasonal and irrigation-only rate
Stage 2	No surcharge	1.25 times normal Block 2 rate	1.5 times normal Block 3 rate	2 times normal Block 4 rate	3 times normal Block 5 rate	1.25 times year-round rate	1.25 times seasonal and irrigation-only rate
Stage 3 and Emergency	No surcharge	1.5 times normal Block 2 rate	2 times normal Block 3 rate	3 times normal Block 4 rate	4 times normal Block 5 rate	1.5 times year-round rate	1.5 times seasonal and irrigation-only rate

RECLAIMED WATER SYSTEM

Reclaimed water is the clean water produced from the advanced treatment of wastewater at our wastewater treatment plant. It is used in our service area for non-drinking water purposes,

such as flushing toilets, irrigating fields, and in the cooling towers at UNC and UNC Hospital. Other utilities also use reclaimed water for washing cars, concrete mixing, and augmentation of surface drinking water supplies.

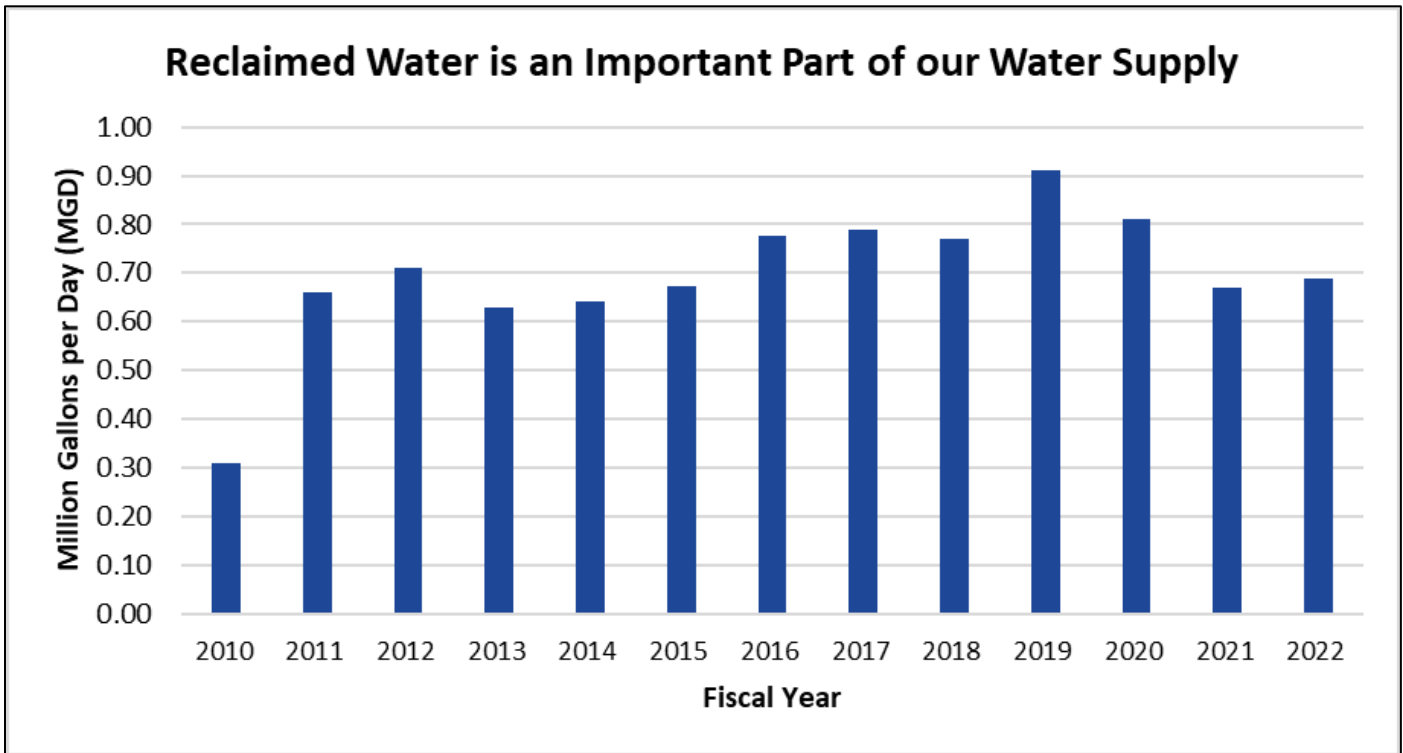


Fig. 9: Reclaimed water sales reached over 900,000 gallons per day in 2019.

- The Reclaimed Water System:
- Enables OWASA to meet non-potable water needs, freeing up the community's drinking water supply in a cost-effective manner
- Lowers the risk of a water shortage in future droughts
- Defers or eliminates the need for costly water supply or expanded treatment facilities

As currently constructed, the reclaimed water system can meet peak demand of 3 million gallons per day (mgd), and it was constructed to allow cost-effective expansion to about 5 mgd. The cost to operate and maintain the system is paid solely by reclaimed water customers: the University of North Carolina at Chapel Hill, which uses the majority of reclaimed water, as well as St. Thomas More School.

OWASA'S INTERNAL WATER CONSERVATION EFFORTS

Maintenance and upgrade of infrastructure

Since beginning operations in 1977, OWASA has utilized a systematic replacement program for aging water distribution mains. Under this program, projects are prioritized by the following conditions:

- where line breaks may result in major damage or disruption to the community;
- where pipe material condition and other factors have indicated a pipe has reached the end of its useful life;
- Where there are serious risks to water service reliability;
- Where there are opportunities to improve water quality; and
- where capacity is no longer adequate.

OWASA catalogs the risk conditions listed above using the following two sources: a system hydraulic model and a risk-based pipe prioritization model:

- In 2011, the hydraulic model of the water distribution system was updated to identify and prioritize any areas of capacity and/or pressure concerns that need to be addressed in OWASA's water system through 2030. OWASA is currently updating the hydraulic model and final modeling results should be available in 2024 and will be used to evaluate areas where expanded capacity and distribution system improvements may be needed in the future.
- In 2020, as part of a comprehensive Distribution System Management Plan Update, OWASA updated its detailed distribution system prioritization model, which systematically evaluates and prioritizes water mains for replacement. This model relies on a statistical analysis of historical breaks to define pipe deterioration drivers for water main failures and determine potential failure patterns. This detailed understanding of failure patterns was combined with criteria regarding the consequence of specific main failures to develop the risk prioritization framework which is used to guide decisions on replacement projects. The model is not intended to predict when or where breaks will occur but rather to be used as a tool to observe trends in likelihood of failure and then use engineering judgement to prioritize lines and project groupings for replacement within the Capital Improvements Program (CIP).

Over the last 10 years, OWASA has replaced about 1.7 miles of water main per year. OWASA's water main replacement goal is 3 miles per year. Recently, additional water main replacements have been completed by OWASA's internal construction crew, which focuses on smaller diameter, neighborhood replacements.

Water main break repair

OWASA's valve maintenance program ensures that we test the valves in our distribution system on a routine basis and fix valves that are broken - before they fail. If a water main does break, our goal is to isolate the break as soon as possible. Our GIS-based valve isolation tool pinpoints the primary and secondary valves necessary to isolate the area needed to make the repair. The faster we can isolate the break; the less water is lost.

Leak detection and pressure monitoring

OWASA currently monitors distribution system pressure at nine locations in addition to the Jones Ferry Road Water Treatment Plant (WTP). The distribution system locations include three storage tanks, three booster pump stations, and three locations elsewhere in the distribution system. Data from each of these locations are transmitted from their location back to the Supervisory Control and Data Acquisition (SCADA) system at the Water Treatment Plant (WTP). WTP staff monitor the pressures in the elevated water storage tanks, but the locations at the booster pump stations and throughout the distribution system are not monitored routinely.

Although OWASA's Infrastructure Leakage Index (ILI) indicates that there is little opportunity to reduce water waste in our distribution system, when leaks occur, time is of the essence: the faster we know about a leak, the faster we can repair it and stop the water loss. In addition to water conservation benefits, both pressure and leak monitoring strategies can provide benefits to operations, condition assessment and capital planning efforts. These monitoring strategies and associated technologies can help pinpoint water leaks, identify main failures or mains that are more likely to fail, reduce break response time, alert operators to system anomalies and respond to customer complaints, among other benefits.

Based on recent recommendations, OWASA staff is evaluating both temporary and permanent leak and pressure monitoring strategies throughout the distribution system. OWASA's FY23-27 Capital Improvements Program plan has \$150,000 of funding for distribution system asset management strategies which includes leak detection and pressure monitoring among other initiatives.

Water conservation and reuse at the Wastewater Treatment Plant

Since the 1960s, the wastewater treatment plant has incorporated non-potable water, treated wastewater, into many of its processes. Non-potable water is used in the headworks, in the solids building, in the aeration basin spray system, in the secondary clarifiers, fire hydrants, and as seal water for the pumps that move water throughout the wastewater treatment plant. Using this non-potable water instead of potable water saved approximately 200 million gallons of potable water in 2020 (about 0.5 MGD).

OWASA staff have begun sub-metering non-potable water use at the plant and are actively working to identify and pursue strategies to reduce our use of potable water and to connect facilities that currently use potable water to the non-potable system.

Recirculation System at Rogerson Drive Pump Station

In late 2017, the recirculating seal water system for the pumps at the Rogerson Drive Pump Station began to fail. This damaged the pumps. By 2018, the recirculation system was taken off-line entirely. Now, instead of recirculating water, potable water is used as seal water to

maintain the pump pressure. With the recirculating system out-of-service, the seal water is sent back into the wastewater collection system. In FY22, this used approximately 20,000 gallons per day. Staff have a plan to put the recirculation system back in place in FY 23 and potable water use should fall to pre-2018 levels.

In-plant recycling of water treatment plant process water

After the 2001/2002 drought, OWASA sought state approval to recycle process water at the Jones Ferry Road WTP. Process water is the water used to remove solids from the treatment process and backwash (clean) filters. In 2005, OWASA received approval from the State of North Carolina to use recycled process water for up to 10 percent of the total daily flow of raw water. This change effectively cut the amount of raw water used by 0.4 million gallons per day. In addition, it allows treatment plant operators to make small adjustment to WTP flow without making changes to University Lake or Cane Creek Reservoirs pumping rates.

Water Sense certified toilets, showerheads, dishwashers and water efficient fixtures

OWASA has water saving devices, fixtures and faucets installed in many bathrooms and kitchens.

Data Management

OWASA tracks water use in many of our facilities using Agua Vista. The system alerts our maintenance staff when water use increases indicating a possible leaking faucet or toilet so that repairs can be made promptly. In addition, OWASA regularly conducts AWWA water audits to identify cost-effective strategies to reduce water waste in our distribution system.

Evaluation of OWASA's Water Conservation and Efficiency Program

The American Water Works Association (AWWA) updated a standard in 2021 for Water Conservation and Efficiency Program Operation and Management. This standard describes the critical elements of an effective water conservation and efficiency program. It encompasses activities undertaken by a given utility within its own operations to improve water use on the supply side upstream of customer meters through distribution system management, and on the demand side downstream of customer meters through customer billing and education practices. A program meeting this standard has the potential to impact all water users.

AWWA serves the entire country; therefore, these guidelines are not prescriptive but rather provide a general template for a robust water conservation plan. These are designed as voluntary guidelines and can be modified to better fit our needs and the needs of our community. They are organized into four sections: regulatory requirements, top-level organization functions, internal utility actions, and external policy requirements.

Based on an evaluation of OWASA's existing program described above, staff have assigned each requirement a score of 'not yet,' 'good,' 'better,' and 'best' based on our current water conservation

strategies. Appendix B includes more information on each standard, staff's rationale for its rating, and potential opportunities to improve each area rated as 'not yet', 'good', or 'better'.

Section	Requirements	OWASA 'Score'
REGULATORY REQUIREMENTS		
	Meet or exceed all current federal, state and local regulatory requirements	BEST
TOP-LEVEL ORGANIZATION FUNCTIONS		
	Point of contact for water conservation initiatives	NOT YET
	Water conservation and efficiency plan that addresses conservation across all relevant customer categories and includes clearly defined and measurable performance goals	NOT YET
	Integrated resource planning evaluates efficiency and conservation on a comparable basis with supply options	BEST
	Water shortage or drought plan	BETTER
	Public information and education program promoted to all customers	GOOD
	Landscape efficiency program	GOOD
INTERNAL UTILITY ACTIONS		
	Universal metering or a plan to achieve universal metering	BETTER
	Source water metering	BEST
	Conservation-oriented rate structures that provide a financial incentive to reduce water use	BEST
	Monthly billing to provide regular feedback on usage to customers	BEST
	Units clearly labeled and defined in gallons	GOOD
	Limit estimated billings to no more than twice per year per customer	BEST
	Water loss control program to detect and minimize water loss in the distribution system including a utility water audit validated by a third-party	BETTER
EXTERNAL POLICY REQUIREMENTS		
	Water efficiency in building codes and standards	NOT YET
	Integrate water efficiency into land-use planning	NOT YET
	Water waste ordinance	BETTER

Guiding Principles

At its [January 13, 2022](#) meeting, the Board of Directors adopted the following guiding principles for evaluating strategies within the Water Conservation program:

1. The strategy is expected to contribute to a sustained reduction in the community's per capita water consumption.
2. The strategy is cost-effective as measured by dollars per thousand gallons saved. Where cost cannot be reliably quantified, the strategy will be considered based on how well it promotes environmental,

economic, and societal goals.

3. Where appropriate, the strategy will be developed in coordination and with the cooperation of the Town of Chapel Hill, Town of Carrboro, UNC, Chapel Hill Carrboro City Schools, Orange County, the development community, and other partners and stakeholders.
4. Strategies will be evaluated by their performance against the following criteria:
 - The strategy is based on the best available and demonstrated water efficiency technology, designs, and practices.
 - The strategy utilizes a data-driven approach.
 - The strategy is equitable and provides multiple benefits to all.
 - The strategy incorporates efforts to raise community awareness and advocacy through active engagement, public outreach, and education.

Next Steps

The Guiding Principles for our Water Conservation Program described above signify that the Board of Directors desires a data-driven approach, and that strategies that will cost-effectively achieve sustained water reductions are preferred. OWASA's AMI system provides data that strategies could be evaluated against. Staff proposes using our AMI data to develop SMART goals for our water conservation program, to identify our largest types of water use, target our messaging, and evaluate strategies included in AWWA's standards against the data obtained through this AMI analysis. Staff will need consulting help to evaluate the AMI data and proposes the following next steps.

1. **Appoint the Strategic Initiatives Manager and Planning and Development Manager as the points of contact for water conservation.** An effective water conservation program will have elements of engineering, planning, sustainability, and communications – a combination of the skill sets of both positions. In addition, having two points of contact enables one to keep the program moving while the other may have other priorities or in the event that one of the positions is vacated or absent for an extended period of time. This action is effective immediately.
Point of contact for water conservation initiatives: NOT YET > GOOD
2. **Use the AMI data to develop SMART goals for the program, identify the areas of largest water use, target communications, and identify the most cost-effective strategies to achieve our SMART goals.** In order to fully achieve the benefit of our AMI data, staff believe we will need consultant help on this step. Thus, the earliest it would be completed is in fiscal year 2024 if the Board approved this assistance in that year's budget.
Water conservation and efficiency plan that addresses conservation across all relevant customer categories and includes clearly defined and measurable performance goals: NOT YET > BEST
3. **Update our Water Shortage Response Plan using the analysis of the AMI data.** Our Water Shortage Response Plan assumes certain water reductions are achieved by the community with each level of declared water shortage. Given the water reductions already achieved by the community, staff has reservations on whether we could actually achieve these water reduction goals in the case of a severe drought. At the same time, we should update the trigger graphs to show how they would change when we have guaranteed access to our allocation of water from

Jordan Lake. We are required to update our Water Shortage Response Plan and have it approved by the Board of Directors in calendar year 2025 by general statute. Thus it will be important to include consulting help to evaluate our AMI data in the FY 2024 budget. Staff will bring a summary of the data with a draft SMART goal(s) and an updated list of next steps to the Board of Directors.

Water shortage or drought plan: BETTER > BEST

4. **Pursue a new Customer Billing and Information System (CIS)** that allows for displaying water consumption in increments smaller than thousand gallons. The budget for this step has been approved in the current (FY 2023) budget.

Units clearly labeled and defined in gallons: GOOD > BETTER/BEST

5. **OWASA staff meet with Town of Carrboro, Town of Chapel Hill, and University staff.** Each of the Towns recently adopted plans that include elements of water conservation in them that require partnering with OWASA. Staff proposes to begin meeting with the Towns to identify short- and long-term strategies that will help meet the goals in each of our respective Plans. Additionally, the University has water conservation goals on which we would like to align. We would propose pursuing strategies that score well against the guiding principles.

Water efficiency in building codes and standards: NOT YET > TBD

Integrate water efficiency into land-use planning: NOT YET > TBD

Water waste ordinance: BETTER > TBD

APPENDIX A: Coordination of OWASA Plans Related to Water Conservation

This plan captures OWASA's current water conservation and efficiency practices and ensures that demand management elements of OWASA's Long-Range Water Supply Plan (LRWSP), Water Shortage Response Plan, Affordability Program Plan, Energy Conservation Plan and Communications Plan, and Strategic Plan are well-coordinated.

A copy of the most recent version of all these plans can be found at:

<https://www.owasa.org/plans-budgeting/>

Long-Range Water Supply Plan

The Long-Range Water Supply Plan used 50-year forecasts to evaluate the need, costs, and benefits of various alternatives to increase the resiliency of our water supply. Staff evaluated several supply and demand management alternatives against the social, environmental, and economic goals established and approved by the OWASA Board of Directors. Based on this evaluation, it was determined that there is no individual or collective group of demand management strategies that, if pursued further, would prevent the need for additional supply in the long-run in a cost-effective manner.

Demand management through water conservation, water efficiency, and reclaimed water use, however, remain a key value of OWASA, and we are committed to considering cost-effective demand management strategies as part of this Water Conservation Plan. Cost-effective is defined by the LRWSP as having a lower unit cost (\$ per million gallons) than the next supply option.

Water Shortage Response Plan

For the purposes of this document, demand side strategies do not include those that are only enacted in times of drought. While water shortage response strategies are important to extending OWASA's water supply during a drought, they are not desirable to reduce average day demands on a regular basis. Instead, these strategies are considered in OWASA's Water Shortage Response Plan.

Communication and Community Engagement Plan

Additionally, for the purposes of this document, demand side strategies are not communications and outreach strategies. Although extremely important in influencing our community's ethos regarding sustainable water use, the impacts of outreach strategies are difficult to quantify. Now that OWASA has a strategic communication plan such strategies will be included in the updates of these plans.

Affordability Plan

OWASA's affordability plan ensures that our rates are fair and equitable. One program that helps OWASA accomplish this goal while also contributing to water conservation is the tiered rate structure. Single-family households that use less water enjoy a lower rate than those that

use more. In addition, multi-family master meter customers (i.e., apartment complexes) are no longer subject to seasonal rate fluctuations to ensure that families living in these households are not faced with larger bills in the warmer months.

Energy Management Plan

It is important to note that saving water in turn conserves energy. The treating, transporting, and heating of water all take some form of either electricity or gas power, and those costs translate to rising rates on utility bills. Water conservation efforts, including increasing the use of non-potable water at our wastewater treatment plant, are also a part of OWASA's Energy Management Plan.

Strategic Plan

OWASA's Strategic Plan includes strategies to adapt to climate change including improving our resiliency to drought. Water conservation can help meet that goal. The Plan also includes a goal to integrate the online billing system with water use portals which can help educate customers on how to reduce their water bill with practices to reduce their water use.

Appendix B: Evaluation of American Water Works Association (AWWA) Water Conservation and Efficiency Program Operation and Management Strategies Against OWASA Practices

This appendix summarizes the rationale on why OWASA staff rated various strategies within the AWWA standard as “not yet”, “good”, “better”, or “best”. We included time frames for strategies that we have identified as next steps in upcoming years.

NOT YET

1. Point of contact for water conservation initiatives

AWWA Standard – A water utility shall have a dedicated coordinator who is the person responsible for planning and implementing water conservation and efficiency efforts

Rationale for Scoring – While water conservation and efficiency is a part of many OWASA staff member’s job descriptions, no one is officially dedicated as a point of contact for water conservation efforts - yet. If the Board approves appointing the Strategic Initiatives Manager and the Planning and Development Manager as points of contact for the Water Conservation Program, this strategy will move into the “good” category.

Move the Needle –

Staff Score	Opportunity	Timeline
GOOD	Officially designate the Strategic Initiatives Manager as point of contact	FY2023
BETTER	Hire a part-time position to plan, implement and track water conservation and efficiency efforts	TBD
BEST	Hire a full-time position who dedicates a portion of their level of effort to water conservation and efficiency efforts	TBD

2. Water Conservation Plan with SMART Goal

AWWA Standard – The utility shall create, implement, and maintain a water conservation and efficiency plan. The plan must address water conservation and efficiency across all relevant customer categories and include clearly defined and measurable program performance goals accompanied by benchmarks that can be used to assess progress.

Rationale for Scoring – OWASA does not have a water conservation plan – yet. With adoption of this plan, this strategy would move into the “good” category. Staff proposes using its AMI data to develop SMART goals for the Water Conservation Program. Staff will need consulting help to evaluate the AMI data. Staff would then report on progress toward meeting those goals annually as part of the annual Operating Trends report.

Move the Needle –

Staff Score	Opportunity	Timeline
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GOOD	Officially approve a water conservation plan	FY2023
BETTER	Commit to a measurable program performance goal	FY2024 (assuming consultant help approved in budget)
BEST	Report on progress annually; Update plan regularly to reflect new technology and best practices	FY2024 and annually thereafter

3. Integration of Water Efficiency into Land-use Planning and Building Codes

AWWA Standard – Where feasible, the utility shall engage in the development or adoption of water-efficient codes and standards for indoor plumbing fixtures, commercial/industrial equipment, and outdoor landscaping.

Where appropriate, the utility shall coordinate and integrate with their land-use planning authority to influence water demand, such as requiring or incentivizing low-water-use landscaping and efficient outdoor fixtures; requiring turf limitations; incentivizing higher density; and requiring water conservation commitments or adherence to green building standards.

Rationale for Scoring – While OWASA does work closely with our partners at the Town of Chapel Hill and Carrboro, we have not encouraged the adoption or implementation of water efficiency codes or land-use planning standards. The Town of Carrboro adopted their Comprehensive Plan in 2022, and the Town of Chapel Hill adopted their Climate Action and Response Plan in 2021. Each of these Plans includes elements of water conservation and partnering with OWASA. In addition, the town of Chapel Hill is beginning its Complete Community initiative that will identify where and how to meet future housing needs. This initiative could be coordinated to include water conservation objectives. Staff proposes to begin meeting with the Towns to identify short- and long-term strategies that will help meet the goals in each of our Plans. These partnerships could include integrating requirements into land-use planning and building codes as well as partnering on communications and other strategies included in the AWWA water conservation standards.

As part of the update of our Long-Range Water Supply Plan, OWASA evaluated several demand management alternatives. Based on that evaluation, OWASA determined that there are no individual or collective group of demand management strategies that would prevent the need for additional supply in the long run. However, two alternatives were identified to be cost-effective that would fall under this standard. Because these strategies are so closely linked with land-use planning and building codes, they will be incorporated into discussions with Town staff.

- Unit sub-metering of water use for multi-family, master-metered (MFMM) customers, accompanied by a required for WaterSense fixtures.** MFMM properties are projected to be the second largest water use sector in OWASA's service area by 2070. For reasons of practicality and economics, apartments and mixed use developments may be master-metered for water use, and individual tenants never see a water bill (i.e., the water bill is included in rent payments). Research shows that metered customers use 15-20% less water than non-metered customers. Retrofitting existing buildings can be difficult and requires meter reading inside an individual unit, which can be costly. It is much easier to accommodate in new construction. Given the projected growth of multi-family and mixed-use developments in our service area, this initiative was identified to have water savings potential and would be relatively easy and cost-effective to implement. This initiative would be coupled with a requirement for the installation of high efficiency fixtures, so as not to put off the cost of water onto tenants.
- OWASA-run water efficiency design assistance and development program with application of a conservation-oriented system development fee.** OWASA's development review program accepts developers' proposed water use requirements and designs OWASA's infrastructure to meet their needs with minimal discussion of technologies and approaches to reduce a facility's water use. This potential initiative would include the adoption of an OWASA-provided service for new development in which OWASA staff review water use projections and provide individualized efficiency recommendations and design assistance. It will not be regulatory in nature but would partner with the conservation-oriented system development fee (SDF) structure. OWASA's current SDFs for non-residential/MFMM customers are based on meter size. Meter size-based SDFs are easy to administer and allow OWASA to charge for the infrastructure needed to provide the maximum amount of water a customer could possibly use. However, this approach does not give developers an incentive to build more efficiently unless they are on the cusp of needing a smaller meter size. Maximum flow rates vary widely between meter sizes, so though a customer's peak flow rate might be significantly lower than what their meter size allows, the customer would still have to pay for the infrastructure associated with full use of the meter.

Move the Needle –

Staff Score	Opportunity	Timeline
GOOD	Partner with the Town of Chapel Hill and Town of Carrboro to identify short- and long-term strategies which support goals and strategies identified in their plans and OWASA's Water Conservation Plan and Strategic Plan. These strategies should include voluntary actions from developers.	FY2023
BETTER	Partner with the Town of Chapel Hill and Town of Carrboro to develop incentives for adopting water conservation and efficiency into residential and mixed use development or re-development projects. Require sub-metering for all new multi-family development and WaterSense fixtures.	TBD
BEST	Hire a water conservation and efficiency advocate to help developers applying for system development fees design developments that reduce water use	TBD

GOOD

1. Landscape Efficiency Program

AWWA Standard – The utility shall establish a program to improve and maintain water-efficient landscapes and irrigation. The program should include any or all of the following:

- Programs intended to maximize water efficiency through proper design, installation, and maintenance of new and existing landscapes and irrigation systems
- Irrigation scheduling
- Landscape water budgets
- Landscape transformations

Rationale for Scoring – OWASA does not have a landscape efficiency program. Staff proposes using the results of the AMI data analysis to estimate how much water is used to irrigate and the potential cost-effectiveness of including this strategy in our Water Conservation Program. If that analysis indicates that landscape water efficiency programs would help us cost-effectively achieve our SMART goal for the program, OWASA will partner with the Town of Chapel Hill and Carrboro to identify landscape efficiency strategies.

Move the Needle –

Staff Score	Opportunity	Timeline
BETTER	Partner with the Town of Chapel Hill and Town of Carrboro to develop a landscape efficiency program that applies to new development.	
BEST	Partner with the Town of Chapel Hill and Town of Carrboro to develop a landscape efficiency program that applies to all development.	

1. Public Information and Education

AWWA Standard – The utility shall develop or incorporate into existing programs information that fosters a culture of conservation and efficiency. Key components of this program include: communicating the value of water, the water source, and the treatment and delivery process; information on methods and opportunities for reducing consumption; and delivering consistent and persistent messages. The utility shall promote the use and maintenance of water-efficient products, practices, and services to all of their customers.

Rationale for Scoring –OWASA has a strategic communications plans that incorporates water conservation and efficiency messages. We are particularly good at communicating the value of water, the water source and treatment and delivery processes and communicating to low-income customers about ways they can reduce their water bills. We could improve by sending more consistent and persistent messages to all our customers about how to reduce their water consumption. Customers who do not receive OWASA water bills are key target audience that are not currently receiving these messages.

Move the Needle –

Staff Score	Opportunity	Timeline
BETTER	<p>Integrate more messaging around water conservation and efficiency into our Communications Plan</p> <p>Utilize AguaVista to send customized home water reports to all residential water users, comparing their water use to their neighbor's, and recommending actions they can take to reduce water use.</p> <p>Contract with a local plumbing company or non-profit to conduct home water audits and fix emergency leaks for low-income customers</p>	TBD
BEST	<p>Dedicate key accounts manager to work one-on-one with top water users to reduce water use at their facilities</p>	TBD

2. Clearly Label Units on All Bills and Communications

AWWA Standard – When reporting water use to customers on the water bill or other communications, the units should be clearly labeled in gallons.

Rationale for Scoring – OWASA's current bill reports customer's consumption in a box labeled: USAGE (1000S). Our customers must know that 1000S means thousand gallons of water used. A clearer way to represent this would be to label this 1000 gallons. An even better way to clearly communicate how much water a customer is using and therefore how much they could save by adopting water conservation strategies is to bill in 100 gallon or less increments. This would also address the Town of Carrboro's number one issue related to water conservation: lumpy billing. Because we bill in 1,000 gallons, if you use just under 1,000 gallons one month, your bill will be smaller. But, those gallons carry forward to the next month; making your next bill larger. This is a real hardship for low or fixed-income customers. OWASA's FY 2023 budget includes funding for a new customer billing system. Staff should ensure that this system be able to clearly report usage in 100 gallons or less when they evaluate vendor responses to proposals.

Move the Needle –

Staff Score	Opportunity	Timeline
BETTER	Ensure our new billing system can clearly label units	FY2023
BEST	Ensure new billing system can report usage in 100 gallons or less	FY2023

BETTER

1. Water shortage and drought plan

AWWA Standard – The utility shall have a plan to describe utility actions that will be carried out in the event of a drought or other water shortage conditions.

Rationale for Scoring – OWASA’s current Water Shortage Response Plan does not include several important new tools in our toolbox, such as AMI technology, that have been introduced in that time. We are required by statute to update our WSRP by December 2025. Our Water Shortage Response Plan assumes certain water reductions are achieved by the community with each level of declared water shortage. Given the water reductions already achieved by the community, staff has reservations on whether we could actually achieve these water reduction goals in the case of a severe drought. Staff suggests using AMI data to evaluate the estimated reductions we could anticipate at each water shortage threshold. We will need consultant help to complete this exercise. We also suggest using this opportunity to add trigger tables (when we declare a given water shortage stage) to use when we have access to our Jordan Lake allocation through the Western Intake Partnership.

Move the Needle –

Staff Score	Opportunity	Timeline
BEST	Update Water Shortage Response Plan	FY2024

2. Universal metering practices

AWWA Standard – The utility shall have universal metering of all service connections.

Rationale for Scoring – Currently, we supply water to approximately 4,500 households that are not individually metered. Because they do not receive a bill for their water use, these are not receiving the strong conservation rate signals our single-family residential customers do. In addition, they may not know how much water they use per month or how much they are paying for it they are billed for water as a part of their monthly rent. This is an item that we can discuss with our local government Partners as outlined in the “Integration of Water Efficiency into Land-use Planning and Building Codes” described above.

Move the Needle –

Staff Score	Opportunity	Timeline
BEST	Develop a plan for all new developments to require sub-metering for MFMM complexes	TBD

3. Water loss control program

AWWA Standard – The utility shall prepare an annual water loss audit report. Each water loss audit shall undergo validation as described in the Water Research Foundation *Level 1 Water Audit Validation: Guidance Manual*.

Rationale for Scoring – For many years, OWASA has conducted a water loss audit, but has never hired a third-party firm to validate the report.

Move the Needle –

Staff Score	Opportunity	Timeline
BEST	Hire a third-party firm to validate the water loss audit report every 5 years	TBD

4. Water waste ordinance

AWWA Standard – A water waste ordinance shall be in force and effect throughout the utility service area.

Rationale for Scoring – Both the Town of Chapel Hill and Town of Carrboro have a water waste ordinance, but it is rarely, if ever, enforced. This is another topic we can discuss with our local government Partners.

Move the Needle –

Staff Score	Opportunity			
BEST	Work with our partners in the towns to update the ordinance and add enforcement			

BEST

1. Regulatory requirements

AWWA Standard – A water utility shall demonstrate that it meets or exceeds all current state or local regulatory requirements.

Rationale for Scoring – OWASA meets or exceeds all regulatory requirements

2. Integrated resource planning

AWWA Standard – The utility shall evaluate conservation and efficiency on a comparable basis with other water supply options.

Rationale for Scoring – As part of the Long-Range Water Supply Plan (LRWSP), OWASA considered several suites of water demand management and reclaimed water strategies alongside supply options.

3. Source water metering

AWWA Standard – The utility shall implement metering of all sources.

Rationale for Scoring – OWASA meters all source water from our three reservoirs as well as interconnects from other utilities.

4. Conservation-oriented rate structures

AWWA Standard – Utilities shall use a non-promotional water rate that provides the financial incentive for customers to reduce water use. These rate structures include one or more of the following:

- Inclining tier rates
- Marginal cost pricing
- Seasonal rates, and
- Water budget-based rates

Utilities shall provide sanitary sewer collection or treatment service shall include a volumetric component in the sewer rate structure. Such rates shall provide a conservation signal by using wintertime water use to set sewer rates.

Rationale for Scoring – OWASA utilizes increasing block rates and seasonal rates. In addition, we charge different rates for irrigation and apply drought surcharges.

5. Monthly billing

AWWA Standard – Retail billing shall be monthly.

Rationale for Scoring – OWASA bills all customers on a monthly basis.

6. Limited estimated billing

AWWA Standard – Utilities shall estimate a bill amount no more than twice a year per customer.

Rationale for Scoring – By using AMI technology, OWASA rarely estimates customer bills.