

# Operating Trends Report for Fiscal Year 2023

OCTOBER 2023

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Orange Water and Sewer Authority

Carrboro, North Carolina



**Orange Water and Sewer Authority**

Our community's trusted partner for clean water and environmental protection.

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## Purpose and Summary

This report summarizes observed trends for several indicators – such as water supply and drinking water treatment, wastewater treatment, use of reclaimed water, and environmental regulations – which are important factors that influence the need, timing, and scope of our facilities planning and investment decisions. Through the process of regularly reviewing and updating this report, we strive to anticipate and proactively prepare for change so that we are better positioned to provide high quality and reliable water, wastewater, and reclaimed water services for the long-term. Some of the key messages are:

- Our customers have reduced peak day drinking water demands by 36 percent since Fiscal Year (FY) 1999 despite a 33 percent increase in customer accounts over that same period. Similarly, demands on our raw water supply have decreased substantially. These reduced, long-term demands result from:
  - Increased water use efficiency and conservation by our customers;
  - Conservation pricing and conservation ordinances including year-round water restrictions; and
  - Implementation of the reclaimed water system in partnership with the University of North Carolina at Chapel Hill (UNC) in 2009, which now meets about 10 percent of the community's water needs based on water sales.
- These 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.
- Based on current demands, we believe we have sufficient raw water supply for the next few decades under most conditions. However as noted in analyses completed for the update of our Long-Range Water Supply Plan (LRWSP), we are vulnerable during droughts. The LRWSP recommends that we work with the City of Durham, Town of Pittsboro, and Chatham County on a new intake and transmission infrastructure on the western side of Jordan Lake (group known as Western Intake Partnership), and this project is factored into our current capital improvements program (CIP). This infrastructure is difficult and costly to expand once constructed. This partnership will secure our allocation of water from Jordan Lake to use during extended droughts or operational emergencies and meet our long-term needs.
- Based on current demands and projections, we do not anticipate needing to expand the hydraulic capacity of the water or wastewater plant for several decades.
- There are upcoming regulations we are tracking that may require significant investments of capital and/or staff to ensure we meet all regulatory requirements. These include proposed drinking water compliance standards for per- and poly-fluoroalkyl substances (PFAS) and identifying and replacing any potential lead service lines in our community.

## Acronyms

AWWA	American Water Works Association
BG	billion gallons
CIP	Capital Improvements Program
CY	calendar year
DEQ	NC Department of Environmental Quality
EPA	US Environmental Protection Agency
FY	fiscal year (July – June)
GAC	granular activated carbon
ILI	Infrastructure leak index
Kgal	One thousand gallons
kWh	kilowatt-hour
lb/yr	pounds per year
LCRI	lead and copper rule improvements
LCRR	lead and copper rule revisions
LRWSP	Long-Range Water Supply Plan
MG	million gallons
mgd	million gallons per day
mg/L	milligrams per liter
mL	milliliters
NPDES	National Pollutant Discharge Elimination System
OWASA	Orange Water and Sewer Authority
PAC	powdered activated carbon
PFAS	per and poly-fluoroalkyl substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonic acid
ppt	parts per trillion
RCW	reclaimed water
SSO	sanitary sewer overflow
TN	total nitrogen
TP	total phosphorus

µg/l	micrograms per liter
UCMR	Unregulated Contaminant Monitoring Rule
UCMR5	Unregulated Contaminant Monitoring Rule 5
UNC	University of North Carolina at Chapel Hill
WTP	water treatment plant
WWTP	wastewater treatment plant

## Background

Orange Water and Sewer Authority (OWASA) publishes this annual report to evaluate how well we are meeting our mission of providing our customers with valuable water and sewer services that are essential to our community's health, environment, and economy through the stewardship of infrastructure and natural resources.

This report summarizes observed trends for several indicators – such as water supply and drinking water treatment, wastewater treatment, use of reclaimed water, and environmental regulations – which are important factors that influence the need for, timing, and scope of our facilities planning and investment decisions. Thus, the information in this document is one item that shapes our Capital Improvements Program (CIP). Through the process of regularly reviewing, updating, and publishing this report, we strive to anticipate and proactively prepare for change so that we are better positioned to engage the community as we consider and decide on how best to sustainably meet service requirements for the foreseeable future.

This Operating Trends report includes a description of OWASA's main management areas beginning with source water protection that includes our forest management program; then raw water supply and treatment; distribution of drinking water to our customers; wastewater collection, treatment, and recycling or reuse. The report also includes sections on our Energy Management Program and provides a summary of upcoming regulations that will impact our operations and for which we are proactively planning.

# Source Water Protection

## Description

OWASA has three locally managed water supply sources: Cane Creek Reservoir, University Lake, and the Quarry Reservoir as illustrated in Figure 1. Our community has a long history of taking progressive actions to ensure the health and safety of these drinking water supplies. Since it began operations in 1977, OWASA has understood that to protect the water source, you must protect the watershed. We have worked with the other local governments in Orange County on a variety of watershed protection efforts, such as:

- Limits on the extension of water/sewer service into the Cane Creek Reservoir and University Lake watersheds;
- Support for comprehensive protection through zoning and land use controls;
- Restrictions on in-lake recreational activities;
- Lake water quality monitoring;
- Special technical studies and educational activities;
- Land acquisition through the strategic purchase of property or conservation easements in areas determined to be critical for water quality protection; and
- Managing healthy forests.

OWASA set land management protection goals based on water quality modeling of University Lake and Cane Creek Reservoir. In the 1990s and early 2000s, OWASA had an active program to purchase land and protect easements around streams to meet those land protection goals. OWASA has met those goals and now focuses on managing the land it owns; we also continue to acquire cost-effective easements on land near our water supplies. Figure 1 illustrates the location of protected lands in OWASA's watersheds. The remainder of this section focuses on some of OWASA's land management activities; protecting water quality is OWASA's highest objective in each of these activities.

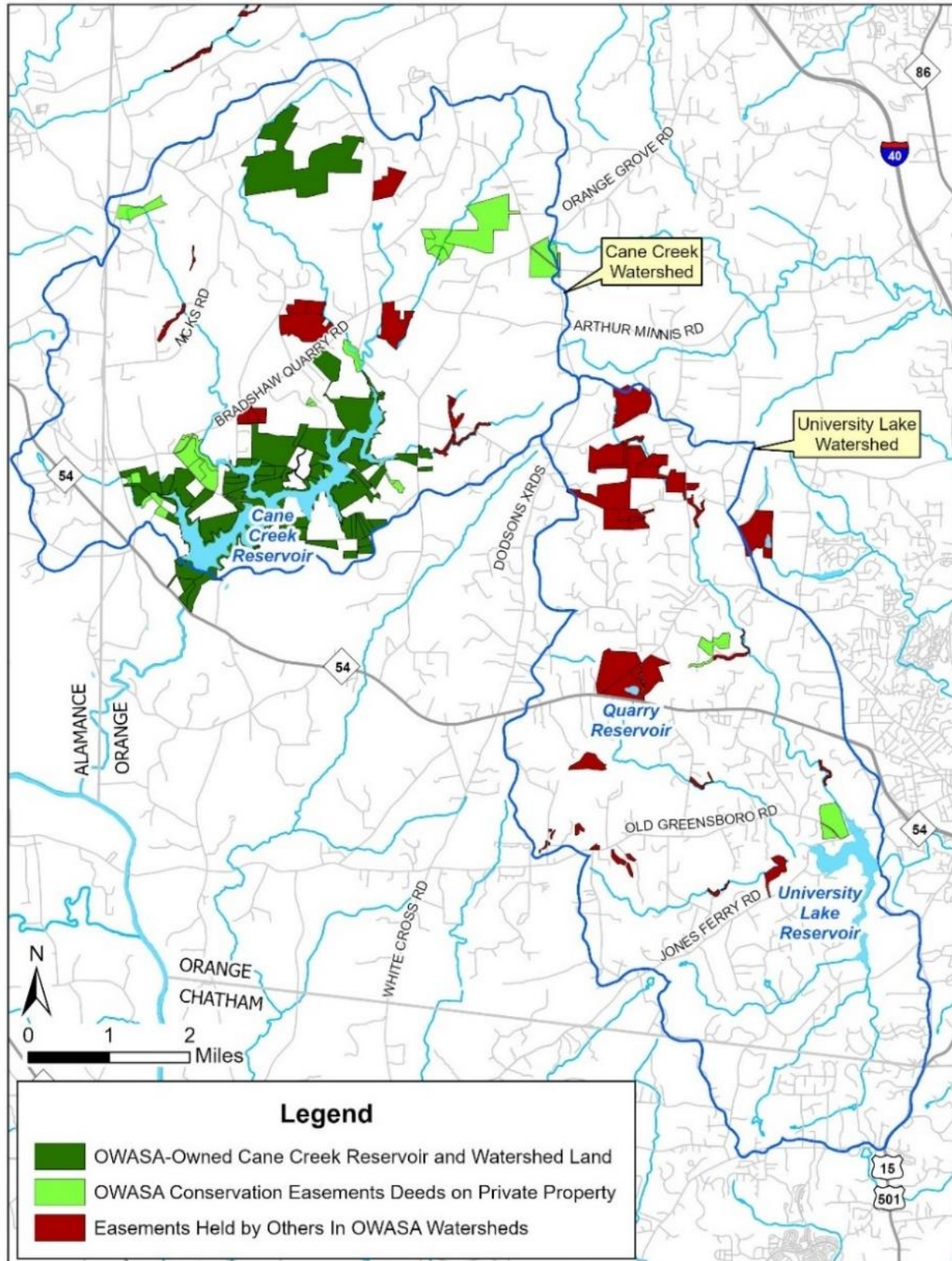


Figure 1. Protected Land in OWASA's Watersheds – Approximately 10 percent of our watershed lands are located outside Orange County, where less stringent controls apply.



## Forest Management

OWASA owns approximately 2,400 acres of forested lands, the majority of which is in the Cane Creek Reservoir watershed. Sustainable forest management facilitates protecting our water supply and provides other environmental benefits such as reducing the risk of wildfire and providing wildlife habitat. OWASA has seven guiding principles for its [forest management program](#):

- Protect water quality, OWASA's highest priority;
- Improve ecological health of forested land;
- Reduce the risk of wildfire;
- Improve wildlife habitat and species diversity;
- Sustainably manage OWASA's resources;
- Engage the community and partner agencies; and
- Minimize adverse impacts on neighbors and surrounding community

In FY 2023, OWASA accomplished the following activities:

- Maintained roads on the Cane Creek Mitigation Tract
- Marked areas for thinning and harvest for the second phase of activities on the Meadowcrest South Tract
- Constructed access road at Meadowcrest South
- Showed the Meadowcrest South area to potential timber buyers and signed timber contract
- Applied herbicides at Meadowcrest North to control invasive plants
- Held a neighborhood meeting and finalized the stewardship plan for Teer West
- Presented information about our forest management program at the North Carolina Water Resources Research Institute's annual conference

In FY 2024, OWASA plans to accomplish the following:

- Host an oak regeneration school at the Cane Creek Mitigation Tract and Teer West Tract
- Perform a prescribed burn on portions of the Meadowcrest property
- Enter into a timbering contract for the second phase of thinning and timbering on the Meadowcrest South Tract; timbering may begin in FY 2024
- Build access roads on Teer West Tract
- Mark areas for thinning and harvest on the Teer West Tract and show site to potential timber buyers
- Potentially begin timbering on Teer West Tract
- Spray road edges on the Cane Creek Mitigation Tract to keep trees from growing along road while maintaining the grasses to prevent erosion
- Develop forest stewardship plan for Peninsula South Tract

Figure 2 illustrates the location of OWASA's land near Cane Creek Reservoir and the status of forest management activities.

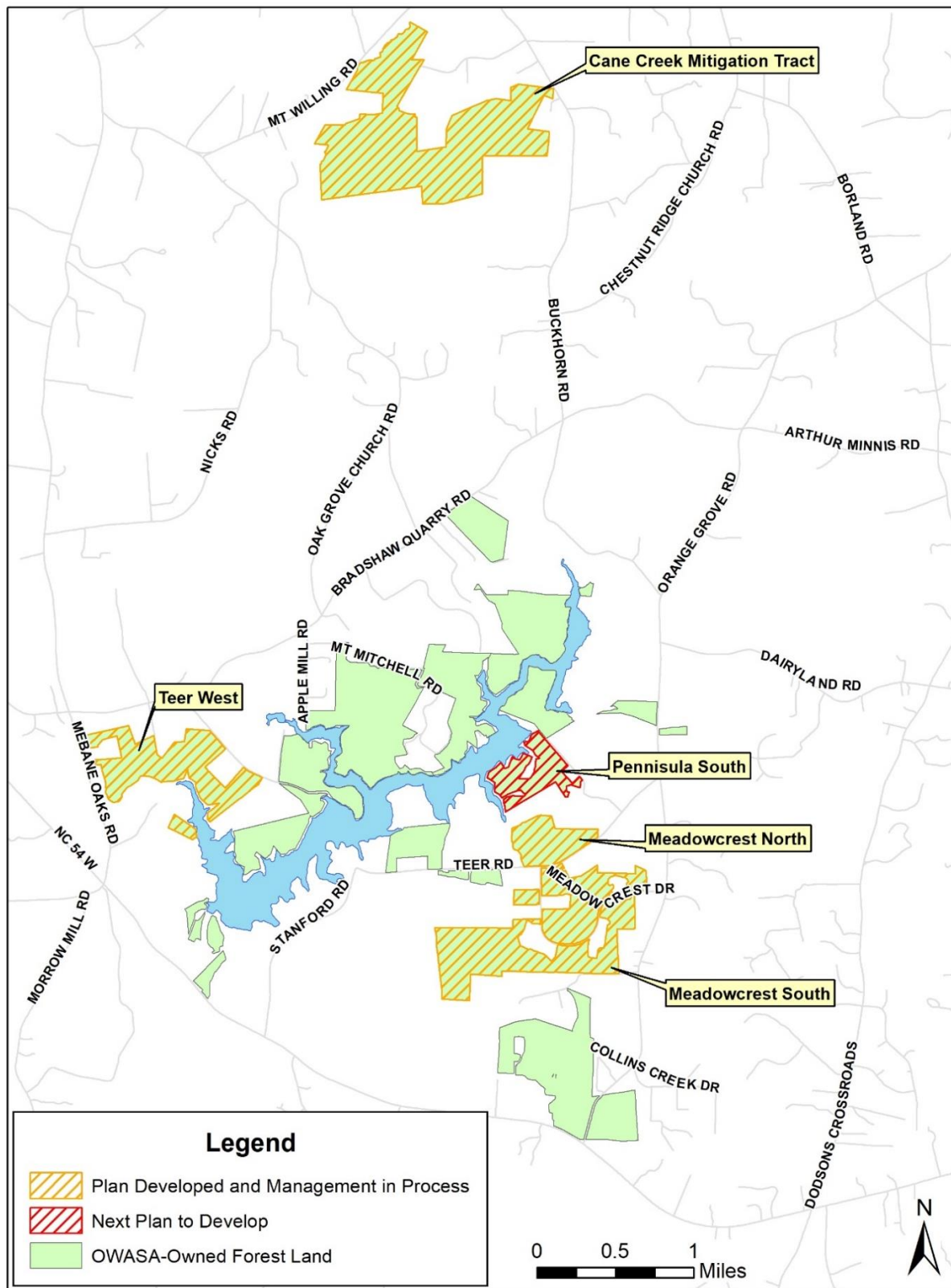


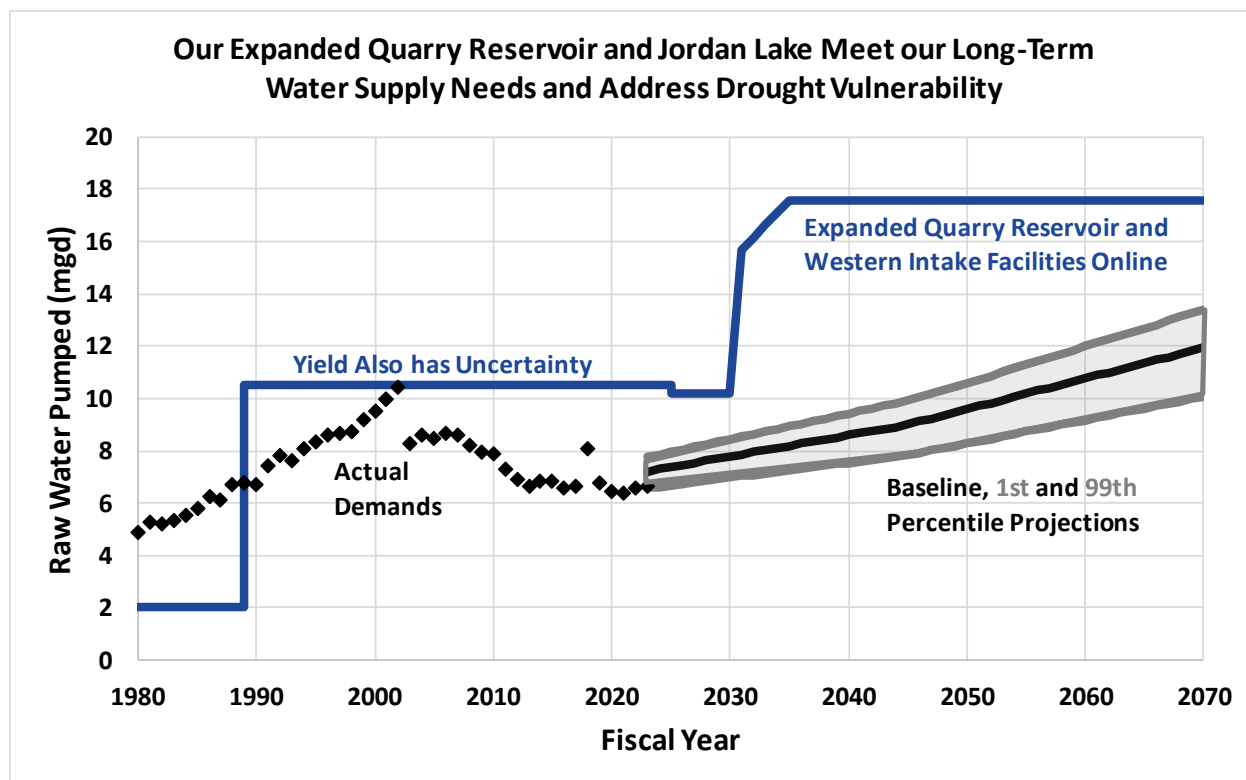
Figure 2. Status of OWASA Forest Management Plan Development and Implementation

## **Managing Lands with Orange County Local Governments**

OWASA believes it should work with the local government agencies within Orange County to provide the best level of services for County residents when it does not increase the cost of OWASA's services or risk to our mission of delivering valuable water and sewer services that are essential to our community's health, environment, and economy. Our highest priority when working with other local governments is the protection of water quality of our water supply watersheds. One of the main areas where we are working with Orange County is in the creation of the [Mountains-to-Sea Trail](#) (MST). OWASA developed a list of conditions for the use of OWASA property for the MST that were designed to protect Cane Creek Reservoir, reduce risks from hiking, and minimize the impacts on neighbors. Development of this trail on OWASA property is likely several years away, but OWASA staff and Orange County staff communicate regularly about the project and other land management activities that may impact one another.

Another project that OWASA is coordinating on with Orange County is the potential sale of approximately 7 acres of land to the County for use as a solid waste and recycling convenience center. Again, OWASA developed conditions for provision of this sale that are designed to protect the environment, preserve OWASA's ability to continue to develop its biosolids recycling program, and minimize impacts on neighbors. The County recently completed its first round of community engagement to hear comments and concerns which could impact the potential sale and/or design of the facility.

## Raw Water Supply



*Figure 3. OWASA's Water Supply Yield and Demands – The estimated yield that includes our allocation of water from Jordan Lake is oversimplified as our access through the Western Intake Partners has not yet been modeled with our three local supplies. The projections shown in the figure are from 2019. In addition, there is uncertainty in the yield which is more difficult to quantify than the demand projections.*

**Description:** This trend evaluates the supply (estimated yield) of our locally-owned upland water sources – Cane Creek Reservoir, University Lake, and the Quarry Reservoir as well as access to our Jordan Lake allocation along with historic raw water demands and estimated future raw water demands.

### Key Observations and Related Information:

- The annual average-day amount of water we pumped from reservoirs has declined substantially since peaking in FY 2002.
- Annual average-day raw water demands are now at the same level they were in the early-1990s, shortly after Cane Creek Reservoir was placed into service. This has occurred despite over a 60 percent increase in the number of customer accounts during that period.
- As recommended in our Long-Range Water Supply Plan, OWASA is working with the City of Durham, Town of Pittsboro, and Chatham County on new water supply intake, treatment, and transmission facilities on the western side of Jordan Lake. OWASA does not yet need access to its Jordan Lake allocation on a regular basis so is participating in a limited capacity to have ownership in the intake and transmission infrastructure, which are difficult and costly to expand once constructed. These

facilities are planned to be operational around 2031 and will provide about 5 mgd of yield to OWASA. This is one of the major projects included in our current Capital Improvements Program (CIP).

- Our current estimated yield is 10.5 mgd; we will lower the water level in the Quarry Reservoir in the next few years to prepare for the Quarry Reservoir expansion and our estimated yield will decline to approximately 10.2 mgd. When the Quarry Reservoir expansion is completed, our local supplies will provide approximately 12.6 mgd in the mid-2030s. Once we have access to our Jordan Lake allocation, our estimated yield is 17.6 mgd (estimated online in approximately 2031).

# Water Treatment Plant: Peak Day Drinking Water Demands

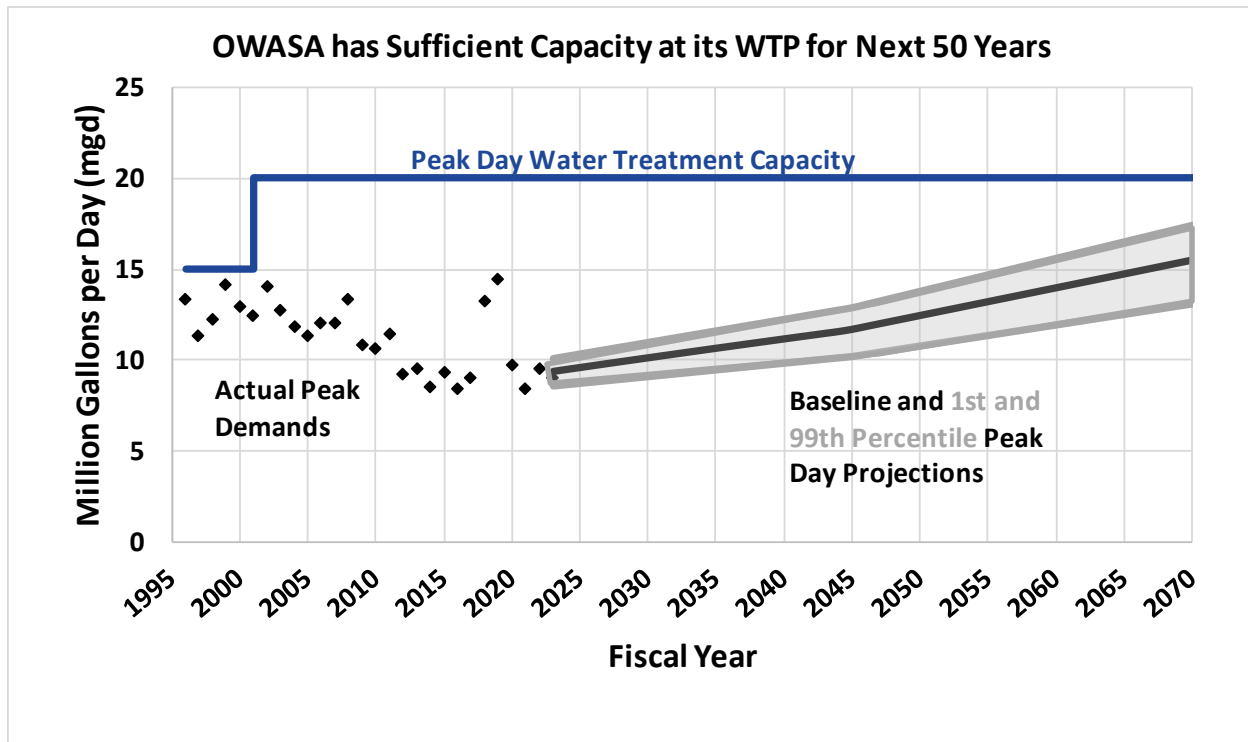


Figure 4. WTP Capacity and Peak Day Drinking Water Demands. The projections were based on an analysis completed in 2019 and assume that our reclaimed water system is in operation throughout the peak day demand season. Peak day water demands would be considerably greater if the reclaimed water system is out-of-service during hot, dry periods.

**Description:** This trend evaluates peak day drinking water demands and compares those demands to the 20 mgd rated capacity of the Jones Ferry Road Water Treatment Plant (WTP).

## Key Observations and Related Information:

- Since FY 1999, the year with the highest peak day demand under normal operations, peak day drinking water demands have declined by 36 percent despite a 33 percent increase in customer accounts over that same period. (See comments regarding peak demands in FY 2018 and FY 2019 below).
- The peak day drinking water demands indicate that we have adequate capacity in our WTP for the next 50 years even when accounting for uncertainty in our demand projections.
- There was a significant increase in peak day drinking water demands in FY 2018 and FY 2019 compared to the recent past. OWASA provided drinking water to Durham while they had one WTP offline in FY 2018 and were making improvements at their second WTP. The reason for the increased peak day in FY 2019 was the large water main break that occurred near the WTP on November 5, 2018. If OWASA had not had the main break, our peak day demand would have been 8.6 mgd, which is comparable to earlier years.

- OWASA has interconnections with the City of Durham, Town of Hillsborough and Chatham County. We rely on these interconnections during CIP projects, some maintenance activities, and operational emergencies. These interconnections provide about 8 mgd and can currently meet our average day demands (the Jones Ferry Road WTP treated 6.7 mgd on average in FY 2023). If the City of Durham also sends water to Chatham County and the Town of Cary sends water to the City of Durham, modeling shows we can get over 9 mgd through our interconnections.
- OWASA received the 10-year Excellence in Water Treatment award from the [Partnership for Safe Water](#) program. The Partnership for Safe Water is a voluntary effort sponsored by the American Water Works Association (AWWA) for water utilities to optimize their treatment and distribution system processes to help ensure the production and delivery of safe water to all users that go beyond regulatory measures.
- Another important project at our WTP is studying, designing, and constructing additional treatment to meet proposed drinking water standards for PFAS (see [Regulations](#) section of this report).

## Drinking Water Distribution System Integrity

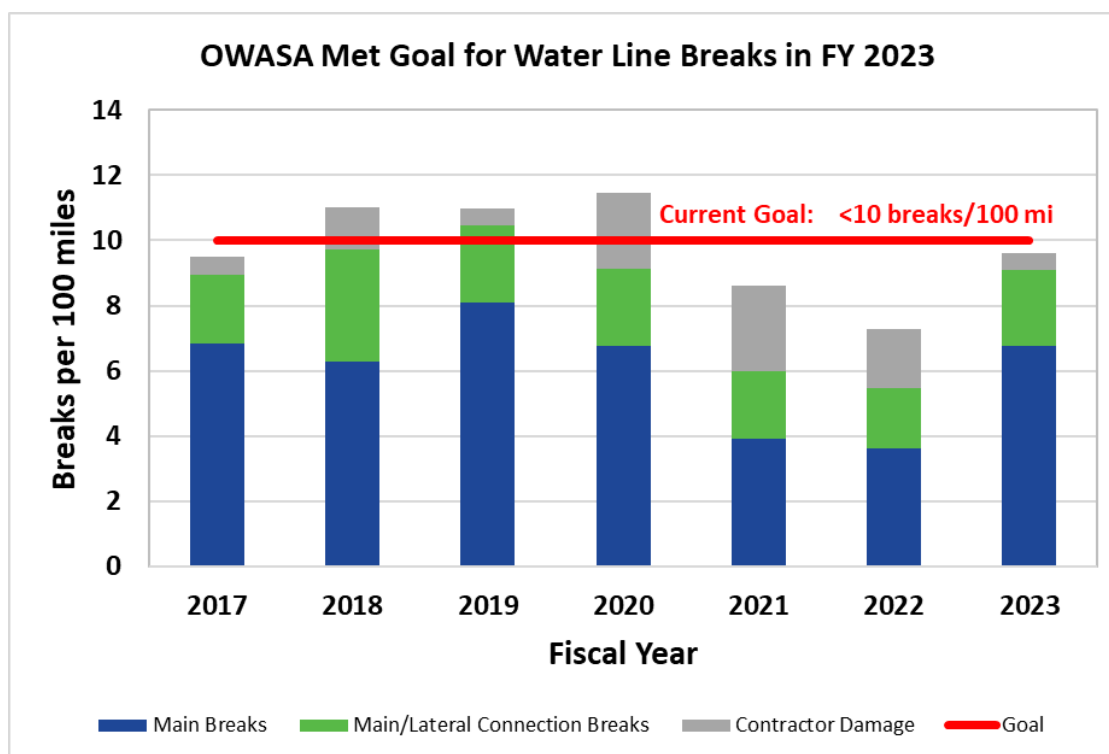


Figure 5. Historic Water Line Breaks

**Description:** This trend evaluates the number of water main breaks per 100 miles of water mains and connections with service lateral lines. These are important indicators of the integrity of our drinking water distribution system. It also includes information on lines damaged by contractors; while that metric is not indicative of an issue with the integrity of our water distribution system, there is an impact on our customers and thus we include contractor damage in this trend.

### Key Observations and Related Information:

- We had fewer water main breaks than our goal of 10 main breaks or less per 100 miles of pipeline in FY 2023, which is based on a goal selected by the Board of Directors at its [December 10, 2020 meeting](#). That goal is based on OWASA's historic breaks, break rates from other local utilities, and a large study which evaluated rates in the United States and Canada. For context, OWASA has about 385 miles of water line.
- In FY 2023, the number of main breaks increased over the prior two fiscal years. A few of these occurred last winter during a cold snap. OWASA will continue to watch this trend and determine whether we need to make any changes to our maintenance program and planned capital projects for water distribution.
- In 2023, OWASA received the 5-year Presidents Award and 10-year Directors Award for Distribution Systems Operations through AWWA's Partnership for Safe Water showing a commitment to maintaining our water distribution system.



## Water System Audit

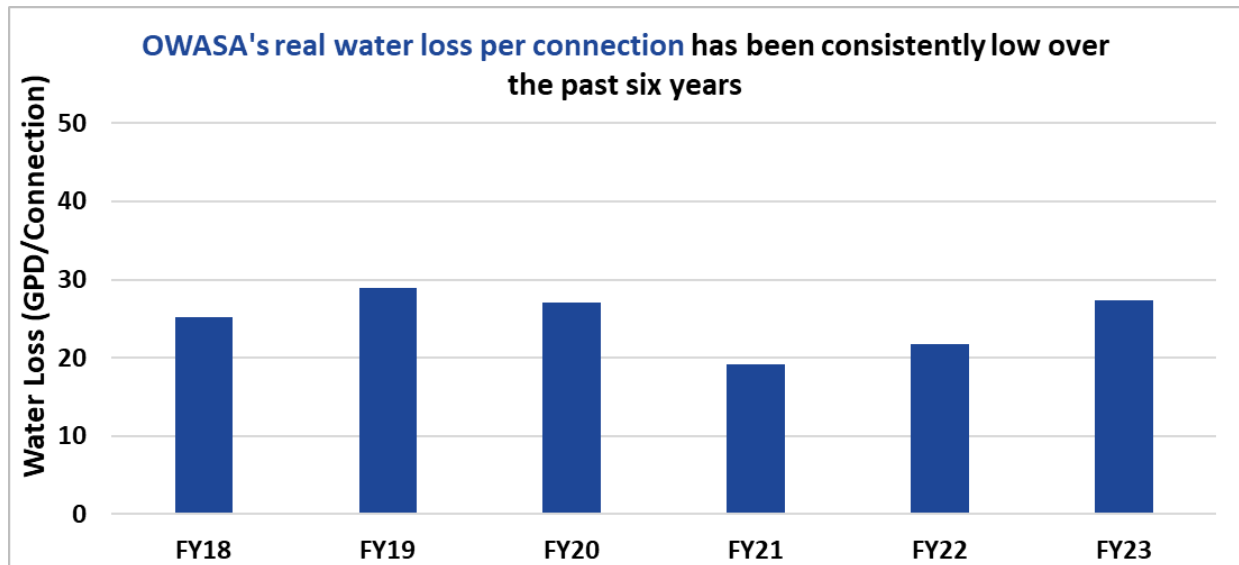


Figure 6. Historic Real Water Loss

**Description:** 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 system flushing, CIP projects, unbilled water from illicit connections, and water that leaks out of OWASA’s nearly 400 miles of drinking water distribution pipes. The trend reflected above summarizes the annual volume of water lost through leaks in the distribution system. Real loss is the difference between water supplied and authorized consumption; utilities also subtract out apparent losses associated with inaccuracies in metering, data errors, and estimated water theft.

### Key Observations and Related Information:

- OWASA’s water loss remains less than other utilities. The median water loss for water utilities in Georgia (a state where all water providers that serve a population of 3,300 or more conduct annual, validated water system audits) averaged over 70 gallons per connection per day in 2021 with a median water loss of 49 gallons per connection per day. The median water loss reported in the 2021 AWWA Benchmarking survey was 37.64 gallons per connection.
- While our water loss is less than other utilities, OWASA notes that it has increased in recent years. We are evaluating the data to identify a potential cause.
- 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.

## Wastewater Collection System Integrity

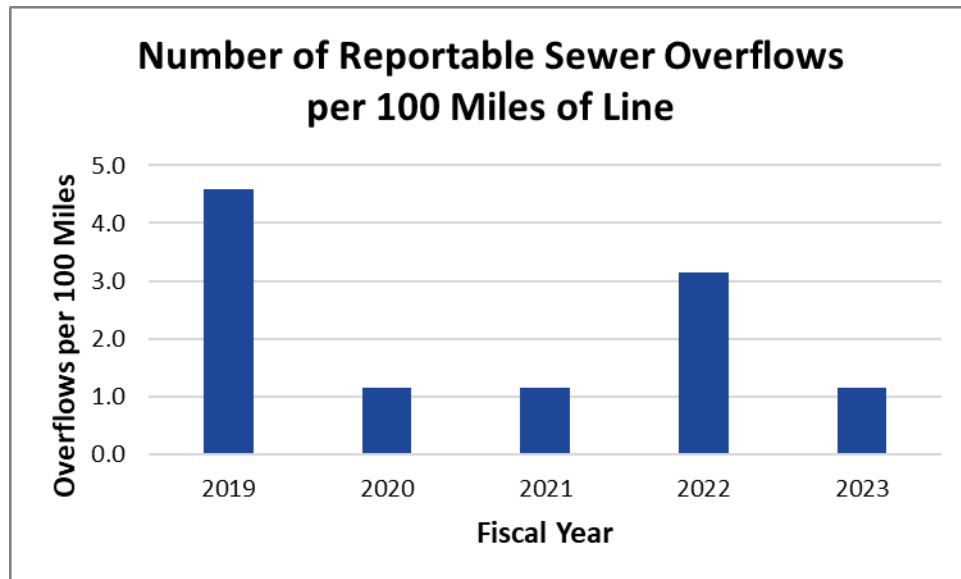


Figure 6. Historic Reportable Sanitary Sewer Overflows

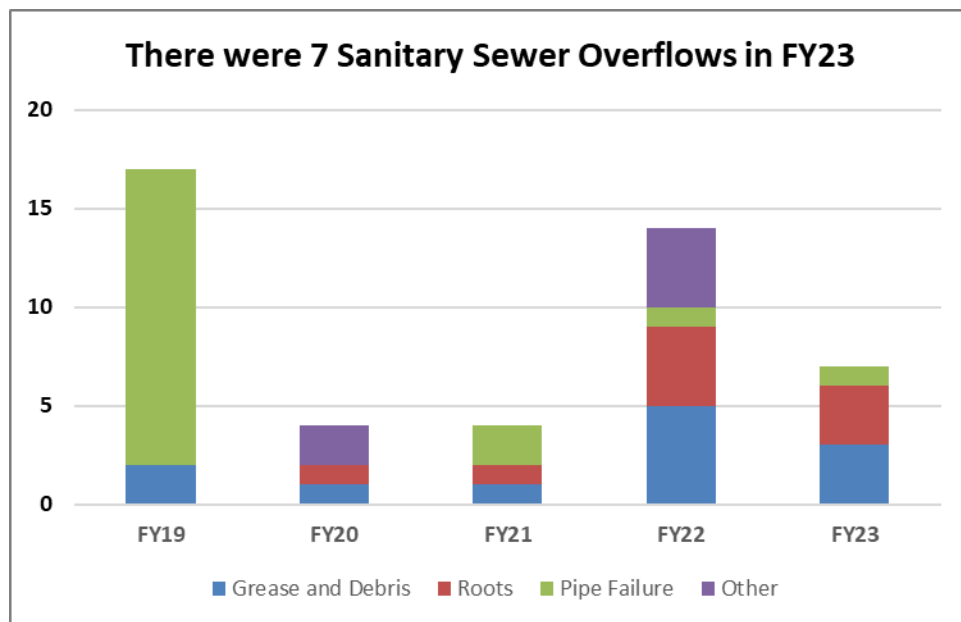


Figure 7. Historic Causes of All Sanitary Sewer Overflows

**Description:** This trend evaluates the number of reportable sewer overflows (Figure 6), which is an important indicator of the integrity of our wastewater collection system. It also evaluates the causes of all sanitary sewer overflows (SSO) in Figure 7. The North Carolina Department of Environmental Quality (DEQ) defines a reportable overflow as being over 1000 gallons or any amount reaching surface water.

**Key Observations and Related Information:**

- The number of reportable overflows is 1.1 per 100 miles of pipeline, which is less than 3.0 per 100 miles of pipeline, the national median per the American Water Works Association 2021 Benchmarking report. Per DEQ guidance, OWASA strives to have no overflows. For context, OWASA has about 350 miles of sewer lines.
- In FY 2023, there were 7 total overflows (reportable and non-reportable) attributed to grease and debris, roots, and pipe failure. Grease, debris, and roots are typically the primary causes of overflows. Customers can help minimize overflows from grease and debris by scraping fats and oils from pans and dishes prior to washing them. Our wastewater collection system is designed to collect water that has been used for flushing, bathing, washing clothes and dishes, and other normal residential, business and institutional purposes and other items should not be disposed of down drains. Customers are reminded to only flush the three Ps: pee, poop, and toilet paper. Customers can also help minimize potential root intrusion by not planting deep rooted plants near our sewer lines; OWASA's website includes a [list of shallow-rooted species](#) that may be appropriate in and near our easements.

## Mason Farm Wastewater Treatment Plant Maximum Month Flows

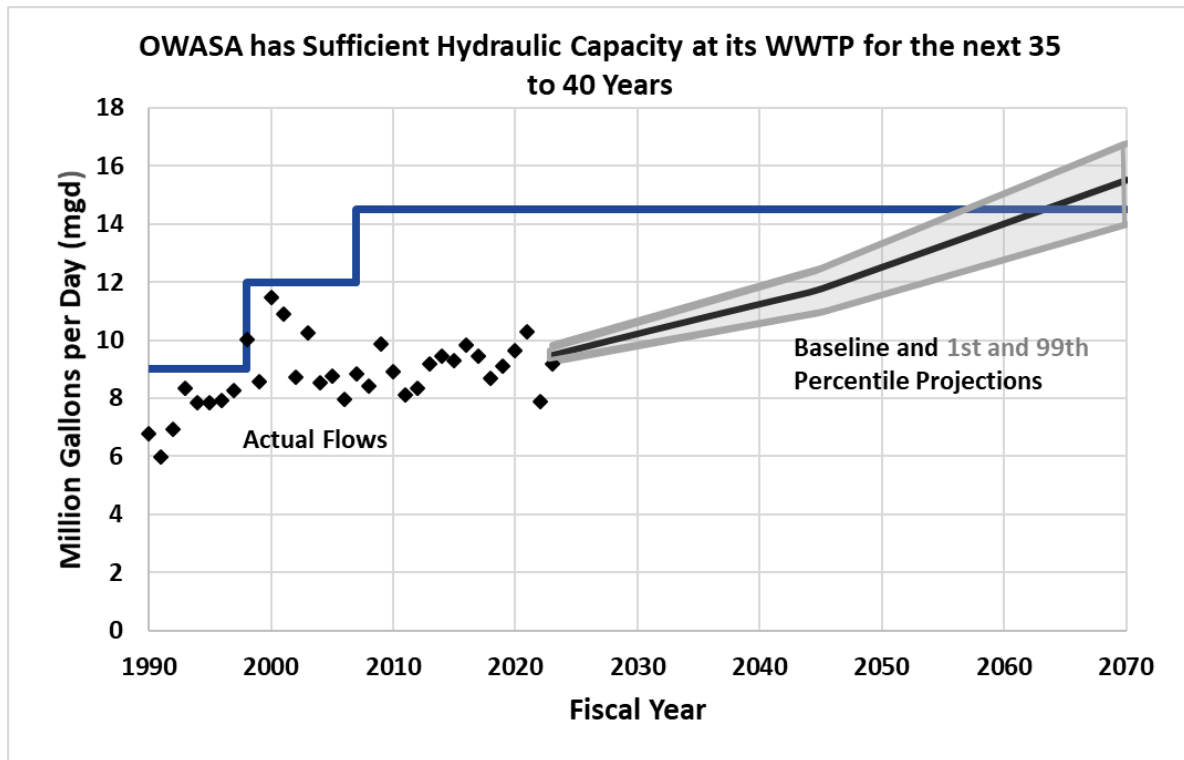


Figure 9. Mason Farm WWTP Capacity and Demands. Projected flows are from 2019.

**Description:** The Mason Farm Wastewater Treatment Plant (WWTP) has a permitted capacity of 14.5 mgd, which is the maximum average daily flow which can be treated in any given month. This trend tracks historical annual maximum month of flow and compares those against the permitted capacity of the WWTP.

### Key Observations and Related Information:

- OWASA's maximum month wastewater flows have declined from a peak of 11.5 mgd in FY 2000. This corresponds to reduced drinking water demands by our customers, as well as our continuing investments in the rehabilitation and replacement of sewer lines and manholes.
- In FY 2023, the maximum month flow was 9.2 mgd, which is about 63 percent of the WWTP's permitted flow capacity.
- The projected maximum month flows indicate that we have adequate hydraulic capacity in our treatment plant for the next 35 to 40 years assuming inflow and infiltration rates do not increase. However, if the frequency of high intensity storms increases with climate change, we may need to address our hydraulic capacity earlier than anticipated. We are also evaluating potential bottlenecks in our treatment processes that could limit the peak flow we may be able to treat as part of the WWTP Master Plan.

## Mason Farm WWTP Nutrient Capacity

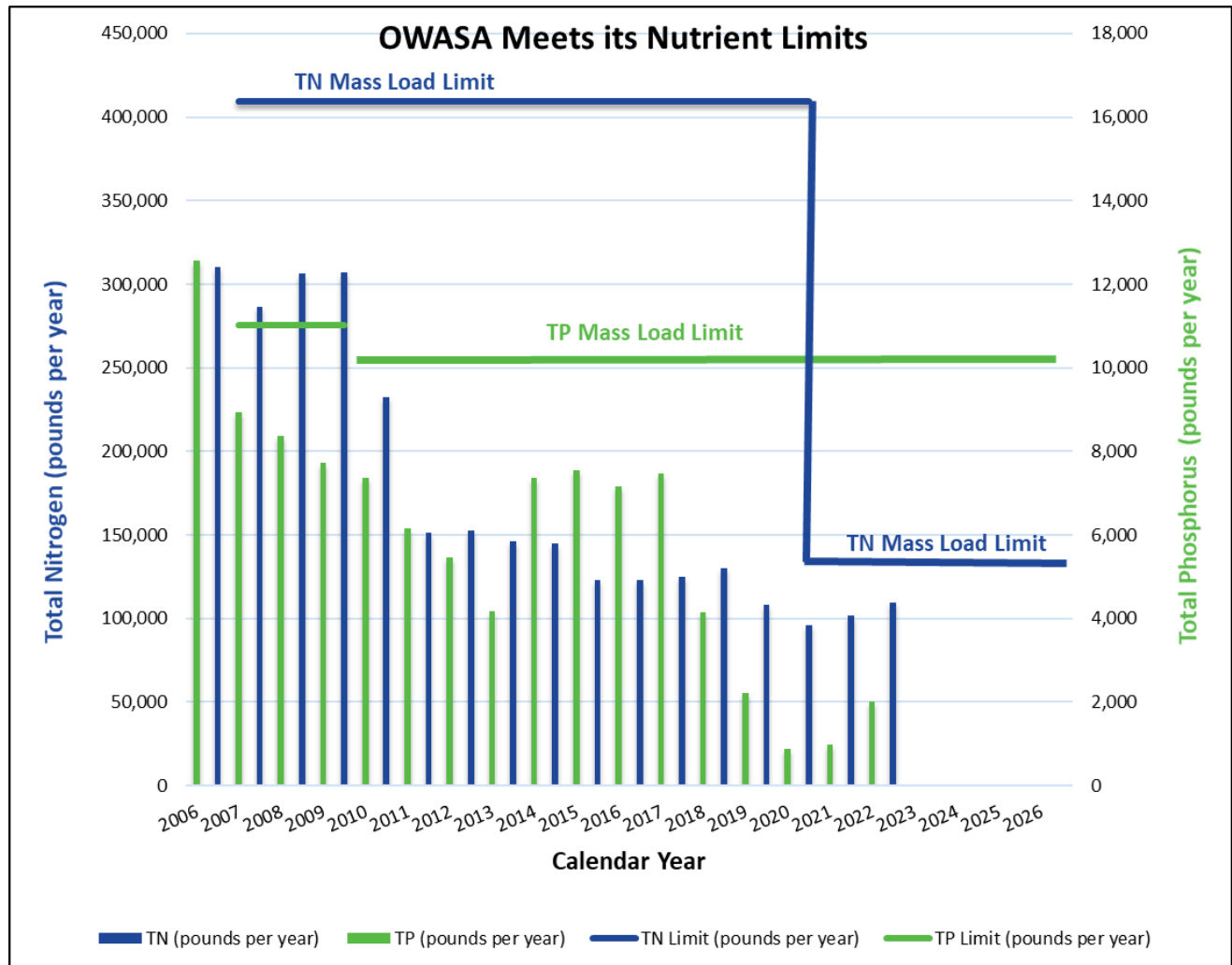


Figure 10. Mason Farm WWTP Annual Nutrient Loading

**Description:** The state’s Jordan Lake nutrient management rules require point sources to reduce their discharge of Total Phosphorus (TP) and Total Nitrogen (TN). OWASA’s new TN limit took effect in calendar year 2021. We report nutrient loading on a calendar year basis rather than a fiscal year basis since our permit limits for TN and TP are on a calendar year.

### Key Observations and Related Information:

- OWASA has met its TP limit since the annual mass load limit was first incorporated into our permit in 2007. We expect to continue to meet the limit within the 20-year planning horizon without the need for additional major capital improvements for TP removal.
- OWASA optimized its biological phosphorus removal process which is reflected in the decrease in TP in 2018-2022.

- Our TP loading was higher in 2022 than in 2020 and 2021, but still well below our permitted loading. We did treat more flow in 2022 than in 2021 which accounts for some of the increase. We also have been doing some rehabilitation work on some of the plant processes which has affected plant performance.
- OWASA has consistently met its current TN limit. Staff continues to focus efforts on plant optimization to improve the denitrification process, but we may need to operate our filters in denitrification mode and incur considerably greater energy and chemical costs to meet the more stringent limits. Staff completed inspections and testing to ensure the denitrification filters are operationally ready should they be needed. Next steps will be determined based on recommendations in the Wastewater Treatment Plant Master Plan (anticipated to be completed in FY 2024) and plant performance against current regulatory limits.
- The Wastewater Treatment Plant Master Plan currently underway will help inform OWASA of needed capital investments and operational changes to ensure we continue to meet our nutrient limits.
- OWASA's WWTP received the Peak Performance award for 100% compliance with the NPDES permit for the 13<sup>th</sup> consecutive year.

## Reclaimed Water

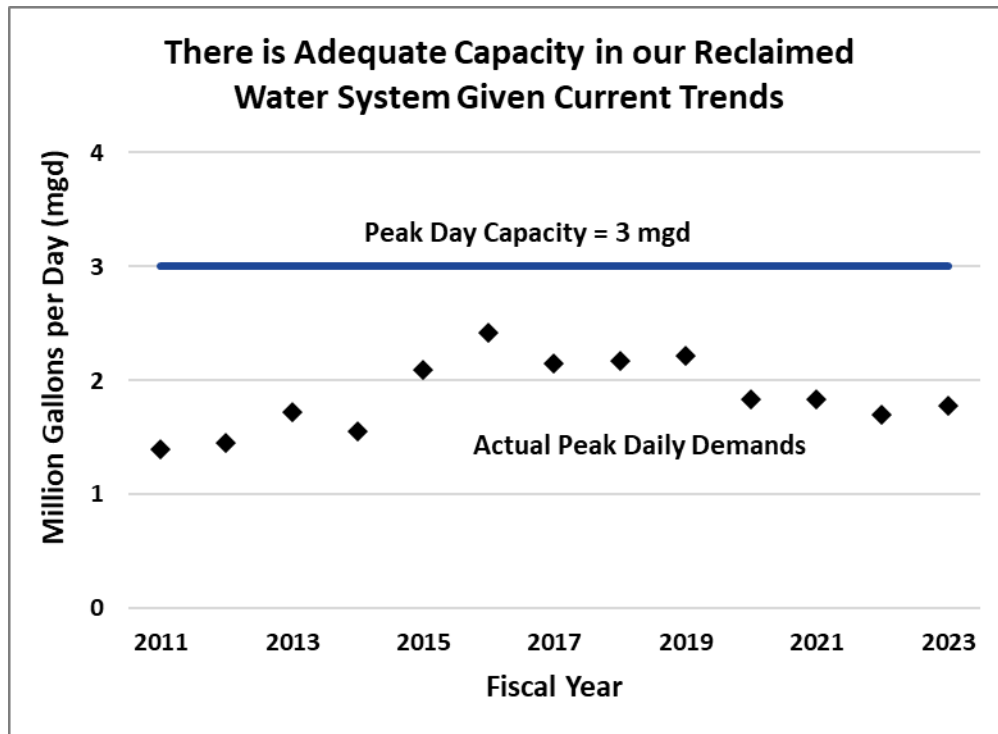


Figure 11. Reclaimed Water System Capacity and Demands

**Description:** This trend tracks historical annual peak day reclaimed water (RCW) demands and compares those against the peak day capacity of the Mason Farm WWTP’s RCW system.

**Key Observations and Related Information:**

- The RCW system is currently configured to meet a total peak day demand of 3 MGD; however, the system was designed and constructed to allow cost-effective expansion to 5.2 MGD by adding only an additional transfer pump and additional chemical feed system capacity (if that feed system is deemed necessary).
- The majority of RCW is used for chilled water and irrigation of landscaping and athletic fields. These demands peak during warm months (April-October) and help reduce peaking on our Jones Ferry Road WTP during high demand periods. Demands are typically lower during cold months (November-March).
- There is a current study to evaluate the water quality of our reclaimed water to ensure that it will continue to meet quality requirements for UNC’s chilled water plants.
- The RCW system was designed without storage within its distribution system. There is a CIP study to evaluate the potential addition of an elevated storage tank including planning level costs.

## Biosolids

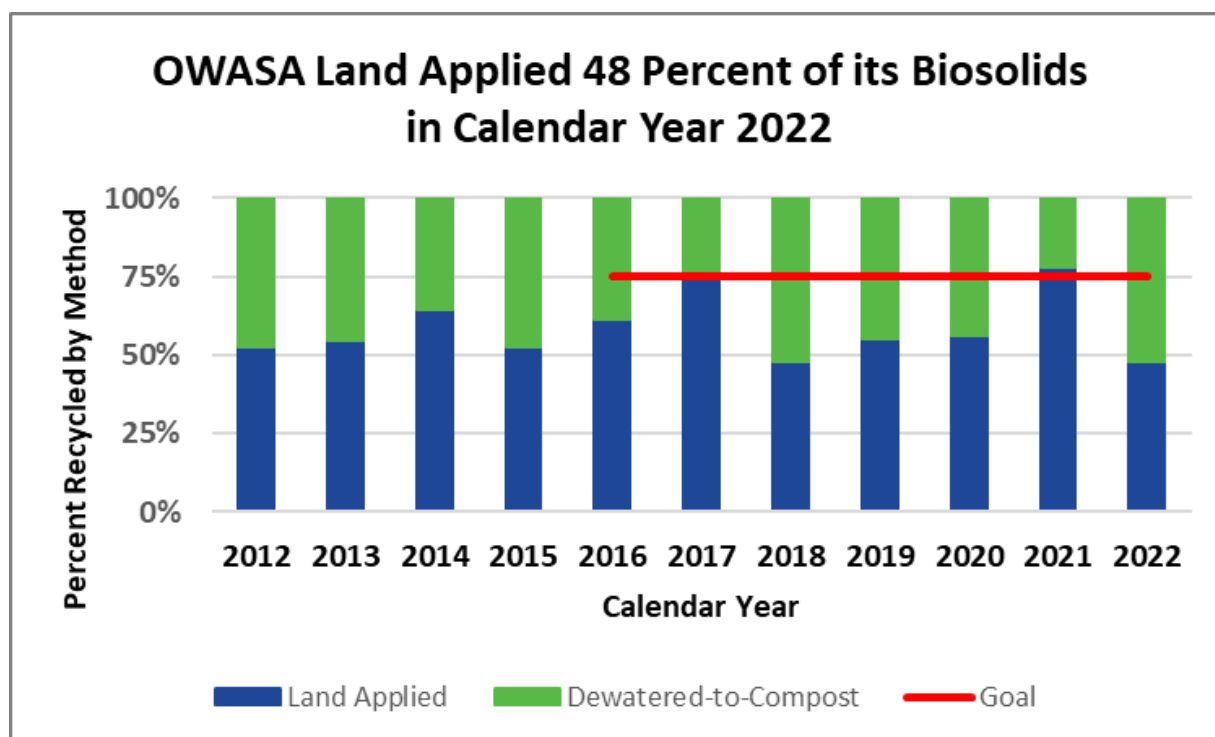


Figure 12. Historic Biosolids Application

**Description:** This trend evaluates the amount of biosolids which OWASA applies to land and the amount it dewateres for composting. The WWTP produces 3-4 dry tons of biosolids each day. Some of this is applied in liquid form to agricultural land and a portion is dewatered to the texture and consistency of moist soil and transported to a private composting facility in Chatham County. For the liquid form, OWASA has 1,430 acres of farmland in Orange, Chatham, and Alamance counties available for its land application program (see Figure 13). 90 percent (1,277 acres) is privately owned. The remaining 153 acres are owned by OWASA as part of a 700-acre tract west of Orange Grove Road in Orange County. At its October 8, 2015 work session, the Board of Directors agreed that OWASA's goal is to apply 75 percent of our biosolids in liquid form and to dewater 25 percent of our biosolids. The Board of Directors understands that there are factors including weather conditions and staffing which may keep staff from meeting the goal.

### Key Observations and Related Information:

- Historically, OWASA has land applied about half of its biosolids and dewatered and composted the remaining half.
- In CY 2022, OWASA land applied 48 percent of its biosolids and did not meet its goal. Frequent rains and equipment issues limited the amount of biosolids we could land apply.



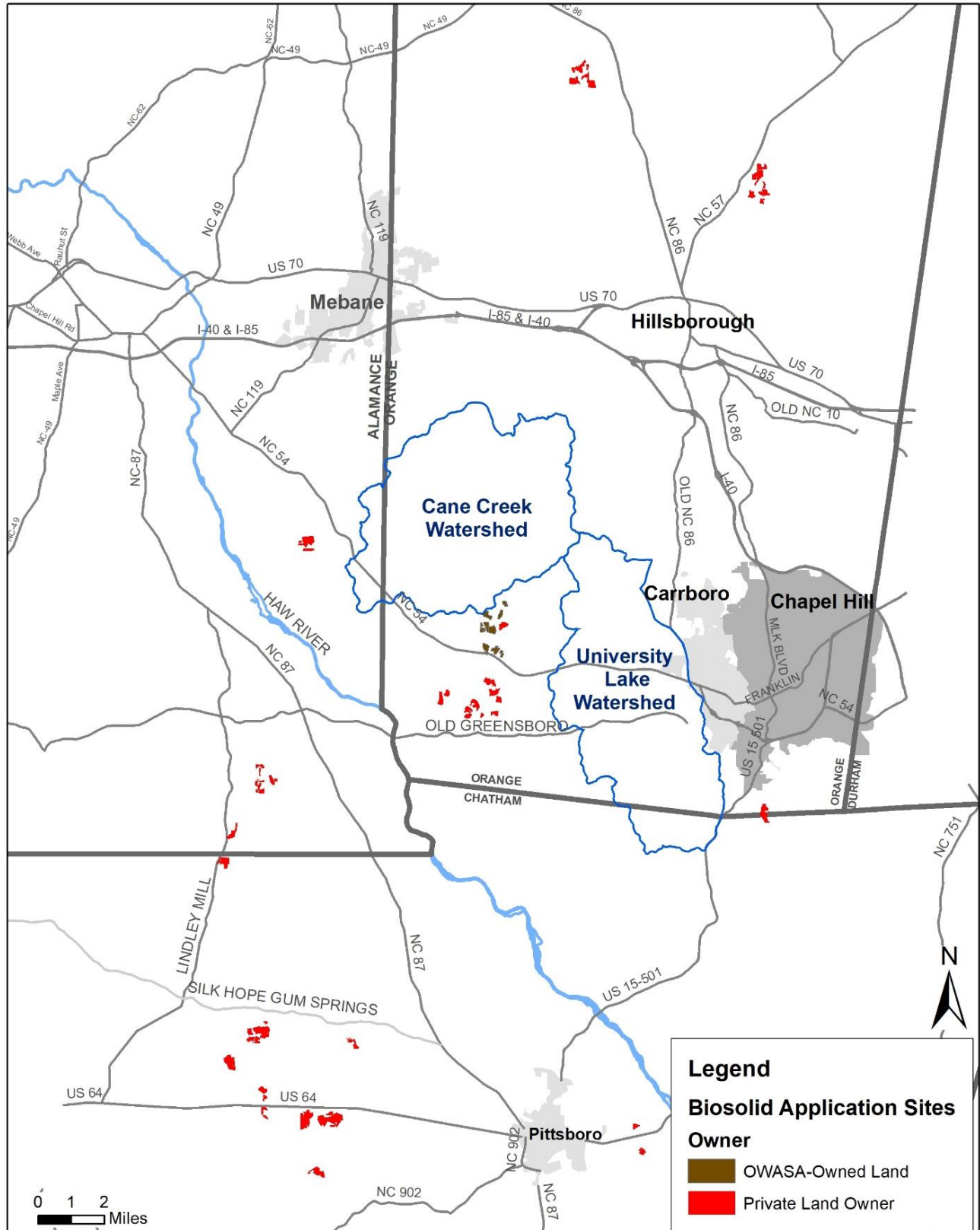


Figure 13. OWASA Biosolids Application Sites

## Regulations

This section summarizes upcoming regulations for which OWASA is preparing. Upcoming regulations included in this section are:

- Fifth Unregulated Contaminant Monitoring Rule,
- Per- and polyfluoroalkyl substances (PFAS), and
- Lead and Copper Rule Revisions (LCRR) and Lead and Copper Rule Improvements (LCRI).

### **Fifth Unregulated Contaminant Monitoring Rule (UCMR5)**

The Safe Drinking Water Act Amendments of 1996 included a program for water utilities to monitor unregulated contaminants in drinking water every five years, known as the Unregulated Contaminant Monitoring Rule (UCMR). The US Environmental Protection Agency (EPA) identifies the contaminants in each round based on the potential to occur in drinking water, whether there is an established laboratory method, the potential health impacts of the substance, public interest, and other factors. EPA has identified 29 PFAS substances and lithium to monitor in drinking water in the fifth round of monitoring for unregulated contaminants (UCMR5). UCMR5 will occur 2023-2025, and OWASA will need to monitor these compounds in 2025. Gathering data under the UCMR is one of the first steps EPA takes to establish drinking water regulations.

### **Per- and poly-fluoroalkyl substances (PFAS)**

Per- and poly-fluoroalkyl substances (PFAS) are emerging compounds of concern. PFAS have been used in a variety of substances since the 1940s to increase resistance to water, grease, or stains. PFAS are highly persistent once released into air, water, and soil, and there is the potential for them to bioaccumulate. Our treatment processes are not sources of PFAS, but rather a conveyor of PFAS compounds through treated drinking water, wastewater, and biosolids. Exposure to PFAS over a prolonged period may lead to health effects including an increased risk of certain cancers, high blood pressure, elevated cholesterol, hormone disruptors, and immune system impacts.

Because of the concerns about health impacts, EPA released its [PFAS Strategic Roadmap](#) in October 2021 which outlined a strategy to address PFAS which includes development of drinking water standards, investing in scientific research, and holding responsible parties accountable. As part of its PFAS Strategic Roadmap, EPA proposed drinking water standards for six PFAS compounds in drinking water on March 14, 2023:

- Perfluorooctane sulfonate (PFOS) and perfluooctanoic acid (PFOA) – these are two of the most widely studied PFAS compounds; while they are no longer manufactured, they persist in the environment. EPA has proposed a maximum contaminant level (MCL) of 4.0 parts per trillion for each of these compounds.
- PFNA, PFHx, PFBS, and GenX – EPA is proposing a Hazard Index of 1.0 (unitless) for the combination of these four parameters. The Hazard Index is a tool to evaluate the health risks of simultaneous exposure to mixtures of these related compounds.

The EPA is also proposing health-based, non-enforceable maximum contaminant level goals for these six PFAS compounds. The goal for PFOS and PFOA is 0 parts per trillion, and the goal for the other four compounds is the combined Hazard Index of 1.0. It is anticipated that EPA will finalize these drinking water standards in January 2024. Once the rule is finalized, there will be a three-year timeline for compliance, with a potential two-year extension if new capital facilities are required.

OWASA began proactive quarterly testing of our source water in Cane Creek Reservoir and treated drinking water in 2018 to monitor these compounds and publishes the data on a [dashboard](#). Our drinking water has concentrations of PFAS and PFOA that are higher than the proposed MCLs. Monitoring data indicate that we currently meet the proposed Hazard Index for the other four compounds.

OWASA has taken several steps to ensure compliance with the proposed drinking water regulations and to better understand the sources and extent of PFAS throughout the utility system:

- Engaged a consultant to evaluate and update our monitoring plan and provide recommendations for the mitigation, treatment, and removal of PFAS in water, wastewater, and biosolids;
- Expanded our PFAS monitoring program to include feeder creeks to Cane Creek Reservoir, our collection system, and biosolids; monitoring of the feeder creeks strongly suggests a connection between prior biosolids application by another wastewater utility on sites north of the reservoir and higher levels of PFAS in those feeder creeks;
- Began benchscale testing of optimization of our existing Powdered Activated Carbon (PAC) treatment process to provide near-term PFAS reductions in drinking water; we anticipate beginning to implement any optimization recommendations later in 2023.
- Developed a plan for bench-scale testing of Granular Activated Carbon (GAC) and Ion Exchange technologies, currently two of the most effective drinking water treatment technologies; testing started in August 2023, and we anticipate receiving results of this study in Fall 2023;
- Began conceptual planning for a proposed site layout of a new PFAS treatment process at our Jones Ferry Road WTP;
- Developed a long-term schedule for the detailed design and construction of a new PFAS treatment process at our Jones Ferry Road WTP with a goal of compliance with the proposed drinking water standards by 2028;
- Began proactively monitoring additional sites within the treatment process at the Mason Farm WWTP;
- Began proactively monitoring our biosolids for PFAS compounds to prepare for anticipated regulatory requirements;
- Began working with researchers from UNC on the use of a novel sorbent to determine its effectiveness at removing PFAS from drinking water

OWASA supports local and national monitoring and research on PFAS. OWASA is a founding member of the Triangle Water Supply Monitoring Partnership, in which utilities in the Triangle fund the US Geological Survey to monitor our water supply reservoirs. The phase of the program that will begin in

calendar year 2023 will focus on PFAS. OWASA also participated in the PFAS Testing Network's landfill leachate sampling study and drinking water studies. We also help fund research through the North Carolina Urban Water Consortium and the Water Research Foundation.

### **Lead and Copper Rule Revisions and Lead and Copper Rule Improvements**

There is no safe level of lead exposure, and EPA first began regulating lead through the Lead and Copper Rule in 1991. As part of these requirements, OWASA has historically tested for lead in drinking water in 30 homes that have lead solder because we have no known lead service lines. OWASA also provides testing of our drinking water for lead at no charge when requested by a customer.

The primary source of lead in drinking water is pipes. Thus, EPA published the Lead and Copper Rule Revisions on January 15, 2021. One of the initial requirements of the LCRR is to identify lead service lines on both the utility and customer sides of the meter, which must be completed by October 16, 2024. OWASA has begun the process to identify lead service lines through the following steps:

- Using data to identify properties that may have lead service lines based on the structure's age and other information;
- Identifying unknowns by working with residents to identify the type of pipe in their crawl space/basement or by exposing a small part of the pipe in the landscape (potholing);
- Identifying unknown service lines on OWASA side of meter;
- Using this information to input into a model that will help us identify the highest probability areas to check lines next; new data from these priority areas will then be fed into the model to continually improve the analysis through machine learning.

OWASA is not aware of any lead service lines in our service area.

Other primary components of the LCRR include developing a replacement plan for any identified lead service lines and galvanized lines requiring replacement, evaluating our corrosion control program, modifying our sampling program to include mandatory sampling of elementary schools and day care centers, and communicating potential lead service lines to the public. OWASA has hired a consultant to assist with these and other requirements of the LCRR and will publish an online map to help inform the community of these efforts.

Subsequent to publishing the LCRR, EPA further evaluated the rule and concluded that there are opportunities to improve it to better protect communities from lead exposure. The EPA intends to promulgate the Lead and Copper Rule Improvements (LCRI) prior to October 16, 2024.

# Energy Management

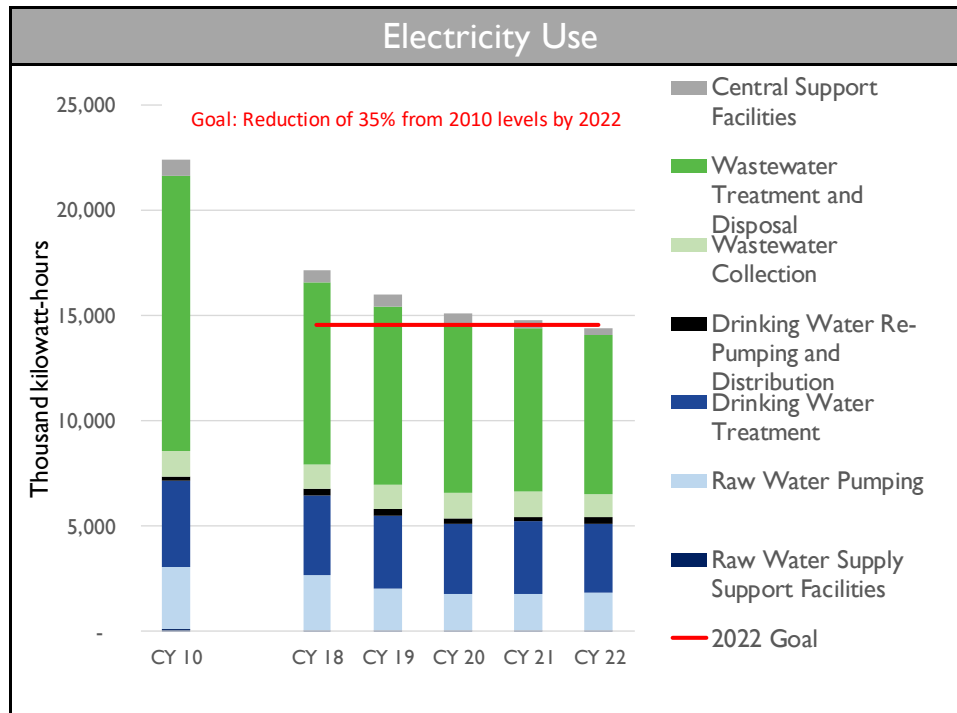


Figure 14. OWASA's Use of Purchased Electricity

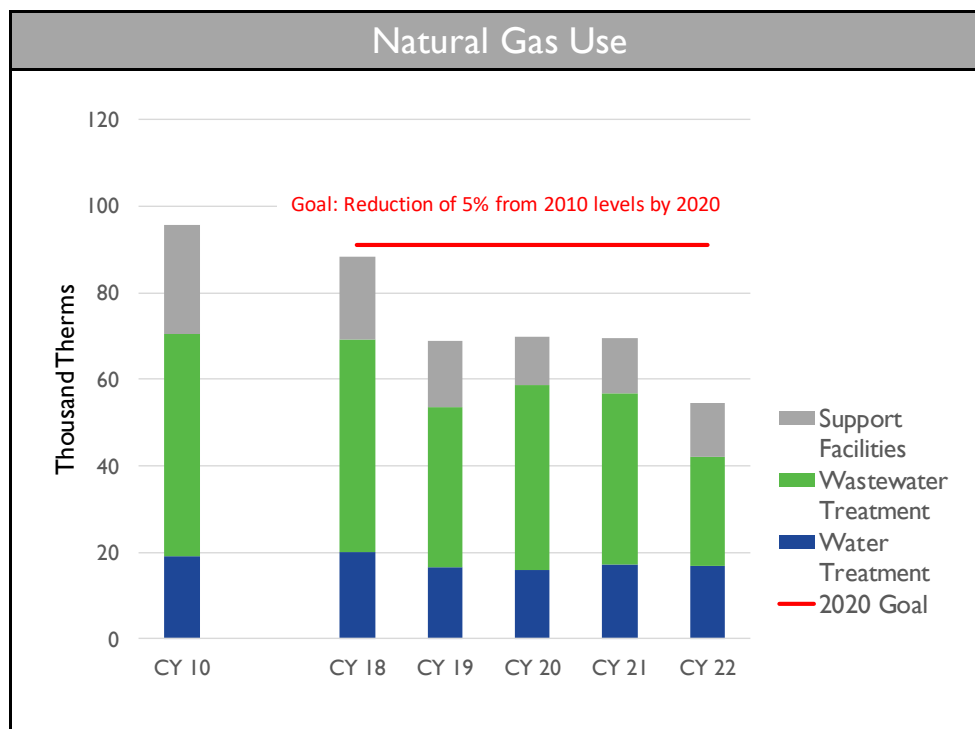


Figure 15. OWASA's Use of Natural Gas

**Description:** In 2015, the OWASA Board of Directors set energy management goals to reduce our overall use of electricity by 35% and of natural gas by 5% from 2010 levels. This trend evaluates progress toward those goals.

**Key Observations and Related Information:**

- As of the end of Calendar Year 2022, we have surpassed both goals, reducing our use of purchased electricity by 36% and of natural gas by 43%.
- These gains have been achieved through a series of cost-effective investment in energy efficiency and renewable energy technology, as well as a team commitment to conservation and the wise use of energy.
- In the Fall of 2022, OWASA connected its fourth and largest solar photovoltaic lease system. This system was connected behind the meters serving the Cane Creek Reservoir Pump Station.