Operating Trends Report for Fiscal Year 2024

NOVEMBER 2024

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 20 percent since Fiscal Year (FY) 1999 despite a 32 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 July 2022 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 (group known as Western Intake Partnership or WIP) on a new intake and transmission infrastructure on the western side of Jordan Lake. This partnership will secure access to our allocation of water from Jordan Lake to use during extended droughts or operational emergencies and meet our long-term needs. Given our current water demand weighed against our available supply, OWASA has decided to delay our full participation and partnership in the WIP to invest in more urgently needed projects. OWASA will fully join the WIP closer to the time when water from Jordan Lake will be needed on a regular basis.
- Based on current demands and projections, we do not anticipate needing to expand the hydraulic capacity of the water or wastewater plants for several decades.
- There are recent regulations that will require significant investments of capital and/or staff to ensure we meet all regulatory requirements. These include the upcoming drinking water compliance standards for per- and poly-fluoroalkyl substances (PFAS) and the requirement to identify and replace certain galvanized service lines in our community as part of the Lead and Copper Rule Revisions (LCRR) and Lead and Copper Rule Improvements (LCRI).

Acronyms

AWWA	American Water Works Association
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
lb/yr	pounds per year
LCRI	lead and copper rule improvements
LCRR	lead and copper rule revisions
LRWSP	Long-Range Water Supply Plan
mgd	million gallons per day
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 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 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
- Management of 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.

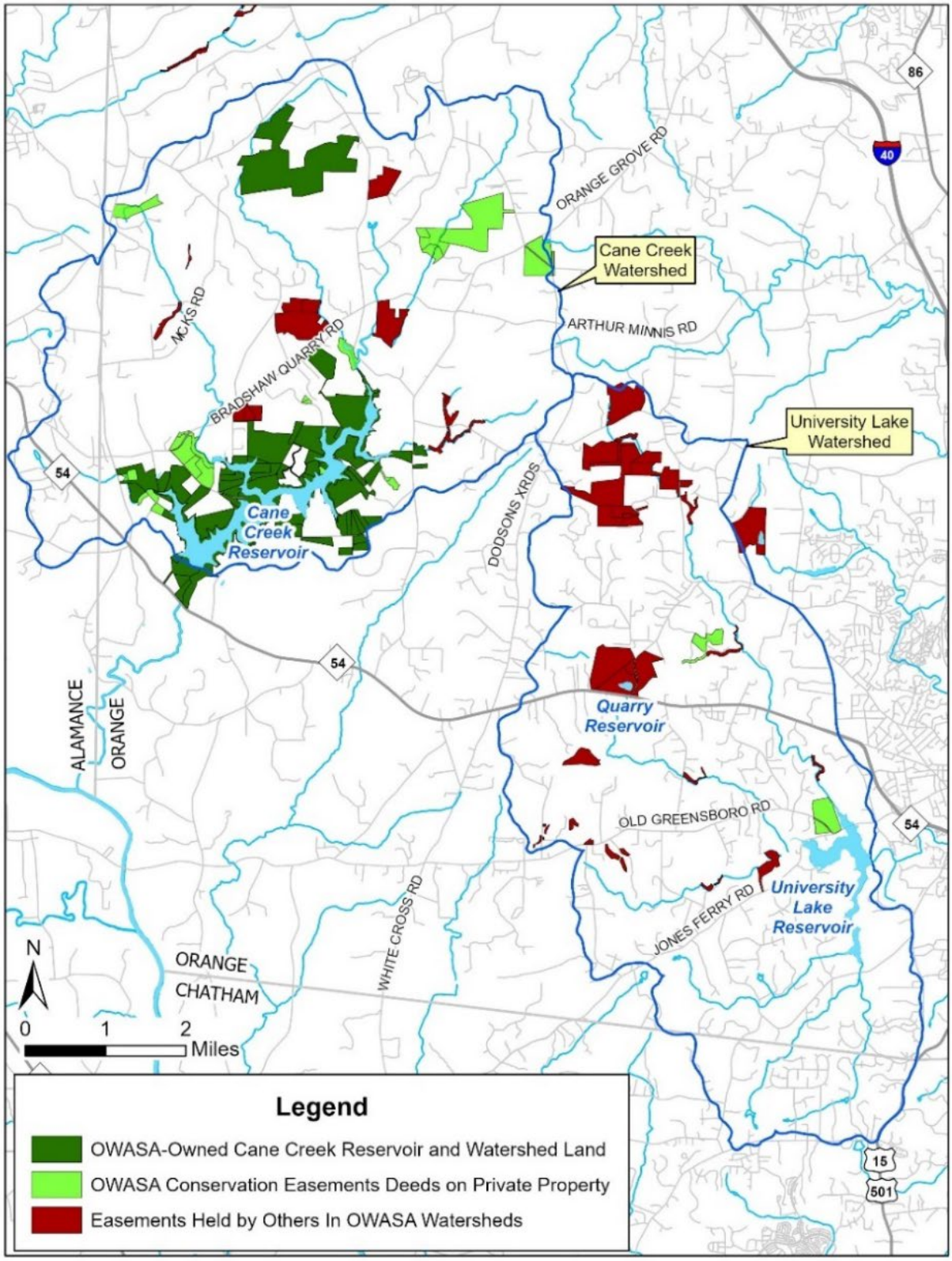

Figure 1. Protected Land in OWASA's Watersheds – Approximately 10 percent of our watershed lands are located outside Orange County, where less stringent controls apply.

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 the protection of 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 2024, OWASA accomplished the following:

- Hosted an oak regeneration school at the Cane Creek Mitigation and Teer West Tracts.
- Entered into a timbering contract for the second phase of thinning and timbering on the Meadowcrest South Tract. Timbering was initiated in FY 2024, with plans to be completed in FY 2025.
- Planted 11 acres of Loblolly pines and 8 acres of Shortleaf pines at the Meadowcrest South Tract.
- Marked areas for thinning and harvesting on the Teer West Tract and showed the site to potential timber buyers.

In FY 2025, OWASA plans to accomplish the following:

- Treatment to portions of the Cane Creek Mitigation Tract to control invasive plants.
- Communicate to nearby residents and perform a prescribed burn at the Cane Creek Mitigation Tract.
- Initiate Phase II maintenance at the Cane Creek Mitigation Tract, which includes marking areas for thinning, flagging harvest areas, and developing a preharvest plan.
- Perform maintenance on road edges on the Cane Creek Mitigation Tract to keep trees from growing along road while maintaining grasses to prevent erosion.
- Perform a prescribed burn on portions of the Meadowcrest property.
- Harvest portions of the Meadowcrest property.
- Communicate with the community about planned harvesting activities and potential impacts, then initiate harvesting at the Teer West property.
- Build access roads on Teer West Tract.
- Start developing a Forest Stewardship Plan for Peninsula South.
- Figure 2 illustrates the location of OWASA's land near Cane Creek Reservoir and the status of forest management activities.

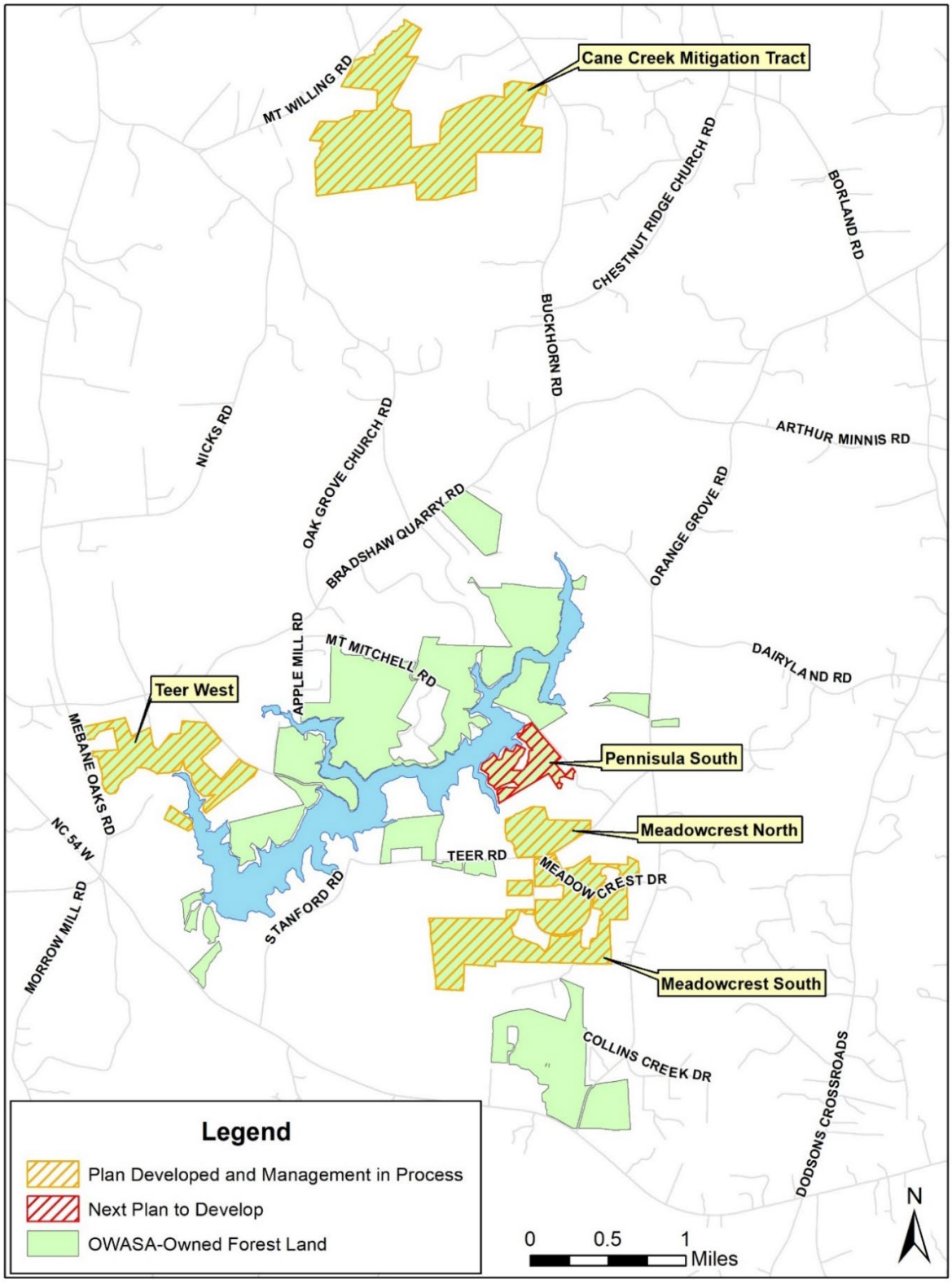

Figure 2. Status of OWASA Forest Management Plan Development and Implementation

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 add 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 protecting the 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.

Raw Water Supply

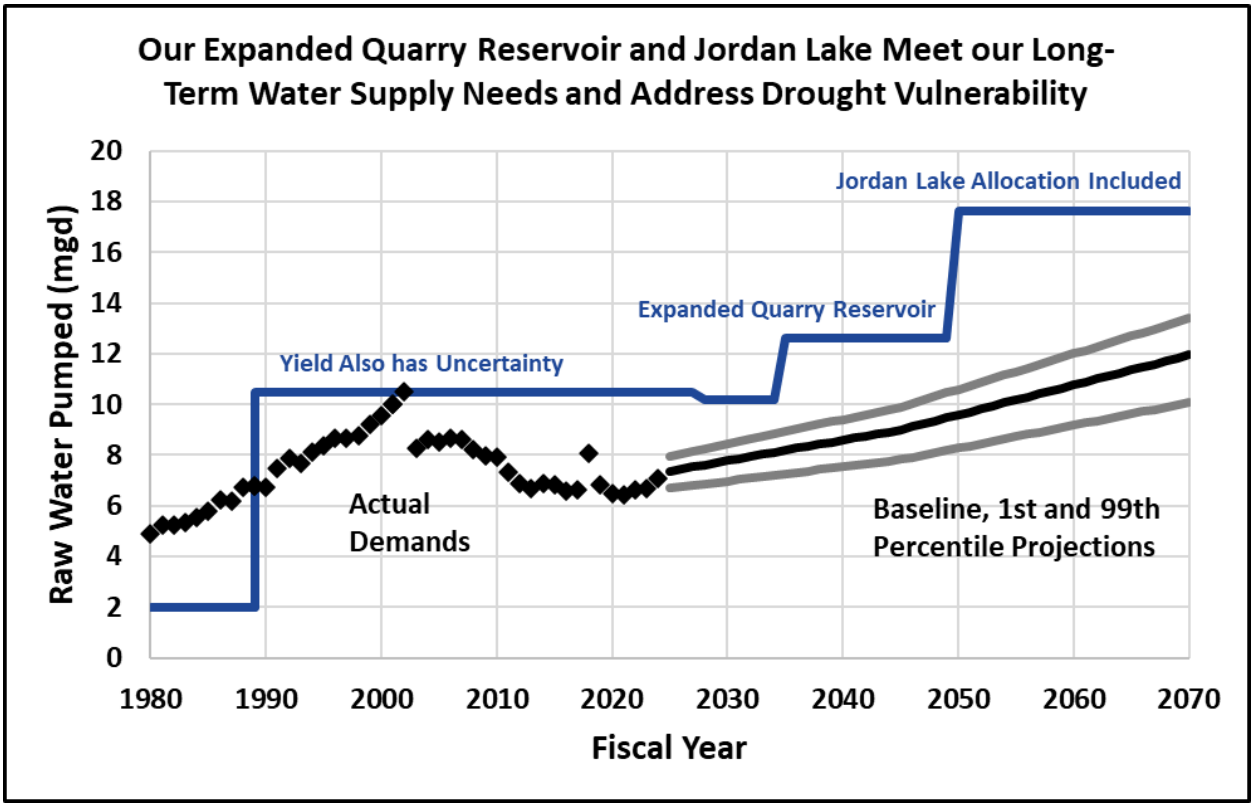

Figure 3. OWASA's Water Supply Yield and Demands – The estimated yield that includes our allocation of water from Jordan Lake is oversimplified as our access through the Western Intake Partners has not yet been modeled with our three local supplies. The projections shown in the figure are from 2019. 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 (cumulatively represented by the blue line) along with actual historic raw water demands (represented by black diamonds) and estimated future raw water demands (represented by the black curve with a range of uncertainty).

Key Observations and Related Information:

- The annual average-day amount of water we pumped from reservoirs has declined substantially since peaking in FY 2002.
- Our customers have reduced peak day drinking water demands by 20 percent since Fiscal Year FY 1999 despite a 32 percent increase in customer accounts over that same period.
- As recommended in our Long-Range Water Supply Plan, OWASA is working with the City of Durham, Town of Pittsboro, and Chatham County (collectively known as the Western Intake Partnership, or WIP) 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 only in the preliminary design phase for these facilities, which are planned to be operational around 2031. These facilities will provide OWASA access to its 5 mgd allocation once that additional yield is needed.

- Our current estimated yield is 10.5 mgd, while daily demand averaged just over 7 mgd during FY 2024. OWASA 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 will be 17.6 mgd. Though this current phase of WIP infrastructure is estimated to be online in approximately 2031, it will be further in the future before infrastructure is expanded and OWASA will rely on it as part of our water supply.

Water Treatment Plant: Peak Day Drinking Water Demands

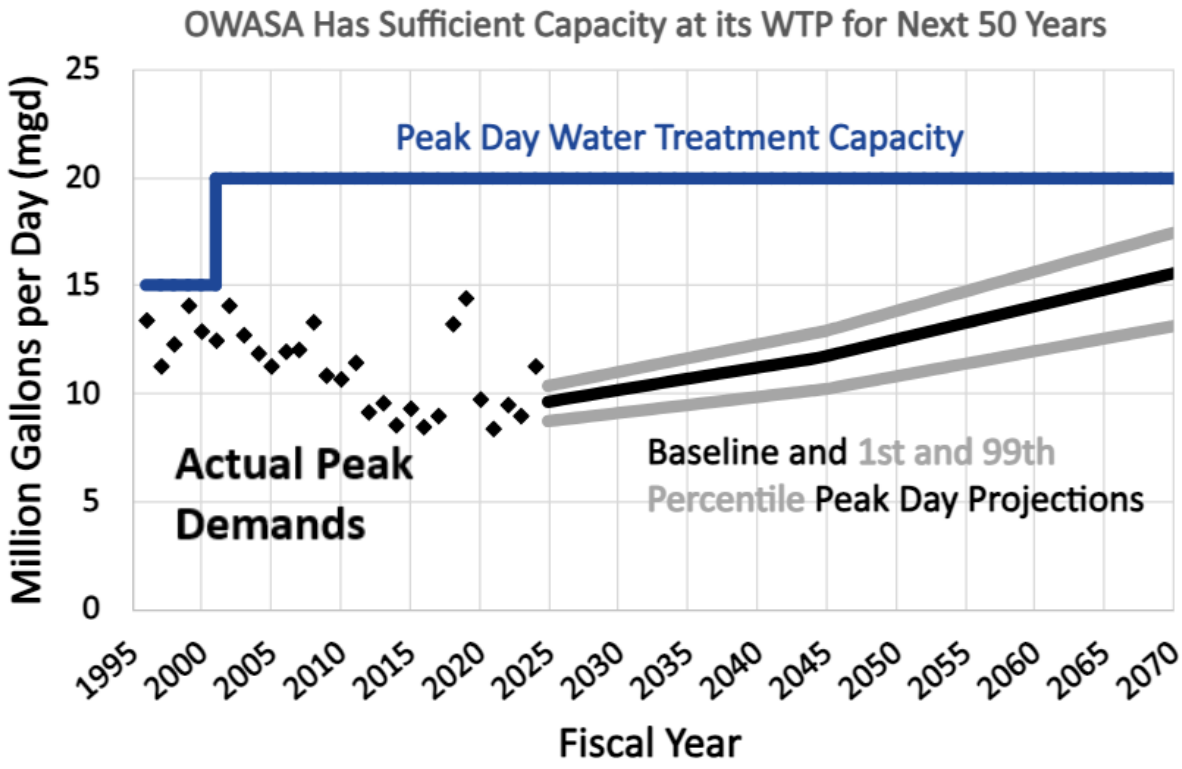

Figure 4. WTP Capacity and Peak Day Drinking Water Demands. The projections were based on an analysis completed in 2019 and assume that our reclaimed water system is in operation throughout the peak day demand season. Peak day water demands would be considerably greater if the reclaimed water system 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 20 percent despite a 32 percent increase in customer accounts over that same period. See comments regarding peak demands in FY 2018, FY 2019, and FY 2024 below.
- There was a significant increase in peak day drinking water demands in FY 2018 and FY 2019. OWASA provided drinking water to Durham while they had one WTP offline in FY 2018 and were making improvements at their second WTP. In FY 2019, a large water main break occurred near OWASA's WTP on November 5, 2018. If the main break had not occurred, OWASA's peak day

demand would have been 8.6 mgd, which is comparable to earlier years. In FY 2024, OWASA provided drinking water to Durham to support with local drought conditions, which accounted for the peak day transfer on September 15, 2023.

- 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.
- 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 7.1 mgd on average in FY 2024). 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, though this scenario has not been tested in practice.
- For the eleventh consecutive year, OWASA received the 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.
- An important project at our WTP is studying, designing, and constructing additional treatment to meet new drinking water standards for PFAS (see Regulations section of this report). Another significant project at our WTP is designing and constructing a new and larger clearwell and associated electrical work to increase our system's resiliency and treatment capacity.

Drinking Water Distribution System Integrity

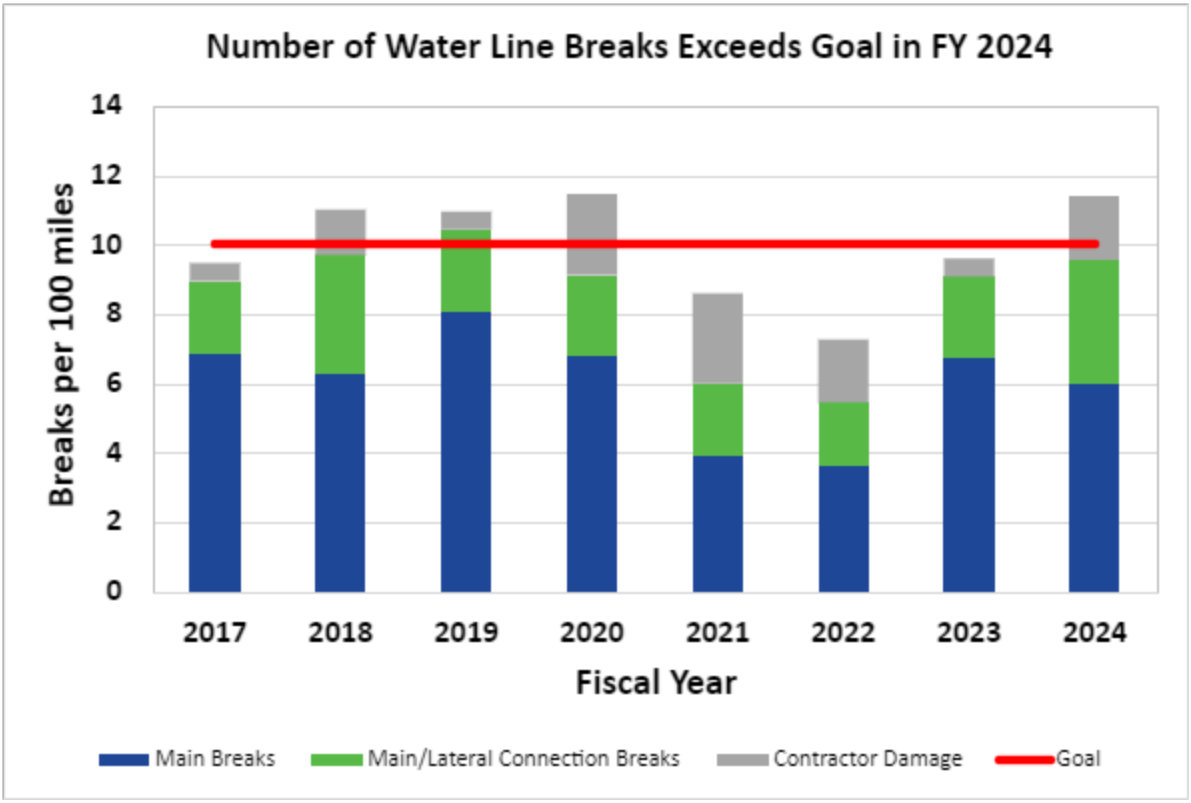

Figure 5. Historic Water Line Breaks

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, it represents an impact to our customers and thus we include contractor damage in this trend.

Key Observations and Related Information:

- We exceeded our goal of 10 main breaks or less per 100 miles of pipeline in FY 2024, the goal set 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 break rates in the United States and Canada. For context, OWASA has about 386 miles of water line.
- In FY 2024, the number of main breaks continued the upward trend from the past couple of years. OWASA will continue to monitor this trend and determine whether changes are needed to our maintenance program and planned capital projects for water distribution.

Water System Audit

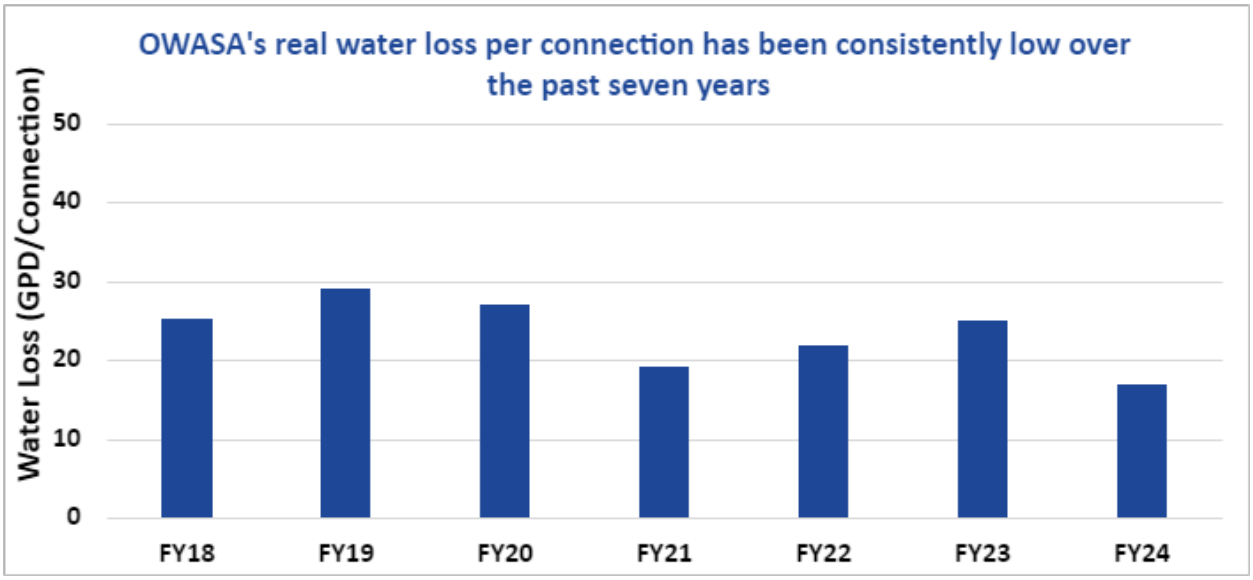

Figure 6. Historic Real Water Loss

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 2024 AWWA Benchmarking survey was 40.6 gallons per connection. OWASA's real water loss in 2024 was 16.9 gallons per connection per day.
- Part of the water audit process is for utilities to account for all water uses. Prior to September 2023, OWASA was not accounting for water used in the water treatment process at our Water Treatment Plant. Once we started metering and accounting for that water use, real water loss has decreased. 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 (0.7 for 2024), 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

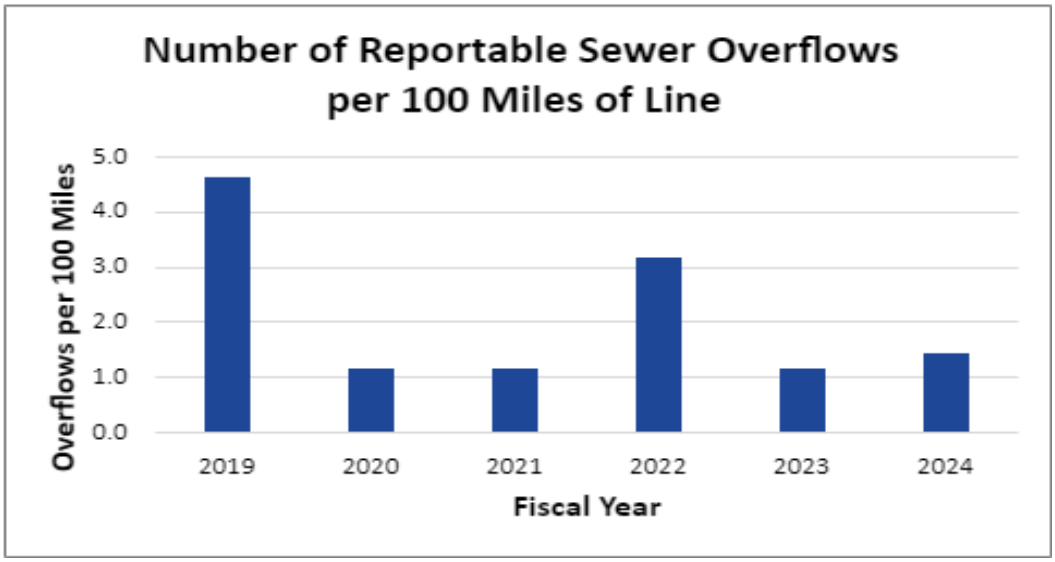

Figure 7. Historic Reportable Sanitary Sewer Overflows

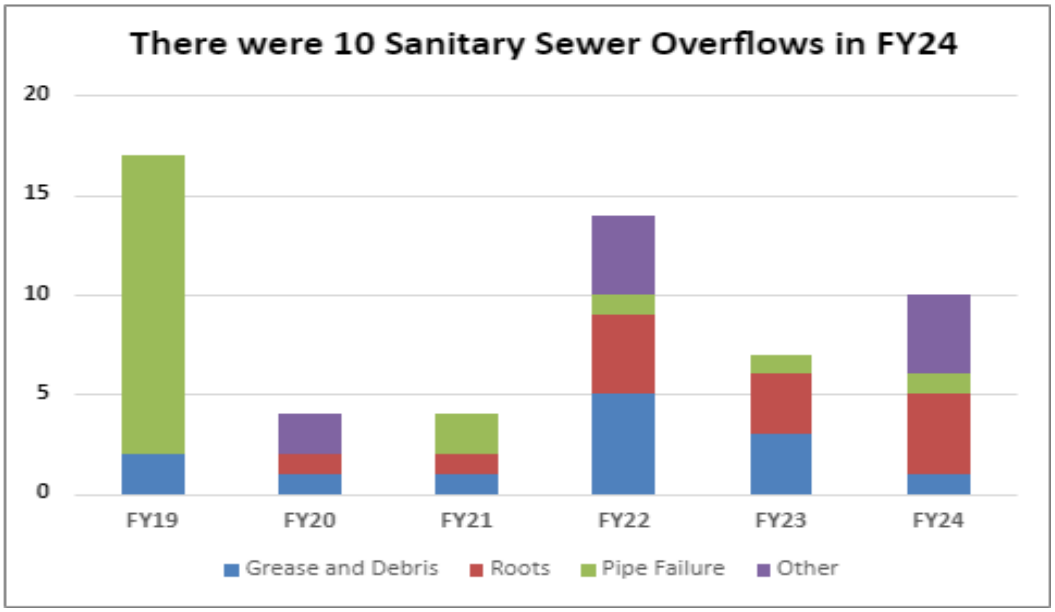

Figure 8. Historic Causes of All Sanitary Sewer Overflows

Description: This trend evaluates the number of reportable sewer overflows (Figure 7), 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 8. 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 in FY 2024 was 1.4 per 100 miles of pipeline, which is less than the national median of 3.0 overflows per 100 miles of pipeline, according to the American Water Works Association 2021 Benchmarking report. For context, OWASA has about 350 miles of sewer lines. Per DEQ guidance, OWASA strives to have no overflows.
- In FY 2024, there were ten total overflows (reportable and non-reportable) attributed to grease, roots, pipe failure, lift station overflow, and damage during construction activities such as construction damage. Grease, debris, and roots are common 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; 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

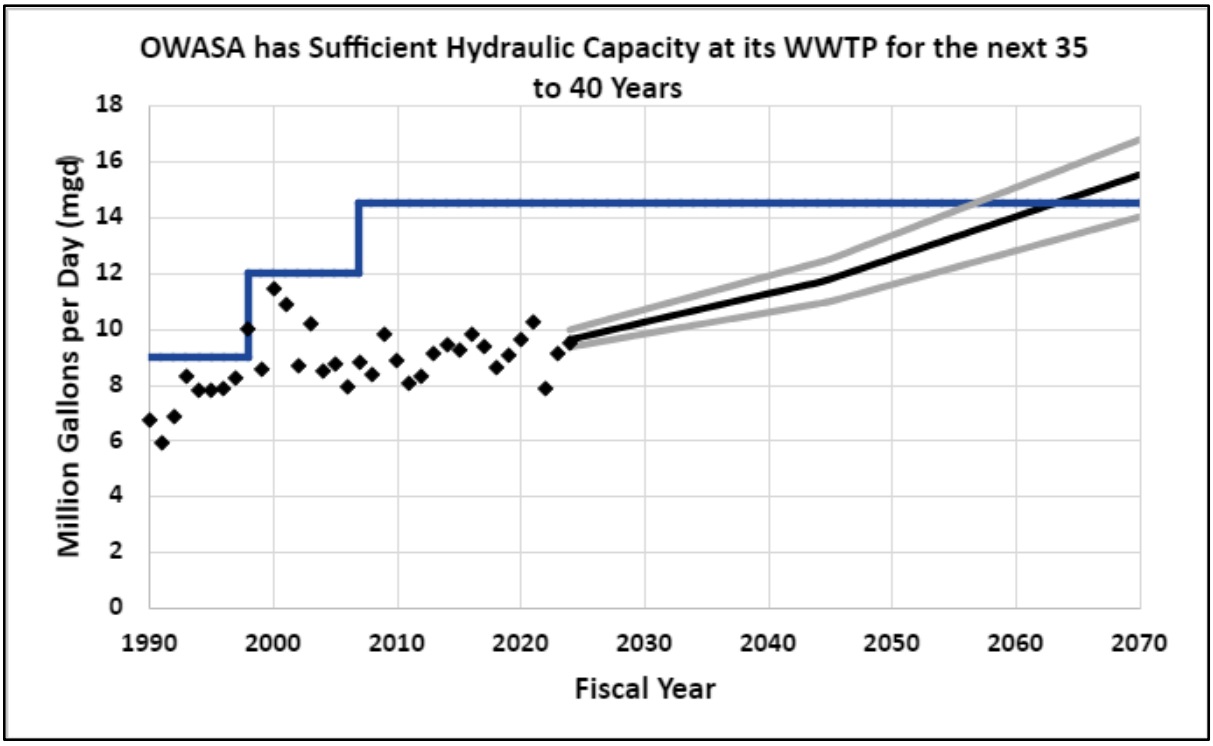

Figure 9. Mason Farm WWTP Capacity and Demands. Projected flows are from 2019.

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 2024, the maximum month flow was 9.5 mgd, which is about 66 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.

Mason Farm WWTP Nutrient Capacity

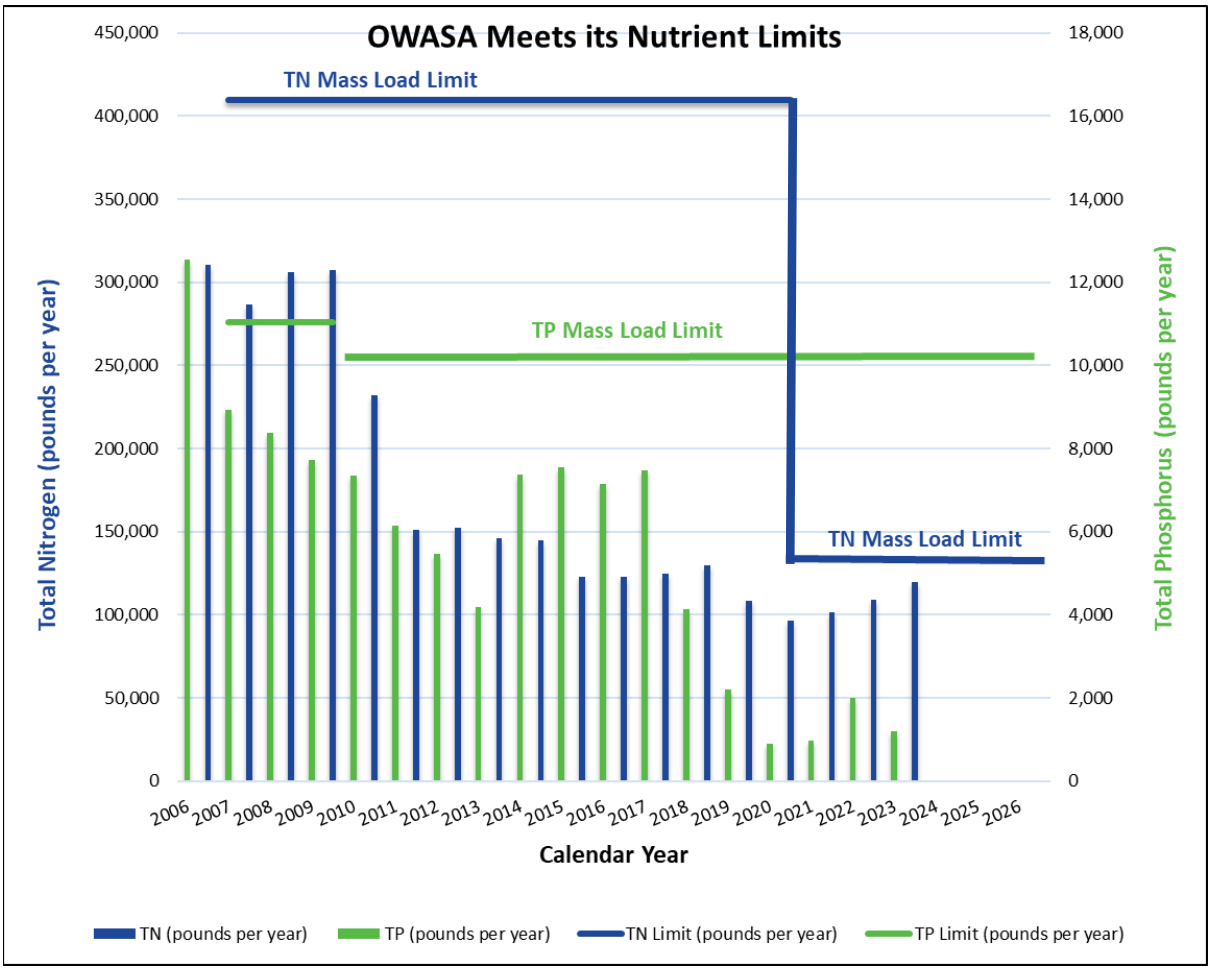

Figure 10. Mason Farm WWTP Annual Nutrient Loading

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 2018-2023.
- 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 to meet the more stringent limits. Staff inspected and tested the denitrification filters to ensure they are operationally ready should they be needed. TN could be reduced significantly through the use of the denitrification filters, but OWASA would see a significant increase in energy and chemical costs. Next steps will be determined based on pilot study recommendations in the Wastewater Treatment Plant Master Plan (anticipated to be completed in FY 2025) and plant performance against current regulatory limits.
- The Wastewater Treatment Plant Master Plan was finalized in January 2024 and provides an adaptable roadmap with triggering events for the timing of needed capital investments and operational changes to ensure we continue to meet our nutrient limits.
- The North Carolina Department of Environmental Quality is currently reviewing the Jordan Lake Nutrient Rules for updates or revisions. OWASA has participated in the stakeholder engagement process which began in early 2024; revised rules are expected to be adopted by the Environmental Management Commission and approved by the Rules Review Commission in 2027.
- OWASA's WWTP received the Peak Performance award for 100% compliance with the National Pollutant Discharge Elimination System (NPDES) permit for the 14th consecutive year.

Reclaimed Water

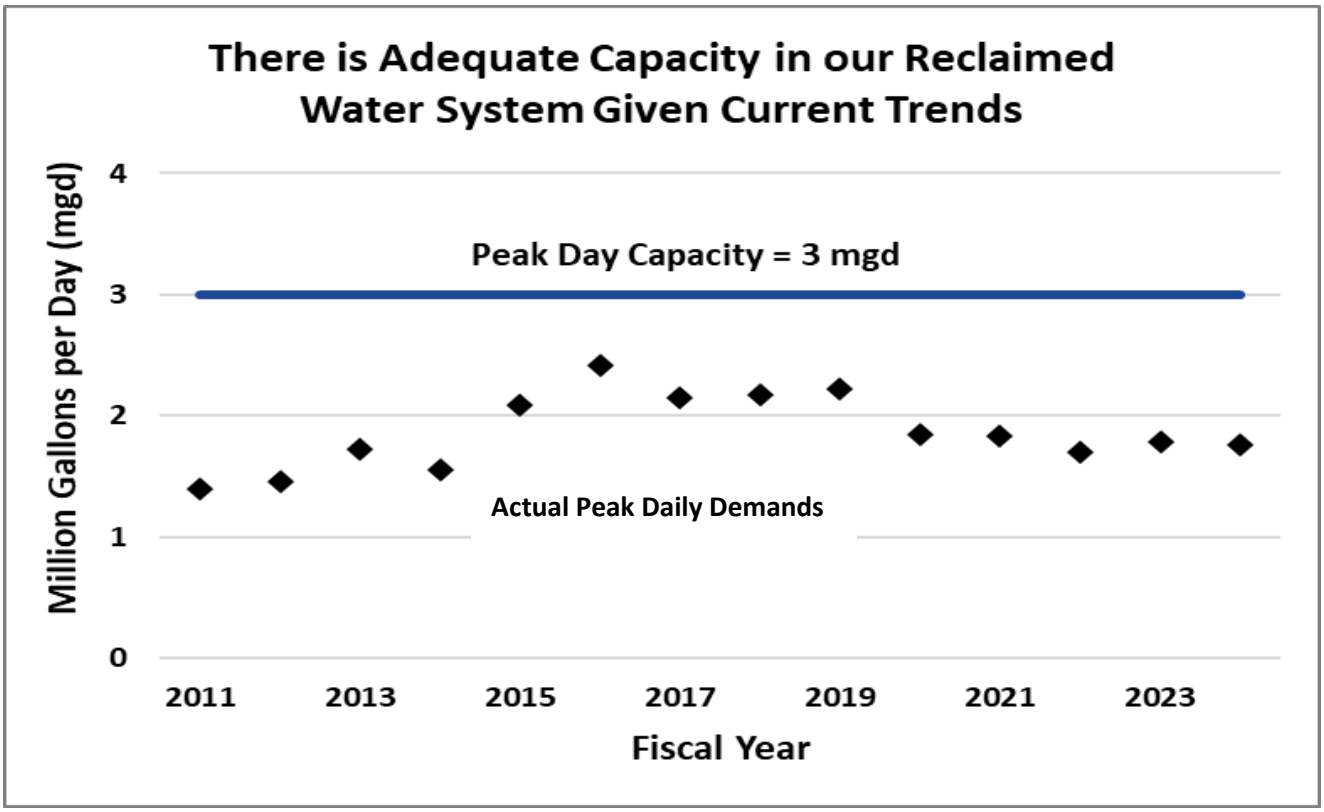

Figure 11. Reclaimed Water System Capacity and Demands

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 by UNC 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).

- A study was conducted 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. As a result of the study, OWASA identified some potential opportunities to optimize the water quality.
- The RCW system was designed without storage within its distribution system. There was a CIP study completed in FY 2024 to evaluate the addition of an elevated storage tank for the RCW system. The study found that the current demand for reclaimed water and estimated price did not justify the construction of a storage tank at this time.

Biosolids

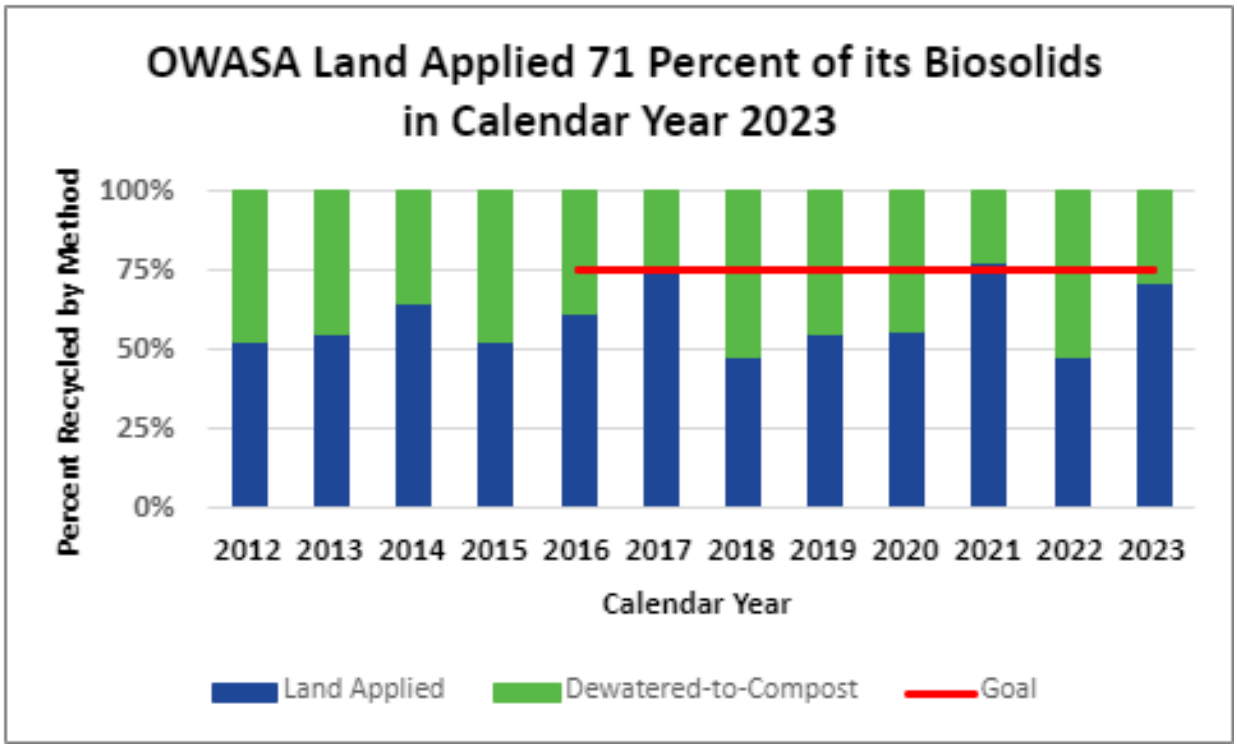

Figure 12. Historic Biosolids Application

Description: This trend evaluates the amount of biosolids which OWASA applies to land and the amount it dewaters 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 1,532.5 acres of farmland in Orange, Chatham, and Alamance counties available for its land application program (see Figure 13). Ninety percent (1,379.5 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:

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- In CY 2023, OWASA land applied 71 percent of its biosolids, falling short of the goal. Frequent rains and equipment issues limited the amount of biosolids we could land apply.

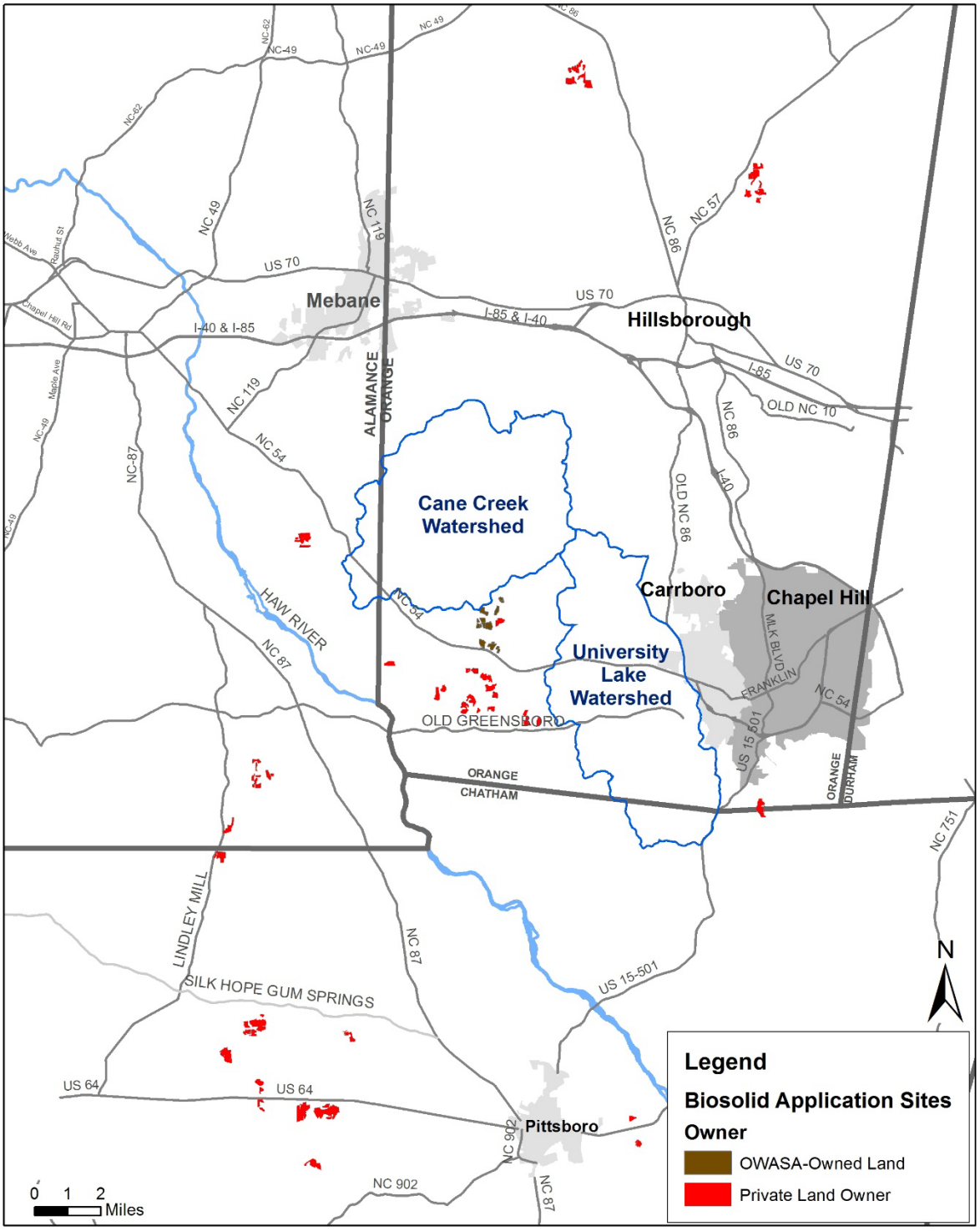

Figure 13. OWASA Biosolids Application Sites

Regulations

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

- Fifth Unregulated Contaminant Monitoring Rule (UCMR5),
- 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 compounds of emerging 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 they convey 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 developing drinking water standards, investing in scientific research, and holding responsible parties accountable. As part of its PFAS Strategic Roadmap, EPA issued enforceable drinking water standards for six PFAS compounds in drinking water on April 10, 2024:

- 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 issued a maximum contaminant level (MCL) of 4.0 parts per trillion (ppt) for each of these compounds.
- PFHxS, PFNA, and HFPO-DA (commonly known as GenX chemicals) – EPA issued an MCL of 10 ppt for each of these compounds.

- PFNA, PFHxS, PFBS, and HFPO-DA (GenX) – EPA issued a Hazard Index of 1 (unitless) for mixtures containing two or more of these four compounds. The Hazard Index is a tool to evaluate the health risks of simultaneous exposure to mixtures of these compounds.

The EPA also released final health-based, non-enforceable maximum contaminant level goals for these six PFAS compounds in April 2024. The goal for PFOS and PFOA is 0 ppt each, meaning the EPA does not consider there to be any safe concentration for these compounds. The goal for PFHxS, PFNA, and HFPO-DA (GenX) is 10 ppt each. There is also a Hazard Index of 1 (unitless) for mixtures containing two or more of PFHxS, PFNA, HFPO-DA, and PFBS. Now that the PFAS rule has been finalized, public water systems have three years, until 2027, to complete initial monitoring, followed by compliance monitoring. Public water systems have five years, by 2029, to implement technology that reduces PFAS that monitoring showed exceed the MCLs.

In 2018, OWASA began proactive quarterly testing of our source waters in Cane Creek Reservoir and our treated drinking water to monitor these PFAS compounds and publishing the data on OWASA's website. Our drinking water has concentrations of PFOS and PFOA that are higher than the MCLs. Monitoring data indicate that we currently meet the proposed Hazard Index for the other four compounds. 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; the conceptual plan was completed in early 2024;
- 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;
- Optimized our existing Powdered Activated Carbon (PAC) treatment process to provide near-term PFAS reductions in drinking water, while maintaining the ability to meet other treatment goals.
- Launched pilot testing of Granular Activated Carbon (GAC) and Ion Exchange technologies, currently two of the most effective drinking water treatment technologies, in May 2024. By the end of 2024, OWASA will select the best technology for removing PFAS from our water based on effectiveness considering seasonal variations and the construction and maintenance costs;
- Began preliminary design 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 EPA's new PFAS drinking water standards that will become effective in April 2029;

- 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 U.S. Geological Survey to monitor our water supply reservoirs. In April 2024, the USGS started monitoring for PFAS analytes in select Triangle reservoirs, including both Cane Creek and University Lake. Cane Creek is also targeted for stormwater runoff sampling. The reservoirs are being sampled every other month through March 2025. OWASA 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 (LCRR) and Lead and Copper Rule Improvements (LCRI)

There is no safe level of lead exposure. 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 had to be completed by October 16, 2024. OWASA has worked 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 helped us identify the highest probability areas to check lines next; new data from these priority areas was then fed into the model to continually improve the analysis through machine learning.

Following the inventory of service lines in our service area, OWASA found no lead service lines. There were 108 galvanized service lines that, according to the LCRR, could cause lead exposure under certain circumstances. OWASA is developing a service line replacement program for customers with galvanized service lines.

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 about potential lead service lines with the public. OWASA has hired a consultant to assist with these and other requirements of the LCRR and published an online map on October 16, 2024 to help inform the community of these efforts. EPA further evaluated the rule and concluded that there are opportunities to improve it to better protect communities from lead exposure. On October 8, 2024, EPA published the final Lead and Copper Rule Improvements (LCRI). This rule requires drinking water systems to replace lead service lines within 10 years.

Energy Management

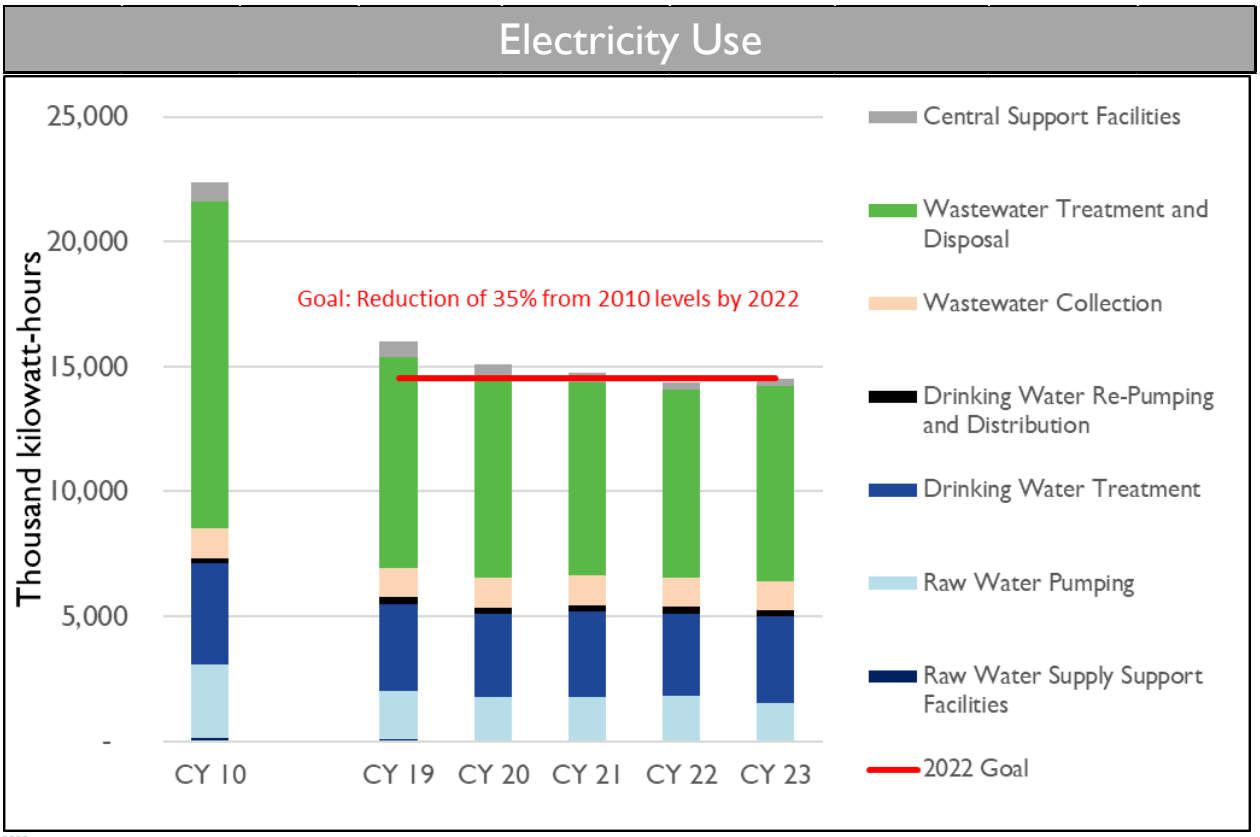

Figure 14. OWASA's Use of Purchased Electricity

Natural Gas Use

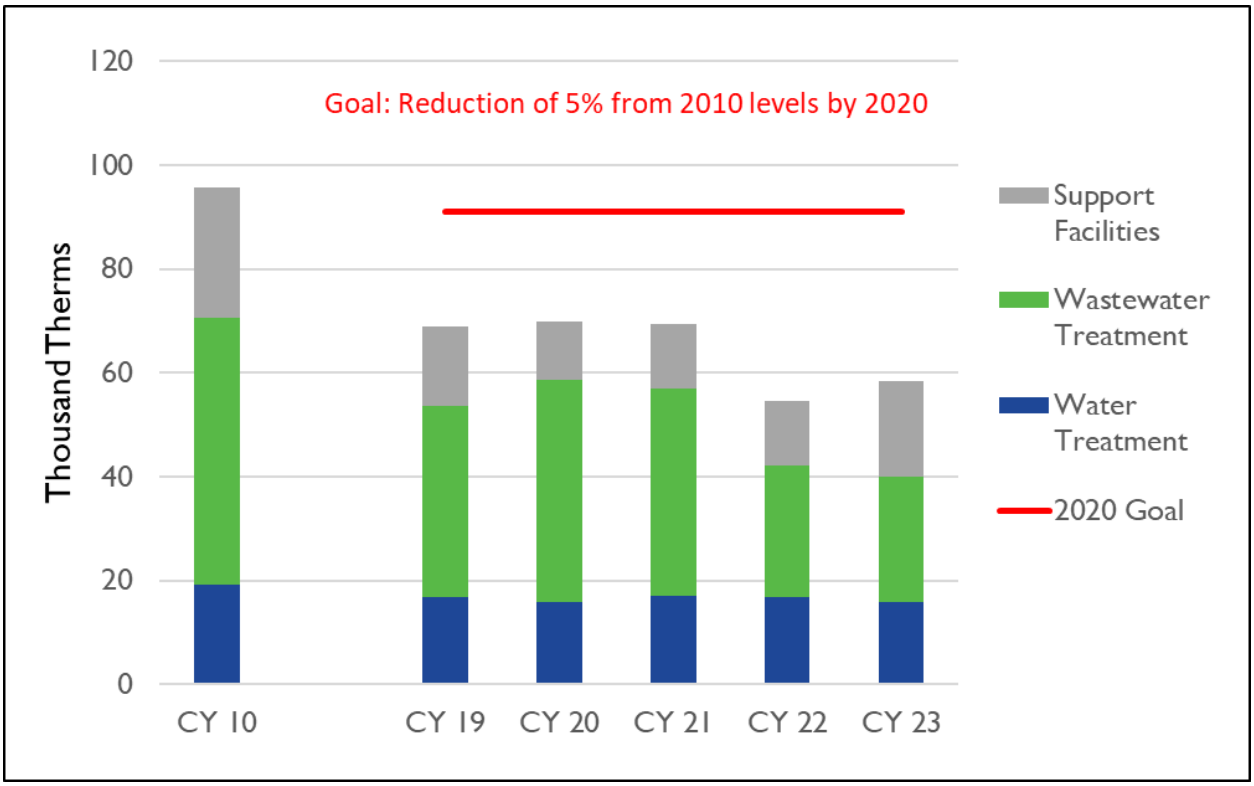

Figure 15. OWASA's Use of Natural Gas

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 2023, we have met our goal for reducing our use of purchased electricity by 35% for the second year in a row.
- As of the end of Calendar Year 2023, we have surpassed our goal for reducing our use of natural gas by 5% for the fifth year in a row, with a reduction of 39% compared to 2010 levels.
- These gains have been achieved through a series of cost-effective investments in energy efficiency and renewable energy technology, as well as a team commitment to conservation and the wise use of energy.