

# 9. Water and Aquifer Protection

## Goal

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*Implement integrated water quality and conservation strategies and make infrastructure improvements to mitigate the adverse effects caused directly or indirectly by climate change, including protecting our aquifer, springs, and surface water resources in Alachua County.*

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## Introduction

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### Water and Climate Change

Water is the essence of life, underscoring the urgent need to protect it from contamination and overuse. However, climate change is drastically impacting water supply by influencing the water cycle. The increase in global temperatures is leading to increased evaporation, resulting in more water vapor in the air and subsequent rainfall. Sea level rise puts aquifers, which many rely on for potable water, at risk through saltwater intrusion. Climate migration and increased heat also increase demands on our aquifer from urban and agricultural uses. As climate change worsens, the threats to water increase, necessitating a need to act and protect our water quality and water supply. Water Supply resilience can be increased by diversifying management strategies. This report outlines water supply resilience strategies including reducing landscape irrigation, enforcing irrigation restrictions, implementing tiered water rates, enhancing aquifer recharge, and promoting water quality improvement projects and monitoring.

As climate change is expected to impact water availability and distribution, continuous tracking of water withdrawals and usage patterns will be vital for adapting to new conditions. Groundwater supply heavily depends on inputs and outputs to the Floridan Aquifer. Given Florida's significant reliance on groundwater resources, monitoring rainfall and groundwater levels and pumping is crucial. The City of Gainesville maintains a rain gage network, and precipitation is also tracked by the water management districts and United States Geological Services. As climate change causes variations in precipitation patterns, supporting and analyzing these monitoring efforts is vital to understanding the impacts of extreme weather events.

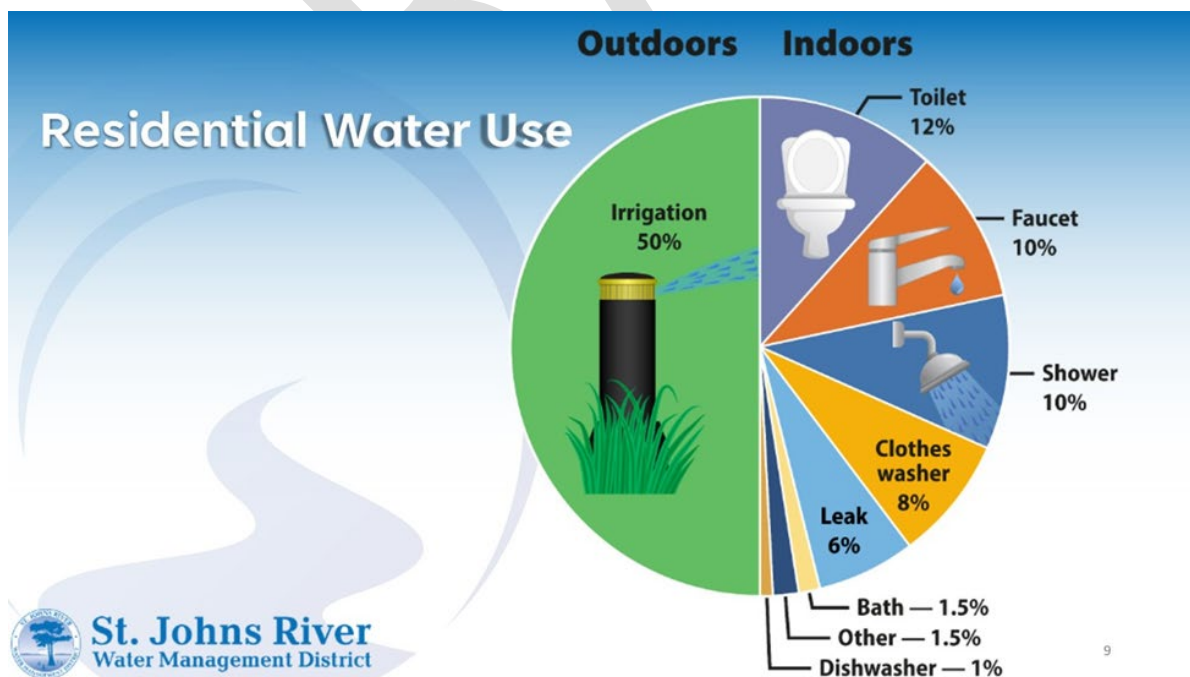
Changes associated with climate change also pose a threat to water quality of our surface waters and groundwater. Increases in air temperature will have a cascading effect on surface and groundwater temperatures and water quality. Changes in fertilizer use on agricultural and urban lands can also degrade water quality. Strategies to protect our water quality and utility infrastructure are also presented in this chapter.

## Water in Alachua County

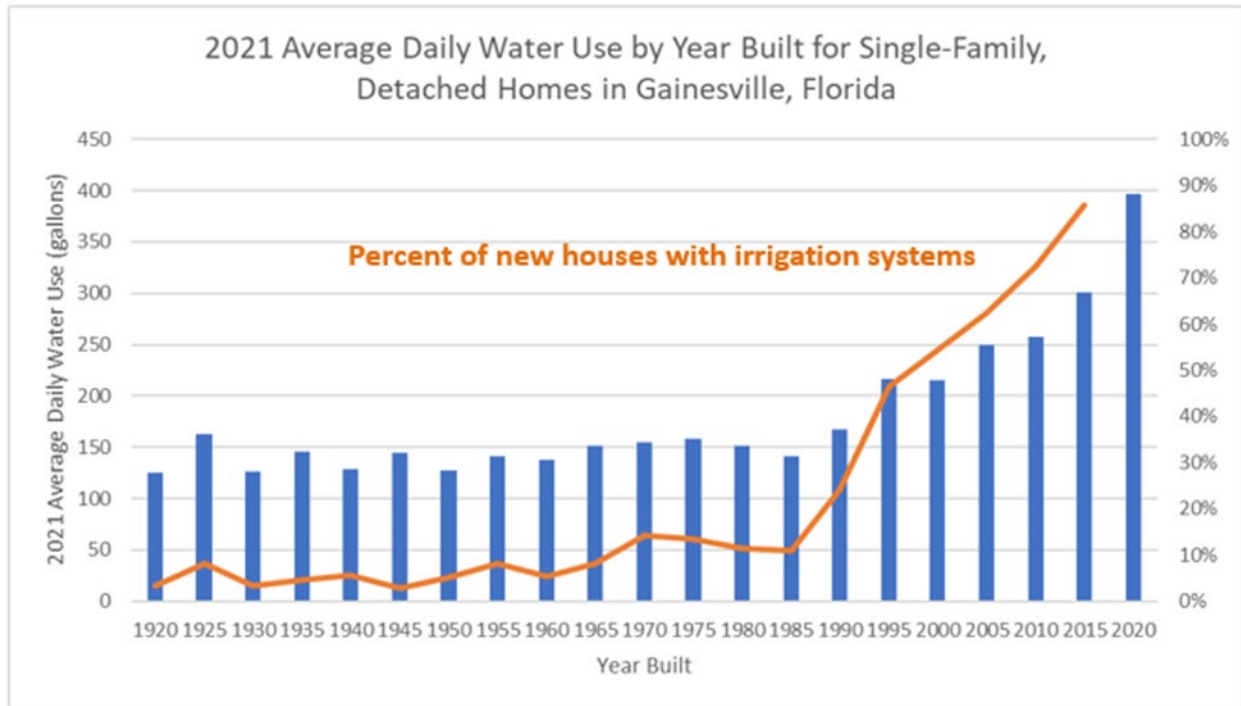
In Alachua County, as most of northern peninsular Florida, the primary source of water is the Floridan aquifer. The Floridan aquifer is also the source for most springs on the lower Santa Fe River. To protect the springs, surface waters, and the drinking water in Alachua County we must reduce pollution that degrades water quality and reduce water use that drives over pumping.

According to the 2023 North Florida Regional Water Supply Plan (NFRWSP), the population of North Florida is projected to increase by 49% by 2045. This results in a 32% increase in water demand, which is 135 million gallons a Day (MGD). Even without this projected growth, we are not meeting the adopted Minimum Flows and Levels (MFLs) due to current pumping allocations through Consumptive Use Permits (CUPs) issued by the Water Management Districts and thousands of unregulated wells allowed by right. MFLs set minimum water levels necessary to protect water resources and maintain ecosystem services such as habitat and recreation. The NFRWSP outlines billions of dollars in proposed projects to meet projected demand. Measurable and meaningful water conservation policies could reduce demand and the need for expensive water supply projects, especially as climate change exasperates the issues.

Residential and commercial water use (referred to as Public Supply) is the largest water use in Alachua County, followed by agricultural use. Agriculture is the focus of a different chapter and is beyond the jurisdiction of local government. Public Supply water use is largely driven by landscape irrigation (Figures 1 and 2), hence a large focus of this chapter is on reducing landscape irrigation. According to 1000 Friends of Florida's Water 2070 Report, "The single most effective strategy to reduce water demand in Florida is to significantly reduce the amount of water used for landscape irrigation."



**Figure 9.1: Residential Water Use (St. Johns River Water Management District).**



**Figure 9.2: 2021 Average Daily Water Use by Year Built for Single-Family Detached Homes in Gainesville, Florida (UF IFAS Program for Resource Efficient Communities).**

The County's Vulnerability Assessment reveals concerning projections for water due to climate change. A small increase in average total annual precipitation is expected, accompanied by more heavy and extreme rainfall events and longer dry periods between storms. This can cause more variation in groundwater levels, long-term surface water levels and flow reductions, increased risk of flooding, and increased fertilizer use and irrigation/water demand. Increased runoff can lead to more pollutants entering our lakes, streams and rivers, which means decreased water quality.

One of these pollutants is fertilizer. Fertilizers containing nitrogen and/or phosphorus can degrade the quality of our waters, especially during heavy rains that push nutrients past the rootzone of plants and into groundwater. Fertilizer can also contribute to algae blooms (such as cyanobacteria) when it washes off our landscapes into ponds, lakes, creeks, and other surface waters. Because cyanobacteria thrive in warm, slow-moving water, Florida and Alachua County are especially susceptible to its impacts.

## Equity

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When looking at residential water use trends, most high-water users live in more affluent areas as the majority of older homes do not have permanent irrigation. In this regard, strategies to reduce water use (such as tiered water rates) typically do not harm low income and marginalized communities. However, some strategies, such as rebates and monetary incentives to encourage high-water users to reduce their use, are typically distributed to wealthier individuals, as these users are most likely to live in high-water use areas.

As part of the Alachua County Energy Efficiency Program (ACEEP), Alachua County is able to reach low-income households (households making 50% area median income or lower) with water-saving technology including:

- Updated efficient clothes washers
- Updated efficient water heaters
- Efficient WaterSense toilets
- Water-efficient faucet aerators and showerheads, as part of the Community Weatherization Coalition tune-up program

The Community Weatherization Coalition's tune-up alone has been shown to produce an average of 9% less water usage in participating homes.

## Baseline & Targets

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To measure our success, it is important to have meaningful metrics.

- 1) The State has adopted Minimum Flows and Levels (MFLs) for the Lower Santa Fe and Ichetucknee Rivers and Springs and for Lake Brooklyn and Geneva. These MFLs have associated prevention and recovery strategies that outline how and when the MFLs will be achieved. The state is developing revised MFLs for the Lower Santa Fe and Ichetucknee Rivers which are expected to be ratified by the legislature in 2026. The projects and regulatory strategies should be tracked to help monitor success, with an ultimate goal of meeting the MFLs within the prescribed timeframe.
- 2) Per capita water use is a common metric for measuring a community's collective water use. However, per capita water use largely depends on development patterns and residential types (for example, multi-family residential water use is typically much lower compared to single family residential) and ignores other uses included in public supply. To accommodate future growth and maintain healthy flows for rivers, springs and lakes, the per capita water use will need to decrease with the goal of maintaining or decreasing current Consumptive Use Permit (CUP) levels as population increases. Table 1.0 summarizes current CUPs issued for each municipality within Alachua County. As a measure of our success in decreasing water use, changes in CUPs should be tracked with a goal of not increasing allocations as populations increase.

Municipality/PW Suppliers	Consumptive Use Permit-CUP (mgd)	Issue Date	Expiration Date
City of Gainesville (GRU)	30	9/10/2014	9/10/2034
City of Alachua	1.7843	8/13/2024	8/14/2029
City of High Springs	1.1178	7/11/2023	7/11/2028
City of Newberry	0.89	3/22/2023	3/22/2028
GRU South Energy Center (backup)	0.341	3/25/2008	3/25/2028
City of Hawthorne	0.298	1/4/2006	12/12/2025
City of Archer	0.2567	4/28/2023	4/28/2043
City of Waldo	0.1723	7/21/2022	7/21/2042
Town of Micanopy	0.103	1/13/2021	1/13/2041

**Table 9.1. Consumptive Use Permits issued to Municipalities/Public Water Supply Providers in Alachua County.**

- 3) Landscape irrigation is currently one of the largest water uses in Alachua County. For dual metered household within GRU’s Service Area, landscape irrigation accounts for an average of 10,400 gal/month per home. In parts of Florida already experiencing severe water constraints, new developments are prohibited from using potable water for landscape irrigation. Landscape irrigation water use should be tracked to determine the success of decreasing this use, with a goal of reducing the current average in new developments by 50%.
  
- 4) Irrigation wells contribute to over pumping of the aquifer and lead to uncertainties in water use projections and monitoring. Because well metering has not been historically required, it is presently impossible to accurately report the current baseline for groundwater pumping from the region. Additionally, well registration efforts implemented by the St. Johns and Suwannee River Water Management Districts have resulted in an incomplete inventory of wells. To ensure accurate well pumping accounting is available in the future, Alachua County continues to advocate for changes to the well permitting rules to require all new wells to be metered, as well as requiring all CUP renewals to install meters on existing wells, if not currently equipped. To document progress, a map of all suspected irrigation wells in Alachua County should be created by 2026.

- 5) Protecting water quality requires a robust monitoring program. Currently, ACEPD monitors 21 groundwater wells semi-annually. A recent groundwater report, which included a spatial analysis determining the optimal groundwater network for Alachua County, recommended expanding the network to 45 groundwater monitoring wells. This expansion would more than double the size of the current network and would provide a more comprehensive baseline groundwater quality monitoring network.
  
- 6) Water quality data is shared with the State and is used to determine impaired water bodies in need of water quality improvements through the Total Maximum Daily Loads (TMDL) program. The State works with stakeholders to adopt a Basin Management Action Plan (BMAP) to outline how and when water quality improvements will be achieved. Alachua County is within the Silver, Santa Fe, and Orange Creek BMAPs and is responsible for a portion of the nutrient load reductions in each basin. Progress is reported annually.

## Past and Current Efforts

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EPD staff has learned that voluntary programs alone are not effective at creating needed changes, so we use a combination of regulatory, educational, and incentive programs to create lasting behavior change. Most of our regulatory efforts have been consolidated in the Water Quality Code as described in detail below. The Alachua County Comprehensive Plan addresses water supply and conservation through policies that relate to development patterns, residential density, expansion of and connection to potable water systems, aquifer protection and recharge, water conservation, water quality standards, and irrigation practices.

### Water Quality Code

The Alachua County Water Quality Code was adopted by the Board of County Commissioners in August of 2002. The code applies countywide and is enforced by Alachua County Environmental Protection Department. The code originally addressed:

- Only stormwater (with a few exceptions) can be discharged to surface waters, stormwater collection systems, and groundwater
- Best Management Practices must be used on construction sites to reduce [erosion and sedimentation](#)
- Cleanup or monitoring of pollutant discharges may be required
- Civil Citations (FINES) may be issued for violating the code

The Code was later expanded to address fertilizer pollution. Current provisions state that:

- fertilizers containing nitrogen must have a minimum of 50% of the nitrogen in a slow release format and may not be applied:
  - o during the seasonal ban of July through February
  - o when soils are saturated or before a heavy rain
  - o for the first 30 days after seeding or sodding (except when hydro-seeding for erosion control)
- Fertilizers containing phosphorus are prohibited unless a deficiency is verified by a soil or tissue test.
- The above standards do not apply to fruit trees and/or vegetable gardens.
- Fertilizers spilled on impervious surfaces must be removed immediately, and may not be blown or washed into storm water systems or water bodies.
- Fertilizers shall not be applied within a minimum of 10 feet from any waterbody unless a deflector shield is used (then a minimum of 3 feet is required).
- Grass clippings must be removed from impervious surfaces immediately.
- Fertilizer must be stored in areas protected from rainfall and stormwater runoff.

The Water Quality Code was further amended in 20xx to address landscape irrigation. While the County would like to implement even more protective irrigation restrictions, we are currently pre-empted by the water management districts and can only implement the restrictions as adopted by the state and illustrated in the following table.

Irrigate only on your day(s), and not between 10 am and 4 pm		
Location	Summer (2 <sup>nd</sup> Sun. In March – 1 <sup>st</sup> Sun. In Nov)	Winter (1 <sup>st</sup> Sun. In Nov – 2 <sup>nd</sup> Sun. In Mar)
Odd house #	Wednesday and/or Saturday	Saturday
Even house #	Thursday and/or Sunday	Sunday
Non-residential/Commercial	Tuesday and/or Friday	Tuesday

**Table 9.2: Irrigation Rules for Alachua County**

In 2015 the County adopted Landscape Irrigation Design Standards that were further strengthened in 2023. This Article of the Water Quality Code:

- Limits irrigation to 50% of the permeable area of lots and commercial sites.
- Limits irrigation to 0.25 acres for residential lots
- Requires soil moisture sensors or smart controllers
- Requires approval and fees prior to installation
- Requires inspections to ensure code compliance

## Incentive and Outreach Programs

Alachua County commits significant resources (staff and budget) to public education programming. We have a program largely funded through the Gainesville Clean Water Partnership (Florida Department of Transportation, City of Gainesville Public Works, and Alachua County Public Works) which brings educational programs to schools, camps, and public events. The Partnership also funds an illicit discharge detection and elimination program designed to identify and eliminate sources of water pollution.

We have various campaigns designed to change behaviors that increase water use and degrade water quality. Campaigns include various components depending on budget and need and include paid social media runs, billboards, newsletter articles, paid print media ads, radio, videos, bus wraps, car wraps, exhibits at events, and more. Examples of some of our current campaigns include:

- Keeping Grass Off the Streets
- Scoop it, Bag it, Trash it
- Only Rain Down the Drain
- FOGS Cause Clogs
- Fertilizer Free
- Watch the Weather Wait to Water
- Irrigation Systems Need Maintenance
- Winter Irrigation

We also have grant funded incentive programs to assist with more costly behavior changes. With financial assistance from the St. Johns River Water Management District (SJRWMD), we offered builders \$700 rebates for each new home that received Florida Water Star Certification. This program was only utilized by one builder. The irrigation standards in the Florida Water Star program were later largely codified into the Water Quality Code as described above.

The Turf SWAP (Save Water Add Plants) program was originally funded by the SJRWMD and then by the Suwannee River Water Management District (SRWMD) to provide 50% rebates to property owners that replaced thirsty landscapes with Florida-Friendly Landscaping (FFL), reduced irrigation, and replaced high-volume irrigation with low-volume. This program was successful in helping promote the FFL program and normalize shifts in landscaping away from traditional, turf-dominated yards. Water savings were increased when the program targeted high-water users.

With the conclusion of, and lessons learned from, the Turf SWAP program we recently launched an Irrigation Tune-Up program with financial support from the SRWMD. Through the Irrigation Level Up program, staff provides free irrigation tune-ups to residents coupled with 50% rebates for eligible property owners to address the issues identified by staff. The program also offers larger rebates for commercial property owners to upgrade their system and reduce the irrigated footprint.

Healthy soil is key to healthy landscapes. Through the SJRWMD and SRWMD we are currently offering rebates for soil amendments in new construction.



## Water Quality Monitoring Program

Protecting water quality requires a robust monitoring program. ACEPD has been monitoring water quality throughout Alachua County since the 1970's, providing a crucial baseline for environmental conditions. Currently, ACEPD, monitors 20 surface water streams and two lakes on a quarterly basis, and 21 groundwater wells semi-annually. Large lakes such as Lake Santa Fe and Newnans Lake are sampled semi-annually by the Water Management Districts with ACEPD conducting additional sampling once a year. Two of Alachua County's notable springs, Poe and Hornsby, are also sampled by the Water Management District, while ACEPD conducts quarterly monitoring of Boulware and Glen Springs, two 3<sup>rd</sup> magnitude springs within the City of Gainesville. Sampling efforts are constrained by budget and staff time. Grants are utilized to conduct special studies to further our understanding of pollution trends and sources.

## Partners

Alachua County collaborates with various partners to achieve our water protection goals. As mentioned above the Gainesville Clean Water Partnership is comprised of FDOT, the City of Gainesville, and Alachua County. The Partnership works to reduce stormwater pollution in the greater urban Gainesville area.

GRU, the largest utility in Alachua County, has been an essential partner in delivering getting water protection messages to its customers. GRU's water conservation program includes customer notifications through high water use letters, outreach efforts such as social media posts, and participation in community events like STEAM nights. GRU also utilizes a water use data and visualization tool (H2OSAV) that helps partners identify water use trends and assess program effectiveness.

GRU also has water quality protection programs and was a partner in creating the FOGS Cause Clogs outreach program designed to keep grease out of our plumbing systems and reduce sanitary sewer overflows. GRU also created the "Unflushables" program, which turns commonly flushed items into characters to educate customers, especially children, about what not to flush and why.

GRU operates a significant amount of infrastructure which includes water and wastewater treatment facilities, pumping systems and over 2,000 miles of piping in order to provide potable water and wastewater service to its customers. GRU continues to invest in maintaining and replacing infrastructure to maintain and improve reliability and resiliency. GRU currently invests approximately \$50 to \$70 million per year in replacing aging water and wastewater infrastructure. The increase in extreme weather events with climate change makes this on-going investment even more critical.

Most of the water GRU pumps from the Floridan Aquifer and sends to its customers comes back to GRU as wastewater. In order to minimize our community's water footprint it is important that this water be treated or "reclaimed" and beneficially reused. Reclaimed water is used for aquifer recharge, environmental restoration, and irrigation. Sweetwater Wetlands Park receives flow from Sweetwater Branch which includes reclaimed water and stormwater. The park further reduces nutrients in that water and discharges to Paynes Prairie thus helping to hydrate wetlands and restore the natural flow balance to the prairie. The park also removes sediment and trash and provides wildlife habitat and a public park. Use of reclaimed water for aquifer recharge is critical in reducing

the impacts of groundwater pumping in the region. Reclaimed is recharged to the Floridan aquifer via recharge wells and groundwater recharge wetlands. GRU is constructing the Southwest Nature Park which will include a groundwater recharge wetland with nature trails and public use facilities. The project will achieve aquifer recharge with high quality, low nutrient water and provide wildlife habitat and public recreation.

UF IFAS Extension is a wonderful resource for providing educational materials and training to the public and to our landscaping industry.

### **Other Existing Opportunities and Next Steps**

- North Florida Regional Water Supply Plan
- Gainesville/Alachua County Facilities Plan update due 2025
- Lower Santa Fe and Ichetucknee Minimum Flows and Levels (MFLs) Prevention and Recovery Plan expected to be adopted by 2026
- Alachua County Landscaping Code updates 2024
- Comprehensive Plan Evaluation and Appraisal 2025
- Implement infrastructure improvements identified in Alachua County Vulnerability assessment and City of Gainesville mitigation plan

## **What Can You Do?**

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### **Volunteer**

Every member of the community plays an important role in protecting our water, especially amid a changing climate. Each person can take action to reduce their water use and personal pollution. Collectively, we can make great strides in protecting our water resources. For more ways to get involved, volunteer with us at [www.Volunteer.AlachuaCounty.us](http://www.Volunteer.AlachuaCounty.us)

### **Minimize Landscape Irrigation**

One of the most direct ways to alleviate pressure on our groundwater supply is by physically reducing the amount of landscape irrigation on your property and limiting its use. Approximately 60% of residential water use goes to watering lawns. Therefore, one of the most direct ways to alleviate pressure on our groundwater supply is by limiting the amount of landscape irrigation. To eliminate the need for irrigation, replace turfgrass lawn with drought-tolerant native plants. Hardy native plants can typically thrive on rainfall alone, reducing the need for landscape irrigation. Furthermore, native plants provide habitat for pollinators and other wildlife. Learn more about native plants and landscaping for water conservation on the Florida Friendly Landscaping website and the Florida Springs Institute Website.

The greatest long-term water conservation impact is achieved by capping or removing irrigation on established landscapes. Slowly adjusting run times and turning off zones that no longer need irrigation is also an option. Irrigation restrictions (days of the week) are the maximum amount of irrigation allowed on a property and allow watering that far exceeds even the thirstiest plants need, so we recommend turning the system off and only operating it manually as needed.

Rainfall shut off devices are required by law and should be checked regularly for correct operation and replaced every couple of years to prevent water waste by eliminating irrigation after sufficient rainfall. To further reduce wasteful watering during rain events, property owners should consider installing Smart Evapotranspiration Irrigation Controllers (look for the WaterSense label) or Soil Moisture Sensors. These water saving technologies are required for systems installed after 10/1/2019.

Property owners with a permanent irrigation system and an average monthly water use exceeding 10,000 gal/month can request a free irrigation tune-up from the County's Water Conservation Team. Eligible customers can also take advantage of rebate funds, when available, to help cover some of the costs incurred to remove irrigation or upgrade to more efficient components.

Saving water indoors is a simple yet important way to conserve one of our most precious resources. By making small changes to daily routines, residents can save water while lowering utility bills. From the kitchen to the laundry room, every drop saved adds up for the health of our shared water resources.

- Fix leaky faucets, showers, and toilets. A leaky toilet can waste up to 200 gallons of water per day and \$2,000 per year.
- Install low-flow shower heads (2.0 gallon/minute) and faucet aerators (0.5 gallon/minute in bathrooms & 1.5 gallon/minute in kitchens).
- Dishwashers can use less water than hand-washing, but only run your dishwasher when fully loaded.
- Set your washing machine for the correct load size.
- If possible, upgrade to a high-efficiency washing machine, which can save over 3,000 gallons of water per year.
- Take shorter showers (aim for 5 minutes or less).
- Shut the water off when brushing your teeth or shaving.

### **Reduce Your Personal Pollution**

Fertilizer reduces water quality when it is carried into surface water by stormwater runoff or into our groundwater through leaching. When nitrogen from fertilizer is washed into surface water, it harms local wildlife and contributes to algae outbreaks. If this pollution leaches into our groundwater and goes untreated, it can lead to birth defects and other human health concerns.

Since 2018, the share of Alachua County residents who say they do not use fertilizer increased from 55% to 68%. You can skip the fertilizer, and your yard can still look great. Join the 68%

today by signing the pledge to eliminate the use of fertilizer in your yard and receive a Fertilizer Free bumper sticker.

In most home landscapes, many species of beneficial plants and native wildflowers are intermixed with turf. However, these plants are often framed as “weeds” by landscaping companies. Homeowners may thus be persuaded to have them treated with chemical herbicides that pollute our water resources when they enter stormwater runoff. Residents can prevent water pollution by skipping the herbicides and embracing wildflowers and weeds. In addition to adding interest and beauty to our landscapes, wildflowers and native weeds thrive without extra water or fertilizer. They also serve as a critical food source for birds, bees, and other pollinators.

To help residents discover the hidden beauty of “weeds” in their yards, Alachua County launched a new initiative on iNaturalist (an app), a global database where anyone can document their observations of the natural world using their phones.

Alachua County has a “Pooper Scooper” ordinance (Alachua County Code 72-13) that requires pet owners to clean up pet waste. When not picked up and left on the grass or in the street, pet waste washes into storm drains and pollutes our surface waters. The waste decays within our waterways, using up oxygen and releasing ammonia. Low oxygen levels and ammonia combined with warm temperatures can kill fish. Pet waste also contains nutrients that contribute to algae outbreaks, which harm wildlife and make our water unsuitable for swimming, boating, and fishing. Furthermore, pet waste carries diseases such as *E. coli* that make water unsafe and disproportionately impact children and immunocompromised individuals. To protect our water and community health, scoop it, bag it, and trash it!

In Alachua County, many storm drains lead to our waterways with no filter. This means that pollution on land travels into these storm drains when it rains and eventually flows into our creeks, lakes, and other natural areas. Residents can help the Environmental Protection Department ensure that there is “only rain down the drain” by reporting illegal discharges to the Clean Creeks Hotline: (352) 264-6800. Illegal discharges include:

- Cleaners and solvents
- Wash water from cars, mops, and carpet cleaning
- Landscaping debris and chemicals
- Oil and grease
- Paints
- Swimming pool discharge
- Construction dirt and debris
- Litter
- Wastewater (sewage)