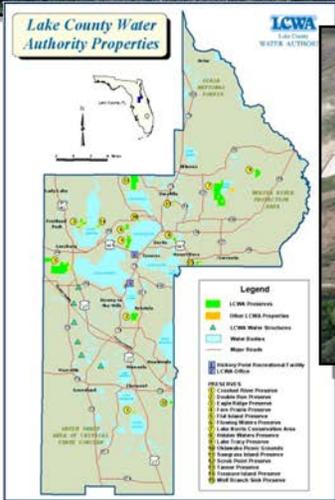




Lake County
WATER AUTHORITY



*2018 Annual Report
and
2018-2023 Five-Year Plan*

*Lake County Water Authority
Board of Trustees
2018*



*Doug Bryant
District Four
Chairman*



*Amy Stone
District Five
Vice Chairman*



*Neil Kelly
Clerk of Courts &
Secretary-Treasurer*



*Peggy Cox
District One*



*District Two
Vacant*



*Diana Mullins
District Three*



*Adam Dufresne
Member At-Large*



*Keith Farner
Member At-Large*

Executive Summary

The legislature amended Chapter 29222, Florida Statutes, in 2000 and altered the structure of the Lake County Water Authority. Two of the most prominent requirements were to prepare a Five-Year Plan and submit an annual report to the legislature. The intent is for the Water Authority to provide the legislature and the public with an understanding of the goals, objectives and direction it will be taking during the five-year planning window. In accordance with Chapter 2005-314, Laws of Florida, this document incorporates an annual report that describes the progress made by the Lake County Water Authority during the period January 1 to December 31, 2018 (including background information as necessary for clarity and continuity) and includes the Five-Year Plan reflecting a planning period from FY 2018-19 to 2022-23.

The Lake County Water Authority has organized its operation around six major work areas: Water Resources, Land Resources, Field Resources, Hickory Point Recreational Facility, Resource Communication, and Resource Data. The Water Authority continues to take a proactive approach in the protection of Lake County's water resources. It keeps the local media and public informed of the many agency activities regarding water quality improvements, water reuse projects, water conservation programs and land management activities.

During 2018, the Water Authority Board of Trustees continued to place its emphasis on implementing projects that will make physical improvements to the degraded water quality of the area lakes. Water quality improvement projects include, but are not limited to:

- Operating a nutrient reduction facility (NuRF) on the Apopka-Beauclair Canal;
- Implementing cooperative stormwater retrofit projects;

The Water Authority has worked to maintain and/or improve navigability between the lakes in both the Clermont and Harris chain of lakes. Emphasis was also placed on protecting and maintaining existing water quality in lakes with desirable characteristics.

Average rainfall during 2018 was 55.21 inches or 109% of expected annual rainfall. although annual rainfall was over the historic average of 50.49 inches, the LCWA was successful in maintaining water levels in the Palatka River within the regulatory range.

In 2018, high average water discharges continued from all the lakes in the Harris Chain of Lakes. At the start of the year, during January and February, flood discharges were released from the lakes. This was followed by high releases throughout the rainy season (June through September). Even though rainfall was above average again, the lakes were maintained within their regulatory ranges all year.

The management of Lake County's water resources requires an informed citizenry and the cooperation of multiple government agencies. The Lake County Water Resource Atlas is an internet-based information collection and dissemination system that employs a Geographic Information Systems (GIS) to make Lake County water resource data available to a maximum number of people in an efficient and cost-effective manner. The Water Resource Atlas is a cooperative program between Lake County and the Water Authority and is being hosted and maintained by the University of South Florida. The Water Resource Atlas will be a primary tool for assisting citizens, scientists, and government leaders to manage the County's water resources.

- Controlling and conserving the freshwater resources of Lake County;
- Fostering and improving the tourist business in the county by improvements to streams, lakes, and canals in the county;
- Providing recreational facilities for tourists and citizens and taxpayers of the county by a more efficient use of the streams, lakes, and canals in the county;
- Improving the fish and aquatic wildlife of the county by improving the streams, lakes, and canals in the county; and
- Protecting the freshwater resources of Lake County through assisting local governments in treating of stormwater runoff by conserving fresh water to improve the streams, lakes, and canals in the county.

In the 2017 legislative session, the legislature amended the purposes and the duties. In brief, the purposes were revised by deleting obsolete language; removing power of the governing board and the authority to acquire land through eminent domain or condemnation; removing power of the board relating to certain state lands; providing for the county or a municipality to acquire private property through eminent domain under certain circumstances; providing powers of the board relating to navigation and blockage of certain waterways in the county; prohibiting the board from expending public funds to promote recreation and tourism; providing powers of and restrictions on the authority and board relating to parks; and requiring certain documents to be published on the authority's website.

The following are the revised purposes as amended in 2017:

- Controlling and conserving the freshwater resources of Lake County;
- Fostering improvements to streams, lakes, and canals in the county;
- Improving the fish and aquatic wildlife of the county by improving the streams, lakes, and canals in the county; and
- Protecting the freshwater resources of Lake County through assisting local governments in treating of stormwater runoff.

The Board of Trustees was first elected in November 2000 and included: Larry Everly, Sr., Joe Hill, Jim Modica, Gene Molnar, Susan Ryan, Dr. Robert Taylor and Ann Wettstein-Griffin. In 2002 Dr. Robert W. Taylor - Board Member at large was re-elected and Nancy H. Fullerton - District 2 and Stan Bainter - District 4 were elected. In the November 2004 election, Chairman Larry Everly, Sr. - District 3 and Board Member Ann Wettstein-Griffin - District 1 were re-elected and Everett Kelly - District 5 and Sean Parks - Member at large were elected. In 2005 the Legislative Delegation desired that the Water Authority Board become a partisan office. A voter referendum in 2006 resulted in changing the Board from a nonpartisan to a partisan elected body. In the 2006 elections, Board Member Nancy Fullerton - District 2 was re-elected and Keith Farner - Member at large and Larry Everly Jr. - District 4 were elected. The election in November 2008 resulted in four new members to the Board. Ms. Linda Bystrak was elected to District 5 and Mr. Charles Clark was elected to District 1, Ms. Carolyn Maimone was elected to District 3, and Mr. John Harris was elected as a Member at large. The election in November 2010 resulted in two members; Keith Farner - Member

at large and Larry Everly Jr. - District 4 being re-elected to the Board and Kelly Pitcher elected from District 2. The election in November 2012 resulted in two members; Carolyn Maimone from District 3 and John Harris - Member at Large being re-elected to the Board. Due to re-districting, Charles Clark (previously in District 1) was elected from District 5 and Peggy Cox was elected from District 1. Keith Farner - Member at Large resigned in mid-term to run for another elected position. Adam Dufresne was elected as Member at Large to fill the remaining term. There were no elections in 2013. In the 2014 election, Adam Dufresne was elected as a Member at Large, Doug Bryant was elected from District 4 and Samuel R. Oppelaar, Jr. was elected from District 2. There were no elections in 2015, however Mr. Oppelaar resigned his seat in November 2015 and was moving out of the area. The seat remained vacant through the end of 2016. In the 2016 election, Peggy Cox was re-elected from District 1, Diana Mullins was elected from District 3 and Amy Stone was elected from District 5 and Keith Farner was elected as Member at Large. The District 2 seat was not contested and remained vacant. There were no elections in 2017, however Ms. Mullins resigned her seat in December 2017. In the 2018 election, Trampus Bonjourn was elected from District 2, Carolyn Maimone was elected to serve out the remainder of Diana Mullins' term in District 3, Robert "Butch" Hendricks was elected from District 4 and Courtney Stokes was elected as Member at Large.

The Board is focusing on projects and management actions that lead to improvements to the water resources and natural systems in Lake County. The Board has promoted cooperation between agencies and governments as the preferred approach to addressing the issues. The Water Authority is neither a regulatory agency nor a water utility and has no power to issue permits or enforce regulations. The Water Authority does, however, work closely with and make recommendations to other agencies, which deal with regulatory and enforcement issues, including Lake County, the Lake County Sheriff's Office, the water management districts, and state offices such as the Florida Fish and Wildlife Conservation Commission and the Florida Department of Environmental Protection.

When the legislature amended Chapter 29222, Florida Statutes in 2000 and altered the structure of the Lake County Water Authority, two of the most prominent requirements were to prepare a Five-Year Plan and submit an annual report to the legislature. The intent is for the agency to provide the legislature and the public with an understanding of the goals, objectives and direction the agency will be taking during the five-year planning window. In accordance with Chapter 2005-314, Laws of Florida, the following sections describe the progress made by the Lake County Water Authority during the period January 1 to December 31, 2018 (including background information as necessary for clarity and continuity) and includes the Five-Year Plan reflecting a planning period from FY 2018-19 to 2022-23.

Water Resources

The Water Authority Board of Trustees continues to place an emphasis on implementing projects that will make physical improvements to the degraded water quality of the area lakes, particularly the Harris Chain of Lakes. Water quality improvement projects include, but are not limited to:

- operating a nutrient reduction facility on the Apopka Beauclair Canal;
- developing nutrient budgets and water quality recommendations for Trout Lake and Lake Yale; and
- implementing cooperative stormwater retrofit projects;
- design, permitting, and construction of modifications to the M-5, M-6, and Villa City dams on the Palatlahaha;
- evaluating nutrient loads to the Apopka Beauclair Canal from ditches downstream of the nutrient reduction facility;
- Eliminating pollutant discharges from the Lake Denham Muck Farm;

The Water Authority has worked to maintain and/or improve navigability between the lakes in both the Clermont and Harris chain of lakes. Emphasis was also placed on protecting and maintaining lakes that presently exhibit good water quality

The LCWA is continuing to monitor the ongoing changes to water levels in South Lake County and its Clermont Chain of Lakes. Last year's above average rainfall, provided above average flows from the Green Swamp. This increase in flow and rainfall allowed water levels within the chain to remain above the minimum regulatory levels. The chain has been maintained above the minimum regulatory levels for the past four years. Previously, the extended drought kept water levels below regulatory levels for approximately 10 years and to maintain these higher levels for the past four years was a dramatic improvement for the residents and ecosystem.

Restoration and Improvements to Water Resources

The Water Authority has been working to implement projects that make improvements to water quality and natural systems. The following are brief descriptions of the major efforts:

Cooperative Stormwater Initiative – The Board has placed emphasis on working with local governments to implement stormwater treatment projects. Since 1996, the Board has offered grants to local governments for stormwater retrofit projects that will reduce the load of pollutants that currently flows to our lakes, streams, and wetlands. There has been a total of fifty-eight stormwater projects completed under this initiative. Using the Lake County Water Authority's \$7.5 million as project seed money, local agencies could complete \$25.6 million in projects.



There are three stormwater projects that were approved in 2018 or earlier and have completed construction. These projects include:

<i>Project Name</i>	<i>Cooperator</i>	<i>Water Authority Contribution</i>
Downtown Stormwater Improvements	Tavares	\$ 639,330
Lk Umatilla Sediment Box	Umatilla	\$ 150,000
West Lake Wetlands and Pond Facility	Clermont	\$ 643,030
	Total:	\$ 1,432,360

Palatlakaha River Dam Modifications – Historically agency staff has determined the timing and volume of water released from the 6 dams on the Palatlakaha. Although staff utilizes a manual that provides guidelines on how and when the structures are opened, the public has often criticized the timing and the volume of the water releases. In particular, citizens have expressed a desire for a flow regime that is more natural and rainfall/water level dependent. In addition, the existing structures require staff to work under hazardous weather and site conditions in order to operate and maintain the dams.

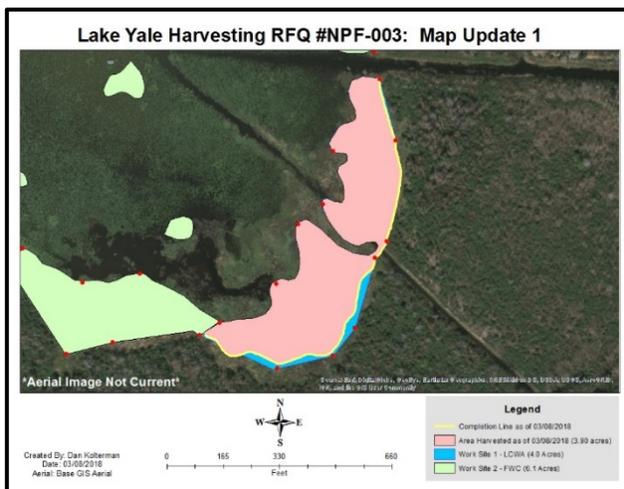
To address these conditions, the Water Authority has initiated a program to modify the dams to inoperable structures. These modifications would also change discharges so that they are directly related to water levels. As water levels increase, flows also increase.

The first four structures, M-1, M-4, M-5, and M-6 have been designed, permitted, and constructed. The next structure, Villa City, is currently under design.



Public Waterway Dredging - The Water Authority has historically responded to concerns from the public about navigable access to the lakes and in particular, maintaining the access between public lakes in the Harris and the Clermont Chains of Lakes. In 2018, the waterways were inspected and determined that no dredging was currently necessary.

The Board has implemented a maintenance program that provides for the removal of navigational hazards (such as fallen trees) from public waterways including the Apopka-Beauclair Canal, the Dora Canal, Haines Creek, Trout Lake Canal, Helena Run, the Winona Canal, and the Montevista Canal, and the other public accessible and navigable portions of the Palatka River. The Water Authority may also act to remove sediment, tussocks, and debris from waterways that impede boat movement through these public waterways.



In 2018, the agency responded and removed numerous obstructions to navigation in public waterways throughout the county. A clear majority of the obstructions removed last year were the result of floating tussocks in Lake Yale. The Lake County Water Authority worked cooperatively with the Florida Fish and Wildlife Commission to remove approximately 10 acres of floating tussocks that were regularly blocking the Lake Yale Marsh Park Public Boat Ramp.

Apopka-Beauclair Canal Nutrient Reduction Facility - The LCWA's Nutrient Reduction Facility (NuRF) became operational in March 2009 and is currently the world's largest alum-based surface water restoration facility. The St. Johns River Water Management District provides the land on which the facility was built and the LCWA received \$3,700,000 in cooperative funds from the Florida Department of Environmental Protection (FDEP) to construct the facility.

The scale of the facility and cooperative management with the St. Johns River Water Management District make it possible to treat nearly all of the discharge from Lake Apopka allowing significantly cleaner water to flow north into the Harris Chain of Lakes.

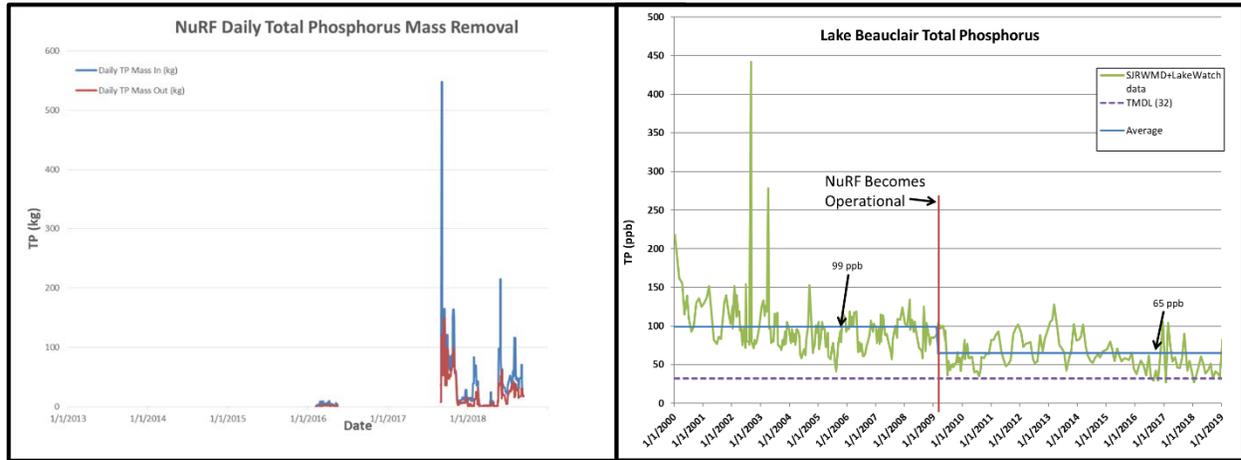
Lake Apopka water quality has improved in recent years but, left untreated, still presents the largest source of phosphorus pollution to the Harris Chain of Lakes. Phosphorus is the limiting nutrient contributing to persistent algal blooms in Lake Apopka and throughout the Harris Chain of Lakes. Average Lake Apopka total phosphorus concentration remains higher than the Total Maximum Daily Load (TMDL) goal established by the FDEP. A TMDL is the maximum amount of a given pollutant that a waterbody can assimilate and still maintain its designated uses. It is important to point out that Lake Beauclair's TMDL is nearly half that of Lake Apopka. Therefore, even if Lake Apopka were to reach its TMDL goals, additional treatment would be required to achieve the Lake Beauclair TMDL.

Performance results conducted when the NuRF operated were as expected and average removal rate for total phosphorus was sixty percent. This past year's above average rainfall on the heels of the previous year's Hurricane Irma, has tested the facilities ability to handle prolonged periods of extremely high flow. Because of the high volume passing through the facility, staff has operated the equipment at maximum capacity 24-hours a day and 7-days a week for extended periods. Though the end of 2018, the NuRF had removed 26,700 pounds of total phosphorus and injected 12 million gallons of alum. Alum cost for the NuRF since opening on February 2009 has

NuRF Site, October 4, 2007, pre-construction



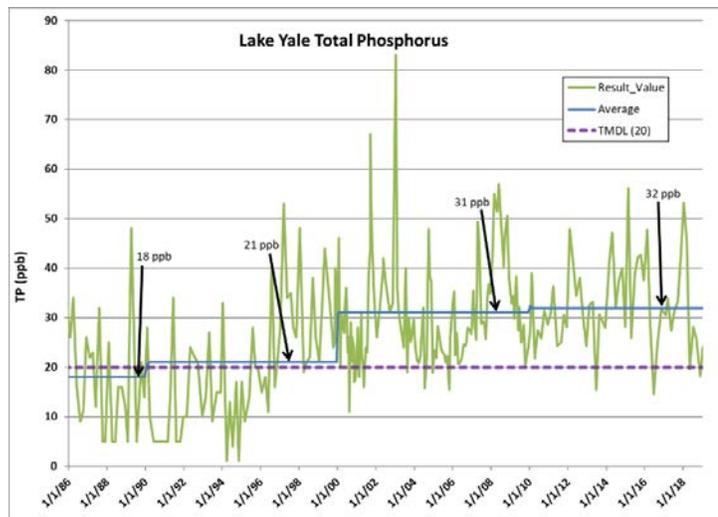
been approximately \$6 million. Water quality data from Lake Beauclair indicates a 35% reduction in total phosphorus since the construction of the NuRF.



Lake Yale Water Quality Improvement Project – Lake Yale is a 4,044-acre lake that is part of the Harris Chain. The lake drains through an unnavigable canal to Lake Griffin. Lake Yale used to have the best water quality in the Harris Chain. However, as the lake became more infested with the exotic plant hydrilla, managers began stocking the lake with grass carp as a biological control. The numbers of stocked grass carp were continually increased without obtaining sufficient control of the exotic plant. When the State herbicided the lake in the early 90's, the hydrilla was dramatically reduced and the grass carp were forced to feed on the remaining submerged plants. The complete loss of submerged plants along with the release of nutrients as the plants decayed resulted in elevated nutrients and continual algal blooms.



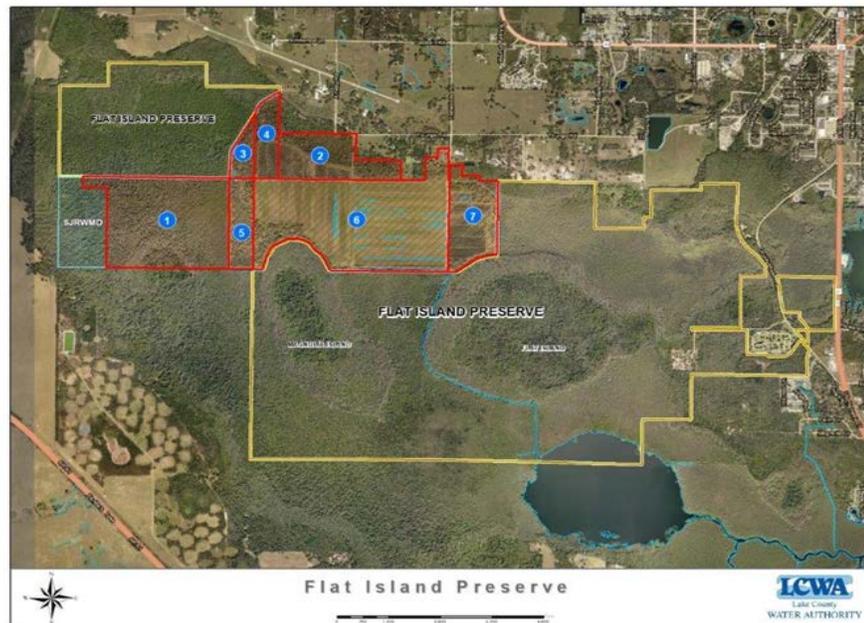
These elevated nutrients have caused the lake to degrade and are resulting in its inability to meet the TMDL. To address these concerns, the Lake County Water Authority developed a detailed



nutrient budget for the lake. The Authority also provided a list of recommended projects for consideration. The top recommended project was a whole-lake alum treatment to strip nutrients from the water column and bind nutrients that were resuspendable in the sediments. The clear water that would result from the treatment would additionally allow the regrowth of submerged vegetation, allowing the plants to continue removing nutrients from the water column. The cost of the project is estimated at slightly over \$4 million. In 2018, the Board was able to budget half the necessary funds to complete the project with the intention of adding additional funds in future years, if available.

Lake Denham Muck Farm Purchase – Lake Denham is a 252-acre waterbody connected to the west end of Lake Harris via Helena Run. The lake has a 6,641 acre watershed that is composed primarily of wetlands (50%), agriculture (20%), and urban development (7%). It has also been identified by the Florida Department of Environmental Protection (FDEP) as a waterbody that does not meet the Numeric Nutrient Criteria and is not projected to meet the Total Maximum Daily Load (TMDL) requirements unless nutrient reduction projects are implemented. The FDEP report sets a goal for the Total Phosphorus concentrations in the lake at 50 ppb. For the modeling period of 2000-2012, the measured average Total Phosphorus was 95 ppb.

The largest controllable source of nutrients to Lake Denham by a large margin is the Muck Farm with 1,101 lbs of TP/year or 66.9% of the controllable lake load. If this source alone is eliminated, it is projected that the loading to the lake would be reduced more than enough to meet the TMDL requirements. If this extremely large load is not eliminated, then it is extremely unlikely that the lake will ever meet the load reductions necessary to reach the water quality goals.



The Lake Denham Muck Farm is located just north of the LCWA owned Flat Island Preserve. It is composed of 7 parcels and covers a total area of 767.59± acres. Approximately, 450± acres are confined within the levees of the muck farm and 12± acres would be considered uplands. The remaining 306± acres remains as a natural forested wetland.

With the assistance of the St Johns River Water Management District (SJRWMD), appraisals and an appraisal review has been completed. Upon completion of the appraisals, the Board elected to extend an offer to the owners of \$1.6 million. After careful consideration, the owners agreed to accept our offer rather than selling to the other interested parties who would have put the farm back into production. The Board has approved a Phase I and II Environmental Assessment for the site.

Biological Lake Assessments – In 2004, the LCWA began assessing the condition of lakes around the county using benthic macroinvertebrates.

This assessment tool, based on the presence or absence of benthic macroinvertebrates, was developed by the Florida Department of Environmental Protection to indicate 'health' and identify impairment in Florida lakes. Benthic macroinvertebrates include snails, worms, crayfish and larval (or young) dragonflies, midges, beetles and many other organisms that live in and on the bottom of the lakes.



This information provides quantifiable evidence of any changes in the benthic community associated with restoration efforts. These Biological Assessments are available on the LCWA website and are updated as new benthic data is collected.

In 2018, the LCWA completed the thirteenth year of assessments on Lakes Beauclair, Griffin, Eustis, and Yale.

Waterway Sign Inventory and Maintenance – As part of the Water Authority's mission "to improve the streams, lakes, and canals in the county for the tourists, citizens and taxpayers", the Water Authority permits, installs, and maintains navigational waterway markers, such as speed zones and lighted navigational aids.

After completing the sign replacement project in the Clermont Chain in 2003, the Authority initiated a waterway sign maintenance program in 2004 for the Harris Chain. The project involved a GIS database that specified locations and characteristics of each sign within the Harris Chain. All identified signs were permitted as necessary and were replaced as needed to adhere to the Uniform Waterway Marker standards set by the Florida Fish and Wildlife Conservation Commission (FWC).

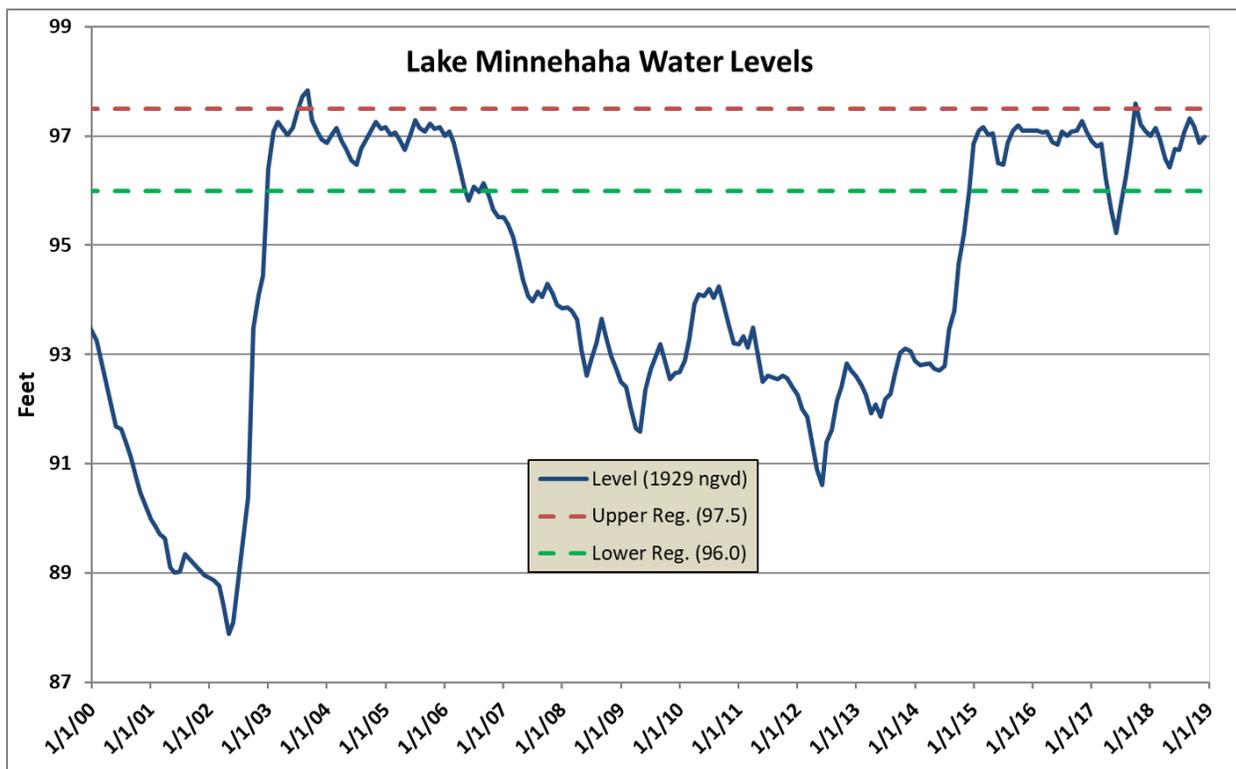
The Authority currently maintains a comprehensive database of over 130 waterway signs and is in the process of identifying and replacing additional signs as necessary. This past year, we also received several requests by local residents on canals for new speed zones and permitted and installed new signs at the entrances of these canals.

Adopt a Lake Program – The Lake County Water Authority participates and funds the local Adopt a Lake Program. This County program trains volunteers to collect water samples and gather water quality data on the lakes. Data collected is placed on the Lake Atlas Website where it is available to all.

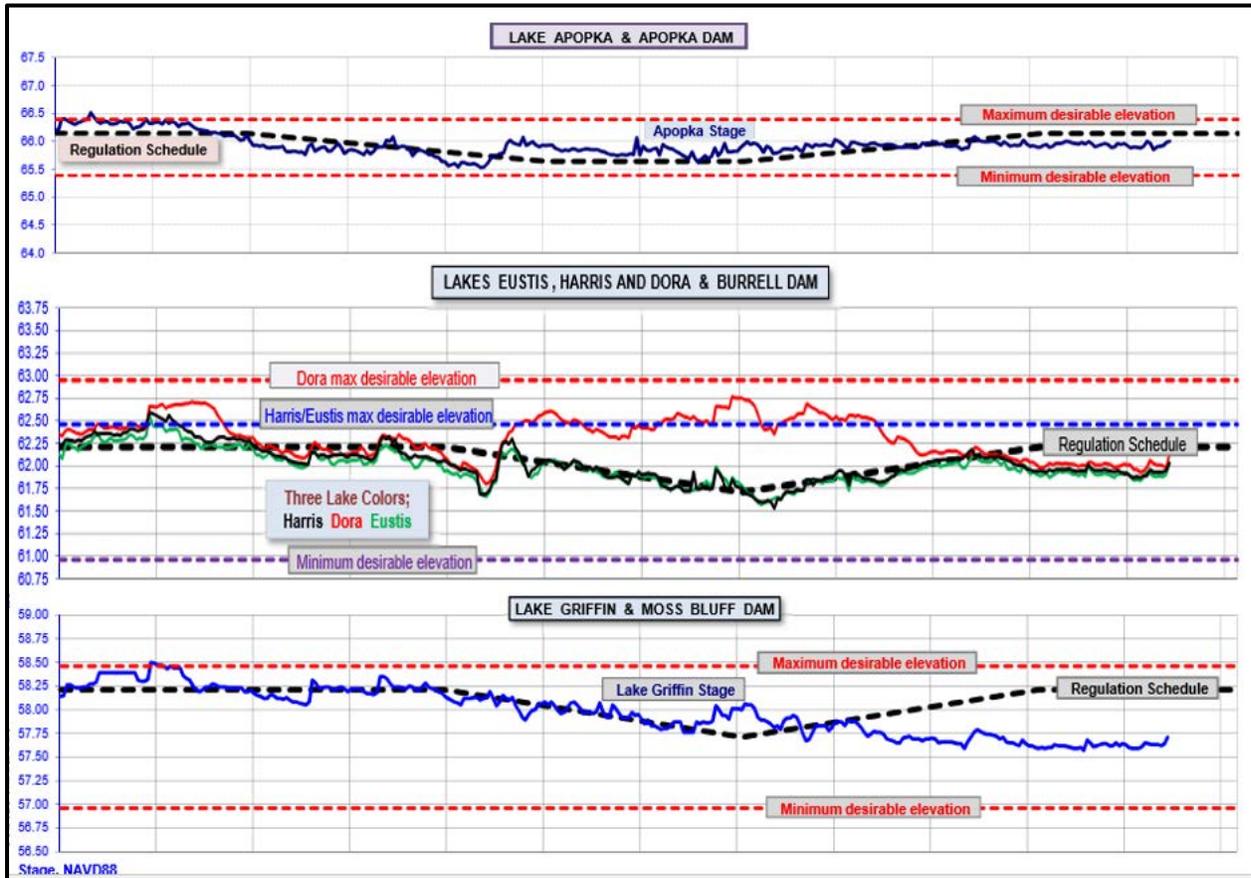
At the request of the Florida LAKEWATCH Program, the Board historically provided funding to cover the Lake County operating expenses. However, to significantly reduce cost, the Water Authority has agreed to fund the much less expensive Adopt a Lake Program. The Lake County Water Quality Lab manages the program and will perform the same services at less than half the cost. Since changing funding to the Adopt a Lake Program in 2010, the Lake County Water Authority has saved the taxpayers of Lake County over \$800,000.

Water Level Management of the Harris Chain of Lakes and the Palatka River - Lake levels on the Harris Chain of Lakes and water levels on the Palatka River are both related to rainfall. To remain abreast of the rainfall situation, the Water Authority has an ongoing program that includes six automated rainfall measurement gauges located throughout the county. This program provides information for tracking rainfall trends on a countywide basis and alerts the Water Authority to increasing or decreasing water levels.

Average rainfall during 2018 was 55.21 inches or 109% of expected annual rainfall. although annual rainfall was over the historic average of 50.49 inches, the LCWA was successful in maintaining water levels in the Palatka River within the regulatory range.



Water Levels in the Harris Chain of Lakes – In 2018, high average water discharges continued from all the lakes. At the start of the year, during January and February, flood discharges were released from the lakes. This was followed by high releases throughout the rainy season (June through September). Even though rainfall was above average again, the lakes were maintained within their regulatory ranges all year.



Land Resources

The Water Authority's land resources program conserves and protects unique and irreplaceable land and water resources in the county, and since 1990 the program has made these conservation lands available for compatible recreational uses such as hiking, primitive camping, paddling, birdwatching, picnicking, horseback riding, geocaching and fishing. While the Water Authority's Board of Trustees primarily focus is on projects which benefit the quality of our lakes, the Board continues responsible management and restoration of the agency's 6,600 acres of public lands.

The Water Authority is managing lands that are environmentally sensitive for water resources. Many of the agency's current holdings were initially identified in 1972 for protection by a citizens committee appointed by the Board of County Commissioners. In 1982, local residents approached the Water Authority Board requesting consideration of an acquisition program to protect water sensitive land resources found throughout the county. A citizen's committee was formed to vet the resources and make annual recommendations to the Water Authority Board. Since 1989 the agency has protected over 6,600 acres classified as having a connection to water resources, including lands with shorelines, marshes and swamps, seasonal wetlands, wet prairies, sinkholes, and high aquifer recharge areas. Long-term protection of these environmentally sensitive lands will also protect the County's water resources.

Examples of this significant water connection includes: Wolf Branch Sink Preserve, which protects high aquifer recharge soils, a seasonal waterfall, one active, and four collapsed sinkholes; Hidden Waters Preserve protects aquifer recharge soils, a steephead ravine and a sinkhole lake. The Sawgrass Island Preserve's 485-acre marsh provides aquifer recharge soils, an influx of freshwater to Lake Yale while Flat Island Preserve's 1,800± acre hardwood swamp benefits the Withlacoochee and the Ocklawaha Rivers. Additionally, Eagles Ridge Preserve, Fern Prairie Preserve, Crooked River Preserve, and Scrub Point Preserve protect aquifer recharge soils and shoreline habitats for fish, alligators, and wading birds.



Land Management

Land management activities performed throughout the year include mowing, trimming and repairing trails, maintaining fences, fire lines and trails, implementing prescribed fire and restoration programs, controlling invasive exotic plants and animals, and enhancing public recreation opportunities.

The Water Authority currently has 26 properties with 19 of them open to the public for various recreational activities on land and on the water.

The following properties are traditional preserves with parking areas, kiosks and trails. They are open to the public seven days a week, from sunrise to sunset.

Bourlay Historic Nature Park - Donated to the Water Authority in 1999 by Arthur “Buddy” Bourlay III, a long-time resident of Leesburg, the 83-acre Park is on the southwest shore of Lake Griffin. This small oasis within the city limits is home to the original Bourlay home and pole barn, as well as additional visitor amenities such as restroom, informational kiosk, exercise stations, amphitheater, chickee, benches and picnic tables. Due to the extensive damage to the Cracker House from Hurricane Irma, staff spent many hours throughout 2018 repairing the roof walls ceiling and porch and refurbishing the interior of the building.



Crooked River Preserve - Many local residents and visitors have enjoyed this 64-acre Preserve. Located on the northern shores of Lake Louisa, on Crooked River (a.k.a Palatlakaha River), this beautiful Preserve encourages visitors to fish, hike, birdwatch and paddle the river as part of the Clermont Chain-of-Lakes. The property continues to be managed for the benefit of listed plant and wildlife species and for the property's aquifer recharge value. The Water Authority partnered with Bok Towers to plant a population of the federally endangered Clasping Warea plant at the Preserve in 2014 and continue to survey the population in 2015, 2016 and 2017 and continues to control the exotic, invasive plants in the uplands and along the shoreline.

In March, free rescued plants from a property undergoing development were planted at the preserve near the orange trail and East fence line. The plants were watered and monitored during the establishment period.



In November, staff scraped and repainted the floors in the restrooms.

Flat Island Preserve - The 2,317-acre property nestled in the Okahumpka Marsh of western Lake County, safeguards an impressive and relatively undisturbed natural area consisting of a vast network of hardwood swamp, upland hardwood hammocks and a wildflower meadow. This large wetland delineates the hydrologic divide between the Ocklawaha River Basin and the Withlacoochee River Basin. The Preserve is relatively low maintenance, but does need control of invasive, exotic vegetation (e.g., coral ardisia, natal grass, Guinea grass) and removal of feral hogs that can damage the uplands and wetlands. In August, more rescued plants were planted in the wildflower meadow.



Hidden Waters Preserve - Purchased in 1996 this Preserve protects a sinkhole lake and steephead ravine that was once used as a local landfill, party spot and golf course. This 90-acre Preserve provides residents and visitors a unique experience. In 2000, this Preserve was the first public property in the County to be selected for the Great Florida Birding and Wildlife Trail. The topography and an elevation difference of more than 100 feet from the start of the hiking trail down into the sinkhole lake area are unique for this county. After the Disc Golf course was removed last year the old course trails were abandoned; however, some of the hikers like the additional trails. As a compromise and with feedback from the public, two of the trails were kept, (one on the east side and one on the west side), that provide a less steep hike from the lake bottom to the outer edge of the property. It was pointed out that this is beneficial to some of the older visitors or visitors with limited mobility. In August, a walkthrough gate was installed in the southwest corner of the preserve, from the Country Club Road right of way. Staff repaired erosion around the “Boy Scout” bridge over the ravine.



Lake Norris Conservation Area – Although the St. Johns River Water Management District owns this property and manages the natural resources, the Water Authority partners with the District to provide public recreation opportunities such as camping and canoeing. Popular activities include paddling, horseback riding, camping, and hiking.

Sabal Bluff Preserve – The 55-acre property was donated in 1999 by Mr. Arthur “Buddy” Bourlay III and has been undergoing upland and shoreline restoration and the re-establishment of prescribed burning. Hiking, birdwatching, kite flying, and wildlife observation continue to be popular at the Preserve. Of all the Water Authority properties, this is the only Preserve to allow visitors on golf carts to tour the property seven days a week from adjacent mobile home communities. In 2014, the property was approved as a waif gopher tortoise site by the Florida Fish and Wildlife Conservation Commission and staff began accepting approved tortoises for the property in 2015. Staff received the last permitted tortoise #13 in 2016 and provided the final report and update in 2018. Duke Energy approached the Water Authority in 2018 to negotiate an agreement to allow the utility company to move their poles onto the Preserve. The Board approved of the agreement and a portion of the monetary settlement was set aside for the restoration of the Preserve. Additionally, Duke Energy paid for the re-establishment of vegetation along the corridor.



Native vegetation has been established in areas once farmed as a citrus grove. Although the soils have been altered due to the historic use of the property as a citrus grove, the soils continue to be amended and different combinations of native vegetation are tried.

Sawgrass Island Preserve - This 1,137-acre site provides protection for the 485± acre sawgrass marsh located within the interior. This marsh provides the largest freshwater influx for Lake Yale. It is also home to large flocks of sandhill cranes, turkeys and Northern bobwhite quail. The unique mix of uplands and wetlands throughout the property provide a welcoming habitat for Florida’s native wildlife. This property was selected in 2008 by the Florida Fish & Wildlife Conservation Commission for inclusion on the Statewide Birding and Wildlife Trail. Because this area of the County provides an environmental corridor for wildlife, threatened Scrub Jays have been surveyed along the perimeter of the Preserve and threatened Florida Black Bears have been observed at the Preserve. Staff continues to plan and conduct prescribed burns when feasible in areas of historic fire suppression. A group of neighbors came to the Board and

requested permission to have the gate installed. In November, a walk-through gate was installed at the end of Trails End Road.

The following Preserves do not have amenities but are accessible to the public through walk-through-gates or by water (boat) access.

Banana Point Preserve – This 12.9 acre preserve is located on the south shore of Lake Harris where it meets the Palatlkaha River.

Bear Track Preserve - This 193-acre preserve was donated as part of a mitigation project by a local developer. The Water Authority accepted this parcel due to its location within the Ocala-Wekiva River Greenway corridor, inclusion within the Lake Norris–Blackwater Creek Basin and its hydrologic connection to Lake Norris. Walk-thru access for the public is available and staff also conducts tours of the property. In December 2016, the Water Authority purchased 18 acres of the Richards Property as part of the agency’s effort to protect this hydrologically important area and provide for future public access to Lake Norris for paddling. Throughout 2018, The Water Authority has worked with Mr. Richards and the Florida Department of Environmental Protection, Division of State Lands to purchase the remaining 85 acres.

Brightwater Mitigation Area – This 35-acre property is located on the south shore of the Dead River, on the Lake Harris (west) side, but is not directly on Lake Harris. It is accessible through the Imperial Terrace community.

Double Run Preserve - This 574-acre Preserve protects the historic connection between Lake Apopka to the south and Little Lake Harris to the North. This large expanse of hardwood swamp also protects the Double Run Spring run. Although there is no public access by land, visitors can boat and paddle into the Preserve to fish or observe wildlife. Staff has led paddle trips into this Preserve.

Eagle Ridge Preserve - This preserve is approximately 341 acres. It was purchased by the Water Authority in 1994 and 1996 as part of a plan to preserve the western shoreline of Lake Griffin and the variety of wetlands and uplands on the site. Currently public access is not available due to the location of the main road, which traverses through private property. The adjacent private property was put up for sale in 2012 and is awaiting a buyer. However, paddlers and fisherman have enjoyed the Lake Griffin shoreline.

Fern Prairie Preserve - This site was purchased in 1992 for the protection and preservation of one and one-half miles of undisturbed Lake Eustis shoreline and a vast forested wetland. The 587-acre Preserve represents the largest remaining intact section of shoreline on the entire Lake Eustis. The lakeshore is accessible by boat.

Flowing Waters Preserve - Portions of this 206-acre property were purchased in 1995 and 1996 to preserve the shoreline along the Haynes Creek waterway. Paddlers and fisherman can enjoy the undisturbed shoreline of this property for fishing and wildlife observation.

Goat Island – This is a 1-acre island in Little Lake Harris, located east of Howey-in-the-Hills.

Ocklawaha Picnic Grounds - This 55-acre property was purchased in 1996 and 2005 to protect wetlands on the fringe of Lake Eustis. There is access along the lake for fishing and wildlife observation.

Scrub Point Preserve - This unique South Lake County property is located on the south shore of Johns Lake. Purchased in 1996, this property was acquired to protect one mile of John’s Lake shoreline and the high aquifer recharge contained within the uplands. Under a cooperative relationship with Bok Tower Gardens, the Preserve has been the host site for the successful planting of federally endangered Clasping Warea plants. The main objectives for the property include maintaining open sandy areas to enhance the aquifer recharge capabilities, to provide valuable habitat for listed species and control invasive, exotic vegetation. The annual bird count for this area and annual hiking and paddling events have occurred. In February 2017 the Water Authority agreed to allow the St. Johns River Water Management District (SJRWMD) to install monitoring wells on the Preserve for a long-term hydrology study. Work on the wells occurred periodically throughout 2018. In March, a new preserve sign was installed at the Point which identifies the property and lists what activities are not allowed.

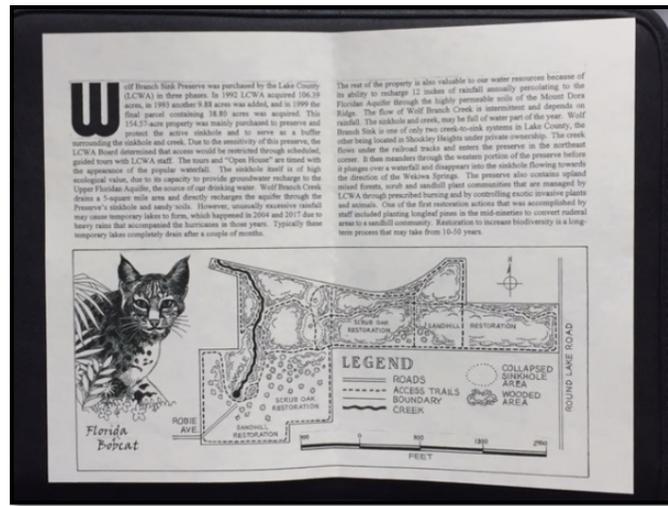
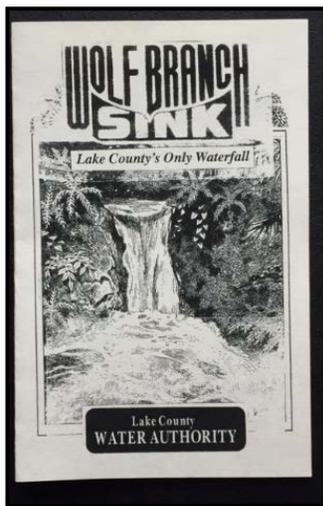


In November, the last two piles of old orange trees that were removed from the five acre parcel were burned.

Treasure Island Preserve - Purchased in 1999, this 73-acre property protects Lake Griffin’s shoreline and wetlands and provides a protected cove for paddlers and fisherman to enjoy. Staff maintains the property and implements an aggressive exotic, invasive control program for feral hogs, air potato, taro, Chinaberry, and camphor. There is public walk-in access and a short trail used primarily by neighbors.

Wilkin Preserve - This 33-acre property was purchased in 1999 to preserve wetlands and shoreline along Lake Griffin. The public can enjoy boating and fishing opportunities along this shoreline. The property is accessed by boat for yearly inspections.

Wolf Branch Sink Preserve - This 154-acre Preserve was purchased in 1992, 1993 and 1999 to protect one of only two creek-to-sinkhole hydrologic systems existing in Lake County. This Preserve is located east of Mount Dora and it is situated in a high aquifer recharge area. The property also protects four collapsed sinkholes and one active sinkhole recharging into the lower Floridan Aquifer. The Preserve provides a protective buffer that reduces the chance of pollutants reaching the aquifer. A new Preserve brochure for Wolf Branch was created to handout when hosting events.



Other Properties

Big Prairie – This 5-acre parcel is located on the western boundary of the county, west of Palatka Island Preserve. The parcel is almost totally grass (Bahia grass) and has minimal access.

Goose Prairie - This 5-acre parcel is located behind the Wedgfield Community. Unfortunately, there is limited access to this property.

Lake Florence – This property is 10 acres of lake bottom in Montverde. Lake Florence is located just west of the Montverde Academy campus.

Lake Tracy - This 440-acre parcel is mostly lake bottom and associated wetlands around Lake Tracy. It is located just west of the Royal Trails development in the northeast corner of the county.

Palatka Island Preserve - This 31-acre peninsular island and surrounding wetlands was purchased in 2001 with the objective of furthering the protection of the Palatka Island River and the beneficial marshes that buffer it from development.

Sawmill Lake – This property is 20 acres of lake bottom in Sawmill Lake located in southwest Lake County, west of Lake Louisa.

Tanner Preserve - Donated in 1990, this 37-acre preserve is part of the larger Eustis Meadows (a.k.a. Pine Meadows) wetland system southeast of Umatilla. This Preserve holds a conservation easement by the Florida Department of Environmental Protection in return for any impacts from the Water Authority's Nutrient Reduction Facility (NuRF) Project located along the Apopka-Beauclair Canal.

2018 Management Activities

- After Hurricane Irma in 2017, damage was still being cleaned up in 2018. More remote Preserves that are not opened to the public were cleared, and the extensive damage to the Cracker House at the Bourlay Historic Nature Park was repaired. Kiosks at Crooked River, Hidden Waters and Sawgrass Island Preserve had to be re-shingled. This included an incredible amount of help from the Field Services Crew.
- In July, five PVC kiosk signs with UV laminate were installed to replace printed, paper kiosk posters at two kiosks at Sawgrass Island, two kiosks at Hidden Waters and one kiosk at Sabal Bluff. These posters were having the biggest issues with fading, sometimes only lasting a couple of weeks. If the new PVC signs hold up, more kiosk signs may be replaced in future fiscal years.
- The Water Authority partnered with the Lake County Parks and Trails to host 6 paddling events throughout the County designed as an introduction to the waterways and encourage participants to enjoy recreating on the County's lakes and rivers. 2018 paddles included:
 - February, Crooked River Night Paddle with 9 participants.
 - March, Stagger Mud Run paddle with 11 participants.
 - September, Beginners Paddling Cass at Hickory Point Park.
 - On October, Blackwater Creek and Lake Norris with 17 participants.
 - November, McDonald Boat Ramp on the Apopka-Beauclair Canal.



- The Water Authority hosted public events on various Preserves to showcase them to the public. 2018 hikes include:
 - January, the Flat Island Loop hike had an overwhelming response and 28 people showed up the day of the hike.
 - February, due to the popularity of this hike the previous month another Flat Island Loop Hike was scheduled.
 - March, was a special night with the LCWA Bat Hike at Flat Island Preserve with 'S'mores and hot chocolate afterwards for 16 participants.



- On April, a Fitness and Hiking Event at Hidden Waters Preserve for 16 participants was held. Anytime Fitness offered a 25 min fitness session at the beginning.



- November, a hike on Hidden Waters Preserve.
- December, a four-mile hike on Flat Island Preserve.

- Other Events in 2018:

- Eustis High School AP Environmental Science Field Trip in January was a big hit with the instructor and the 44 students who attended. They are looking forward to scheduling this each year.



- March, as part of the National Invasive Species Awareness Week, a CISMA Workshop was held at the Lake Sumter State College campus in Leesburg. Volunteers led students on a hike around the campus and showed them how to identify invasive plant species and map them using the “I’ve Got One” app on their smart phones.
- The Free Kids Fishing Clinic was held in March and had 36 kids and their guardians participated.



- In April, the Water Authority participated in the Clermont Earth Day Event by providing kayaks for the clean-up and staffing a booth for the LCWA.



- In April, the Water Authority participated in the Mt. Dora Earth Day Event by staffing a booth for the LCWA.
- In April, the Water Authority conducted a tour for the local chapter of the Florida Native Plant Society. 28 people attended the tour.
- In July, the Water Authority made a presentation for the Highlander Chapter of the Florida Trail Association at the Main Street Library in Leesburg covering a brief overview of the Lake County Water Authority, the recreational opportunities at the LCWA Preserves, and a short discussion of our land management activities.

- In September, the Water Authority held a paddling class, paddling trips, and boardwalk tours for a homeschool group at Hickory Point Park.
- In September, the Water Authority helped with Eustis High School Environmental Science class at Hickory Point Park regarding fire ecology and a boardwalk tour of wetlands.
- In October, participated in the Festival of Flight and Flowers in Eustis with a paddle out of Hickory Point Park with a small group on the 12th and a booth at the festival in Eustis on the 13th.
- In October, participated in the Wildlife Festival in Umatilla with a paddling trip on Blackwater Creek and Lake Norris with 12 participants.



- In October, the Water Authority along with Keep Lake Beautiful and the Lake County Adopt-a-Lake program, held a Love-Our-Lakes Cleanup at the Preserve. A dozen volunteers in kayaks and one motor boat picked up trash along the Palatka River, the preserve lakeshore on Lake Louisa and the area around the bridge where Lakeshore Drive crosses Lake Susan. Representatives from Keep Lake Beautiful oversaw volunteers on the land that picked up trash in the preserve and along Lake Louisa Drive.
- In October, the Water Authority made a presentation on the LCWA Prescribed Fire Program for a Florida Master Naturalist class.
- In November, the Water Authority attended a free FWC Instructors Fish Clinic class at Dunns Creek State Park to get new ideas for the free fish in partnership with FWC Northeast.
- In December, attended Project Wild and Aquatic Workshop in Ormond Beach.

- During 2018, participated in the Lake County Parks and Trails Advisory Committee, North Florida Scrub Working Group, Lake Wales ridge Scrub Working Group, Lake County/Marion County Big Scrub's Cooperative Invasive Species Management Area, Wekiva River Management Advisory Committee, UF/IFAS Overall Committee and the Central Florida Prescribed Fire Council meetings.



- Continued work on removal of exotic, invasive species of plants and animals on the Preserves. A combination of staff and contractors try to keep ahead of the infestations, especially at Hickory Point Park, Hidden Waters Preserve, Sabal Bluff Preserve, Sawgrass Island Preserve, Crooked River Preserve and Wolf Branch Sink Preserve.
- In 2018, conducted 11 prescribed burns. Five were pile burns and the other six totaled 85 acres.

Date	Preserve	Burn Unit(s)	Acres
January 9, 2018	Flat Island	FI-01 (wildflower plot)	1
January 17, 2018	Sawgrass Island	SI-01	38
January 22, 2018	Scrub Point	Pile	2 Piles
May 8, 2018	Hickory Point	Pile	1 Pile
June 18, 2018	Flat Island	FI-01	7
June 25, 2018	Hidden Waters	HW-04	Canceled due to wind shift
October 1, 2018	Hidden Waters	HW-04	9
October 19, 2018	Hickory Point	Pile	1 Pile
November 13, 2018	Scrub Point	Pile	2 Piles
November 27, 2018	Crooked River	Pile	1 Pile
December 7, 2018	Sawgrass Island	SI-08, 09, 07(part)	30

- For the 8th year, the Water Authority along with staff from Bok Tower Gardens and volunteers have surveyed and monitored the endangered Clasping warea (*Warea amplexifolia*) plant that were germinated at Bok Towers and planted on Crooked River and Scrub Point Preserves as part of a regional effort to expand the range of this endangered species.



- During the rainy season native plantings are done on the Preserves as part of the long-term restoration of each site.

Preserve Visitation

Visitors continue to enjoy the passive recreational opportunities afforded to them by the Water Authority's Preserves throughout the County. Popularity of the hikes and paddle trips have encouraged the public to become "regulars" on these activities. For example, there are more than 20 geocaches on the Preserves currently and three Preserves (Sawgrass Island, Bourlay Historic Nature Park & Hidden Waters) are included on the Statewide Birding Trail.

Preserve attendance for 2018 was down about 6% from 2017's attendance numbers with 729 fewer visitors (overall, pretty consistent). 11,939 people visited the Preserves in 2018. Overall, the numbers for individual preserves were very consistent, but the largest deficit was at Hidden Waters Preserve and the fact that we did not have an Open House at Wolf Branch Sink Preserve in 2018. For 2018, the top three Preserves were Flat Island, Hidden Waters and Crooked River Preserves (similar to 2017).

Hickory Point Park

Developed by the Lake County Water Authority as a unique, recreational, waterfront park, the Hickory Point Recreational Facility premiered in February 1992. Today this 67-acre park provides numerous activities and facilities for guests of all ages and is still a one-of-a-kind facility in Central Florida. Open 24-hours a day, seven days a week.

Hickory Point Park is a perfect destination for a day's outing. Guests can enjoy the outdoor picnic areas with barbecue grills, wetland boardwalk, open-field play areas, nature trail, playground, horseshoe pits and sand volleyball court. Ample parking accommodates cars and boat trailers. The park has twelve boat ramps, two of which can accommodate deep-draft vessels including sailboats. A boathouse and comfort station provide



convenient access to restrooms. Hickory Point Park offers a day-use marina (no overnight mooring), with an observation platform and two fishing piers. The mooring facility accommodates boats up to 10 feet by 30 feet. There are 36 boat slips available. The park also features a two-story, screened pavilion with first-floor picnic tables and barbecue grills. The second floor, with convenient elevator access, offers two screened banquet rooms with round tables, patio chairs and barbecue grills. The pavilion can accommodate small groups or larger gatherings of up to 275 people. Restrooms are located on both levels. Handicap restrooms are on the first floor only.

In 2014, the Water Authority leased a portion of Hickory Point to Lake County and then the County worked with the Florida Region of USA Volleyball to construct and manage a 21-court sand volleyball complex. In 2018, construction started on The Hickory Point Beach Fieldhouse adjacent to the existing sand volleyball courts.

2018 Park Activities:

- Hosted a Lake Leadership class and a meeting.
- Site of 30 Fishing Tournaments in 2018, with 1,475 participating boats.
- 184 Pavilion Rentals for 2018.
- Hosted a Kid's Fishing Clinic for 36 children and their families.
- Hosted a Flight & Flowers Paddling trip.
- Hosted a Beginner's Paddling class.

Hickory Point Park Attendance for 2018 – 51,585 vehicles or 128,964 visitors

Resource Communication

The Lake County Water Authority staff takes every opportunity available to educate and provide information to the public regarding the Water Authority's programs, projects and preserves. Through 2018, continued to work on promoting the Water Authority through the agency's website, Facebook and Twitter social media sites.

Following are examples of resource communication activities for 2018:

- Established and maintained an activity email database to inform the public on upcoming hiking, paddling and volunteer events. Currently the email list stands at 500.
- Presented water resource programs for Mount Dora, Tavares, South Lake, Eustis high school students and Lake Sumter State College students at the Nutrient Reduction Facility.
- Updated the Water Authority website with the latest photos, events, special programs (e.g., Summer Teacher Institute, paddling trips, mini-grant submission, Lake Water Atlas).
- Provided unique hiking opportunities at the Preserves by highlighting fireflies and bats at Flat Island Preserve, introduction to camping and cooking at Flat Island Preserve, butterfly photography at Flowing Waters Preserve, hiking/paddling morning at Hickory Point Park and nature walks at Hidden Waters Preserve and Wolfbranch Sink Preserve.



In 2018, the Lake County Water Authority provided \$16,000 in funding for Trout Lake Nature Center for operation and personnel, for transportation to TLNC and for schools that the School Board would not otherwise fund to attend programs at TLNC.

The Water Authority has continued to fund two education contractors. The contractors are charged with providing water resource information within the community through public events, schools, nature tours, community groups, and workshops. Following is a description of the two contractors and their roles on behalf of the Water Authority:

- **LCWA Naturalist** – the Naturalist led hikes and paddles during the weekdays and especially during the evening and weekend hours, to provide a point of contact for local teachers receiving Water Authority grants and to do public outreach events

such as the Mount Dora Earth Day. The Naturalist also coordinated with the Lake County School Board to schedule and present Nutrient Reduction Facility high school and State College programs.

- **LCWA Education Contractor** – The Education Contractor provided assistance for public water resource projects, teacher outreach workshops, coordinated the installation of stormwater drains, coordinated Love Our Lakes clean-up events, participated in the annual Envirothon, conducted outreach to local schools and community groups and to assist with NuRF classes.

Data Resources

Geographic Information System (GIS)

The Water Authority has experienced a considerable increase in the requirement to provide information to the Board and to the public. The Water Authority has experienced an increase in requests for accurate mapping, information and educational services. The Lake County Water Authority has met the demands for providing greater service in part by using new technology to improve services.

Some of the major issues facing the Lake County today such as economic development, tourism, environmental impact, increasing population, improvement of provided services, and so on, has a critical geographic dimension. The old adage "better information leads to better decisions" is true for GIS. A GIS is not just an automated decision making system but a tool to query, analyze, and map data in support of the decision making process.

The Geographic Information System (GIS) has become an essential technology for the Water Authority when making key water and environmental decisions since most of them are related to geography. Geographic information is one of the most important and valuable tools to support the infrastructure of the Water Authority. Geographic Information Systems can play a vital role in making local governments more efficient and more productive, and often result in better service delivery. The benefits accrued from GIS implementation are considerable.

Benefits of GIS:

- Improved mapping and analytical capabilities
- Improved access to data for both employees and citizens
- Improved processes for managing information and conducting analysis both past, present and future
- Less duplication and easier map storage
- Higher product complexity
- Enhanced public presentations and public service capabilities
- Improved analytical capabilities of critical data sets
- Improved ability to share data electronically
- Enhanced economic and community development capabilities
- Improved communications throughout the organization
- Improved the flow of information in the decision-making process
- Guide us to find features in a real world environment
- Makes understand the precise location of features
- Is a technology that makes the Water Authority more efficient in obtaining information for better decision-making

System Administration

System Upgrade and Security

Network security is recognized by the Information Technology (IT) industry as one of the most complex problems IT personnel face. As such, staff has taken a more active approach in network and data security. The approach includes tasks such as:

- ▶ Enclosing the main network equipment for protection and durability
- ▶ Installing servers on secure and locked rack system
- ▶ Upgrading the server and operating system;
- ▶ Actively updating the virus protection software;
- ▶ Upgrading spam e-mail protection software;
- ▶ Upgrading all office workstation's operating systems with latest software patches;
- ▶ Improving backup systems for data and email files. Including data set, reports, and important documents obtaining vital information; and
- ▶ Installing a firewall device for protection of network and virus intrusion.

Several precautions have been put in place to minimize these types of network attacks however system infiltrations are difficult to prevent. Network administration is an active part of total in-house support to staff members of LCWA. A secure network is major challenge that staff will keep working to address. For next year, staff will take advantage of the new technology by installing new security appliances that will decrease the security trends to our network.

Web Mapping Applications (Apps)

In 2017, the Lake County Water Authority GIS began creating mapping applications that utilize the resources provide by ESRI (main GIS software) and the historical aerial photographs of Lake County captured by USDA. During 2018, staff has continued to update and maintain these apps with great feedback from the public. There have been several agencies, including the Lake County Property Appraisal's office, which utilize these apps for the everyday task when evaluating property values.

In 2018, the Water Authority created and configured new web map applications that could map particular data such as the preserves on the web without the need of downloading or installing software. The best thing about these apps is that they work across multiple computers and mobile devices. The information can be presented succinctly and clearly in the form of a web map app allowing the public to focus on the real time information rather than trying to understand it by downloading software and the data. Because GIS apps can be produced over the web, multiple scenarios of maps can be evaluated without the need of technical GIS expertise.



LAKE COUNTY WATER AUTHORITY

Home • Site Map • Contact LCWA

Home

- Board Members
- LCWA Information
- Water Resources
- Land Resources
- Hickory Point
- Education
- GIS Web Mapping

Most Visited Pages

- Employment Opportunity
- New GIS Web Maps
- Hickory Pt. Pavilion Rental
- Water Levels
- Rainfall Data
- Board Meeting Info

Lake County, FL Weather

☀️ 88°F, Clear

Fri: 🌧️ 89°F / 69°F

New GIS Web Applications



Preserves Map Journal

Application Map of Lake Count...



Lake County Historical Aerials

Application Map of Lake Count...



Lake County Historical Aerials

Application Map of Lake Count...



GIS Web Maps

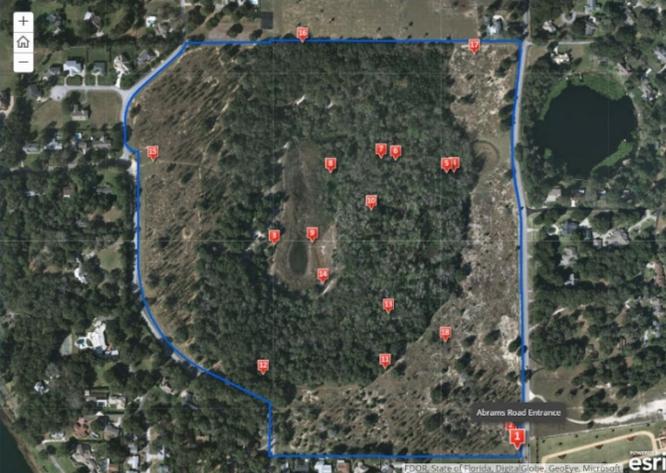
Lake County Water Authority ...

Hidden Waters Preserve 2

This unique 90-acre preserve, east of Eositis was acquired in the mid-1990's to protect the sinkhole lake, the ravine and the creek. Well known for its topography and abundant wildlife, many hikers, joggers and birders enjoy the property 7 days a week.



Abrams Road Entrance Picnic table, informational kiosk with brochures



Aerial map showing the preserve boundary and 12 numbered points of interest.



Abrams Road Entrance



Restoration Area



Lake Alfred



First Overlook



Ravine Trail



Ravine Creek



Creek Bridge



Ravine Creek



Great Egret



Foot Bridge



Prickly Pear Trail



The "Tunnels"

Comparison of Historical Aerials of Lake County, Florida

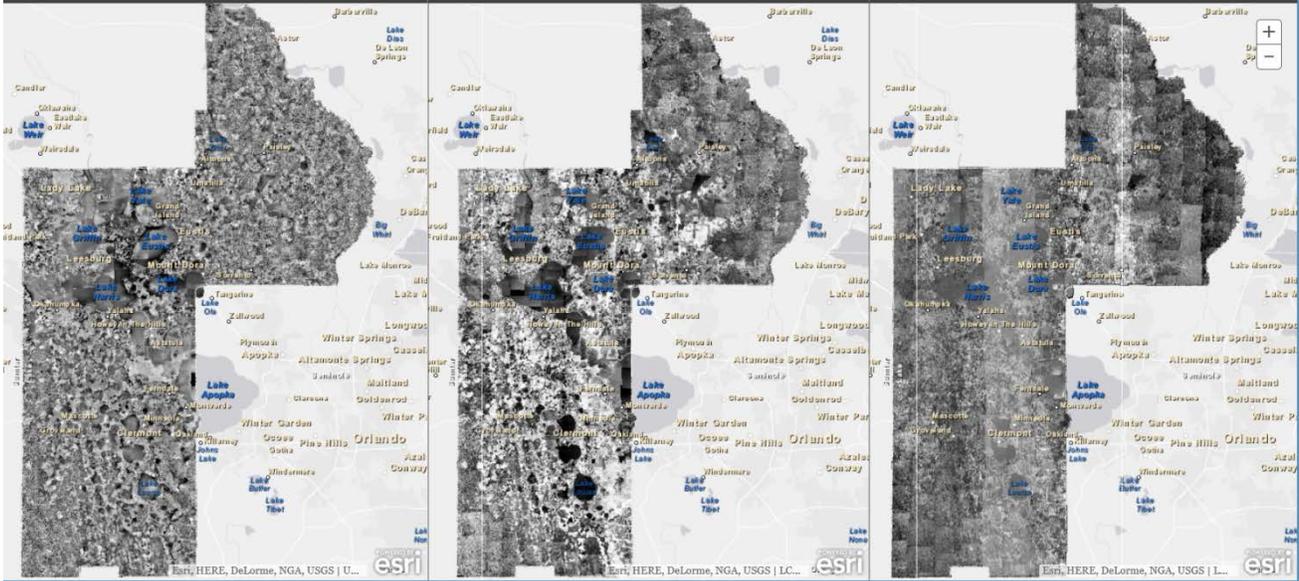
1941, 1958 and 1972 Aerials Scanned and Rectified by the Lake County Water Authority

SYNCHRONIZE MAPS Scale Location

Map of Lake County, FL - 1941 Historical Aerials

Map of Lake County, FL - 1958 Historical Aerials

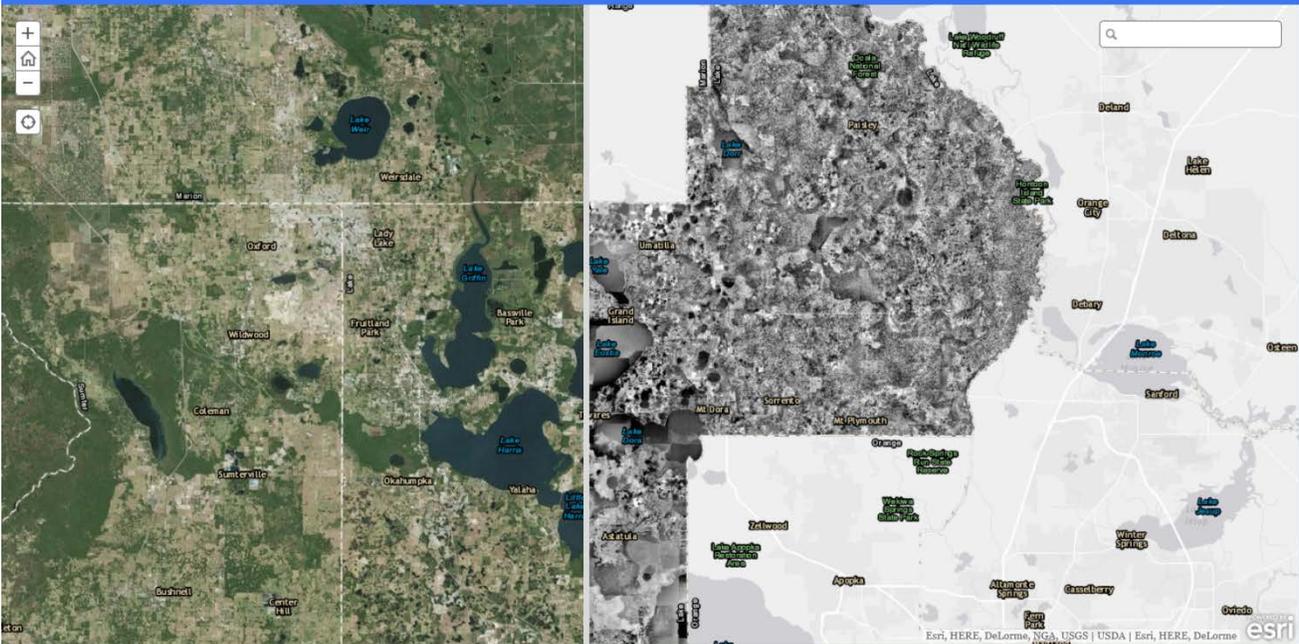
Map of Lake County, FL - 1972 Historical Aerials



Lake County in 1941 and Now

Lake County Water Authority

This web app allows the users to zoom in to their location by typing address or using the location button and compare aerials back in 1941 and now by moving the slider line in the middle of the map. The 1941 aerials photos were provided by USDA acquired, scanned and rectified by the Lake County Water Authority.



The Water Authority is now using GIS Web Apps to help reach better decisions and to inform the public. One of the apps shows the difference in time of 1941 and now aeriels. This app especially is useful to show how growth in Lake County is most reflected at different areas. The location of protected areas, including open preserves, based on present location or address is another example of how these GIS apps could provide benefit for the enjoyment of the public.

The Water Authority will continue to maintain a GIS system including the new web map apps and participate in the sharing of updated data and the acquiring of new layers. The Water Authority will routinely cooperate with other agencies and the public to produce county data layers, as well as more we map apps. Such visual tools will include bathymetric map app, boat location and information app and other web maps of water and land resources within the county. These new web map apps are a simple way to visualized data related to the natural resources of Lake County.

Lake County Water Resource Atlas

The Water Resource Atlas has been up and operating since April 2003. This Web site (<http://wateratlas.co.lake.fl.us/>) consolidates information on the water bodies within Lake County. It is a web-based atlas designed to provide citizens, environmental professionals, planners, and anyone else interested in water resources with current and historical water resource data and information in Lake County. The Atlas provides a one-stop location to find comprehensive and current water quality, hydrologic, ecological and recreational information. The concept was developed by the University of South Florida's (USF) Center for Community Design and Research.

The Lake County Water Authority has provided funding for the annual (Basic) maintenance of the atlas. With minimal updates the Water Atlas still provides the necessary data information about lakes to both public and private sectors with a continuous usage of about 1,400 users per month. The usage is down from previous years when the atlas was in the standard maintenance at 1,720 users per month.

The LCWA Board included \$25,000 in its FY 2017-18 budget to upgrade the Atlas with a new front page and going with the "Standard" instead of the Basic functionality. The standard maintenance provides quarterly updates to all the data and the full functionality of the atlas for the year. This would maintain and increase the number of users of the Atlas.

USF would also like to include a three year agreement that does not affect the Water Authority's decision if to terminate contract at any year.

The Lake Water Atlas went through an update including the initial home webpage completed in the beginning of 2018.

What is the Water Atlas Program?

- Provides the technology to connect multiple stakeholders in water resource management using a web-based interface

- Provides citizens and professionals with comprehensive and unprecedented access to water resource information
- Allows collaboration between local communities and citizens
- Designed to help meet the needs of both local governments and citizens

Benefits to Government

- Opens communication with citizens
- Allows scientists access to data from many agencies
- Reduced time spent finding data and information
- Increases citizen participation and volunteerism

An edition of WaterAtlas.org Presented By: Lake County Water Authority, University of South Florida

Choose a Water Atlas

Lake County wateratlas LCWA

site search Search

MAPPING ANALYSIS LEARN PARTICIPATE ABOUT

The Lake County Water Atlas

Helping researchers, resource managers, and the general public better understand and appreciate Florida's water resources.

WELCOME TO THE LAKE COUNTY WATER ATLAS
Helping researchers, resource managers, and the general public better understand and appreciate Florida's water resources.

WATER RESOURCE SEARCH

Type the name of a water resource in the box below.

Water Resource Name

ADVANCED SEARCH >

POPULAR RESOURCES

Water Resource	Recent Sample	Historical Comparison
Apopka Beauclair Canal near Astahula, FL	Elevation, water surface 64.02 ft 📍 <1 hour ago	Elevation, water surface 63.29 ft Average for April

RECENT NEWS

- Multiple satellite eyes to track algal threat to U.S. freshwater
- Sponsors sought for 4th annual Wings & Wildflowers Festival, Oct. 2-4
- Little Lake Harris to receive hydrilla treatment
- Save the date: National Monitoring Conference, May 2-6, 2016
- From coastlines to the Everglades, researchers tackle sea level rise
- Low risk contamination sites to get fresh scrutiny under DEP plan
- EPA Encourages Consumers to Save 1 Trillion Gallons of Wasted Water
- Lake County Water Authority app provides snapshot of yesteryear
- Lake County targets water quality in Lake Yale and Dora

Benefits to Citizens

- One-Stop Access – Ability to access information and data easily and intuitively in one place
- Educational – Terms are explained in easy to understand language
- Citizen participation:
 - Collection of data (SJRWMD & LakeWatch)
 - Submission of photos
 - Reporting pollution
- Access to programs & projects – What government is doing to improve the environment
- Calendar of events for all public events

Statistics about the Water Atlas

- 928 waterbodies in atlas (named waterbodies only)
- 39 agencies and organization providing data
- 1,589,102 individual analyses / observations
- 57% of visitors of these were new visitors
- 20,127 visitors in the last 12 months
- 58% of all visitors come from searches (google, etc.)
- 35% of visitors are referred by other sites
- 32% of visitors go directly to the atlas

The Lake County Water Resource Atlas has been updated in 2018. Now there is new look and feel of the navigational links of information, making the Water Atlas more user-friendly. Other changes included more links to access information from the home page instead of hard to find web pages. The mapping and the graphing tools were upgraded to simpler to use looks and feel tools.

This internet-based Lake County Water Resource Atlas makes Lake County water resource data available to the maximum number of people in an efficient and cost-effective manner. The management of Lake County's water resources requires an informed citizenry and the cooperation of multiple government agencies. The Water Resource Atlas is a necessary tool for assisting citizens, scientists, and government leaders to manage the County's water resources.

A. LCWA Property Layer

- The layer had several updates on the attribute and vector data that were incorporated in the GIS database. Copies of the layer and the metadata were submitted to the County's GIS department and the SJRWMD. Various property boundaries were incorporated into the layer utilizing certified surveys and the County's most updated parcel layer. This is a continuous updating project, in order to keep the layer up-to-date.

B. Data Update

- Several data layers were created and updated in the LCWA database. These data sets were obtained from the county's GIS or SJRWMD database. Other data layers such as the navigational sign location were created with the GPS system. Data sets such as the Boat Ramp layer information were updated in-house using the latest layer completed by the county. The LCWA staff is now responsible to keep and upgrade the Boat Ramp layer with the help citizens and boaters. A new layer added to the LCWA's GIS layers is the blueways trail and signs location layer. Staff was able to GPS those locations and provided the data to the county to be incorporated on the new Harris Chain of Lakes map.

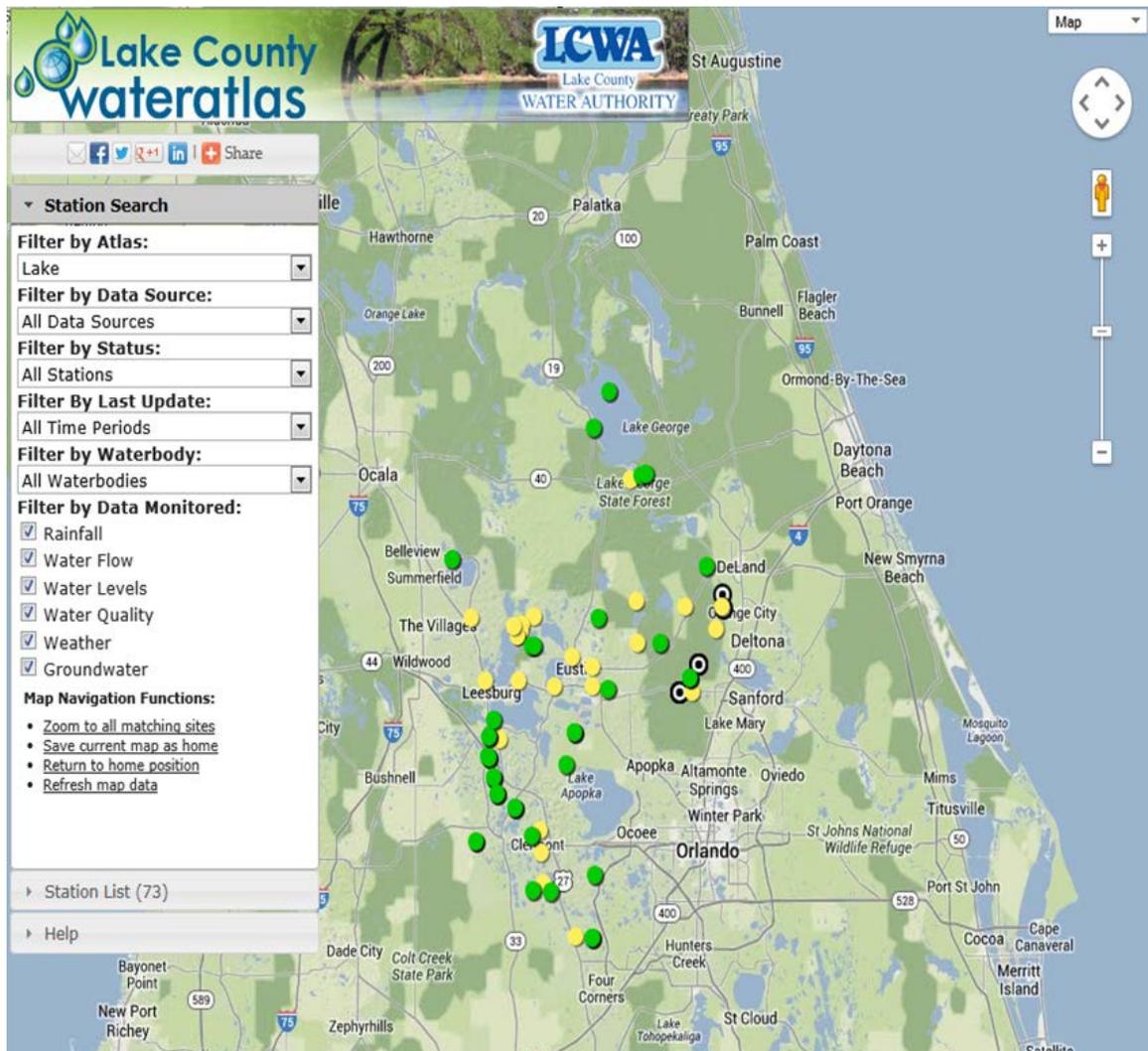
C. LCWA website

- The Water Authority's website has been upgraded with a different look and tools to allow staff to do updates without the help of any outside contractors. The website is now hosted by LCWA and store in our servers, saving money

to the Water Authority on hosting and updates fees. In 2018 the website will be change once more to further improve the easy access of information for the public and residents of Lake County.

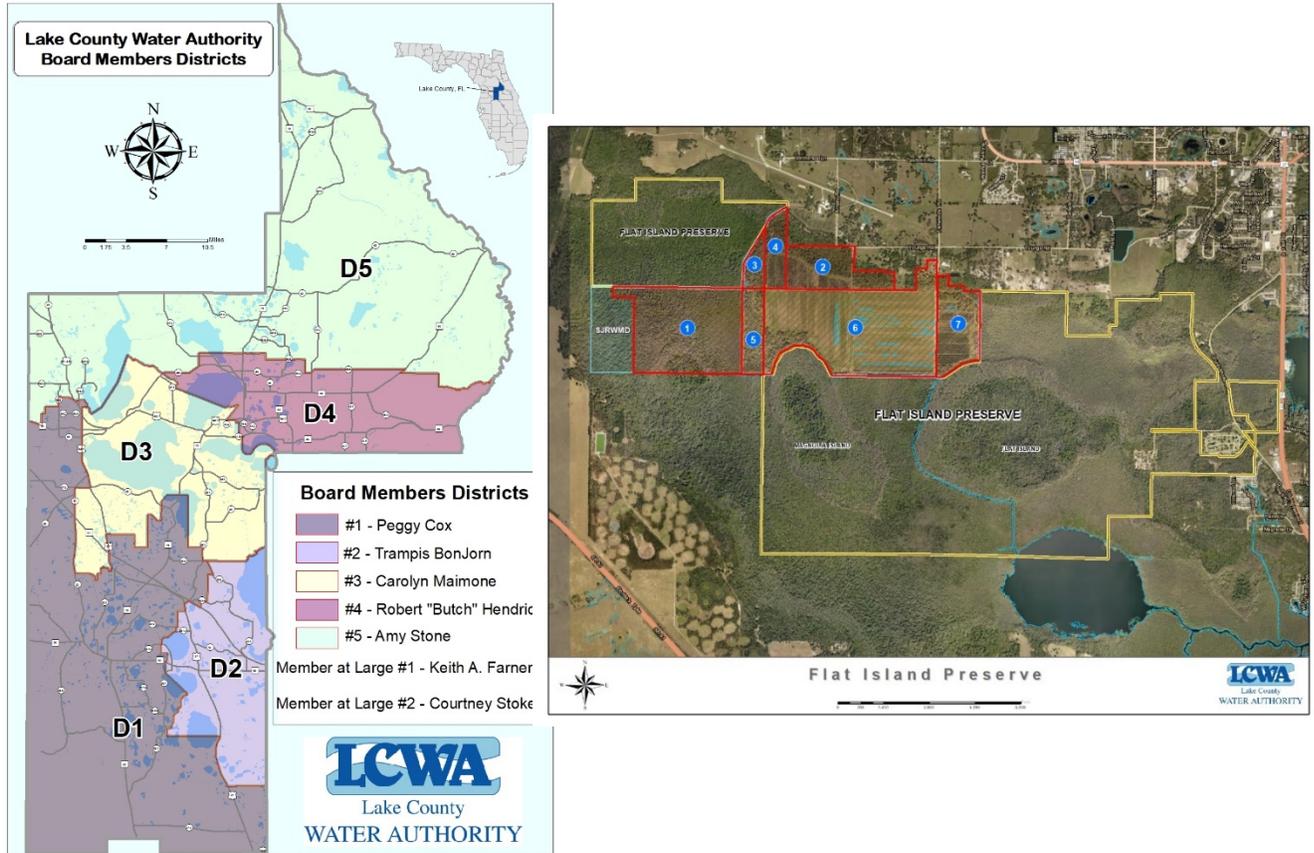
D. Interacting Mapping

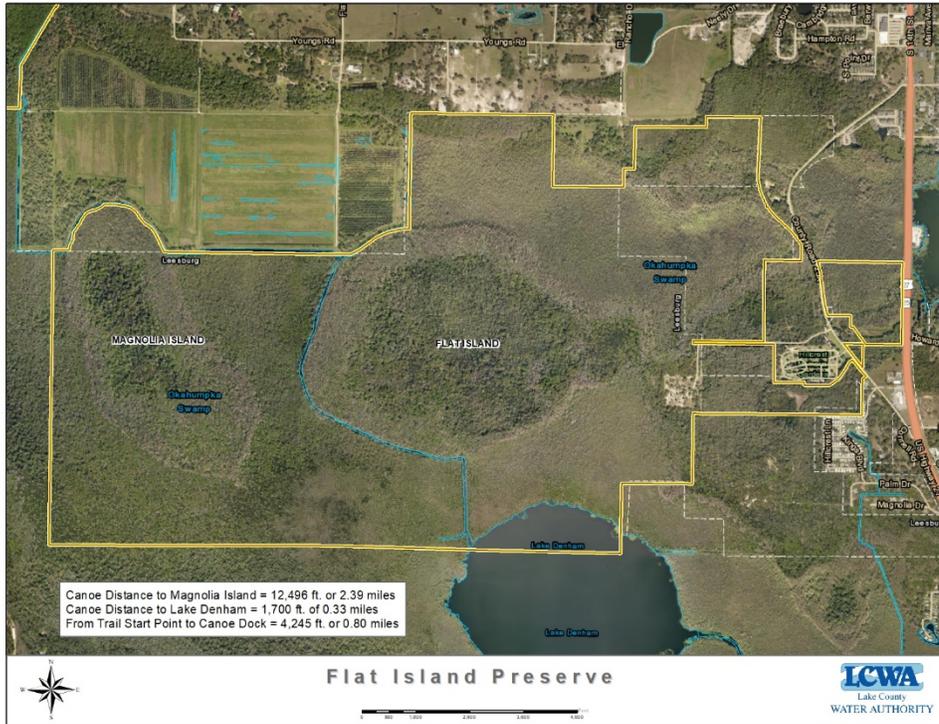
- LCWA and USF worked together to create an interactive mapping application that could provide real time water level and rainfall data from different locations throughout lake county for the public to utilize. This application was integrated on the Water Authority’s website with direct link to the Water Atlas data layers.



Produced Maps

Examples of maps that facilitated the planning and decision-making process and provided general information for the board, staff and public in 2018 are shown below:

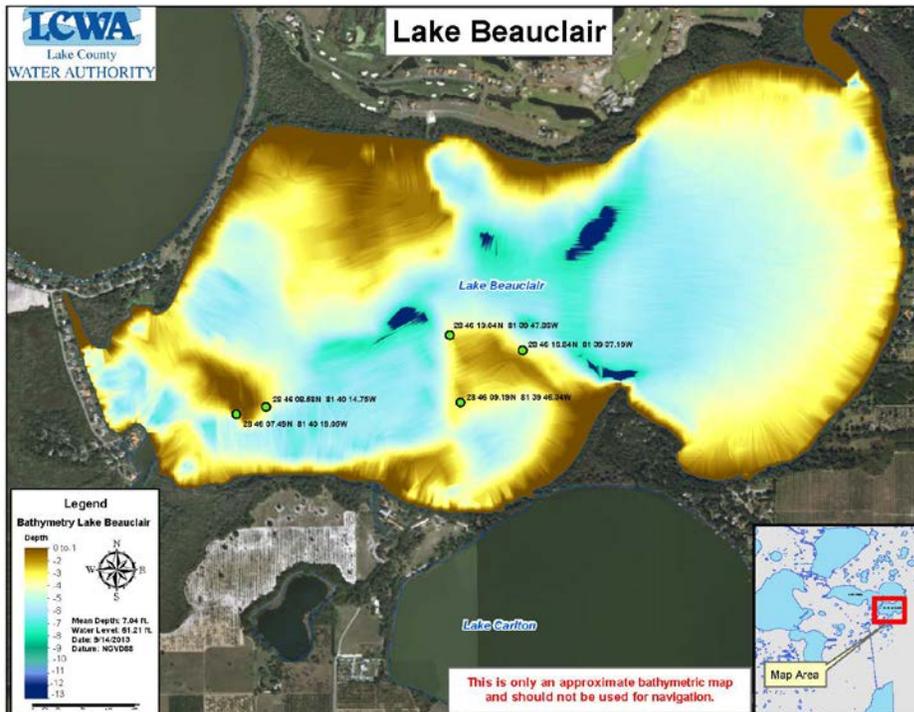
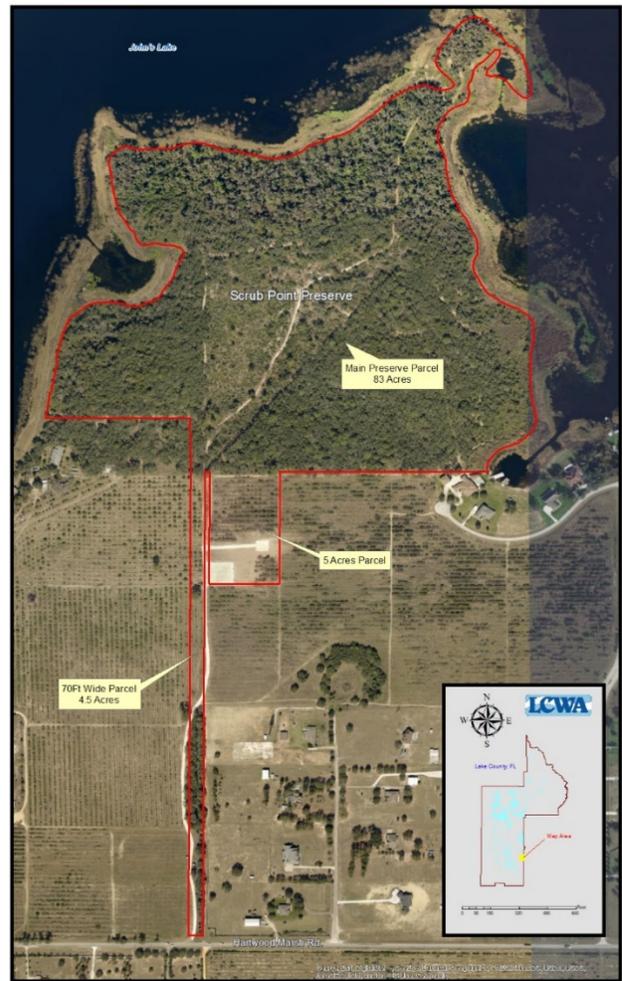


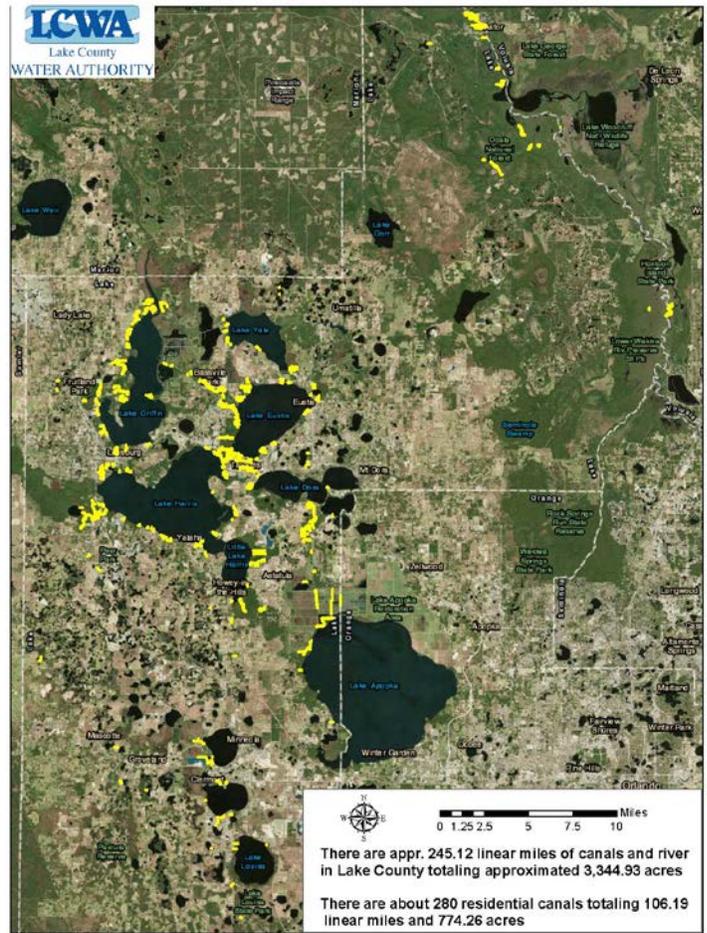
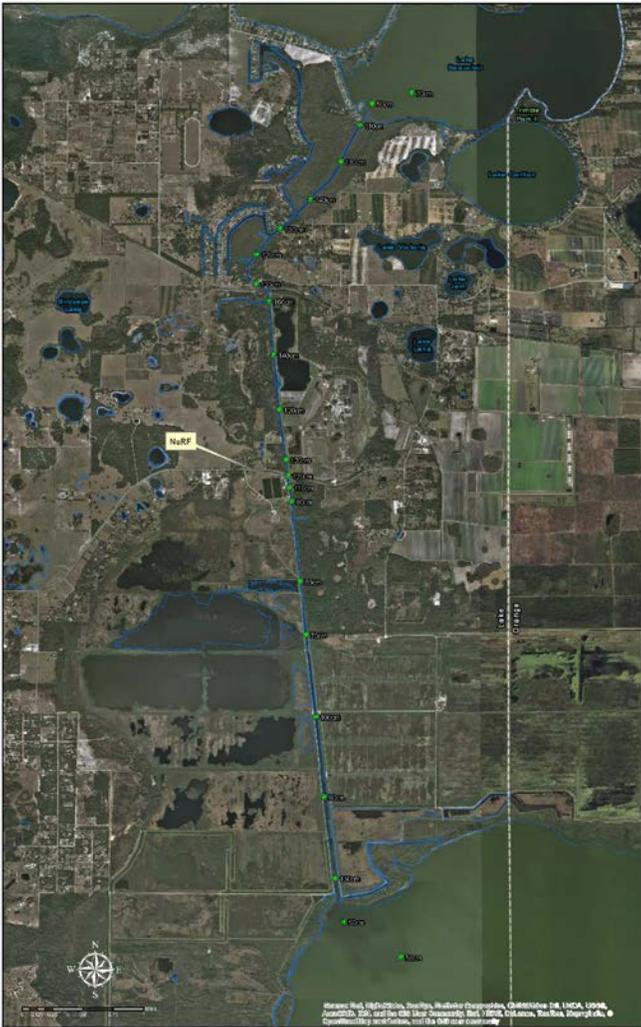


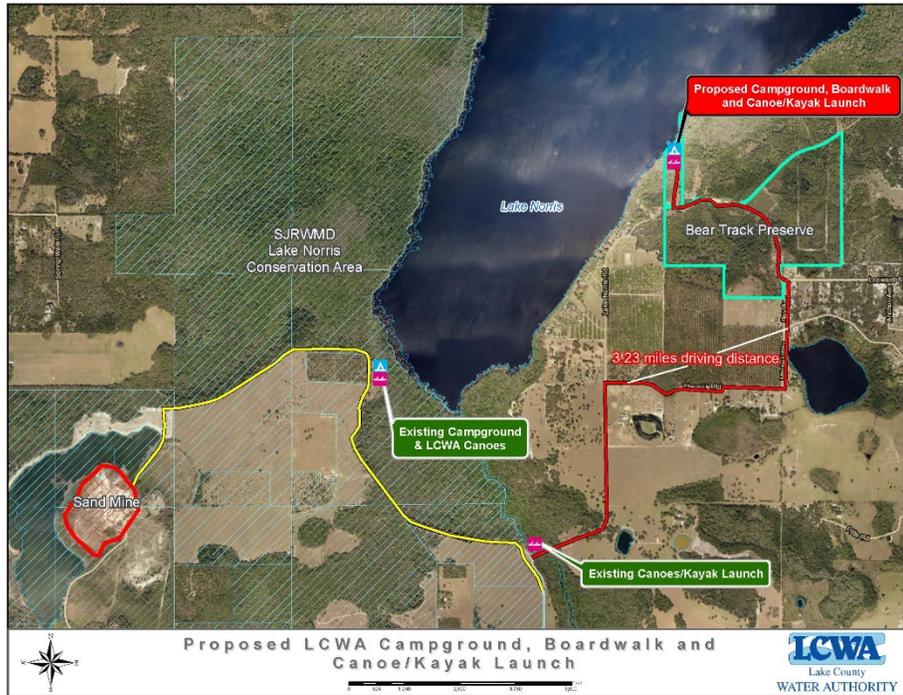


Bourlay Historic Nature Park Burn Units

Legend
 Burn Units







**Lake County Water Authority
Five Year Plan - 2018-2023**

	FY	2018-19	%	2019-20	%	2020-21	%	2021-22	%	2022-23	%
Revenue											
Revenue (less 5% uncollectable)		9,748,085	57.49%	7,153,743	41.95%	6,573,078	50.47%	6,749,800	51.50%	6,827,587	51.78%
Cash Forward		7,149,793	42.17%	9,841,744	57.71%	6,426,767	49.34%	6,332,732	48.31%	6,332,732	48.03%
Outside Revenue		56,850	0.34%	56,850	0.33%	25,000	0.19%	25,000	0.19%	25,000	0.19%
<i>Total Revenue</i>		16,954,728	100.00%	17,052,337	100.00%	13,024,845	100.00%	13,107,532	100.00%	13,185,319	100.00%
Expenditures											
Administration											
Personnel		642,504	3.79%	678,045	3.98%	698,386	5.36%	719,338	5.49%	740,918	5.62%
Operating Expenses		462,639	2.73%	392,839	2.30%	412,481	3.17%	433,105	3.30%	454,760	3.45%
Capital Outlay					0.00%	50,000	0.38%	50,000	0.38%	50,000	0.38%
<i>Sub Total Administration</i>		1,105,143	6.52%	1,070,884	6.28%	1,160,867	8.91%	1,202,443	9.17%	1,245,678	9.45%
Hickory Point											
Operating Expenses		122,850	0.72%	97,600	0.57%	102,480	0.79%	107,604	0.82%	112,984	0.86%
Capital Outlay					0.00%	25,000	0.19%	25,000	0.19%	25,000	0.19%
<i>Sub Total Parks and Rec</i>		122,850	0.72%	97,600	0.57%	127,480	0.98%	132,604	1.01%	137,984	1.05%
Water Resources											
Personnel		301,107	1.78%	307,076	1.80%	316,288	2.43%	325,777	2.49%	335,550	2.54%
Operating Expenses		242,024	1.43%	128,788	0.76%	132,652	1.02%	137,337	1.05%	137,337	1.04%
Palatlakaha Restoration (M-5 & M-6 Design)											
Palatlakaha Restoration (M-5 & M-6 Construction Mgmt.)											
Palatlakaha Restoration (Villa City Design)		20,000	0.12%								
Palatlakaha Restoration (Construction Management)				60,000	0.35%						
Palatlakaha Restoration (Construction)				400,000	2.36%						
Nutrient Source Projects (Lakes Denham, Trout or Yale)											
Lake Yale Sediment Inactivation		2,202,328	12.99%	4,000,000	23.46%						
Palatlakaha Restoration				400,000	2.35%	400,000	3.07%	400,000	3.05%	400,000	3.03%
NuRF - Maintenance		125,000	0.74%	250,000	1.47%	250,000	1.92%	250,000	1.91%	250,000	1.90%
NuRF - Maintenance Reserve		500,000	2.95%	575,000	3.37%	750,000	5.76%	575,000	4.39%	575,000	4.36%
NuRF - Equipment		25,000	0.15%	600,000	3.52%	600,000	4.61%	600,000	4.58%	600,000	4.55%
NuRF - Alum		2,000,000	11.80%	2,000,000	11.73%	2,500,000	19.19%	2,500,000	19.07%	2,500,000	18.96%
NuRF - Polymer		100,000	0.59%	100,000	0.59%	100,000	0.77%	100,000	0.76%	100,000	0.76%
Waterway Signs		10,000	0.06%	15,000	0.09%	15,000	0.12%	15,000	0.11%	15,000	0.11%
Adopt a Lake Sampling		35,000	0.21%	35,000	0.21%	35,000	0.27%	35,000	0.27%	35,000	0.27%
Benthic invertebrate Re-identification		16,000	0.09%	13,000	0.08%	13,000	0.10%	13,000	0.10%	13,000	0.10%
Aquatic Plant Harvesting		30,000	0.18%	5,000	0.03%	5,000	0.04%	5,000	0.04%	5,000	0.04%
USGS monitoring network		147,730	0.87%	150,000	0.88%	150,000	1.15%	150,000	1.14%	150,000	1.14%
Waterway Tree Removal		25,000	0.15%	30,000	0.18%	30,000	0.23%	30,000	0.23%	30,000	0.23%
Sheriff - Marine Patrol (85% of full amount)		211,779	1.25%	222,368	1.30%	222,368	1.71%	222,368	1.70%	222,368	1.69%
Sheriff - Boat for Marine Unit						52,000	0.40%				
Aids To Government Agencies											
2016 Stormwater Retrofit Projects											
Clermont West Project		420,000	2.48%								
2017 Stormwater Retrofit Projects											
Umatilla (Lake Yale Stormwater Reuse)		90,000	0.53%								
2018 Stormwater Retrofit Projects		250,000									
Lake Denham Muck Farm Acquisition		2,020,362	11.92%								
Supplemental Hydrilla Treatment		1,500,000	8.85%								
2019 Stormwater Retrofit Projects				260,000	1.52%						
Future Stormwater Projects				1,000,000	5.86%	1,000,000	7.68%	1,200,000	9.16%	1,200,000	9.10%
Dock on Clermont Chain								30,000	0.23%	30,000	0.23%
Replace Vehicle				30,000	0.18%						
Harris Chain Restoration Council Support											
HCRC - FWC Bass Tracking Telemetry Equipment		9,850	0.06%	9,850	0.06%	9,850	0.08%	9,850	0.08%	9,850	0.07%
<i>SubTotal - Water Resources:</i>		10,281,180	60.64%	10,591,082	62.11%	6,581,158	50.53%	6,598,332	50.34%	6,608,105	50.12%

Lake County Water Authority
Five Year Plan - 2018-2023

	FY	2018-19	%	2019-20	%	2020-21	%	2021-22	%	2022-23	%
Field Services											
Personnel		300,444	1.77%	306,641	1.80%	315,840	2.42%	325,315	2.48%	335,075	2.54%
Operating Expenses		129,248	0.76%	115,248	0.68%	119,083	0.91%	122,656	0.94%	126,336	0.96%
SubTotal - Field Services:		429,692	2.53%	421,889	2.47%	434,924	3.34%	447,971	3.42%	461,411	3.50%
Land Resources											
Personnel		329,525	1.94%	336,128	1.97%	346,212	2.66%	356,598	2.72%	367,296	2.79%
Operating Expenses		40,125	0.24%	33,039	0.19%	34,030	0.26%	35,051	0.27%	36,103	0.27%
Acquisition		225,000	1.33%								
Burn Plan Development		1,500	0.01%	4,000	0.02%	4,000	0.03%	4,000	0.03%	4,000	0.03%
Exotic Invasive Hog Removal		10,000	0.06%	10,000	0.06%	10,000	0.08%	10,000	0.08%	10,000	0.08%
Contract Burning		31,500	0.19%	45,000	0.26%	45,000	0.35%	45,000	0.34%	45,000	0.34%
Fencing of Preserves		4,000	0.02%	5,000	0.03%	5,000	0.04%	5,000	0.04%	5,000	0.04%
Repair & Maintenance		35,000	0.21%	100,000	0.59%	100,000	0.77%	100,000	0.76%	100,000	0.76%
Contract Mowing and Fireline Maintenance		13,500	0.08%	25,000	0.15%	25,000	0.19%	25,000	0.19%	25,000	0.19%
Exotic/Invasive Plant Control		10,000	0.06%	13,000	0.08%	13,000	0.10%	13,000	0.10%	13,000	0.10%
Replace Vehicle						30,000	0.23%	30,000	0.23%	30,000	0.23%
Replace Tractor				40,000	0.23%						
Restoration Projects		23,900	0.14%	25,000	0.15%	25,000	0.19%	25,000	0.19%	25,000	0.19%
Finish Scrub Point Preserve Road		10,000	0.06%								
Bear Track Boardwalk and Canoe Launch				59,500	0.35%						
Improvements to Sabal Bluff		100,000	0.59%								
Site Improvements		7,500	0.04%	7,500	0.04%	7,500	0.06%	7,500	0.06%	7,500	0.06%
SubTotal - Land Resources:		841,550	4.96%	703,167	4.12%	264,500	2.03%	264,500	2.02%	264,500	2.01%
Resource Communication											
Education											
Education Limit - 3.5 % of ad valorem		161,656		166,506		171,501		176,646		181,945	
Operating Expenses											
<i>Other Contractual Services</i>											
Sheriff - Marine Patrol (15% of full amount)		17,171	0.10%	18,030	0.11%	18,931	0.15%	19,878	0.15%	20,871	0.16%
Naturalist Contractor		12,500	0.07%	15,000	0.09%	15,000	0.12%	15,000	0.11%	15,000	0.11%
Education Contractor		12,500	0.07%	15,000	0.09%	15,000	0.12%	15,000	0.11%	15,000	0.11%
Education and Graphics Design Services		1,000	0.01%	10,000	0.06%	10,000	0.08%	10,000	0.08%	10,000	0.08%
<i>Rentals</i>											
Pontoon Boat Rental		500	0.00%	2,500	0.01%	2,500	0.02%	2,500	0.02%	2,500	0.02%
<i>Printing & Binding</i>											
Printing of Educational Materials		1,000	0.01%	2,000	0.01%	2,000	0.02%	2,000	0.02%	2,000	0.02%
<i>Promotional Activities</i>											
Lake Academy		1,150	0.01%	1,500	0.01%	1,500	0.01%	1,500	0.01%	1,500	0.01%
Kids Fishing Clinic		500	0.00%	500	0.00%	500	0.00%	500	0.00%	500	0.00%
LCWA Events/Project Advertisements		1,000	0.01%	2,000	0.01%	2,000	0.02%	2,000	0.02%	2,000	0.02%
<i>Operating Supplies</i>											
Limnology Education & Misc. Supplies		650	0.00%	700	0.00%	700	0.01%	700	0.01%	700	0.01%
<i>Aids to Government Agencies</i>											
Public School Transportation Funds		5,000	0.03%	5,000	0.03%	5,000	0.04%	5,000	0.04%	5,000	0.04%
<i>Aids to Private Agencies</i>											
Trout Lake Center Grant		16,000	0.09%	16,000	0.09%	16,000	0.12%	16,000	0.12%	16,000	0.12%
SubTotal - Education:		68,971	0.41%	88,230	0.52%	89,131	0.68%	90,078	0.69%	91,071	0.69%

Lake County Water Authority
Five Year Plan - 2018-2023

	FY	2018-19	%	2019-20	%	2020-21	%	2021-22	%	2022-23	%
Public Outreach											
Promotional Activities		2,750	0.02%	3,500	0.02%	3,500	0.03%	3,500	0.03%	3,500	0.03%
Supplies, Equipment, Mailings		1,500	0.01%	5,000	0.03%	17,620	0.14%	17,620	0.13%	17,620	0.13%
Media & Graphics Services		2,575	0.02%	10,000	0.06%	15,000	0.12%	15,000	0.11%	15,000	0.11%
Preserve Brochures/Reprinting		5,000	0.03%	10,000	0.06%	10,000	0.08%	10,000	0.08%	10,000	0.08%
SubTotal - Public Outreach:		11,825	0.07%	28,500	0.17%	46,120	0.35%	46,120	0.35%	46,120	0.35%
Resource Data											
Operating Expenses											
Office Supplies		2,900	0.02%	2,900	0.02%						
Operating Supplies		2,375	0.01%	2,375	0.01%						
GIS Projects											
LCWA Web Site Upgrades		1,000	0.01%	1,000	0.01%	1,000	0.01%	1,000	0.01%	1,000	0.01%
Network Maintenance		3,500	0.02%	3,000	0.02%	3,000	0.02%	3,000	0.02%	3,000	0.02%
Lake County Water Resource Atlas		25,000	0.15%	25,000	0.15%	25,000	0.19%	25,000	0.19%	25,000	0.19%
Future GIS Projects		6,025	0.04%	15,000	0.09%	30,000	0.23%	30,000	0.23%	30,000	0.23%
Communication Services		12,500	0.07%	14,000	0.08%	14,000	0.11%	14,000	0.11%	14,000	0.11%
GIS Equipment											
Workstation Replacement		2,475	0.01%	4,500	0.03%	4,500	0.03%	4,500	0.03%	4,500	0.03%
Supplies and Equipment		2,000	0.01%	2,000	0.01%	2,000	0.02%	2,000	0.02%	2,000	0.02%
NAS Server		15,000	0.09%								
GIS Software, Training and Maintenance											
Software Maintenance, Training and Upgrades		2,500	0.01%	2,500	0.01%	2,500	0.02%	2,500	0.02%	2,500	0.02%
LCWA Network - Software and Hardware Upgrades											
Office Server Upgrades (Hardware)		1,500	0.01%	1,500	0.01%	1,500	0.01%	1,500	0.01%	1,500	0.01%
Office Software Upgrades		1,500	0.01%	1,500	0.01%	1,500	0.01%	1,500	0.01%	1,500	0.01%
New Staff PCs Upgrades		5,000	0.03%	5,000	0.03%	5,000	0.04%	5,000	0.04%	5,000	0.04%
Network and Connection Upgrades		3,800	0.02%	5,000	0.03%	5,000	0.04%	5,000	0.04%	5,000	0.04%
SubTotal - Resource Data:		87,075	0.51%	80,000	0.47%	95,000	0.73%	95,000	0.72%	95,000	0.72%
Comm. Redev. Trust Fund Reimbursement		151,442	0.89%	155,985	0.91%	160,665	1.23%	165,485	1.26%	170,449	1.29%
Contingency and Fund Balance											
Fund Balance - End of Year		150,000	0.88%	200,000	1.17%	200,000	1.54%	200,000	1.53%	200,000	1.52%
NuRF Closure Reserve		850,000	5.01%	850,000	4.98%	850,000	6.53%	850,000	6.48%	850,000	6.45%
Alum Reserve		2,100,000	12.39%	2,000,000	11.73%	2,000,000	15.36%	2,000,000	15.26%	2,000,000	15.17%
Surplus of Water Authority Property		315,000	1.86%	315,000	1.85%	315,000	2.42%	315,000	2.40%	315,000	2.39%
Self-Insurance Reserve		240,000	1.42%	250,000	1.47%	200,000	1.54%	200,000	1.53%	200,000	1.52%
Water Authority Building Maintenance Fund		50,000	0.29%	50,000	0.29%	350,000	2.69%	350,000	2.67%	350,000	2.65%
Contingency Reserve		150,000	0.88%	150,000	0.88%	150,000	1.15%	150,000	1.14%	150,000	1.14%
Total Expenditures		16,954,728	100.00%	17,052,337	100.00%	13,024,845	100.00%	13,107,532	100.00%	13,185,319	100.00%
Difference: Revenue - Expenditures		-		0		0		(0)		0	



Lake County

WATER AUTHORITY

27351 State Road 19, Tavares, FL 32778

(352) 324-6141 - www.lcwa.org