Lake County

WATER AUTHORITY

2017 Annual Report and 2017-2022 Five-Year Plan

Lake County Water Authority
Board of Trustees
2017

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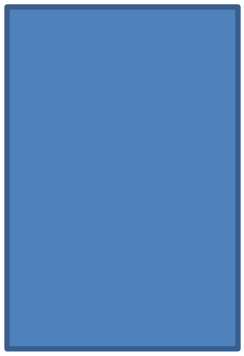


District Two
Vacant

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, 2017 (including background information as necessary for clarity and continuity) and includes the Five-Year Plan reflecting a planning period from FY 2017-18 to 2021-22.

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 2017, 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 County-wide during 2017 was 54.57 inches or 108.08% of expected annual rainfall. The annual rainfall was above the historic average of 50.49 inches due to the passing of hurricane Irma. The Category 3 Hurricane Irma in September was a high intensity rain event at the end of the rainy season that kept water levels within the Clermont Chain of Lakes up at the end of 2017. At times during 2017 lake levels were high enough to require the opening of the dams, particularly before and after the hurricane. Even with these significant meteorological events, the LCWA successful in maintaining water levels within the regulatory levels.

In 2016, minimum discharges continued from the "middle lakes" (including Lakes Harris, Eustis, Dora and Beauclair) and Lake Griffin. During February and March, flood discharges were released from the "middle lakes" and Lake Griffin. For most of the year, the middle lakes and Lake Griffin generally maintained the regulatory level, however fell

during the last two months of the year. Lake Apopka neared the regulatory level during spring and the SJRWMD was able to resume discharges of approximately19 cfs (cubic feet per second) from Lake Apopka through the NuRF until the lake dropped below minimum desirable levels in mid-May. All flow from the lake was suspended for the remainder of the year.

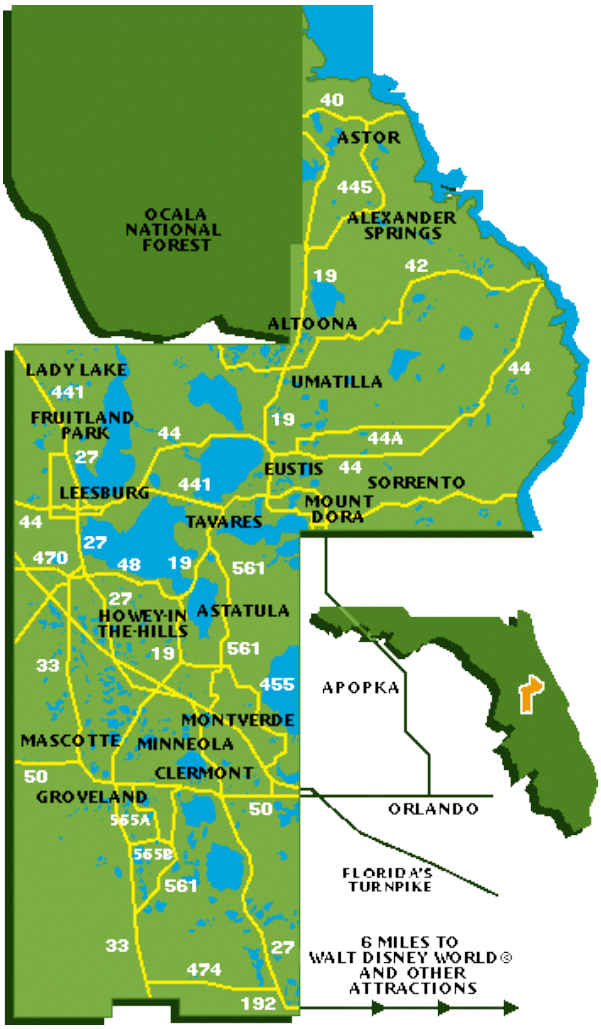
In 2017, levels on all the Harris Chain remained well below regulatory levels and continued to drop as the year progressed. Water levels began to increase at the beginning of our rainy season in June. By August, the lakes were at regulation levels. The exception was Lake Griffin, which was still 6" below its regulation level. As Hurricane Irma approached on September 9th, discharges from all dams increased dramatically. Approximately 11 inches of rain across the county resulted in an average increase of water levels of 1 foot. These high-water levels resulted in extremely high discharges for most of the remaining 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.

Introduction

The Lake County Water Authority

The Lake County Water Authority was created in 1953 as the Ocklawaha Basin Recreation and Water Conservation and Control Authority. The Legislature directed that the Authority be created at that time for the following purposes:



- To control and conserve the freshwater resources of Lake County;

- To foster and improve the tourist business in the county by improvements to the streams, lakes, and canals in the county;

- To provide recreational facilities for the tourists and citizens and taxpayers of the county by a more efficient use of the streams, lakes, and canals in the county;

- To preserve, protect, and improve the fish and wildlife of the county.

During the 2000 Florida Legislative session, the legislature restructured the Board of Trustees from a three-member appointed board to a seven member, non-partisan, elected board. The legislature also added the following as an additional purpose:

- Protecting the freshwater resources of Lake County through assisting local governments in treatment of stormwater runoff.

In 2000, the legislature also officially changed the name of the agency to the Lake County Water Authority.

During the 2005 Legislative session, the legislature passed a codification bill and made some changes to the purposes of the Lake County Water Authority. The following are the purposes as included in this bill:

- 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 January 2015, the Board awarded a bid to build a new office building. Construction continued through much of 2015 and completed in November 2015. The move into the new facility was made in December 2015.

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, 2017 (including background information as necessary for clarity and continuity) and includes the Five-Year Plan reflecting a planning period from FY 2017-18 to 2021-22.

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 Palatlakaha;
- evaluating nutrient loads to the Apopka Beauclair Canal from ditches downstream of the nutrient reduction facility;

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 due to Hurricane Irma, provided increased 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 three years. Previously, the extended drought kept water levels below regulatory levels for approximately 10 years and to maintain these higher levels for the past three 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:

<u>Cooperative Stormwater Initiative</u> – 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-five 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 2017 or earlier and are either under construction or under design. These projects include:

Project Name	***Cooperator***	***Water Authority Contribution***
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 2017,

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 Palatlakaha River. The Water Authority may also act to remove sediment, tussocks, and debris from waterways that impede boat movement through these public waterways. In 2017, 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 fallen trees because of Hurricane Irma. Some of these trees had to be removed immediately because they were in floodways and were obstructing the discharge of flood flows.

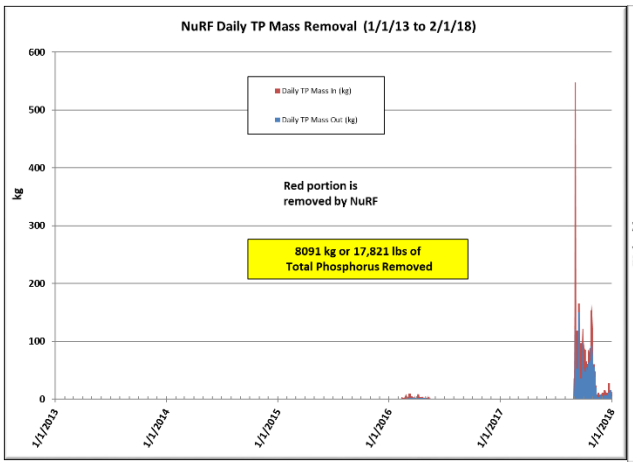
Apopka-Beauclair Canal Nutrient Reduction Facility - The LCWA's Nutrient Reduction Facility (NuRF) became operational in March 2009 and is currently the world's largest alum-based surface water restoration facility. The St. Johns River Water Management District provides the land on which the facility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

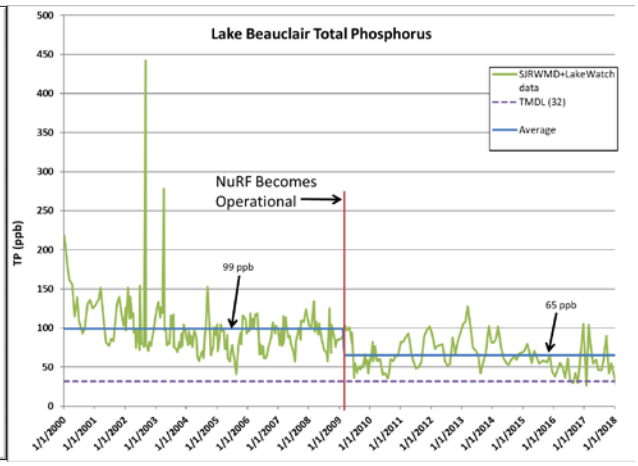
NuRF Site, October 4, 2007, pre-construction

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.

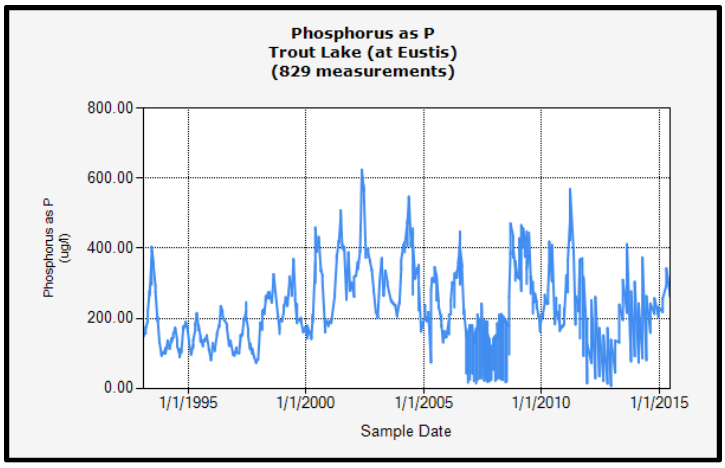




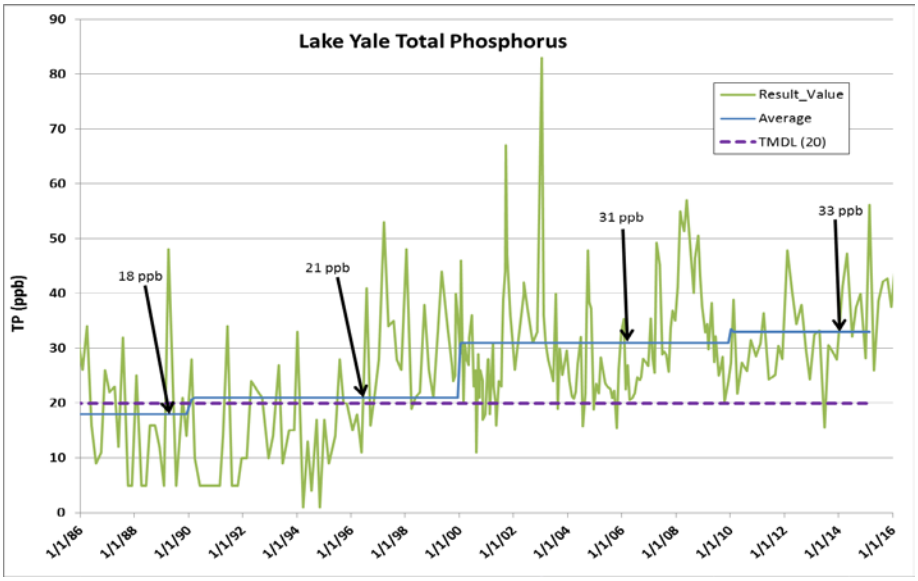
Performance results conducted when the NuRF operated were as expected and average removal rate for total phosphorus was sixty percent. On September 11th, Hurricane Irma made landfall in Marco Island and moved northward through the state. The storm brought an average of 11 inches of rainfall over a 24-hour period. Because of flooding on Lake Apopka, the St Johns River Water Management District (District) released high flows before, during, and for an extended period after the storm. Flows above 375 cubic feet per second were common. By the end of 2017, the total phosphorus removal at the NuRF had more than doubled the removal amount from the previous 7 years combined. Though the end of 2017, the NuRF had removed 17,821 pounds of total phosphorus and injected 8 million gallons of alum. Alum cost for the NuRF since opening on February 2009 has been approximately $4 million. Water quality data from Lake Beauclair indicates a 35% reduction in total phosphorus since the construction of the NuRF.

<u>Trout Lake and Lake Yale Water Quality Improvements Project</u> – Trout Lake is a 103-acre waterbody on the Harris Chain that has been plagued by extremely poor water quality. This poor water quality is the result of historic and continued agricultural discharges from Hick's Ditch as well as old historic direct sewage discharges from the City of Eustis via Orchid Canal. The lake impacts water quality in Lake Eustis through its constant discharges under Highway 19. Other more minor sources, such as stormwater and septic, also are a factor.

Lake Yale is a 4,044-acre lake that is also 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 Board approved the development of a detailed nutrient budget for both lakes. The final report determined the pollutant loading amounts and provided recommendations to reduce the controllable sources. It also included a list of recommended projects for the Board's consideration. The top recommended project was a whole-lake alum treatment to strip nutrient 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 nutrient from the water column.

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 2017, the LCWA completed the twelfth year of assessments on Lakes Beauclair, Dora, and Harris.

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 following Hurricane Irma, staff inspected all the signs and replaced those that were damaged or missing. 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.

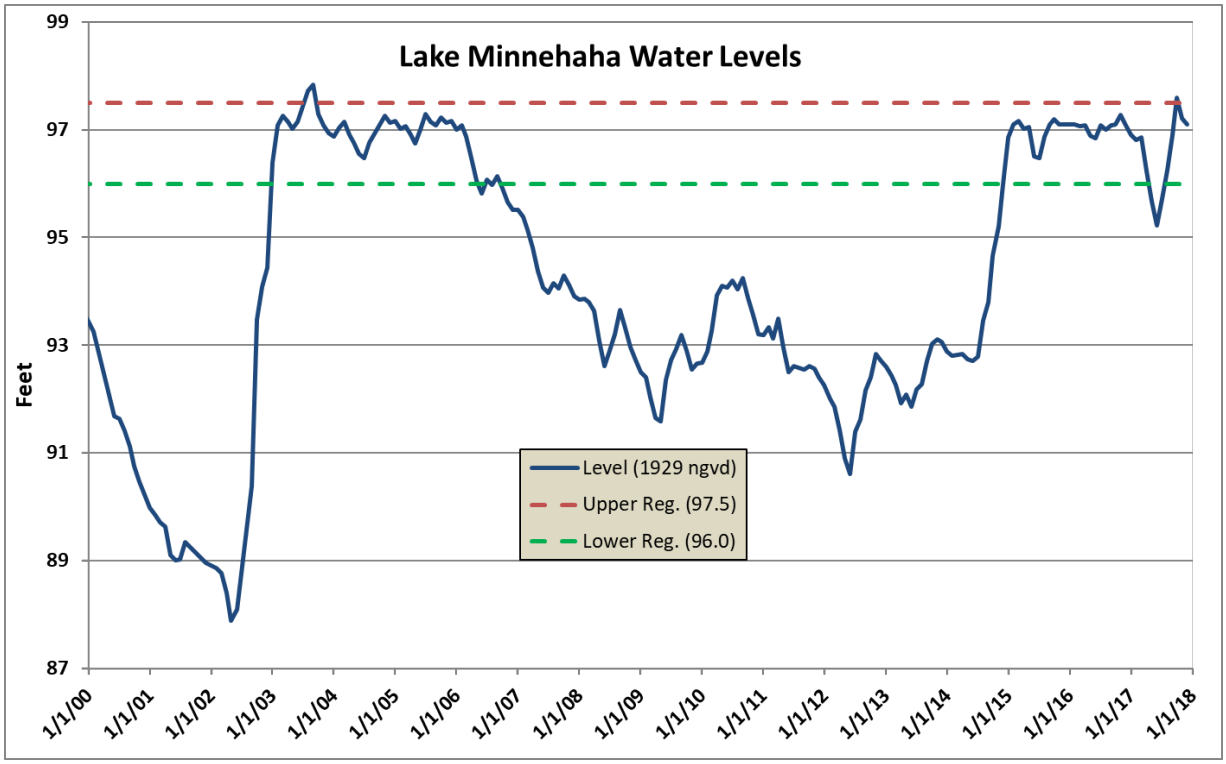
At the request of the Florida LAKEWATCH Program, the Board historically provided funding to cover the Lake County operating expenses. However, to significantly reduce cost, the Water Authority has agreed to fund the much less expensive Adopt a Lake

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 $700,000.

Harris Chain Restoration Council - The Board continued its financial support of the Harris Chain Restoration Council in 2017 by budgeting $5,000 to cover their operating expenses.

Water Level Management of the Harris Chain of Lakes and the Palatlakaha River - Lake levels on the Harris Chain of Lakes and water levels on the Palatlakaha 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 2017 was 54.57 inches or 108% of expected annual rainfall. Because annual rainfall was over the historic average of 50.49 inches, the LCWA was successful in maintaining water levels in the Palatlakaha River within the regulatory range except for a brief spike following Hurricane Irma. However, staff was successful in keeping levels within 3 inches of the regulatory range by discharging enough water prior to, during and following the hurricane. Note: The rainfall from Hurricane Irma was almost equivalent to a 100-year 24-hour storm event.



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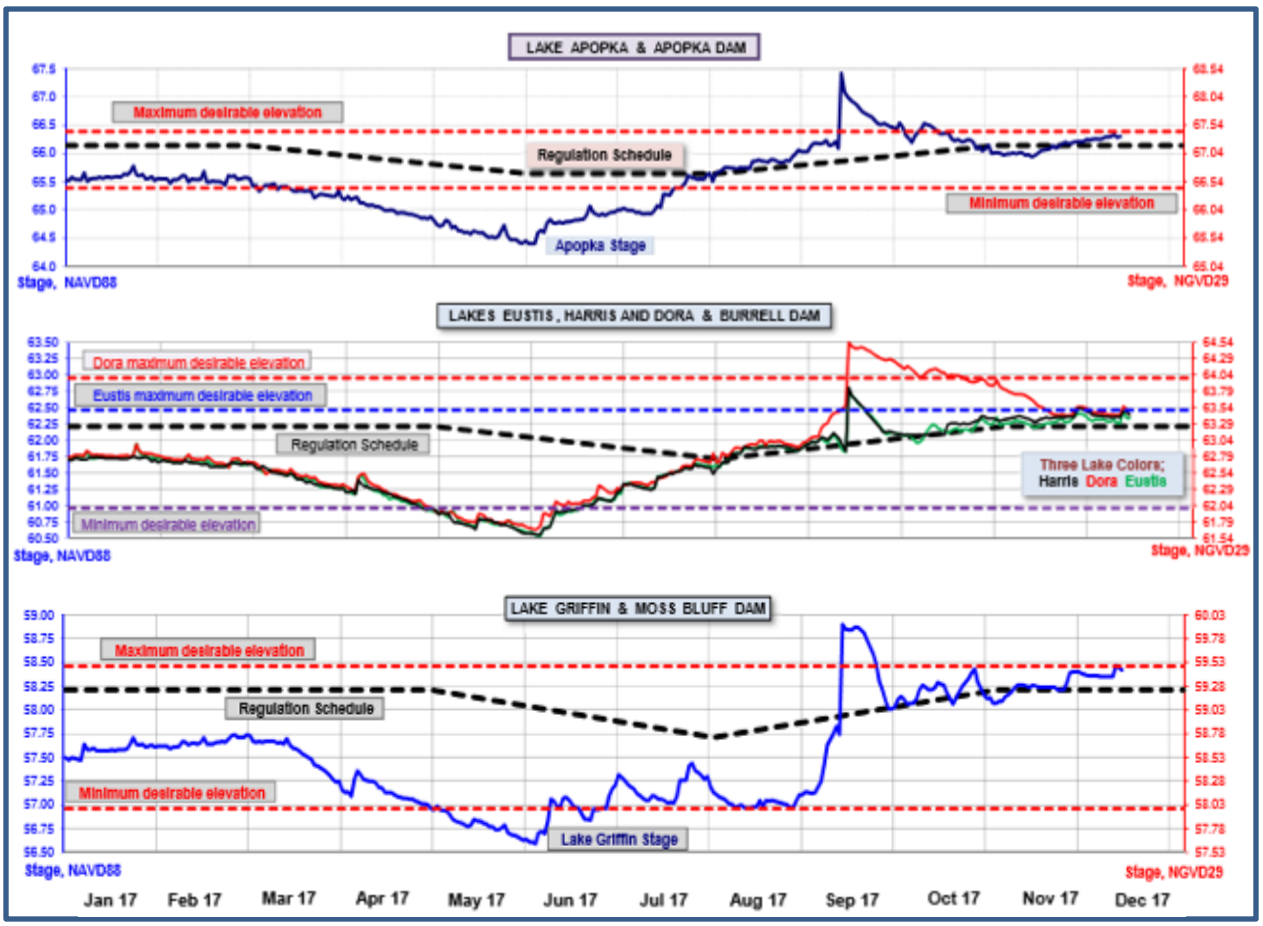
In 2017, levels on all the Harris Chain remained well below regulatory levels and continued to drop as the year progressed. Water levels began to increase at the beginning of our rainy season in June. By August, the lakes were at regulation levels. The exception was Lake Griffin, which was still 6" below its regulation level. As Hurricane Irma approached on September 9th, discharges from all dams increased dramatically. Approximately 11 inches of rain across the county resulted in an average increase of water levels of 1 foot. These high-water levels resulted in extremely high discharges for most of the remaining year.



Land Resources

The Water Authority's land resources program not only conserves and protects unique and irreplaceable land and water resources in the county, but 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 has directed the agency staff to primarily focus on projects benefiting the quality of our lakes, the Board has also directed the Land Resources Division to continue 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 County Commissioner-appointed citizens committee. 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 562- 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.

Sites Accessible to the Public

The Water Authority currently has 27 Preserves with 15 of them open to the public for various recreational activities on land and in the water. The following sites are open to the public seven days a week, from sunrise to sunset.

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.

Future camping and picnic area at Bear Track and view from new property

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. In May, staff rebuilt and rethatched the Chickee.

On July 25th, the pier was repainted by a contractor. In August, staff replaced a portion of the eves on the Cracker House that were rotted. After the initial damage from Hurricane Irma, a large branch from a live oak tree fell onto the Cracker House, doing considerable damage to the roof. On December 18th, staff began repairs on the Cracker House roof.

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. Staff continues to manage the property for the benefit of listed plant and wildlife species and for the property's aquifer recharge value. Staff had 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. Staff regularly has workdays to control the exotic, invasive plants in the uplands and along the shoreline. In 2014 the agency received the Recreational Trails Program grant from the Florida Department of Environmental Protection to install a restroom, handicap parking area and an accessible canoe/kayak structure on the river. In 2015 staff worked on permitting and purchasing the equipment for the trailhead updates. The Preserve has seen a 50% increase in usage especially with visitors fishing and paddling.

Crooked River trailhead including ADA restroom and sidewalk

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, Johnson grass) and removal of feral hogs that can damage the wetlands. In January, a new drain field was installed for the public restrooms. Roots had grown into the drainage pipes of the old drain field and completely blocked the drain field.

A number of trees were blown down across the boardwalk during hurricane Irma, causing considerable damage. In December, staff finished up the repairs to the boardwalk.



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

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. The changing 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. In June, the Board asked the Disc Golf group to remove the course from the Preserve.

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.

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.

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. During 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. Staff has been working to establish native vegetation 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, staff

continues to amend the soils and try different combinations of native vegetation. In 2017, the Water Authority Board of Directors agreed to dedicate a power line easement along the eastern boundary of the Preserve. A number of trees had to be trimmed or completely removed. The Water Authority received compensation for the impacts and the money will go back into restoration and improvement projects on the Preserve.

Sawgrass Island Preserve - This 1,137-acre site provides protection for the 500± 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 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.

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.

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. Staff accesses this property by boat for yearly inspections.

Other Properties

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. Staff conducted a controlled burn in July 2016 on the uplands to reduce the wildfire threat and staff has lead guided tours on the Preserve. Paddlers and fisherman continue to enjoy the undisturbed shoreline of this property for fishing and wildlife observation.

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

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. 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. Staff has assisted in the annual bird count for this area and has led annual hiking and paddling events. 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.

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. In August, staff hosted an "Open House" for the public to visit the waterfall and sinkhole.

2017 Management Activities

- On September 11, 2017, Hurricane Irma left a path of destruction across the state of Florida. For months after the storm, staff worked to clear debris and reopen Preserves as they were made safe for the public. It was a Herculean effort to recover from the hurricane and still try to keep up with the day-to-day operations of the Preserves.
- Staff hosted a "Love Your Lakes" Cleanup event March 5th in the Clermont Chain-of-lakes with 10 volunteers. April 1st, staff along with Florida Forestry Services and Keep Lake Beautiful led a cleanup of the Blackwater Creek Basin and Wekiva River with 18 volunteers. November 18th, staff led a 4-H Day at Hickory Point Park doing a paddle/clean-up along the shore line with 9 participants.

- Water Authority staff partnered with the Lake County Parks and Trails staff to host 6 paddling events throughout the County designed as an introduction to our waterways and encourage participants to enjoy recreating on the County's lakes and rivers. 2017 paddles included: January 13th, Paddle/Hike at Crooked River Preserve with 14 participants. On February 18th Helena Run/Flat Island with 15 participants, April 28th, we paddled Blackwater Creek and Lake Norris with 15 participants. May 20th, we taught a Beginners Paddling Class at Hickory Point,

and led a short paddle around Horseshoe Island. October 19th staff led a paddle/clean-up event at Katie's Landing on the Wekiva River. November 18th, staff led a paddling trip of Double Run.

- During 2017, staff participated in the Lake County Parks and Trails Advisory Committee, North Florida 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 Prescribed Fire Council meetings.
- In October, staff led a paddling trip at Alexander Spring Run in Ocala National Forest as part of the Umatilla Wildlife Festival (formerly the Black Bear Festival).
- April 22nd, staff had an information booth at the Clermont Earth Day Celebration and Clean Up.
- Staff continues to 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 2017, staff conducted 7 prescribed burns. Two were pile burns and the other five totaled 42.7 acres.

Date	Preserve	Unit(s)	Acres	Contractor
January 25, 2017	Scrub Point	SP-07	5	No
June 20, 2017	Flat Island	FI-01	7	No
June 22, 2017	Sabal Bluff	SB-03 (wiregrass plots)	10	No
November 2, 2017	Hidden Waters	HW-05	3.7	No
November 15, 2017	Hickory Point	Pile	Pile	No
November 28, 2017	Sabal Bluff	SB-03 & 04	17	No
December 5, 2017	Scrub Point	Pile	1 Pile	No

- Staff led various hikes on the Preserves such as the Dog Walk on January 7th at Lake Norris Conservation Area, Bats and Fireflies Hike at Flat Island Preserve on March 10th; on April 29th, staff led a field trip for the Florida Wildflower Foundation at Flat Island Preserve; on October 14th at Hidden Waters Preserve staff led a hike with 8 participants; October 27th, staff led a Florida Native Plant Society Beautyberry Chapter hike at Flat Island; November 1st, staff led the Florida Native Plant Society Villages Chapter on a hike at Flat Island Preserve; November 2nd, staff held a Halloweed (Halloween-Weed) Event at Hidden Waters Preserve to survey for and collect invasive plants; October 14th, staff led a hike at Hidden Waters Preserve.

- For the 7th year, LCWA staff, staff from Bok Tower Gardens and volunteers have surveyed and monitored the endangered Clasping warea (W*area 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 staff takes the opportunity to do native plantings on the Preserves as part of the long-term restoration of each site. The photo to the left shows staff planted oaks in the scrub jay restoration unit at Sawgrass Island Preserve.

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.

Staff has noticed an increase in the diversity of locations that people come from at the different Preserves. While maintaining the properties, staff is also trying to increase their profile through the agency's website and through Facebook.

Preserve attendance for 2017 was down about 2.5% from 2016's attendance numbers with 316 fewer visitors (overall, pretty consistent). It is important to consider that most of the Preserves were closed for a few weeks after Hurricane Irma, until they could be cleared of debris and made safe for the public. 12,668 people visited the Preserves in 2017. This year, the top three Preserves were Flat Island, Hidden Waters and Crooked River Preserves (similar to 2016).

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 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.

2017 Park Activities:

- Hosted the Lake County Soil and Water Conservation District's annual Envirothon Competition for school groups and LCWA staff manned the Aquatic Resources table.
- Site of 25 Fishing Tournaments in 2017, with 1,734 participating boats.
- 194 Pavilion Rentals for 2017.
- Hosted a Kid's Fishing Clinic for 58 children and their families.
- Hosted a Freshwater Master Naturalist program.
- Site for Trout Lake Nature Center Spring Break.
- Site for Love Our Lakes Clean Up.

Hickory Point Park Attendance for 2016 – 64,181 vehicles or 160,455 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. In 2017 staff 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 2017:

- 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 2017, the Lake County Water Authority provided $15,500 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 also 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.

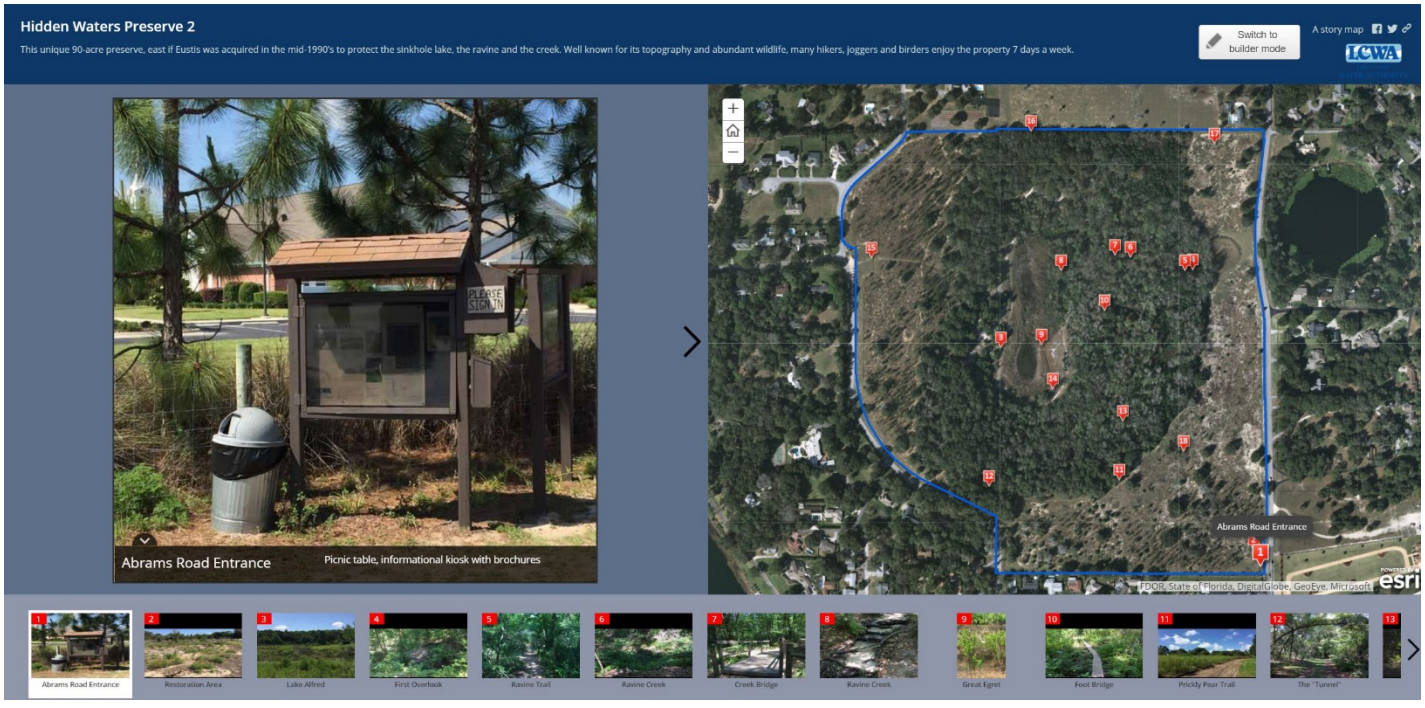
Several precautions have been put in place to minimize these types of network attacks however system infiltrations are difficult to prevent. Network administration is an active part of total in-house support to staff members of LCWA. A secure network is major challenge that staff will keep working to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

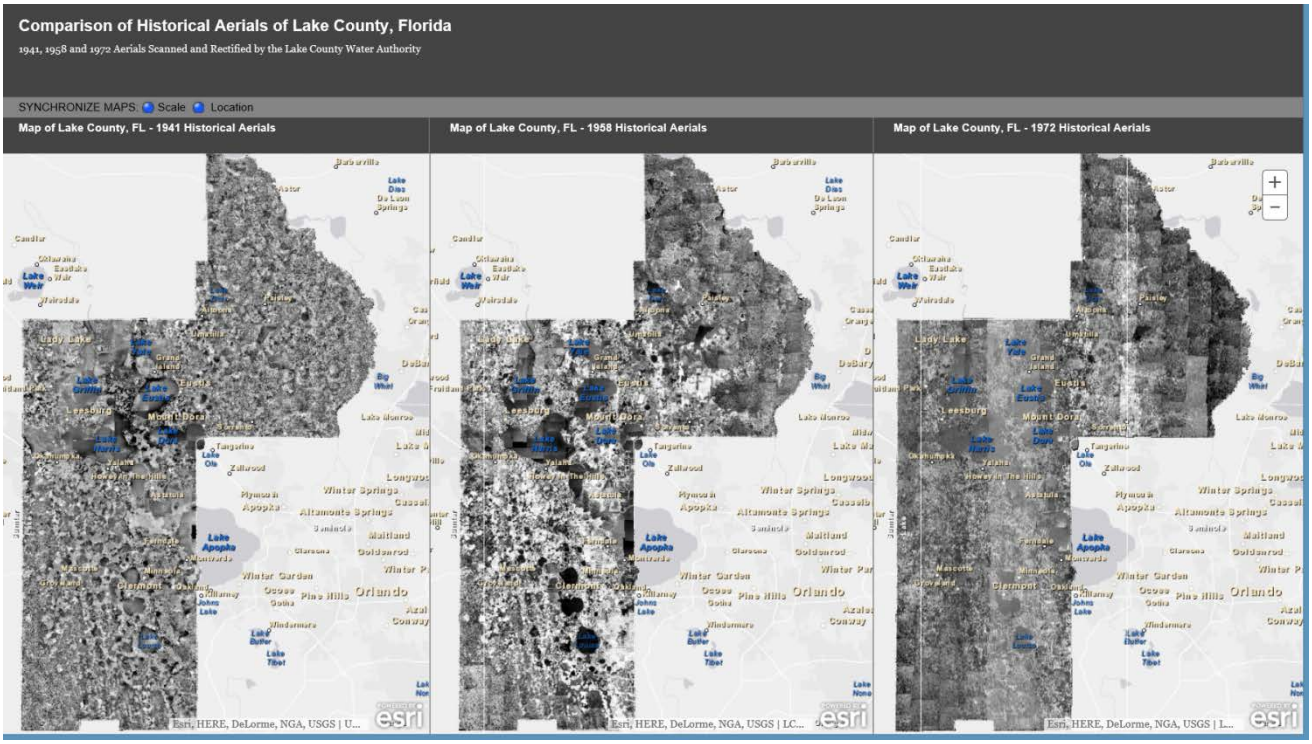
Web Mapping Applications (Apps)

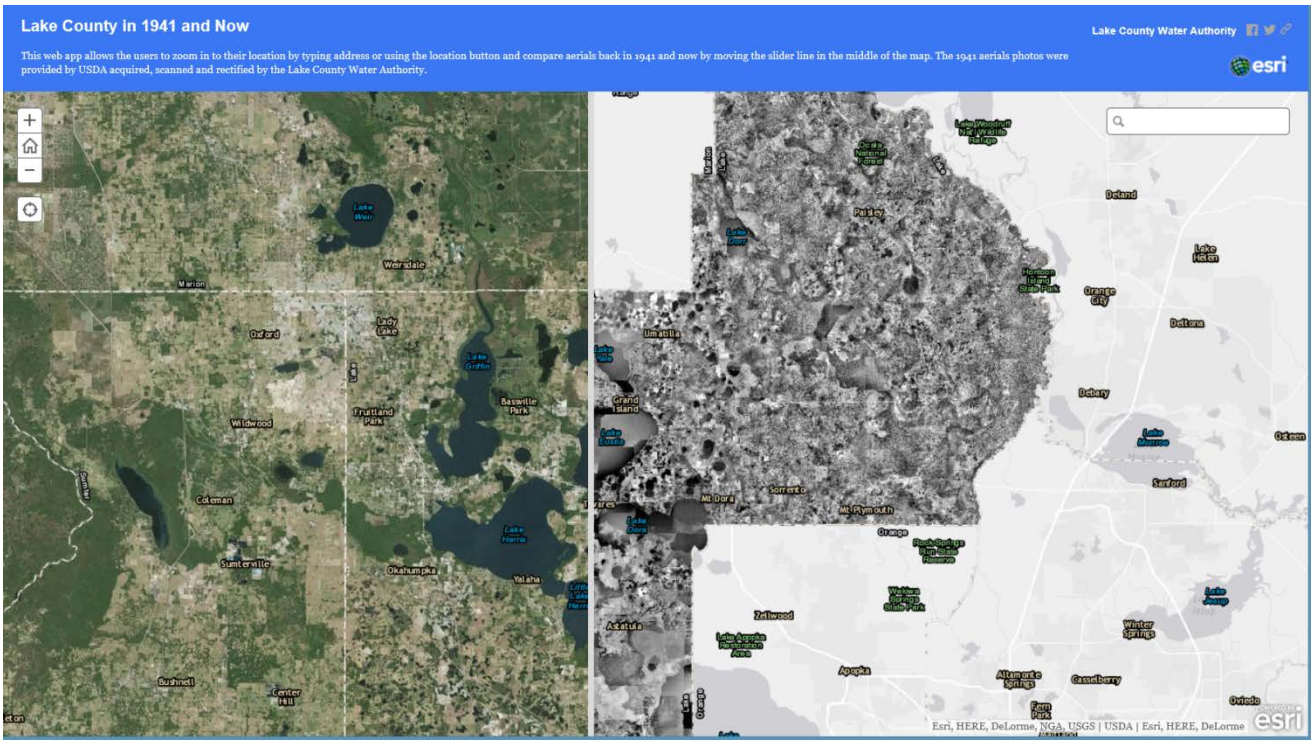
In 2017 the Lake County Water Authority GIS encumber the task of creating mapping applications that utilizes the resources provide by ESRI (main GIS software) and the historical aerial photographs of Lake County captured by USDA. During 2017 staff continued to update and maintain these apps with positive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

In 2017 staff 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 computers and mobile devices. The type of 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 expertise.


LCWA
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
1941
1958
1972
Application Map of Lake Count...
GIS Web Maps
Lake County Water Authority ...


Hidden Waters Preserve 2
This unique 90-acre preserve, east if Eustis 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.
Switch to builder mode
A story map
Abrams Road Entrance
Picnic table, informational kiosk with brochures
Abrams Road Entrance
esri





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 current aerials. 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 our 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 2016-17 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.

The Lake Water Atlas went through an update including the initial home webpage completed in the beginning of 2017.

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

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

- 892 Waterbodies in Atlas (named waterbodies only)
- 36 Agencies and Organization Providing Data
- 1,342,191 Individual Analyses / Observations
- 60% of Visitors of these were new visitors
- 19,323 Visitors in the last 12 months

- 60% of all Visitors come from searches (Google, etc.)
- 30% of Visitors are referred by other sites
- 28% of Visitors go directly to the Atlas

The Lake County Water Resource Atlas has been updated in 2017. 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 was 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.

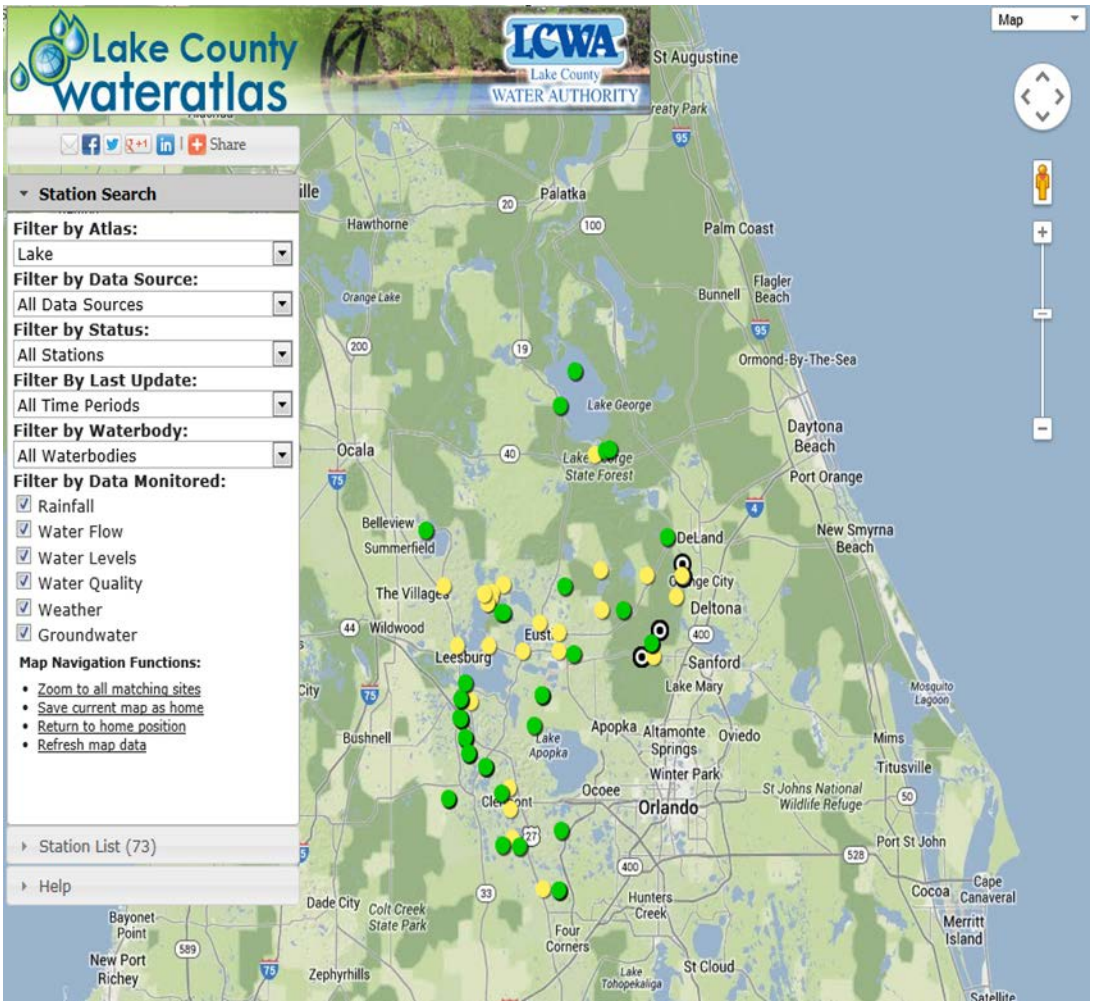
A. LCWA Property Layer
The layer had several updates on the attribute and vector data that were incorporated in the GIS database. Copies of the layer and the metadata were submitted to the County's GIS department and the SJRWMD. Various property boundaries were incorporated into the layer utilizing certified 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 2017 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

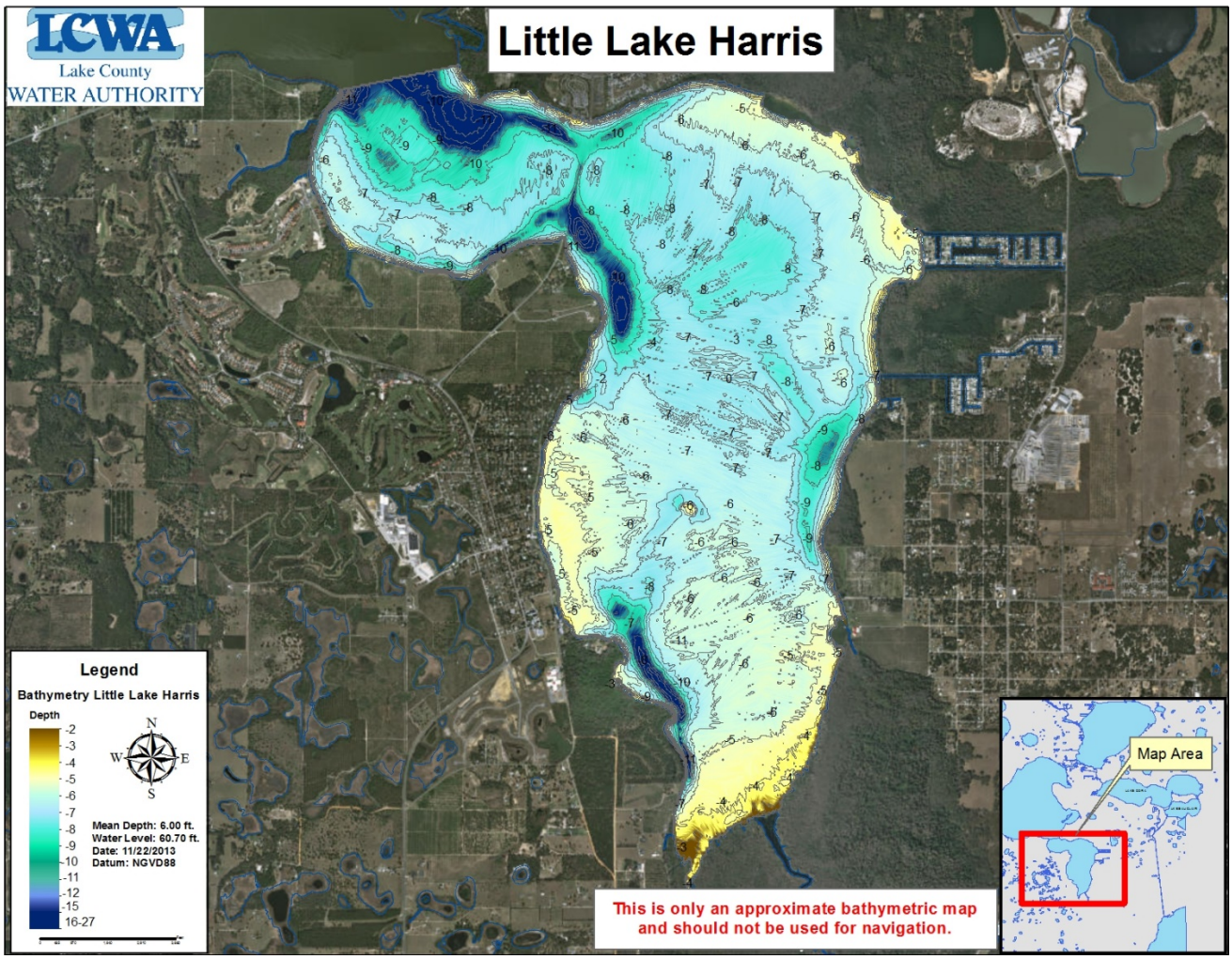
throughout lake county for the public to utilize. This application was integrated on the Water Authority's website with direct link to the Water Atlas data layers.



Lake Bathymetry Data Collection

With current water elevations, bathymetry data information is essential in determining the human and natural impact to the lakes in the county. Often bathymetry data is critical in the decision process regarding water resource projects. Acquiring depth information over a period of time in selected areas could provide information for areas of concern in the lake where navigational hazards exist, such as the narrows on Lake Dora or the Dora Canal. Once collected, maps and data could be provided to the public for both navigational and information purposes.

The Board approved funds in its 2016-17 budgets for equipment that could provide this bathymetric information. Staff is excited to report that the system, which includes the combination of both hardware and software, is collecting and storing data as expected from which staff can create digital maps.

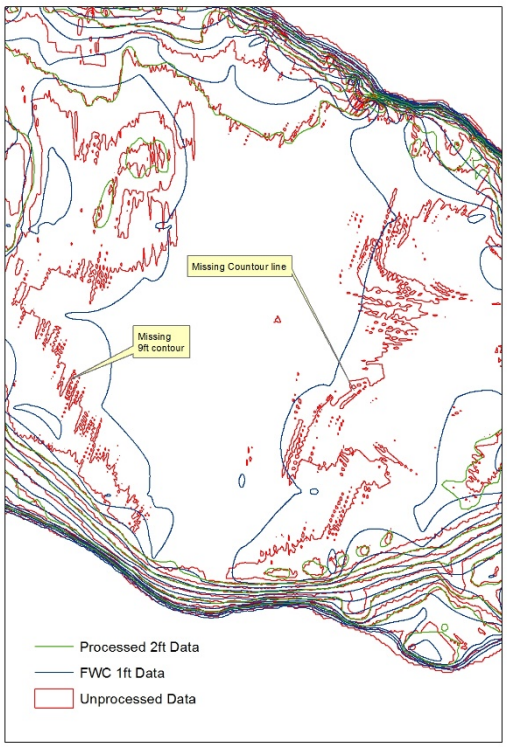


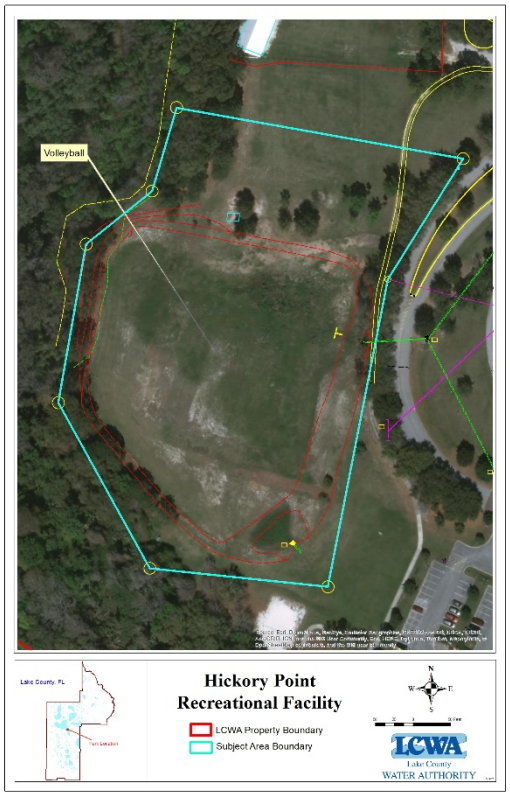
Staff has collected bathymetry data for four major lakes; Lake Dora, Lake Beauclair, Lake Carlton, Little Lake Harris and new in 2017 Lake Harris, Lake Eustis, Lake Denham, Lake Griffin and Lake Louisa. The collected bathymetric data is being processed (cleaned). The maps will be created from this information and provided a presentation to the LCWA Board for information.

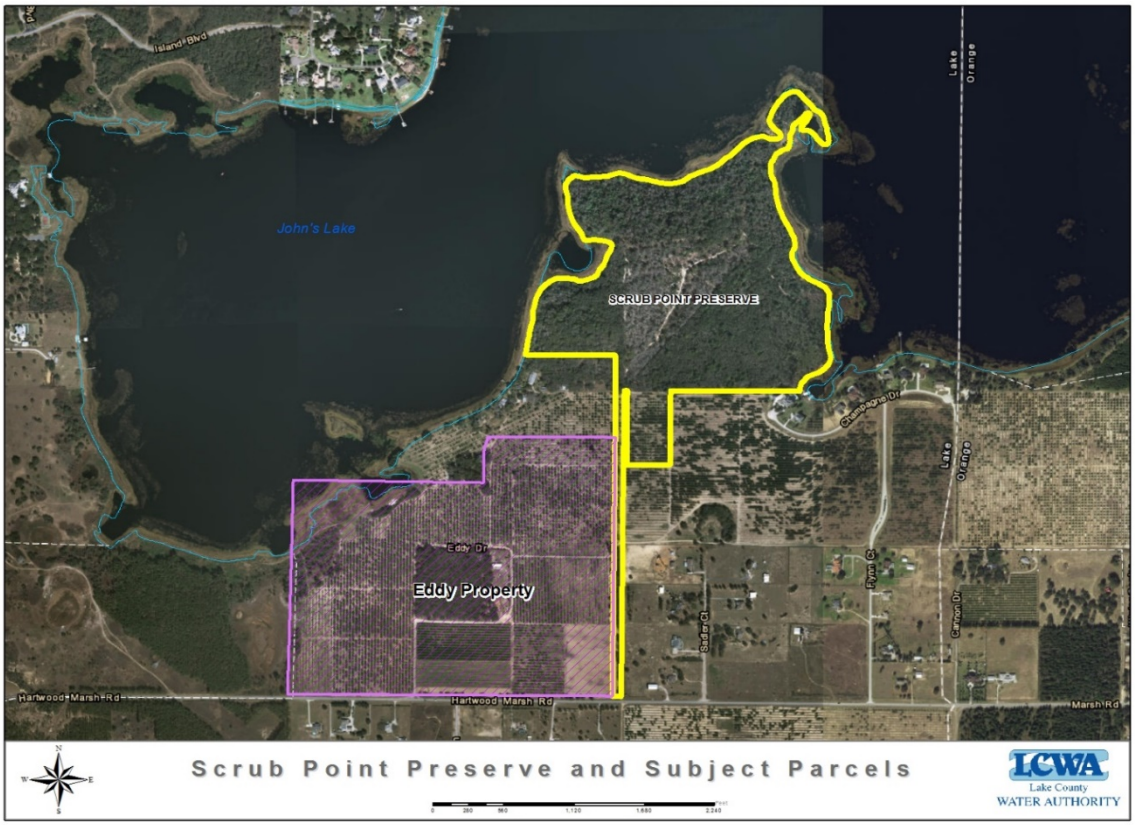
These new bathymetry maps have been saved into the Water Atlas for public download and use replacing the old and outdated maps on the site.

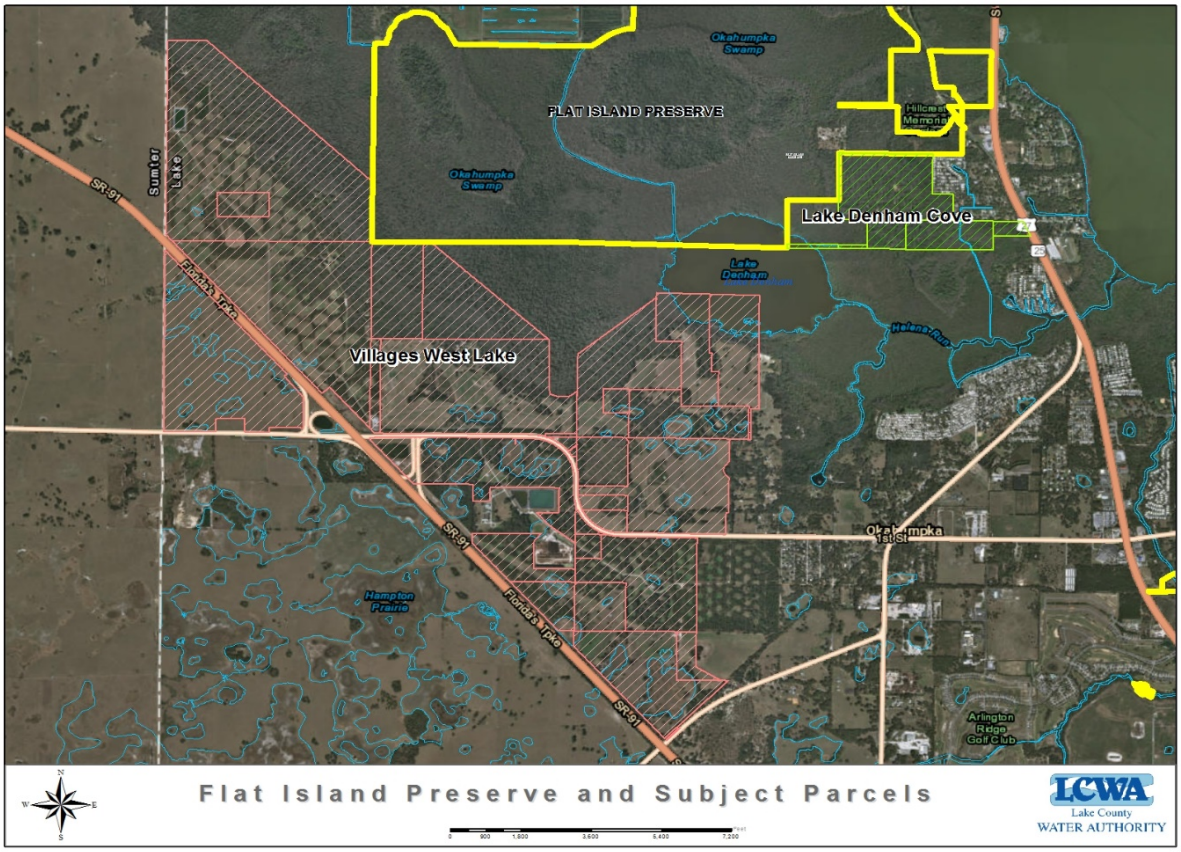
Produced Maps

Examples of maps that facilitated the planning and decision-making process and provided general information for the board, staff and public in 2017 are shown below:


Missing Countour line
Missing
9ft contour
Processed 2ft Data
FWC 1ft Data
Unprocessed Data


Volleyball
Lake County, FL
Hickory Point
Recreational Facility
LCWA Property Boundary
Subject Area Boundary
LCWA
Lake County
WATER AUTHORITY


John's Lake
SCRUB POINT PRESERVE
Eddy Property
Island Blvd
Lake Orange
Hartwood Marsh Rd
Marsh Rd
Scrub Point Preserve and Subject Parcels
LCWA
Lake County
WATER AUTHORITY


FLAT ISLAND PRESERVE
Okahumpka Swamp
Lake Denham Cove
Villages West Lake
Sumter Lake
SR-91
Florida's Turnpike
Hampton Prairie
Arlington Ridge Golf Club
Flat Island Preserve and Subject Parcels
LCWA
Lake County
WATER AUTHORITY


1
93.58
2
92.59
3
91.98
4
91.82
5
90.47
Map Location
Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI,
N
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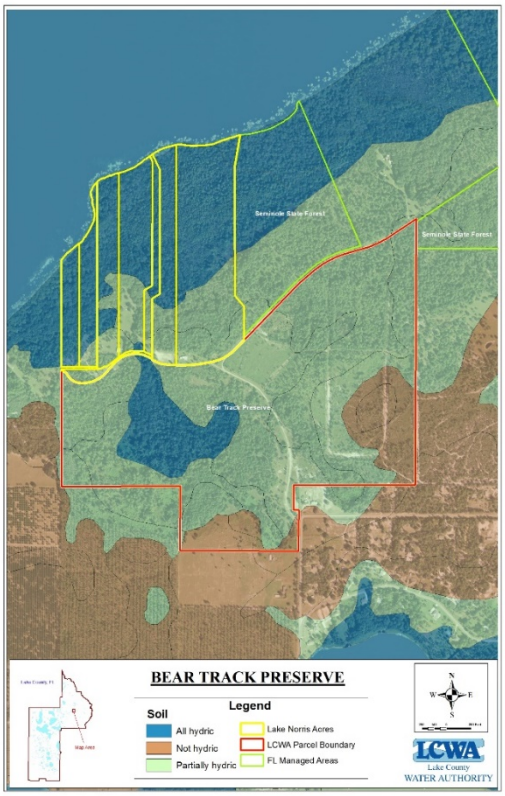
S
0 15 30 60 90 120
Feet


Seminole State Forest
Seminole State Forest
Bear Track Preserve
BEAR TRACK PRESERVE
Legend
Soil
All hydric
Not hydric
Partially hydric
Lake Norris Acres
LCWA Parcel Boundary
FL Managed Areas
LCWA
Lake County
WATER AUTHORITY


Subject Parcel
UNITY LAKE
EAGLE RIDGE PRESERVE
LAKE GRIFFIN
LAKE GRIFFIN
Lake County, FL
Map Location
LCWA
Lake County
WATER AUTHORITY
EAGLE RIDGE PRESERVE
LCWA Preserve/Conservation Areas
Subject Parcel
N
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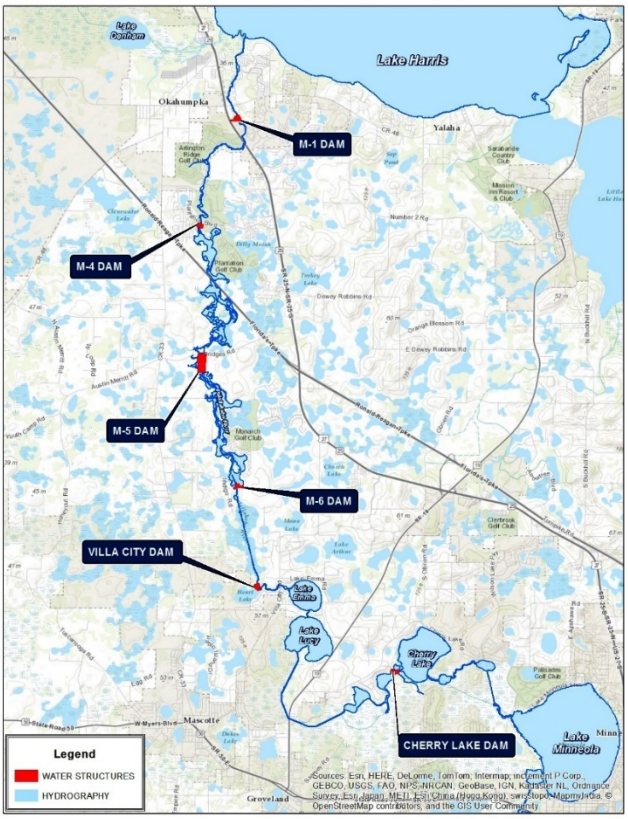
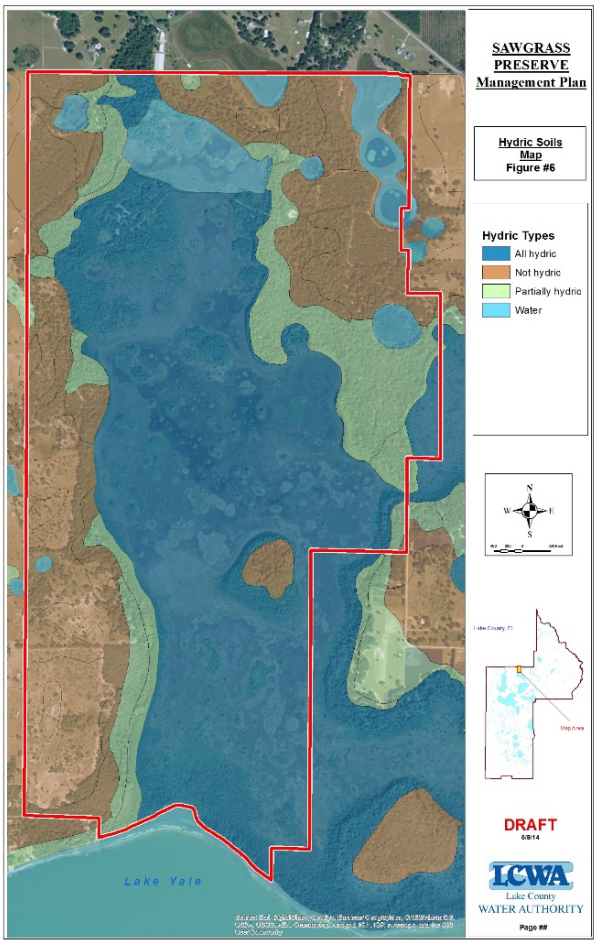
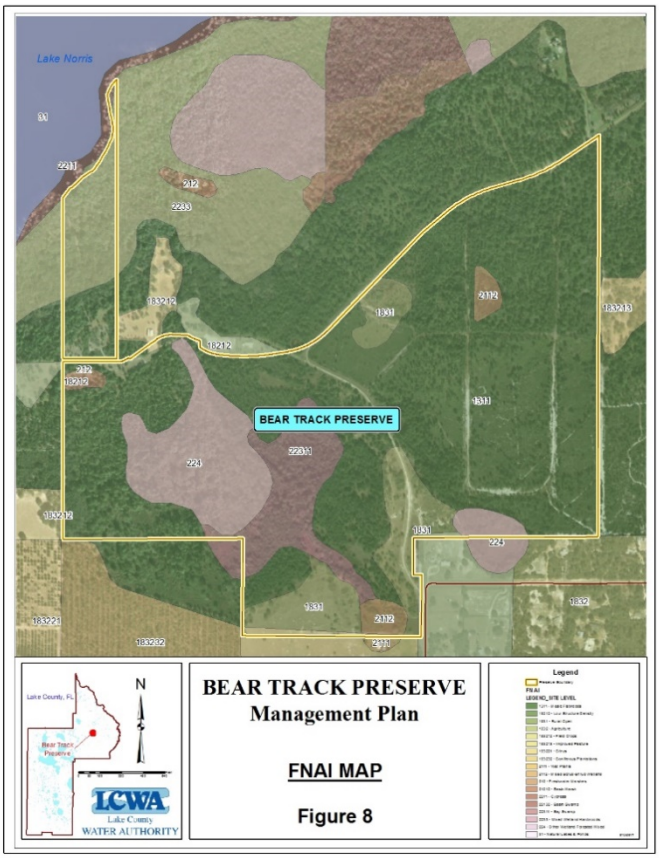
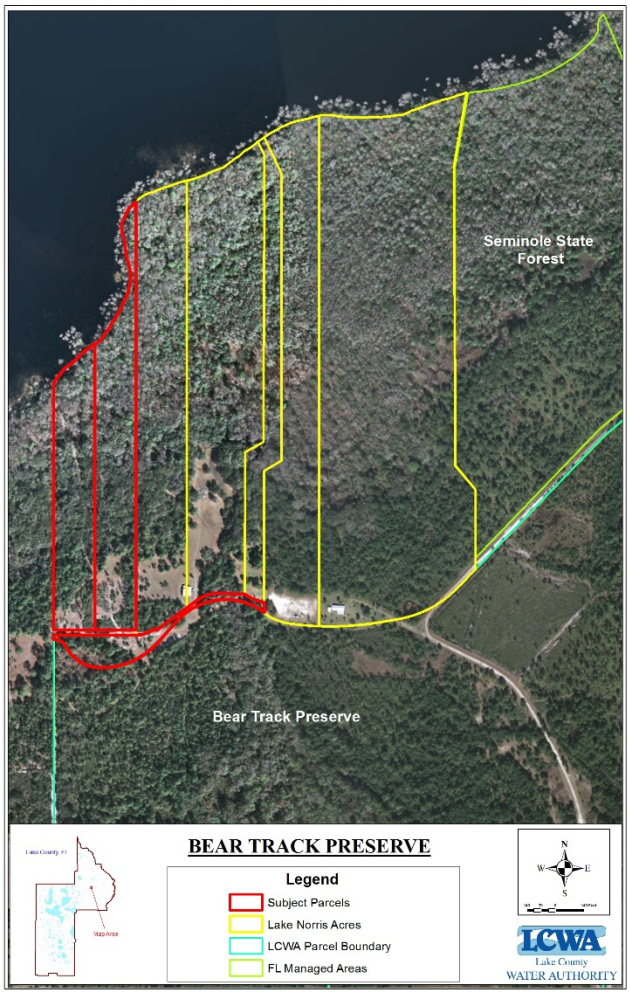
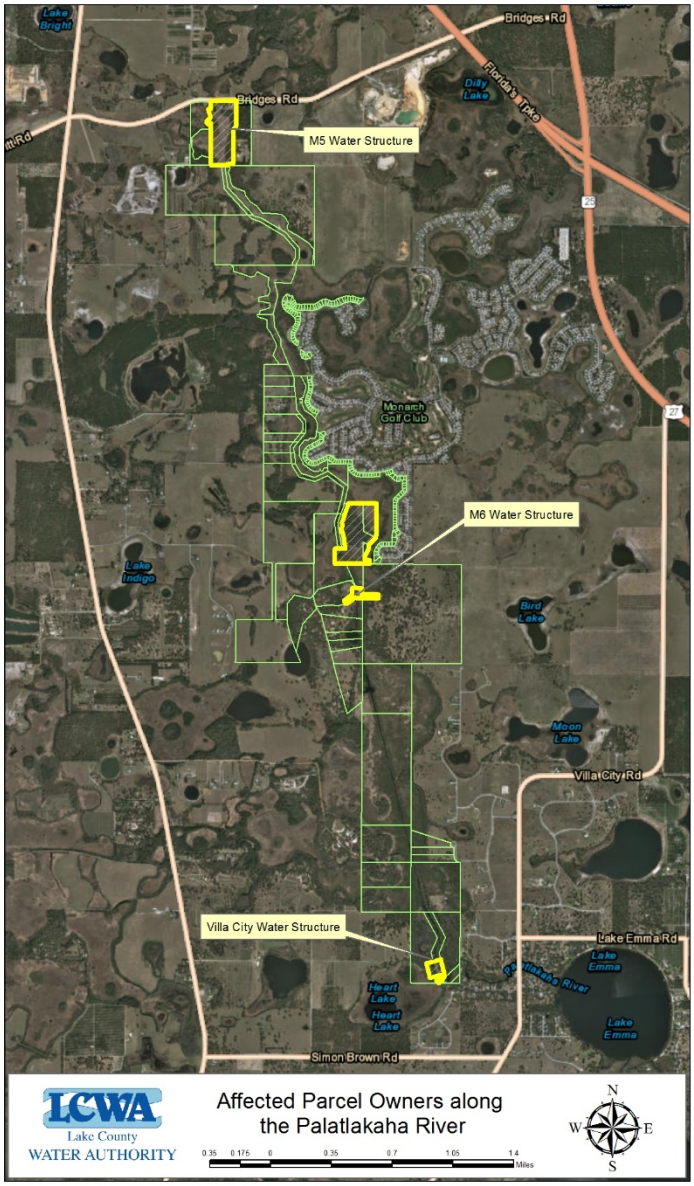

Lake Harris
Okahumpka
Yalaha
M-1 DAM
M-4 DAM
M-5 DAM
M-6 DAM
VILLA CITY DAM
CHERRY LAKE DAM
Lake Minneola
Mascotte
Groveland
Legend
WATER STRUCTURES
HYDROGRAPHY


SAWGRASS PRESERVE Management Plan
Hydric Soils Map Figure #6
Hydric Types
All hydric
Not hydric
Partially hydric
Water
Lake Yale
DRAFT
LCWA
Lake County WATER AUTHORITY


Lake Norris
BEAR TRACK PRESERVE
BEAR TRACK PRESERVE
Management Plan
FNAI MAP
Figure 8
LCWA
Lake County WATER AUTHORITY


Seminole State Forest
Bear Track Preserve
BEAR TRACK PRESERVE
Legend
Subject Parcels
Lake Norris Acres
LCWA Parcel Boundary
FL Managed Areas
LCWA
Lake County
WATER AUTHORITY


Lake Bright
Bridges Rd
Dilly Lake
Florida's Tpke
M5 Water Structure
Monarch Golf Club
M6 Water Structure
Lake Indigo
Bird Lake
Moon Lake
Villa City Rd
Villa City Water Structure
Lake Emma Rd
Lake Emma
Heart Lake
Simon Brown Rd
LCWA
Lake County
WATER AUTHORITY
Affected Parcel Owners along the Palatlakaha River

Lake County Water Authority
Five Year Plan - 2017-2022

FY	2017-18	%	2018-19	%	2019-20	%	2020-21	%	2021-22	%
Revenue										
Revenue (less 5% uncollectable)	4,618,740	28.04%	4,942,052	32.75%	5,090,314	40.09%	5,243,023	44.83%	5,400,314	45.93%
Cash Forward	11,681,580	70.92%	10,052,614	66.61%	7,580,702	59.71%	6,426,767	54.95%	6,332,732	53.86%
Outside Revenue	171,040	1.04%	96,040	0.64%	25,000	0.20%	25,000	0.21%	25,000	0.21%
Total Revenue	16,471,360	100.00%	15,090,706	100.00%	12,696,016	100.00%	11,694,790	100.00%	11,758,046	100.00%
Expenditures										
Administration										
Personnel	595,279	3.61%	595,279	3.94%	613,137	4.83%	631,531	5.40%	650,477	5.53%
Operating Expenses	299,348	1.82%	298,598	1.98%	313,528	2.47%	329,204	2.81%	345,665	2.94%
Capital Outlay	-	0.00%	-	0.00%	50,000	0.39%	50,000	0.43%	50,000	0.43%
Sub Total Administration	894,627	5.43%	893,877	5.92%	976,665	7.69%	1,010,736	8.64%	1,046,142	8.90%
Hickory Point										
Operating Expenses	219,800	1.33%	137,600	0.91%	144,480	1.14%	151,704	1.30%	159,289	1.35%
Capital Outlay			-	0.00%	25,000	0.20%	25,000	0.21%	25,000	0.21%
Sub Total Parks and Rec	219,800	1.33%	137,600	0.91%	169,480	1.33%	176,704	1.51%	184,289	1.57%
Water Resources										
Personnel	292,674	1.78%	292,674	1.94%	301,454	2.37%	310,498	2.66%	319,813	2.72%
Operating Expenses	125,380	0.76%	124,438	0.82%	128,788	1.01%	132,652	1.13%	137,337	1.17%
Palatlakaha Restoration (M-5 & M-6 Design)										
Palatlakaha Restoration (M-5 & M-6 Construction Mgmt.)										
Palatlakaha Restoration (Villa City Design)	75,000	0.46%	20,000	0.13%						
Palatlakaha Restoration (Construction Management)	60,000	0.36%	60,000	0.40%						
Palatlakaha Restoration (Construction)	400,000	2.43%	400,000	2.65%						
Nutrient Source Evaluations (Lakes Denham, Trout or Yale)										
Lake Carlton Nutrient Evaluation	15,000	0.09%								
Project Design	300,000	1.82%								
Nutrient Source Projects (Lakes Denham, Trout or Yale)										
Lake Yale Sediment Inactivation	2,202,328	13.37%	2,202,328	14.59%	750,000	5.91%				
AB Canal AG Diversion to Mine Pit	750,000	4.55%								
Palatlakaha Restoration (M-5 & M-6 Construction)										
Palatlakaha Restoration					400,000	3.15%	400,000	3.42%	400,000	3.40%
NuRF - Maintenance	58,200	0.35%	178,116	1.18%	250,000	1.97%	250,000	2.14%	250,000	2.13%
NuRF - Maintenance Reserve	300,000	1.82%	500,000	3.31%	575,000	4.53%	575,000	4.92%	575,000	4.89%
NuRF - Equipment	5,000	0.03%	25,000	0.17%	25,000	0.20%	25,000	0.21%	25,000	0.21%
NuRF - Alum	2,000,000	12.14%	2,000,000	13.25%	2,000,000	15.75%	2,000,000	17.10%	2,000,000	17.01%
NuRF - Polymer	100,000	0.61%	100,000	0.66%	100,000	0.79%	100,000	0.86%	100,000	0.85%
Waterway Signs	10,000	0.06%	10,000	0.07%	15,000	0.12%	15,000	0.13%	15,000	0.13%
Adopt a Lake Sampling	35,000	0.21%	35,000	0.23%	35,000	0.28%	35,000	0.30%	35,000	0.30%
Benthic invertebrate Re-identification	16,000	0.10%	16,000	0.11%	13,000	0.10%	13,000	0.11%	13,000	0.11%
Aquatic Plant Harvesting	30,000	0.18%	30,000	0.20%	5,000	0.04%	5,000	0.04%	5,000	0.04%
USGS monitoring network	146,000	0.89%	147,730	0.98%	140,000	1.10%	140,000	1.20%	140,000	1.19%
Waterway Tree Removal	20,000	0.12%	25,000	0.17%	30,000	0.24%	30,000	0.26%	30,000	0.26%
Sheriff - Marine Patrol (85% of full amount)	211,779	1.29%	211,779	1.40%	222,368	1.75%	233,486	2.00%	245,161	2.09%
Sheriff - Boat for Marine Unit	52,000	0.32%					52,000	0.44%		
Aids To Government Agencies										
2015 Stormwater Retrofit Projects										
Leesburg (Heritage Estates Stormwater Park)			78,250	0.52%						
Leesburg (Lake Griffin Stormwater Improvement)	100,500	0.61%	100,500	0.67%						
Clermont (Lake Winona Stormwater Improvements)										
Clermont (Drew and East Ave. Improvements)			169,656	1.12%						
Montverde Boat Ramp										
2016 Stormwater Retrofit Projects										
Tavares (Downtown Stormwater Treatment)	261,321	1.59%	-	0.00%						
Clermont West Project	643,030	3.90%	420,000	2.78%						

Lake County Water Authority
Five Year Plan - 2017-2022

FY	2017-18	%	2018-19	%	2019-20	%	2020-21	%	2021-22	%
2017 Stormwater Retrofit Projects										
Umatilla (Lake Yale Stormwater Reuse)	150,000	0.91%	90,000	0.60%						
2018 Stormwater Retrofit Projects	-	0.00%	-							
Lake Denham Muck Farm Acquisition	1,020,362	0.00%	1,020,362							
Future Stormwater Projects			500,000	3.31%	1,000,000	7.88%	1,000,000	8.55%	1,000,000	8.50%
Dock on Clermont Chain										
Lake Restoration Grant										
Eustis Lake Gracie Dredge Design	80,000	0.49%								
Replace Vehicle					30,000	0.20%			30,000	0.26%
Harris Chain Restoration Council Support	5,000	0.03%	5,000	0.03%	5,000	0.04%	5,000	0.04%	5,000	0.04%
HCRC - FWC Bass Tracking Telemetry Equipment	9,850	0.06%	9,850	0.07%	10,000	0.08%	10,000	0.09%	10,000	0.09%
SubTotal - Water Resources:	9,474,424	57.52%	8,771,683	58.13%	6,035,610	47.54%	5,331,636	45.59%	5,335,310	45.38%
			(292,075)							
Field Services										
Personnel	266,901	1.62%	266,901	1.77%	274,908	2.17%	283,155	2.42%	291,650	2.48%
Operating Expenses	130,748	0.79%	122,248	0.81%	125,915	0.99%	130,071	1.11%	133,973	1.14%
SubTotal - Field Services:	397,649	2.41%	389,149	2.58%	400,823	3.16%	413,226	3.53%	425,623	3.62%
Land Resources										
Personnel	302,877	1.84%	302,877	2.01%	311,963	2.46%	321,322	2.75%	330,962	2.81%
Operating Expenses	100,542	0.61%	40,125	0.27%	33,039	0.26%	34,030	0.29%	35,051	0.30%
Acquisition	375,000	2.28%	-	0.00%	100,000	0.79%	100,000	0.86%	100,000	0.85%
Burn Plan Development	1,500	0.01%	1,500	0.01%	4,000	0.03%	4,000	0.03%	4,000	0.03%
Exotic Invasive Hog Removal	10,000	0.06%	10,000	0.07%	10,000	0.08%	10,000	0.09%	10,000	0.09%
Contract Burning	63,000	0.38%	45,000	0.30%	45,000	0.35%	45,000	0.38%	45,000	0.38%
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	64,101	0.39%	75,000	0.50%	100,000	0.79%	100,000	0.86%	100,000	0.85%
Contract Mowing and Fireline Maintenance	22,500	0.14%	25,000	0.17%	25,000	0.20%	25,000	0.21%	25,000	0.21%
Exotic/Invasive Plant Control	10,000	0.06%	13,000	0.09%	13,000	0.10%	13,000	0.11%	13,000	0.11%
Sawgrass Island Preserve Restoration (USFWS Grant)										
Sawgrass Island Preserve Restroom	29,000									
Replace Vehicle							30,000	0.26%	30,000	0.26%
Replace Tractor					40,000	0.32%				
Restoration Projects			25,000	0.17%	25,000	0.20%	25,000	0.21%	25,000	0.21%
Finish Scrub Point Preserve Road	10,000	0.06%	10,000	0.07%						
Bear Track Boardwalk and Canoe Launch	59,500	0.36%	59,500	0.39%						
Crooked River Canoe/Kayak Launch Dock	15,000	0.09%								
Improvements to Sabal Bluff	100,000	0.61%	100,000	0.66%						
Site Improvements	7,500	0.05%	7,500	0.05%	7,500	0.06%	7,500	0.06%	7,500	0.06%
SubTotal - Land Resources:	1,174,520	7.13%	719,502	4.77%	719,502	5.67%	364,500	3.12%	364,500	3.10%

Lake County Water Authority
Five Year Plan - 2017-2022

FY	2017-18	%	2018-19	%	2019-20	%	2020-21	%	2021-22	%
Resource Communication			-		(0)					
Education										
Education Limit - 3.5 % of ad valorem	161,656		166,506		171,501		176,646		181,945	
Operating Expenses	600	0.00%	600	0.00%	618	0.00%	637	0.01%	656	0.01%
Other Contractual Services										
Sheriff - Marine Patrol (15% of full amount)	17,171	0.10%	17,171	0.11%	18,030	0.14%	18,931	0.16%	19,878	0.17%
Naturalist Contractor	12,500	0.08%	12,500	0.08%	15,000	0.12%	15,000	0.13%	15,000	0.13%
Education Contractor	12,500	0.08%	12,500	0.08%	15,000	0.12%	15,000	0.13%	15,000	0.13%
Education and Graphics Design Services	4,000	0.02%	2,000	0.01%	10,000	0.08%	10,000	0.09%	10,000	0.09%
Rentals										
Pontoon Boat Rental	2,500	0.02%	2,500	0.02%	2,500	0.02%	2,500	0.02%	2,500	0.02%
Printing & Binding										
Printing of Educational Materials	5,000	0.03%	1,800	0.01%	2,000	0.02%	2,000	0.02%	2,000	0.02%
Promotional Activities										
Lake Academy	1,150	0.01%	1,150	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%	1,000	0.01%	2,000	0.02%	2,000	0.02%	2,000	0.02%
Operating Supplies										
Limnology Education & Misc. Supplies	450	0.00%	650	0.00%	700	0.01%	700	0.01%	700	0.01%
Aids to Government Agencies										
Public School Transportation Funds	-	0.00%	5,000	0.03%	-	0.00%	-	0.00%	-	0.00%
Water Resource Education Mini-Grants	-	0.00%	-	0.00%	-	0.00%	-	0.00%	-	0.00%
Aids to Private Agencies										
Trout Lake Center Grant	41,000	0.25%	16,000	0.11%	15,500	0.12%	15,500	0.13%	15,500	0.13%
Community Water Resource Mini-Grants (50%)	-	0.00%	-	0.00%	-	0.00%	-	0.00%	-	0.00%
SubTotal - Education:	98,371	0.60%	73,371	0.49%	83,348	0.66%	84,268	0.72%	85,233	0.72%
Public Outreach										
Community Water Resource Mini-Grants (50%)	-	0.00%	-	0.00%	-	0.00%	-	0.00%	-	0.00%
Promotional Activities	2,750	0.02%	2,750	0.02%	3,500	0.03%	3,500	0.03%	3,500	0.03%
Supplies, Equipment, Mailings	2,750	0.02%	2,750	0.02%	17,620	0.14%	17,620	0.15%	17,620	0.15%
Media & Graphics Services	5,575	0.03%	5,575	0.04%	15,000	0.12%	15,000	0.13%	15,000	0.13%
Preserve Brochures/Reprinting	10,000	0.06%	7,500	0.05%	10,000	0.08%	10,000	0.09%	10,000	0.09%
SubTotal - Public Outreach:	21,075	0.13%	18,575	0.12%	46,120	0.36%	46,120	0.39%	46,120	0.39%
Resource Data										
Operating Expenses	51,275									
GIS Projects										
LCWA Web Site Upgrades	1,500	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	0.03%	3,000	0.03%
Lake County Water Resource Atlas	25,000	0.15%	25,000	0.17%	25,000	0.20%	25,000	0.21%	25,000	0.21%
Migration Consulting to MS Office 360	20,400	0.12%								
Future GIS Projects			6,025	0.04%	30,000	0.24%	30,000	0.26%	30,000	0.26%
Communication Services	13,500	0.08%	13,500	0.09%	14,000	0.11%	14,000	0.12%	14,000	0.12%
GIS Equipment										
Workstation Replacement	4,500	0.03%	4,500	0.03%	4,500	0.04%	4,500	0.04%	4,500	0.04%
Supplies and Equipment	2,000	0.01%	2,000	0.01%	2,000	0.02%	2,000	0.02%	2,000	0.02%
Office Generator	45,000	0.27%								
GIS Software, Training and Maintenance										
Software Maintenance, Training and Upgrades	2,500	0.02%	2,500	0.02%	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%

Lake County Water Authority
Five Year Plan - 2017-2022

FY	2017-18	%	2018-19	%	2019-20	%	2020-21	%	2021-22	%
New Staff PCs Upgrades	250	0.00%	5,000	0.03%	5,000	0.04%	5,000	0.04%	5,000	0.04%
Network and Connection Upgrades	5,000	0.03%	5,000	0.03%	5,000	0.04%	5,000	0.04%	5,000	0.04%
SubTotal - Resource Data:	177,425	1.08%	70,525	0.47%	95,000	0.75%	95,000	0.81%	95,000	0.81%
			-	0.00%						
Comm. Redev. Trust Fund Reimbursement	98,470	0.60%	101,424	0.67%	104,466	0.82%	107,600	0.92%	110,828	0.94%
Contingency and Fund Balance										
Fund Balance - End of Year	200,000	1.21%	200,000	1.33%	200,000	1.58%	200,000	1.71%	200,000	1.70%
NuRF Closure Reserve	850,000	5.16%	850,000	5.63%	850,000	6.70%	850,000	7.27%	850,000	7.23%
Alum Reserve	2,100,000	12.75%	2,100,000	13.92%	2,000,000	15.75%	2,000,000	17.10%	2,000,000	17.01%
Surplus of Water Authority Property	315,000	1.91%	315,000	2.09%	315,000	2.48%	315,000	2.69%	315,000	2.68%
Self-Insurance Reserve	250,000	1.52%	250,000	1.66%	200,000	1.58%	200,000	1.71%	200,000	1.70%
Water Authority Building Maintenance Fund	50,000	0.30%	50,000	0.33%	350,000	2.76%	350,000	2.99%	350,000	2.98%
Contingency Reserve	150,000	0.91%	150,000	0.99%	150,000	1.18%	150,000	1.28%	150,000	1.28%
Total Expenditures	16,471,360	100.00%	15,090,706	100.00%	12,696,015	100.00%	11,694,790	100.00%	11,758,046	100.00%
Difference: Revenue - Expenditures	(0)		0		0		0		(0)	

Lake County
WATER AUTHORITY
27351 State Road 19, Tavares, FL 32778
(352) 324-6141 - www.lcwa.org