LCWA

Lake County

WATER AUTHORITY

2016 Annual Report and 2016-2021 Five-Year Plan

Lake County Water Authority
Board of Trustees
2016

Peggy Cox
District One
Chairman

Adam Dufresne
Member At-Large
Vice Chairman

Neil Kelly
Clerk of Courts &
Secretary-Treasurer

District Two
Vacant

Carolyn M. Maimone
District Three

Doug Bryant
District Four

Charles C. Clark
District Five

John N. Harris
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, 2016 (including background information as necessary for clarity and continuity) and includes the Five Year Plan reflecting a planning period from FY 2016-17 to 2020-21.

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 2016, 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 2016 was 45.71 inches or 90.53% of expected annual rainfall. Although annual rainfall was below the historic average of 50.49 inches the passing of two hurricanes. A Category 4 Hurricane Matthew in October 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 2016. At times during 2016 lake levels were high enough to require the opening of the dams, particularly before and after the two hurricanes. Even with these significant meteorological events, the LCWA successful in maintaining water levels within the regulatory levels.

The flood control structures on the Harris Chain of Lakes were closed in March of 2006 allowing only the minimum discharge as required by federal permits and remained the same through the end of 2008. Unlike the Clermont Chain of Lakes, water levels in the Harris Chain of Lakes dropped to near record lows during 2008 within the "superpond"

(Lakes Harris, Eustis, Dora and Beauclair). Significant rainfall at the end of 2009 in the central portion of the county brought water levels back up to regulation levels and resulted in relatively high discharges out the dams. Discharge from the three structures within the Harris Chain of Lakes had been at minimum flow for more than three years until the 2009 rainfall.

In 2010, dry conditions returned in the fall of 2010 and the lake levels fell below minimum desirable for Lakes Apopka and Griffin and were approaching the minimum desirable levels for the superpond by December 2010. Due to low water levels and a long term forecast for dry weather, the SJRWMD chose to allow no water to discharge from the Apopka-Beauclair or the Burrell structures from December 15, 2010 to May 2, 2011. The SJRWMD also reduced the flow passing through the Moss Bluff structure during that same timeframe.

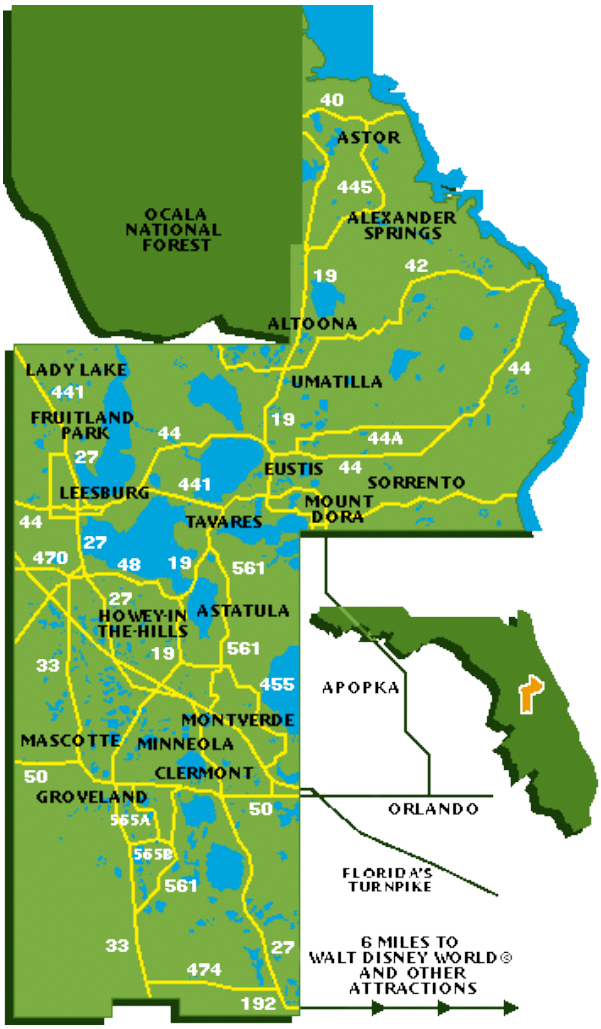
On May 2, 2011, the District opened the Apopka-Beauclair, Burrell and Moss Bluff structures to allow 10 cubic feet per second (cfs) through these structures. On December 8, 2011 took action to reduce flow through the NuRF to 0 cfs. It remained at that rate until the SJRWMD revised the flow regimen to allow 23 cfs through NuRF on January 11, 2012. The SJRWMD intended to keep the flow at 23 cfs until May 1, 2012 or until sufficient rainfall has occurred requiring adjustment in flow. On April 27, 2012 the SJRWMD took action to reduce flow through all of the structures on the Harris Chain (the Apopka Beauclair Lock and Dam - via NuRF, the Burrell Lock and Dam and the Moss Bluff structure) to 0 cfs due to continued dry weather and concern about water quality and loss of submerged vegetation in Lake Apopka and the flow remained at 0 through the end of 2013. Due to above average rainfall in 2014 discharges from the “middle lakes” and Lake Griffin were resumed in December 2014. In Lake Apopka, however, water levels remained low and discharges remained at zero. In 2015 minimum discharges continued from the “middle lakes” and Lake Griffin. For most of the year, Lake Griffin was able to maintain the regulatory levels. The middle lakes (including Lakes Harris, Eustis, Dora and Beauclair) generally maintained the regulatory level, however fell below the regulatory level in the early summer and exceeded the regulatory level in the fall requiring significant discharges. Lake Apopka neared the regulatory level in the fall and the SJRWMD was able to resume discharges of 19 cfs (cubic feet per second) from Lake Apopka through the NuRF for the first time since April 27, 2012. Lake Apopka did, however, again fall below the minimum desirable levels in late 2015 and flow was suspended until May 2016.

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.

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.

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, 2016 (including background information as necessary for clarity and continuity) and includes the Five Year Plan reflecting a planning period from FY 2016-17 to 2020-21.

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 and M-6 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 average rainfall in combination with the South Lake Historical Flow Restoration Project, 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 for the past two years. Previously, the extended drought kept water levels below regulatory levels for approximately 10 years and to maintain these higher levels for the past two 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 have been a total of fifty-two stormwater projects completed under this initiative. Using the Lake County Water Authority's $7.4 million as project

seed money, local agencies are able to complete $27.2 million in projects.

There are six stormwater projects that were approved in 2016 or earlier and are either under construction or have not yet commenced. These projects include:

Project Name	***Cooperator***	***Water Authority Contribution***
Downtown Stormwater Improvements	Tavares	$ 639,330
Heritage Estates Stormwater Park	Leesburg	$ 78,250
Lake Griffin Stormwater Improvements	Leesburg	$ 100,500
Drew & East Ave Stormwater Improvements	Clermont	$ 169,656
West Lake Wetlands and Pond Facility	Clermont	$ 643,030
	Total:	**$ 1,630,766**

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 two structures, M-1 and M-4, have been designed, permitted, and constructed. The next two structures, M-5 and M-6, have been designed, permitted and are under construction. A contract to design and permit a replacement dam at Villa City has been approved.

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 2016, 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 2016, the agency responded and removed numerous obstructions to navigation in public waterways throughout the county.

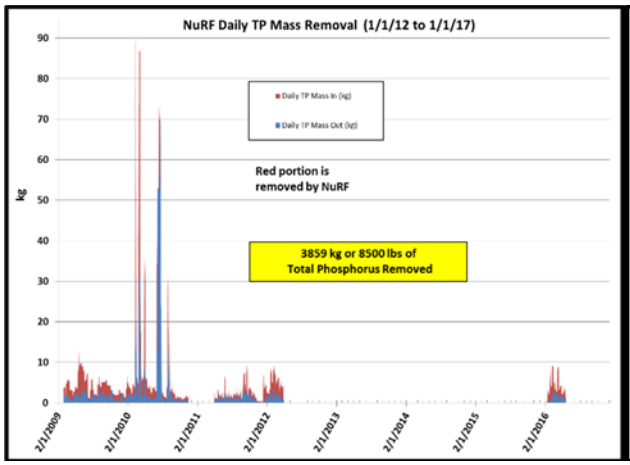
Apopka-Beauclair Canal Nutrient Reduction Facility - The LCWA's Nutrient Reduction Facility (NuRF) became operational in March, 2009 and is currently the world's largest alum-based surface water restoration facility. The St. Johns River Water Management District provides the land on which the facility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

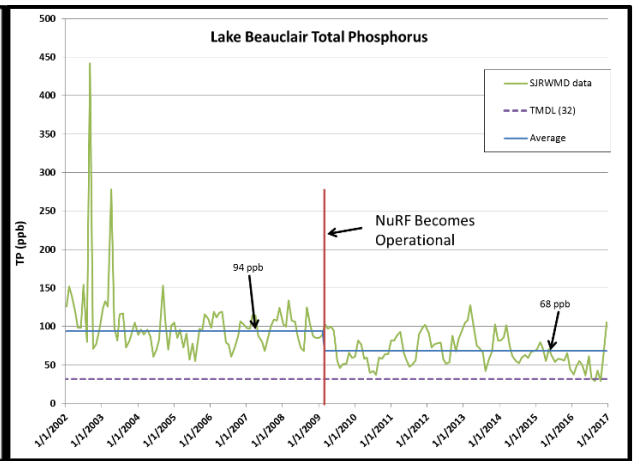
NuRF Site, October 4, 2007, pre-construction

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

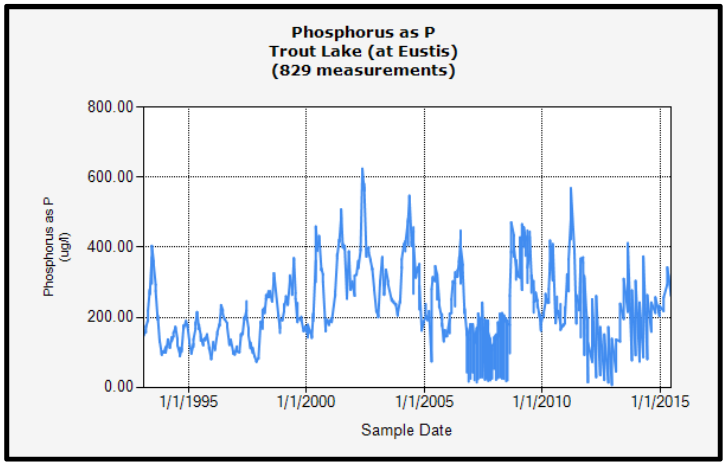
waterbody can assimilate and still maintain its designated uses. It is important to point out that Lake Beauclair's TMDL is nearly half that of Lake Apopka. Therefore, even if Lake Apopka were to reach its TMDL goals, additional treatment would be required to achieve the Lake Beauclair TMDL.





Performance results conducted when the NuRF operated were as expected and average removal rate for total phosphorus was sixty percent. On April 26, 2012, the St Johns River Water Management District (District) stopped all flows from Lake Apopka due to the lakes low levels. Flow through the NuRF resumed on February 8, 2016. However when Lake Apopka's water levels dropped again below minimum desirable on May 17th, the flow was again cut off until the lake recovers again. Through the end of 2016, the NuRF had removed 8,500 pounds of total phosphorus and injected 4.9 million gallons of alum. Alum cost for the NuRF since opening on February 2009 has been approximately $2.49 million. Water quality data from Lake Beauclair indicates a 28% 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

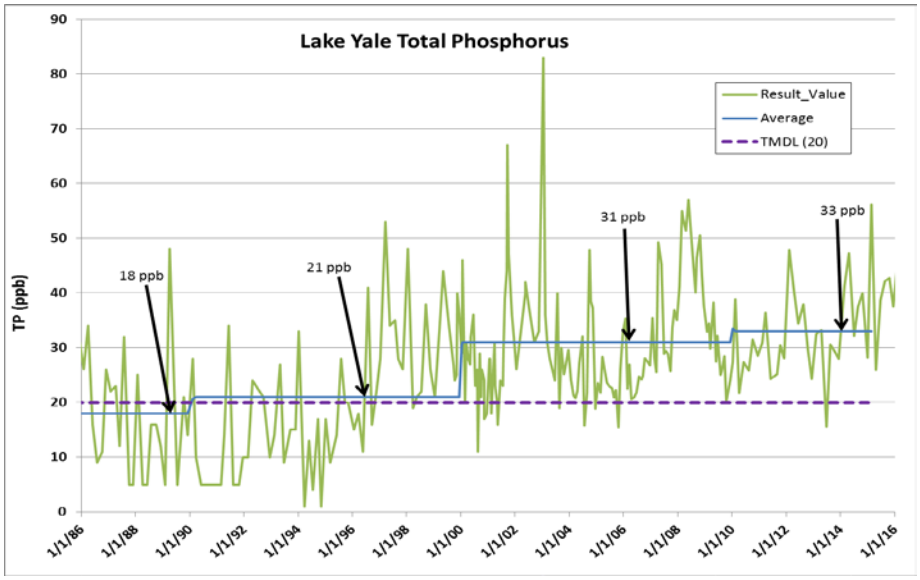


via Orchid Canal. The lake impacts water quality in Lake Eustis through its constant discharges under Highway 19. Other more minor sources, such as stormwater and septic, also are a factor.

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 will determine pollutant loading amounts and provide recommendations to reduce the controllable sources. It will also include a list of recommended projects for the Board's consideration.

The Board selected the engineering firm of Environmental Research & Design to perform the work, which to be completed by summer of 2017.



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 2016, the LCWA completed the eleventh year of assessments on Lakes Beauclair, Minnehaha, Minneola and Louisa.

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, staff inspected all the signs and replaced those that were either faded 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.

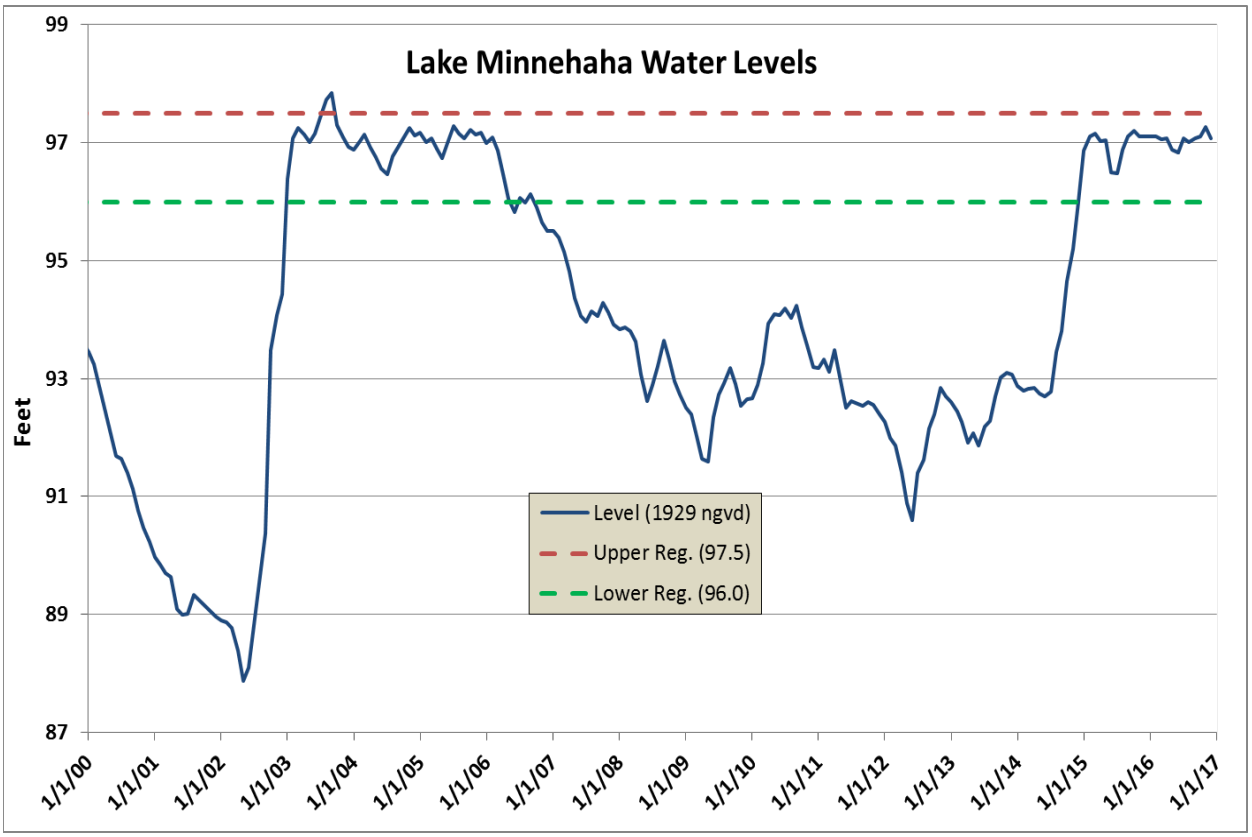
At the request of the Florida LAKEWATCH Program, the Board historically provided funding to cover the Lake County operating expenses. However to significantly reduce cost, the Water Authority has agreed to fund the much less expensive Adopt a Lake Program. The Lake County Water Quality Lab manages the 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 $600,000.

Harris Chain Restoration Council - The Board continued its financial support of the Harris Chain Restoration Council in 2016 by budgeting $5,000 to cover their operating expenses.

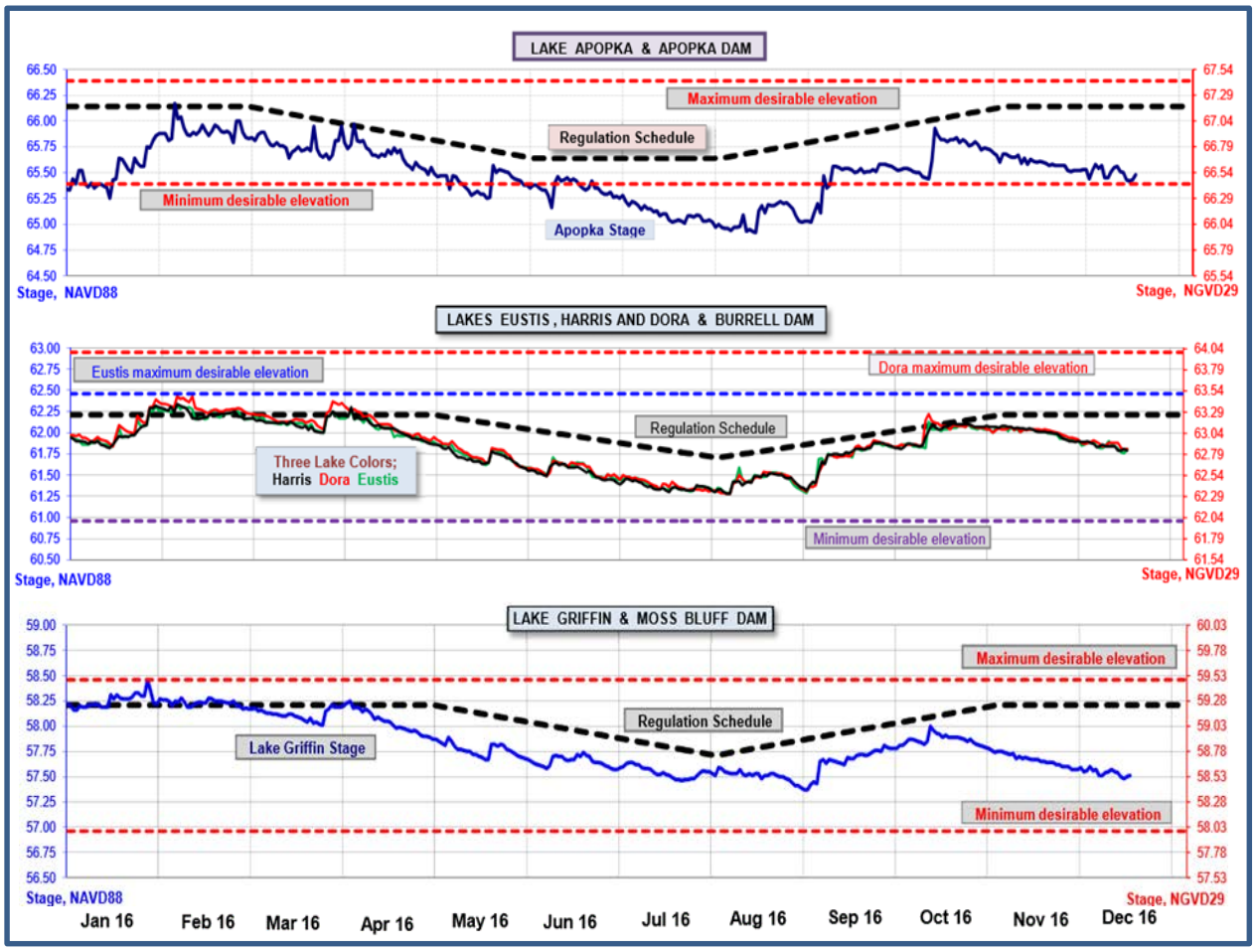
Water Level Management of the Harris Chain of Lakes and the Palatlakaha River - Lake levels on the Harris Chain of Lakes and water levels on the Palatlakaha River are both related to rainfall. To remain abreast of the rainfall situation, the Water Authority has an ongoing program that includes six automated 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 2016 was 45.71 inches or 90% of expected annual rainfall. Because annual rainfall was close to the historic average of 50.49 inches, the LCWA was able to maintain water levels in the Palatlakaha River within the regulatory range. Hurricane Matthew's arrival at the end of the rainy season caused high water levels in the chain. However, staff was successful in keeping levels within the regulatory range by discharging enough water prior to, during and following the hurricane.



Water Levels in the Harris Chain of Lakes – Unlike the Clermont Chain of Lakes, water levels in the Harris Chain of Lakes dropped to near record lows during 2008 within the "middle lakes" including Lakes Harris, Eustis, Dora and Beauclair. However, a high amount of rainfall at the end of 2009 in the central portion of the county brought water levels back up to regulation levels resulted in relatively high discharges out the dams. Since 2009, rainfall has been below normal and discharges have been set to minimum. On April 24th, 2012, the discharges from the dams were reduced to zero. Due to above average rainfall in 2014 discharges from the "middle lakes" and Lake Griffin were resumed. The exception is Lake Apopka, where water levels remained low and discharges remained at zero.

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 Lake Apopka was suspended from for the remainder of the year.

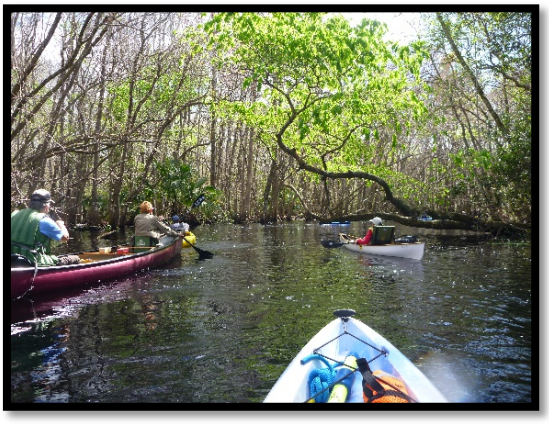


Land Resources

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, bird watching, picnicking, horseback riding, geocaching, disc golf and fishing. While the Water Authority's Board of Trustees has directed the agency staff to primarily focus on projects benefiting the quality of the 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, either through purchase or donation, 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 include: 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

The Water Authority Board of Trustees understands that managing the preserves is an ongoing responsibility. Land management activities performed throughout the year include mowing, repairing trails, maintaining fences, firelines 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, most 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.

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, bird watch

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 and 2016. 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.

Grant funded 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.

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 lead 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


Disc Golf Course

the hiking trail down into the sinkhole lake area are unique for this county. In 2016 the Water Authority Board approved the second year in an annual trial period for the installation of a nine-hole then eighteen-hole disc golf course by a local group. The property has experienced an increase usage primarily from joggers and disc golf visitors. The property is being monitored to determine if the future use for disc golf is compatible within the property.

Lake Norris Conservation Area – Although the St. Johns River Water Management District owns and manages the natural resources for this property, 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.


Planting Long Leaf Pine

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, bird watching, 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 compromised 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.

Sawgrass Island Preserve - This 1,137-acre site provides protection for the 600± 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 bobwhites.


Pine Thinning Area

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. In June 2016, Flatwoods Paper, Inc. conducted a timber thinning on the Western side of the Preserve and a clear-cut within the Scrub Jay restoration area.

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. There is public walk-in access, but no parking area or informational kiosk at this time due to the Preserve being primarily wetlands.

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. Although staff did not conduct any burns on the Preserve, there was a wildfire in May 2016. The property has walk-in access to the short trails on the northern uplands.

May 2016 Wildfire in northern area of Fern Prairie Preserve.

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 Marsh - 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 on the shoreline. Staff is working with nearby neighbors to enhance the public opportunities on the site. Staff has assisted in the annual bird count for this area and has lead annual hiking and paddling events.

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. Hosted an "Open House" for the public in March to visit the waterfall and see the sinkhole in action. Over 700 visitors came to the Preserve. Due to the volume of people it was a self-

guided hike with staff and volunteers stationed at points of interest around the property to answer questions.

TV Crew visiting the sinkhole and public visiting during March's "Open House"

2016 Management Activities

- Hosted a Love Your Lakes Cleanup event March 5th in the Clermont Chain-of-lakes with 10 volunteers.

- Hosted two paddle trips on October 14th for the Wings and Wildflower Festival on the Alexander Springs with over 40 participants.

- 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. 2016 paddles included: Lake Norris February 20th, Stagger Mud Run March 18th, Lake May April 23rd, Beginners Class May 14th, Dora Canal October 14th, and Crooked River November 18th. More than 90 participants enjoyed these guided tours.

- During 2016, 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.

- Continued to work on removal of exotic, invasive species of plants and animals on the Preserves. A combination of staff and contractors worked to consistently keep ahead of the infestations, especially at Hickory Point Park, Hidden Waters Preserve, Flat Island Preserve and Treasure Island Preserve.

- In 2015 the Water Authority conducted seven burns for a total of 48.6 acres and in 2016 staff conducted four burns for a total of 19.7 acres, almost 50% less.

Date	Preserve	Burn Unit(s)	Acres	Contractor
July 13, 2016	Hickory Point	Pile Burn	0	No
July 20, 2016	Flowing Waters	FW-05	10.7	Yes
Nov-Dec, 2016	Bear Track	Wildfire	1	
August 23, 2016	Wolf Branch	WB-15	3.5	Yes
October 25, 2016	Hickory Point	Pile Burn	0	No
December 12, 2016	Flat Island	FI-01 (wildflower plot)	0.5	No
January 25, 2017	Scrub Point	SP-07	5	No
Totals for 2016:			**19.7 Acres**	

- Staff led various hikes on the Preserves such as the Hickory Point Backpacking 101 held on May 14th, Hickory Point Family Dip Netting held on August 8th, Hidden Waters Hallo-weed on October 29th and the Flat Island Loop Hike.

- For the fifth year, LCWA staff, staff from Bok Tower Gardens and volunteers have surveyed 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 right 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 2016 was up about 20% from 2015's attendance numbers. This year 12,984 people visited the Preserves.

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.

<u>2016 Park Activities</u>:

- 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 2016, with 1,734 participating boats.
- 194 Pavilion Rentals for 2016.
- 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.
- Hosted a Basic Introduction to Backpacking 101.

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 2016 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 2016:

- 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.

- Awarded local public and private teachers $ 9,691.41in grant funds as part of the "Drop-by-Drop: You Make A Difference!" mini-grants. In its 15th year, these Water Authority grants help educators spread water resource knowledge through the school system.

- In 2016 the Water Authority hosted a Citizens Lakes Academy in Clermont focused on the Clermont of Lakes. Participants learned about the Clermont Chain of Lakes hydrology including lake levels, hydrology and wildlife dependent upon this lake chain. Participants were also taken on a water outing to get a closer look at water quality testing and limnologic techniques.

In 2016, 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 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.

One major goal for the 2016-17 year will be to upgrade the main Microsoft Office software from workstation install to cloud based system. This will be a major upgrade to all users; therefore, some training to staff will be provided. This upgrade in the long run could save maintenance and equipment cost to the Water Authority.

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.

LCWA Website Upgrade

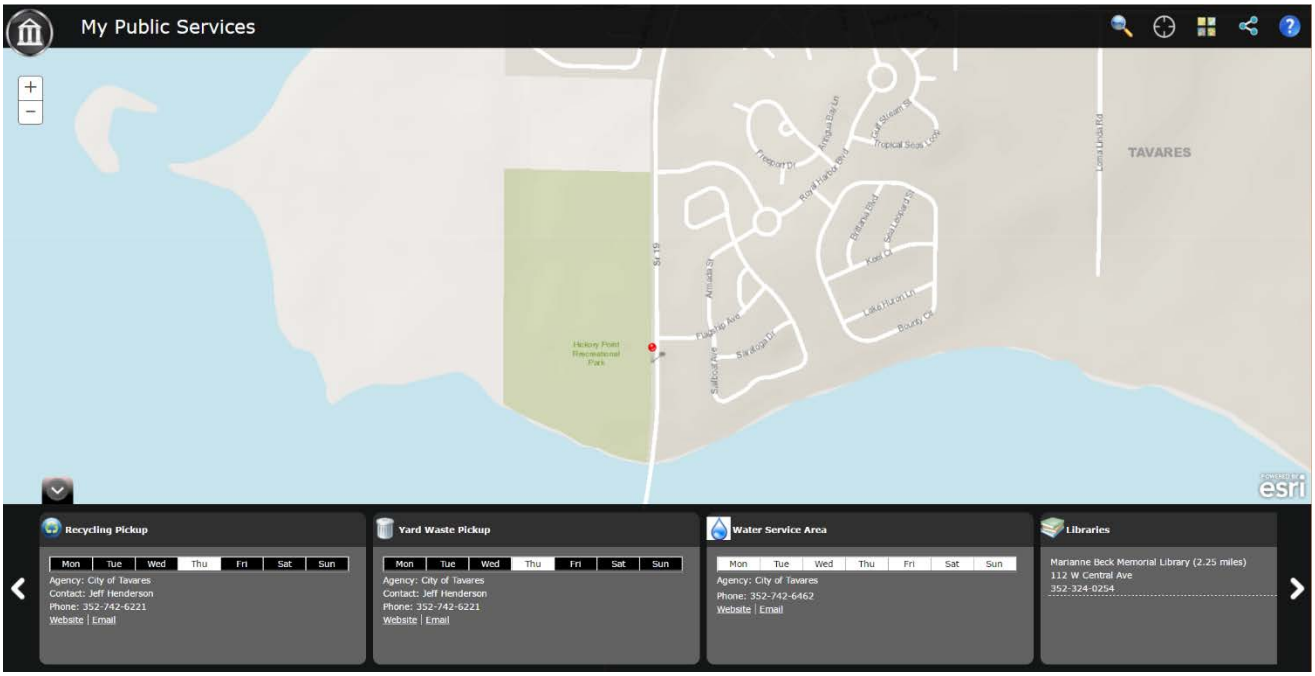
The Water Authority's website has been upgraded with a different look and tools to allow staff to do updates without the help of any outside contractors. The website is now hosted by Go-Daddy.com, saving money to the Water Authority on hosting and updates fees. Updating and changing the website further improved the easy access of information for the public and residents of Lake County via other than PCs devices like smart phones and tablets. Now the LCWA website could adjust the resolution automatically to such devices.

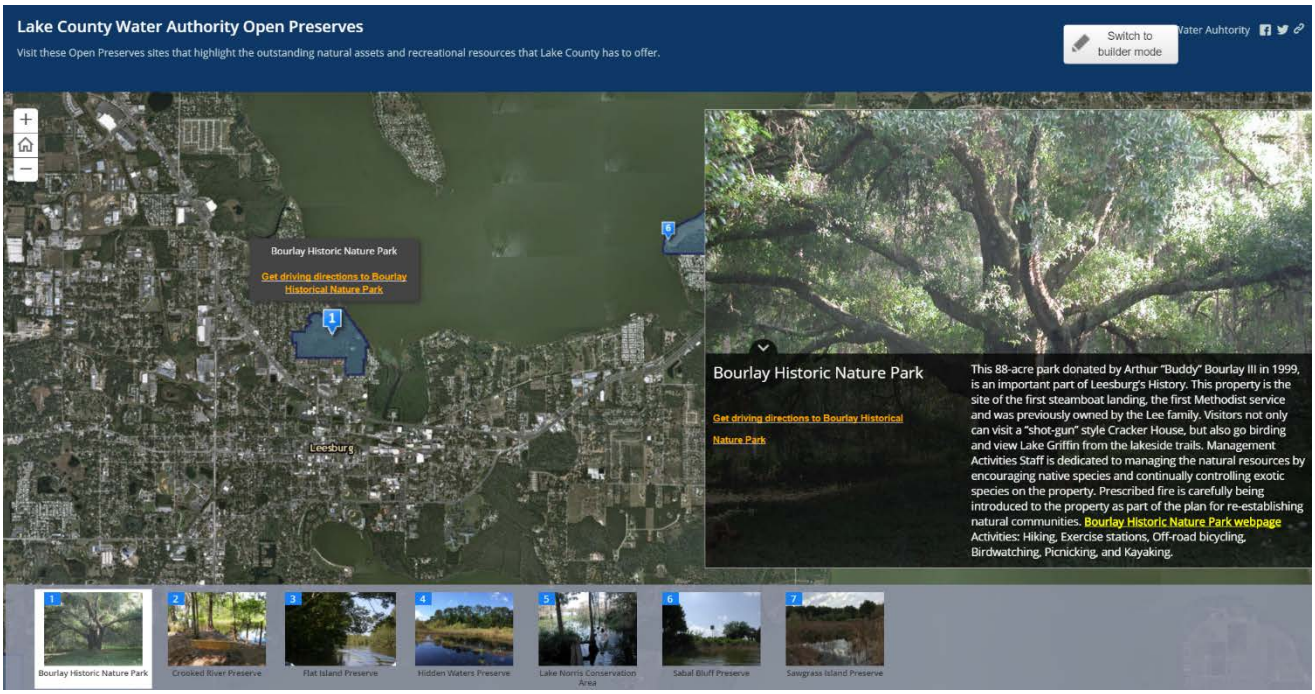
Another improvement to the site is the universal programing language that was created with Word Press. There are many parts of the website that could be easily change with plug-ins without the need any programing knowledge. Another big improvement to the site is the downloading speed. With such a simple language running on the background, users will now notice the speed in which the website show up on the devices.

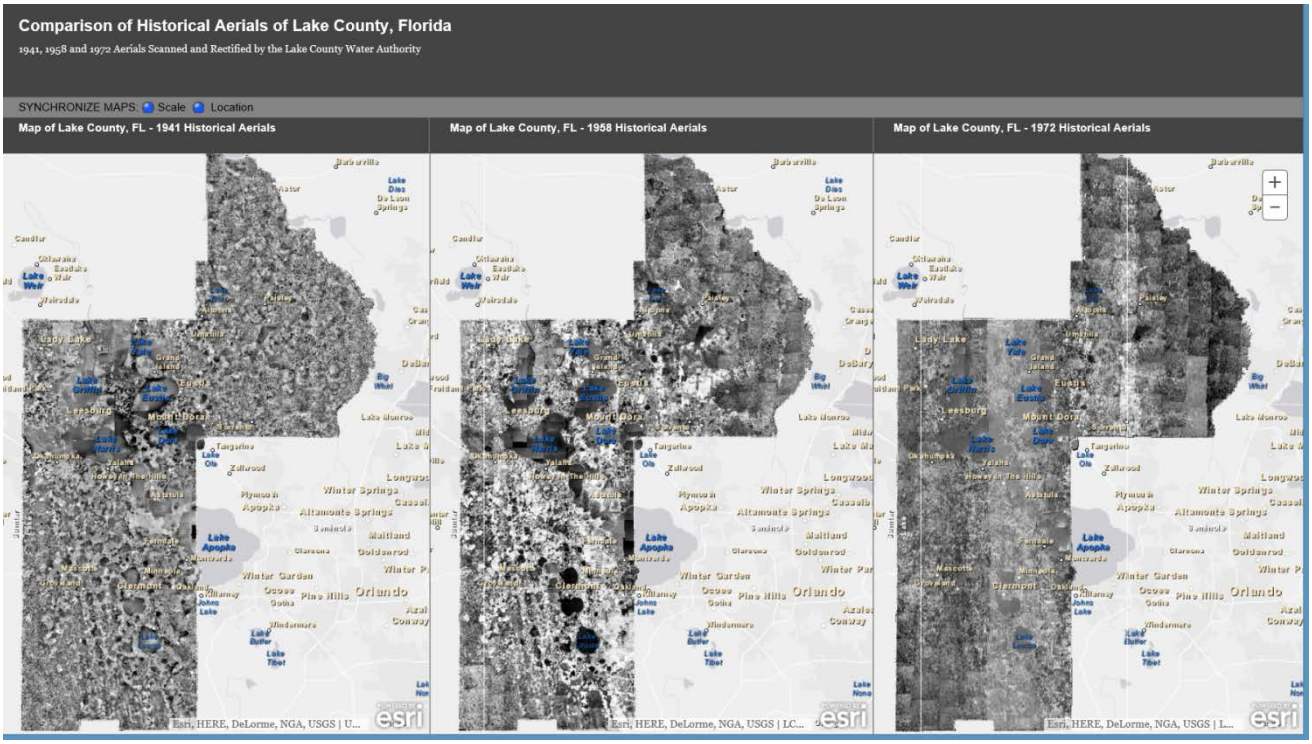
Web Mapping Applications (Apps)

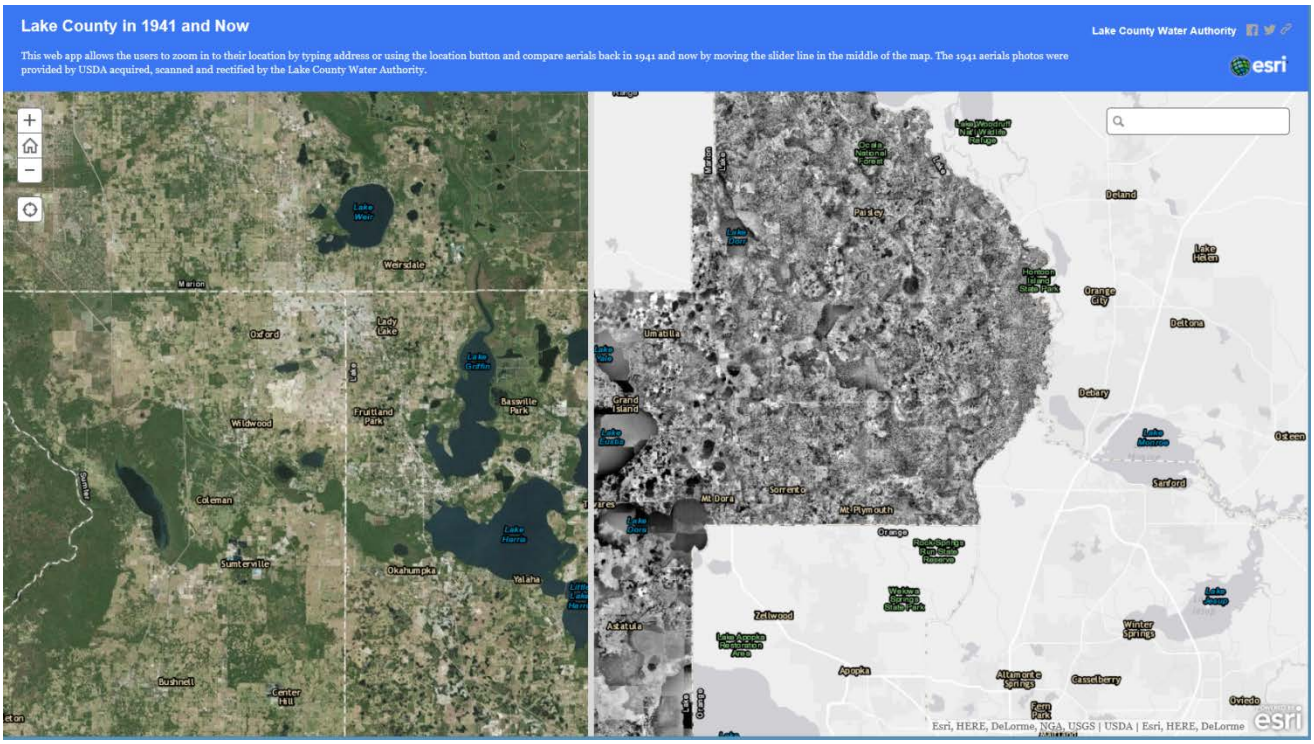
For several years now the Lake County Water Authority GIS has been creating mapping applications that utilizes the resources provide by ESRI (main GIS software) and data created by the Water Authority's GIS. During the 2016 staff has continue to update and maintained existing apps and have created new apps used by the public and with feedback from the public. There has been several agencies, including the Lake County Property Appraisal's office, which utilizes these apps for the everyday task when evaluating property values and determining government services to a specific address.

In 2016 staff created and configured new web map applications that could map particular data such as 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 concisely and simply in the form of a web map apps 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.


My Public Services
TAVARES
Recycling Pickup
Mon Tue Wed Thu Fri Sat Sun
Agency: City of Tavares
Contact: Jeff Henderson
Phone: 352-742-6221
Website | Email
Yard Waste Pickup
Mon Tue Wed Thu Fri Sat Sun
Agency: City of Tavares
Contact: Jeff Henderson
Phone: 352-742-6221
Website | Email
Water Service Area
Mon Tue Wed Thu Fri Sat Sun
Agency: City of Tavares
Phone: 352-742-6462
Website | Email
Libraries
Marianne Beck Memorial Library (2.25 miles)
112 W Central Ave
352-324-0254


Lake County Water Authority Open Preserves
Visit these Open Preserves sites that highlight the outstanding natural assets and recreational resources that Lake County has to offer.
Switch to builder mode
Bourlay Historic Nature Park
Get driving directions to Bourlay Historical Nature Park
Leesburg
Bourlay Historic Nature Park
Get driving directions to Bourlay Historical Nature Park
This 88-acre park donated by Arthur "Buddy" Bourlay III in 1999, is an important part of Leesburg's History. This property is the site of the first steamboat landing, the first Methodist service and was previously owned by the Lee family. Visitors not only can visit a "shot-gun" style Cracker House, but also go birding and view Lake Griffin from the lakeside trails. Management Activities Staff is dedicated to managing the natural resources by encouraging native species and continually controlling exotic species on the property. Prescribed fire is carefully being introduced to the property as part of the plan for re-establishing natural communities. Bourlay Historic Nature Park webpage
Activities: Hiking, Exercise stations, Off-road bicycling, Birdwatching, Picnicking, and Kayaking.
1 Bourlay Historic Nature Park
2 Crooked River Preserve
3 Flat Island Preserve
4 Hidden Waters Preserve
5 Lake Norris Conservation Area
6 Sabal Bluff Preserve
7 Sawgrass Island Preserve





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 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 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 1,500 users per month but at the same time we are getting more repeated users utilizing the Water Atlas tools.

The LCWA Board included $25,000 in its FY 2016-17 budget to keep up with the regular maintenance of 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 2016.

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

- 880 Waterbodies in Atlas (named waterbodies only)
- 36 Agencies and Organization Providing Data
- 1,242,129 Individual Analyses / Observations
- 48% of Visitors of these were new visitors
- 17,876 Visitors in the last 12 months
- 59% of All Visitors Come From Searches (Google, etc.)
- 22% of Visitors Are Referred by Other Sites
- 19% of Visitors Go Directly to the Atlas

The Lake County Water Resource Atlas has been updated in 2016. 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.

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.

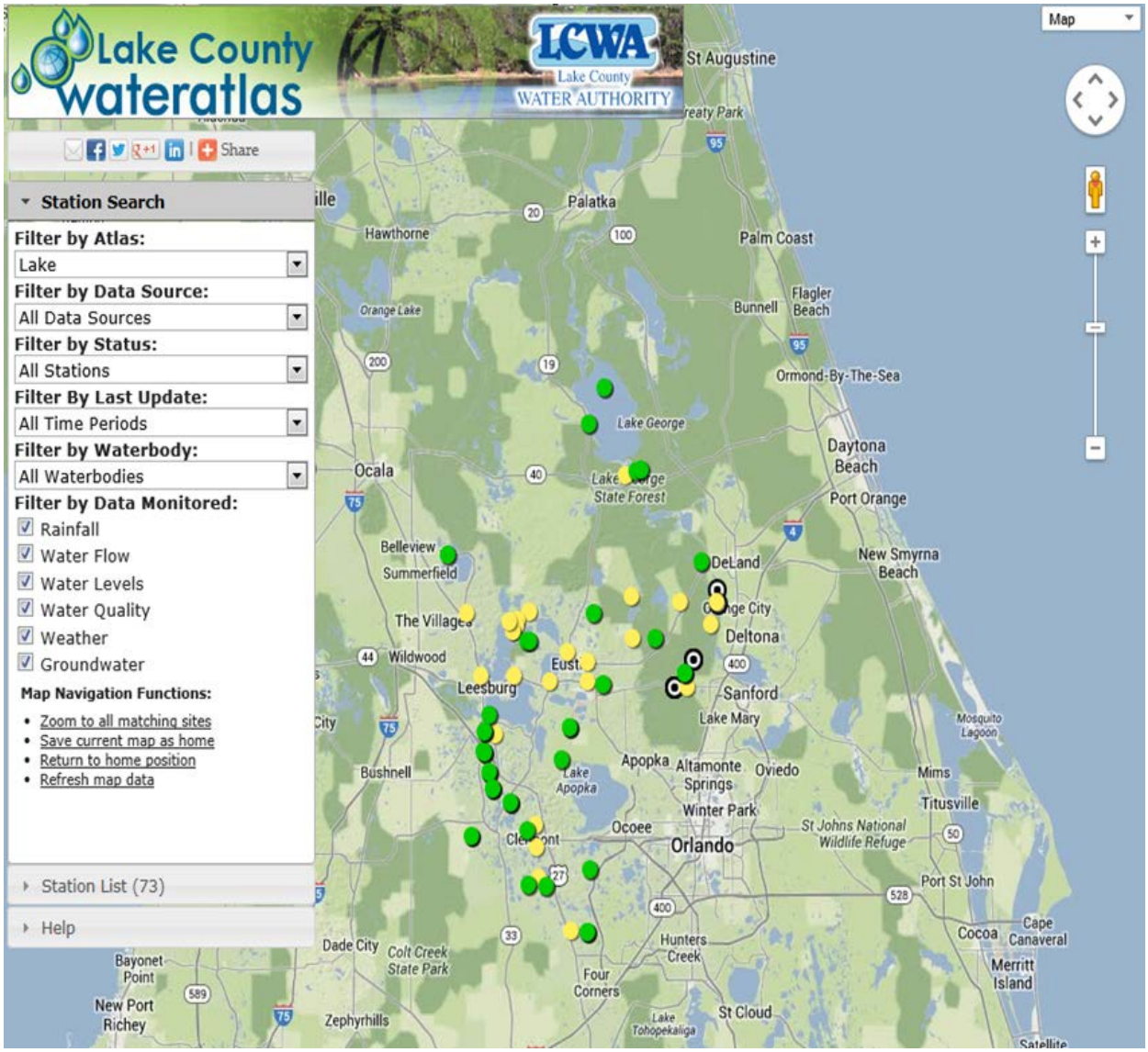
C. Interacting Mapping
LCWA and USF worked together to create an interactive mapping application that could provide real time water level and rainfall data from different locations throughout lake county for the public to utilize. This application was integrated on the Water Authority's website with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

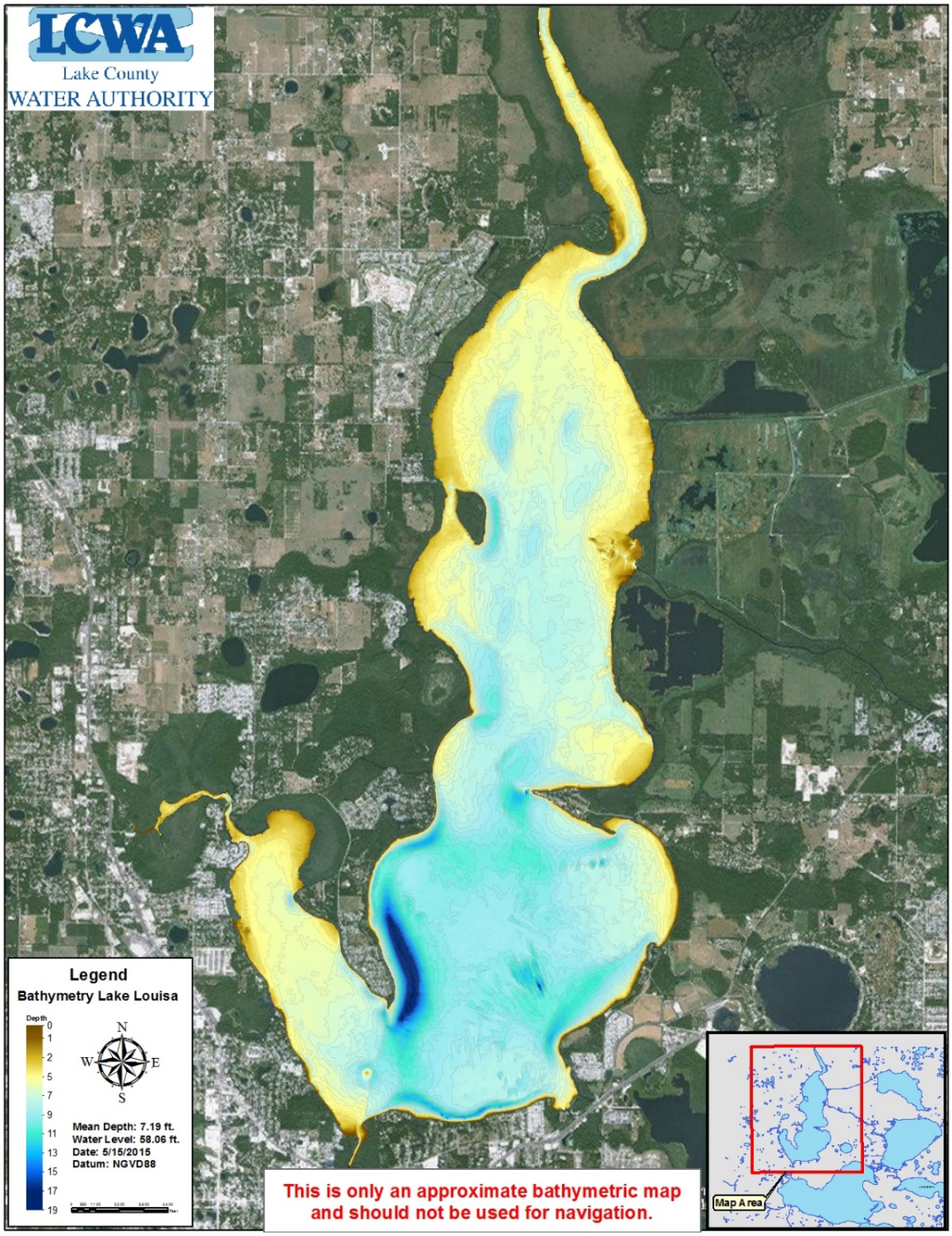
This internet-based Lake County Water Resource Atlas makes Lake County water resource data available to the maximum number of people in an efficient and cost-effective manner. The management of Lake County's water resources requires an informed citizenry and the cooperation of multiple government agencies.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

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 system, which includes the combination of both hardware and software, is collecting and storing data as expected from which digital maps can be created.



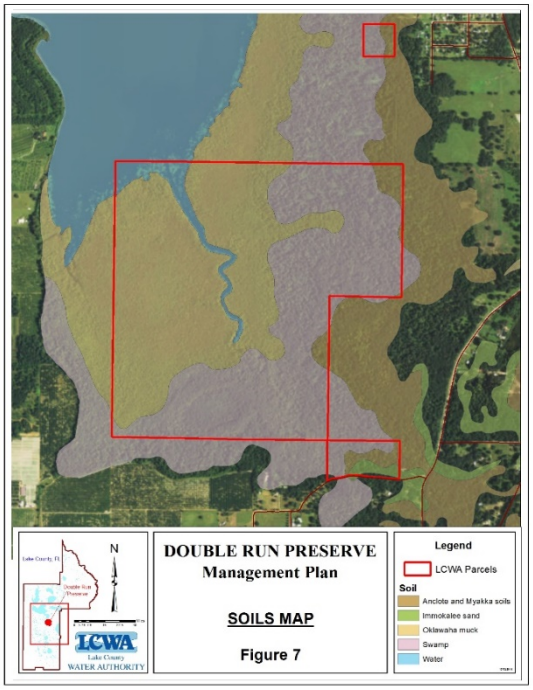


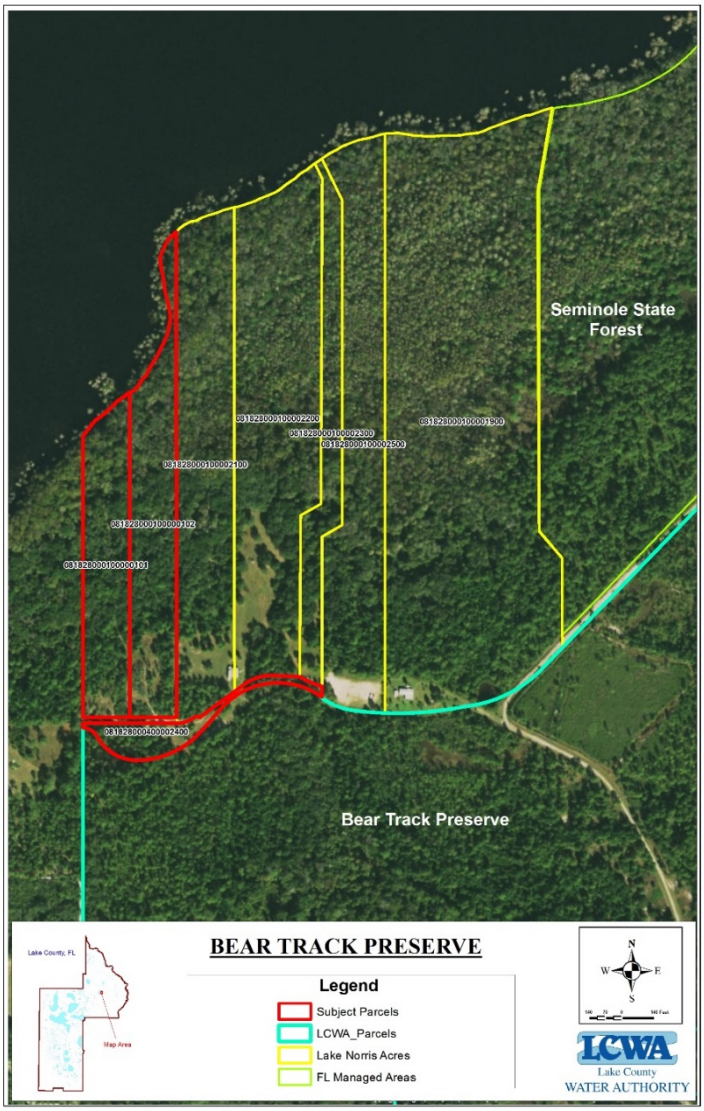
Bathymetry data has been collected for four major lakes; Lake Dora, Lake Beauclair, Lake Carlton, Little Lake Harris. In 2016 Lake Harris, Lake Eustis, Lake Denham, Lake Griffin and Lake Louisa were added. The collected bathymetric data is being processed (cleaned).

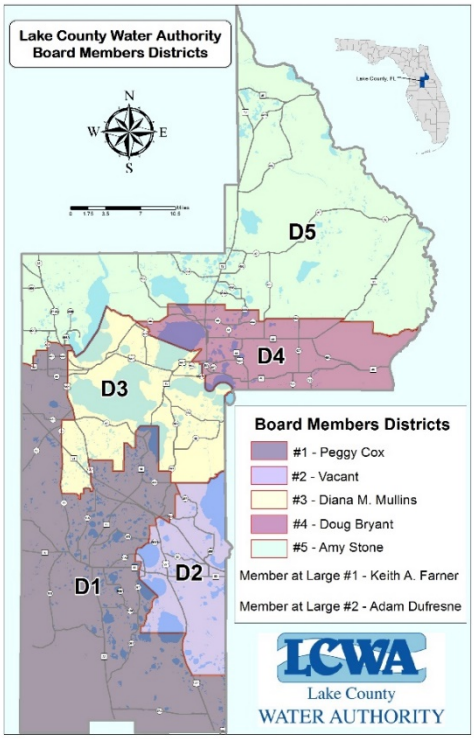
These new bathymetry maps have been saved into the Water Atlas for public download and use replacing the old and outdated maps on the site.

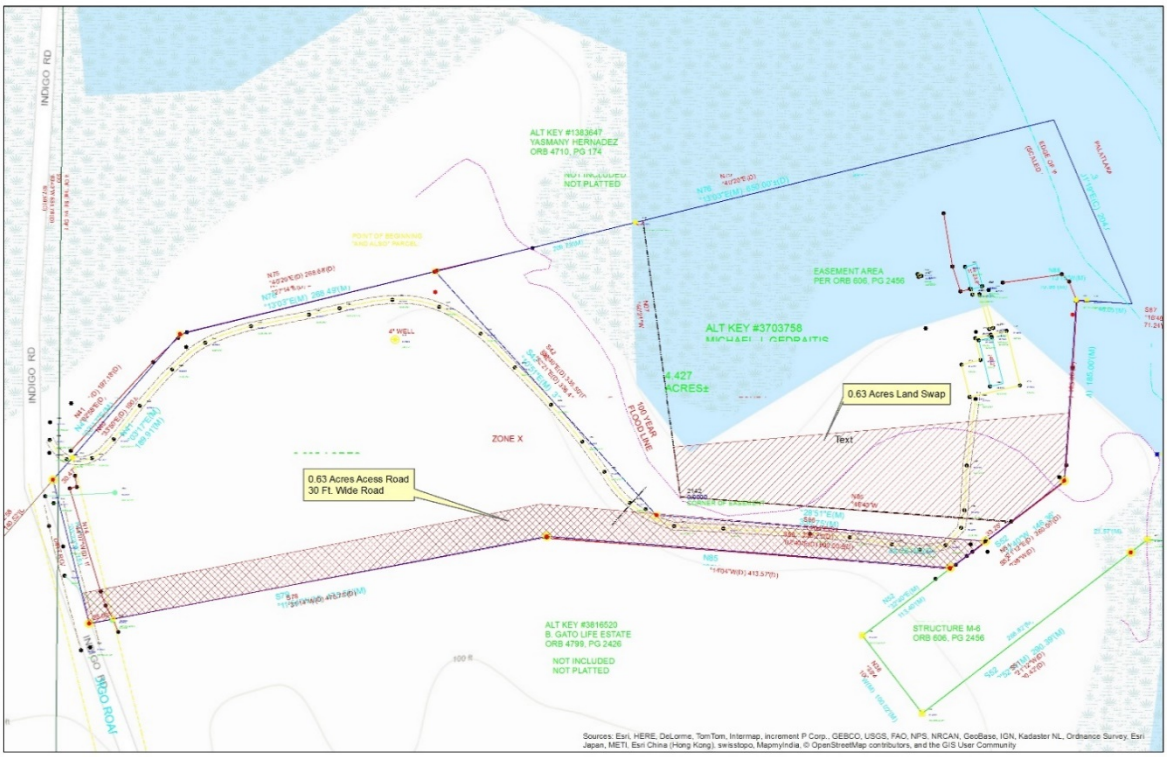
Produced Maps

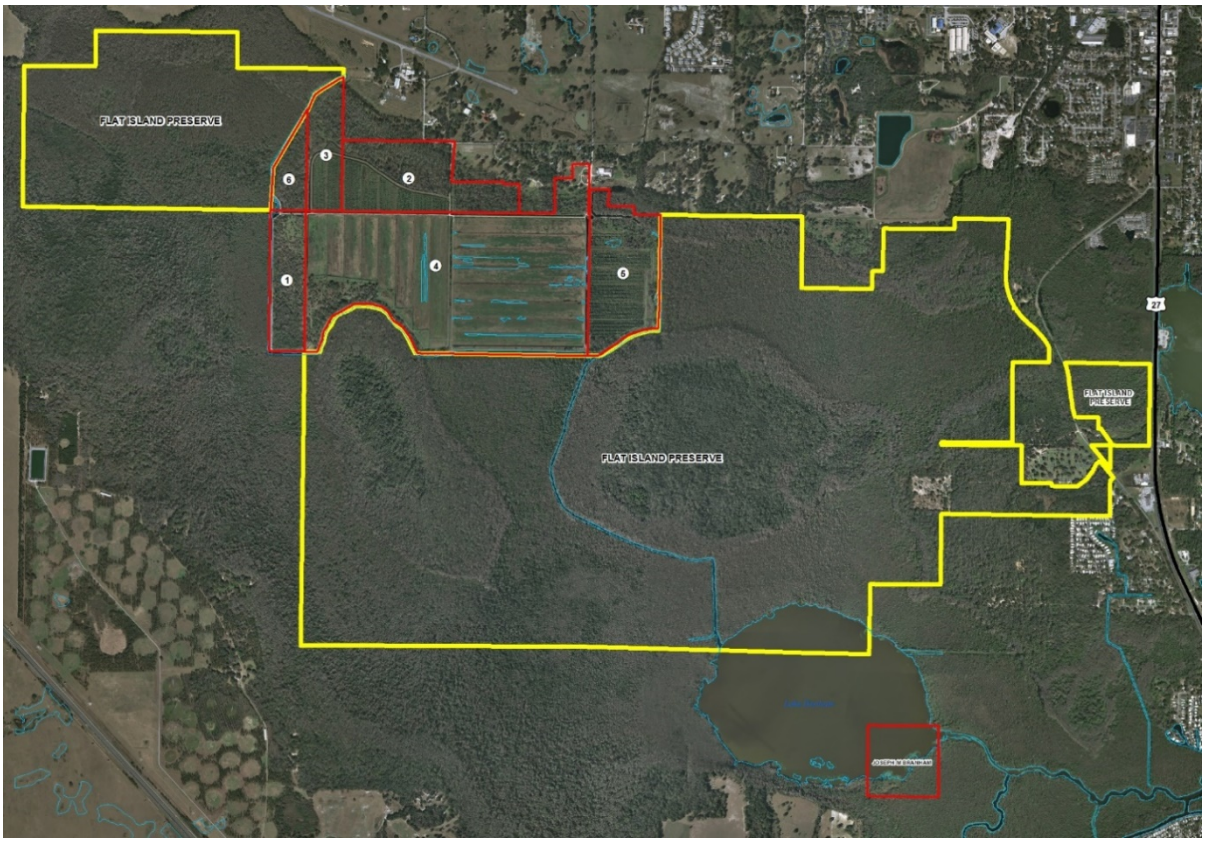
Examples of maps that facilitated the planning and decision-making process and provided general information for the board, staff and public in 2016 are shown below:

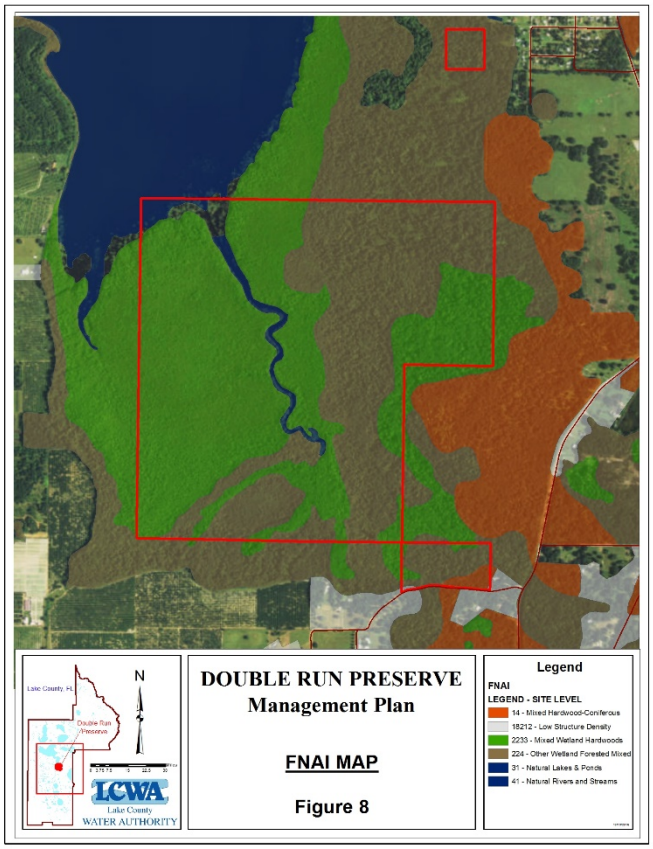


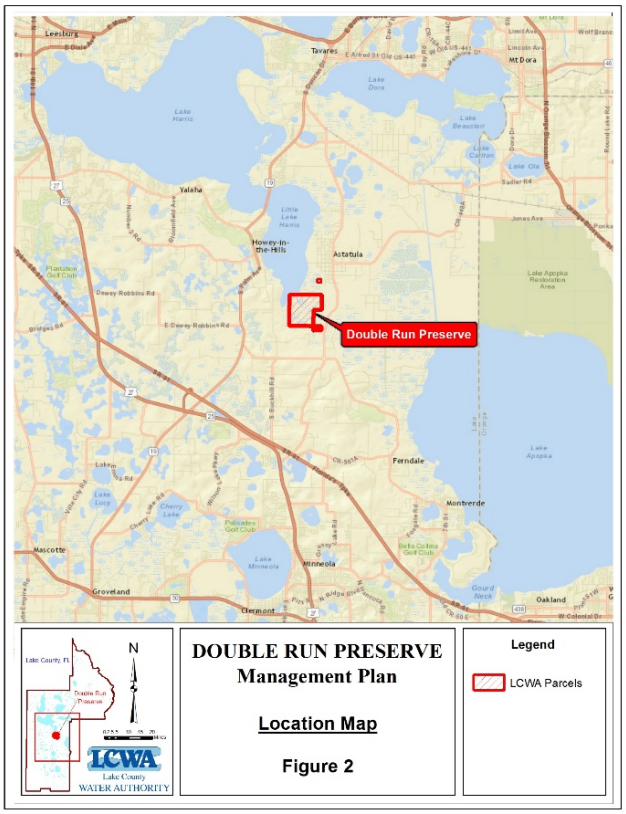


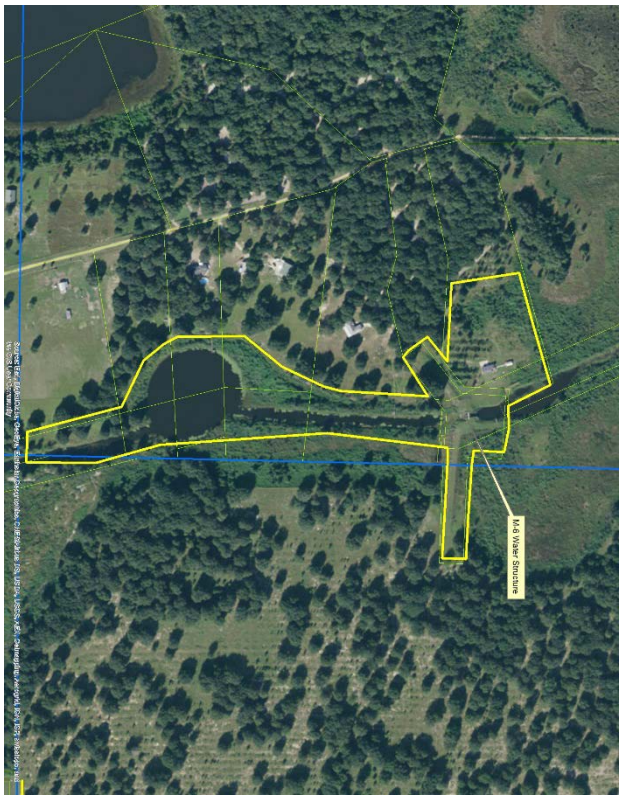


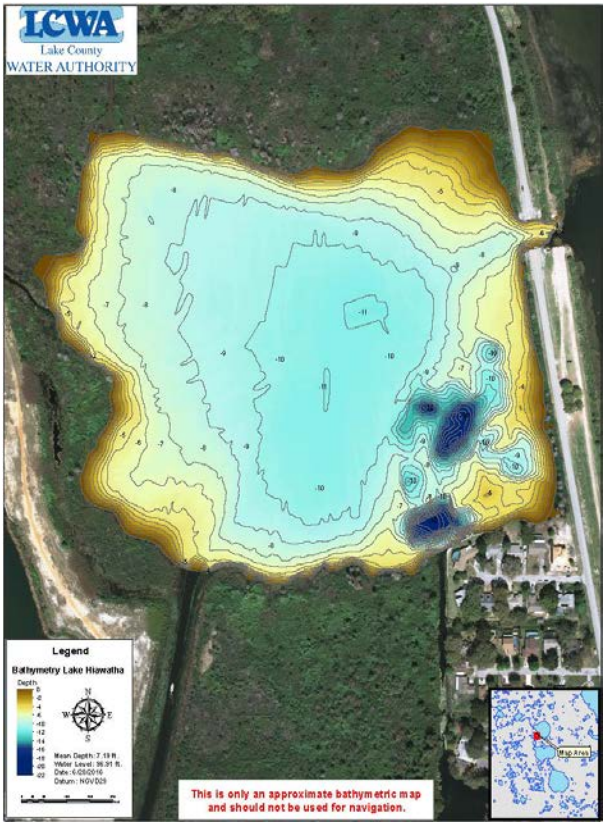

INDIGO RD
INDIGO ROAD
ALT KEY #1383647
YASMANY HERNADEZ
ORB 4710, PG 174
NOT INCLUDED
NOT PLATTED
EASEMENT AREA
PER ORB 606, PG 2456
ALT KEY #3703758
4.427
ACRES±
0.63 Acres Land Swap
Text
ZONE X
0.63 Acres Acess Road
30 Ft. Wide Road
ALT KEY #3816520
B. GATO LIFE ESTATE
ORB 4799, PG 2426
NOT INCLUDED
NOT PLATTED
STRUCTURE M-6
ORB 606, PG 2456
Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

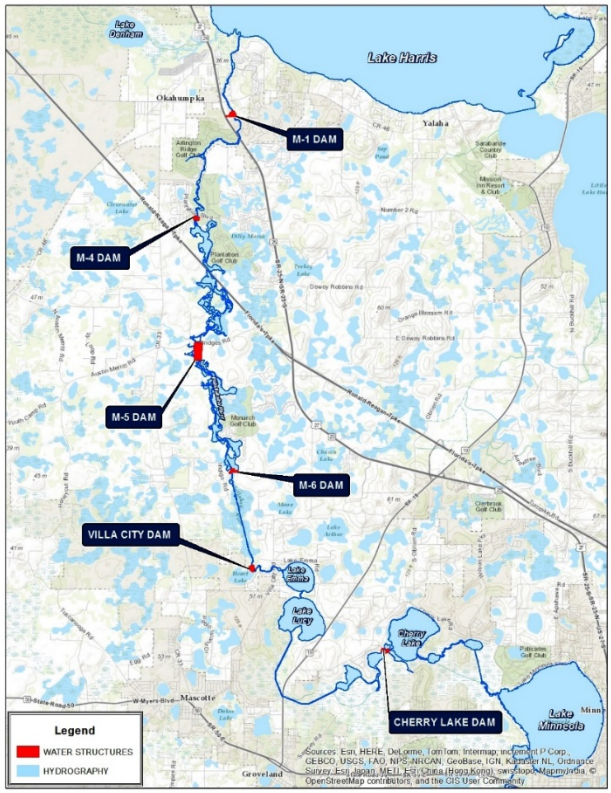

FLAT ISLAND PRESERVE
1
2
3
4
5
6
FLAT ISLAND PRESERVE
FLAT ISLAND PRESERVE


DOUBLE RUN PRESERVE
Management Plan
FNAI MAP
Figure 8
Legend
FNAI
LEGEND - SITE LEVEL
14 - Mixed Hardwood-Coniferous
18212 - Low Structure Density
2233 - Mixed Wetland Hardwoods
224 - Other Wetland Forested Mixed
31 - Natural Lakes & Ponds
41 - Natural Rivers and Streams
N
LCWA
Lake County
WATER AUTHORITY

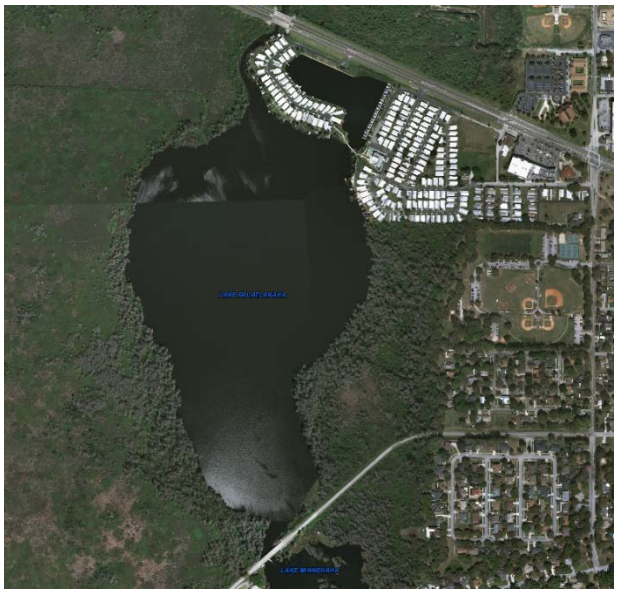

Double Run Preserve
DOUBLE RUN PRESERVE
Management Plan
Location Map
Figure 2
Legend
LCWA Parcels
N
LCWA
Lake County
WATER AUTHORITY

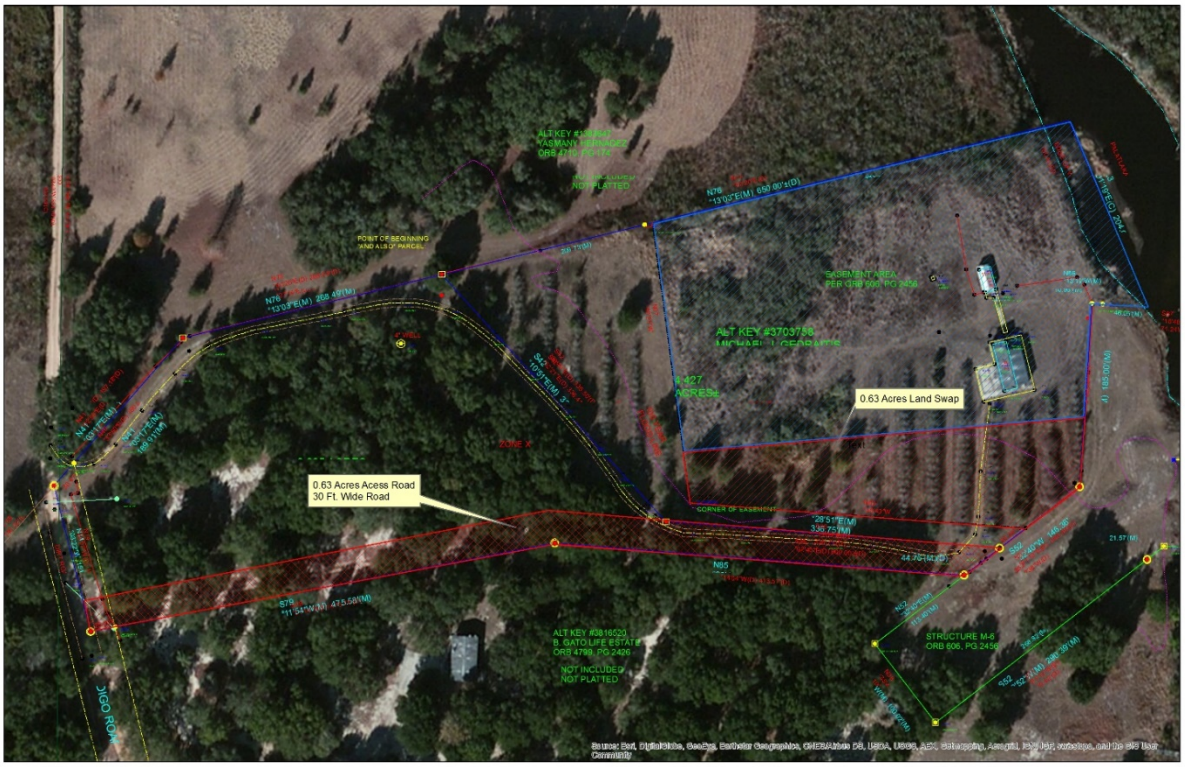

M-6 Water Structure

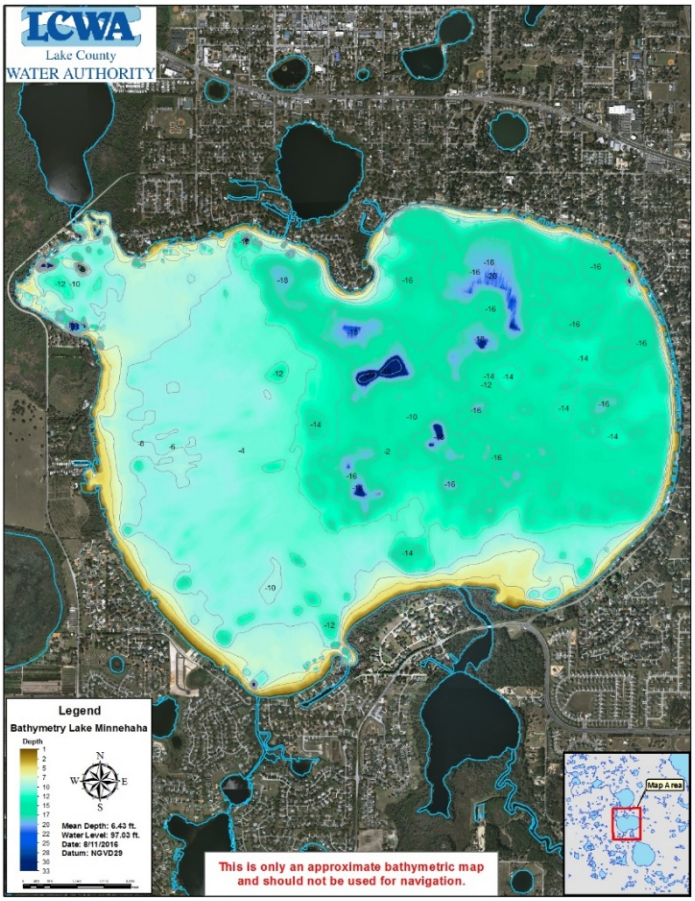

LCWA
Lake County
WATER AUTHORITY
Legend
Bathymetry Lake Hiawatha
Depth
This is only an approximate bathymetric map and should not be used for navigation.

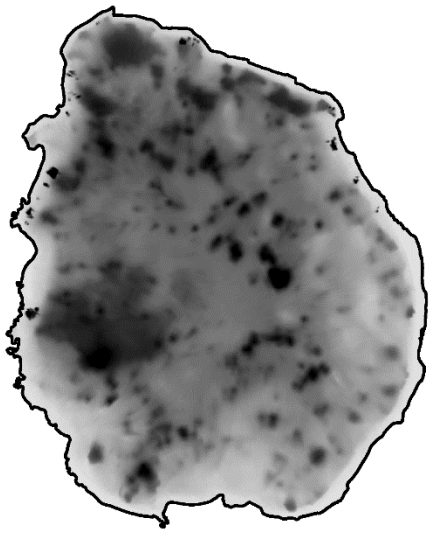

Lake Harris
M-1 DAM
M-4 DAM
M-5 DAM
M-6 DAM
VILLA CITY DAM
CHERRY LAKE DAM
Lake Minneola
Legend
WATER STRUCTURES
HYDROGRAPHY


Soccer
LCWA New Office
Parking
Entrance
Volleyball
Parking
Hickory Point
Recreational Facility
LCWA Property Boundary
Subject Area Boundary
Lake County, FL
Farm Location
LCWA
Lake County
WATER AUTHORITY




0.63 Acres Land Swap
0.63 Acres Acess Road
30 Ft. Wide Road
ALT KEY #3703756
9.427
ACRES+/-
ALT KEY #3816520
B. GATO LIFE ESTATE
ORB 4799, PG 2426
NOT INCLUDED
NOT PLATTED
STRUCTURE M-6
ORB 606, PG 2456
POINT OF BEGINNING
AND ALSO PARCEL
EASEMENT AREA
PER ORB 606, PG 2456
ZONE X
DIGO ROW


LCWA
Lake County
WATER AUTHORITY
Legend
Bathymetry Lake Minnehaha
Depth
Mean Depth: 6.43 ft.
Water Level: 97.03 ft.
Date: 8/11/2016
Datum: NGVD29
Map Area
This is only an approximate bathymetric map
and should not be used for navigation.



Lake County Water Authority
Five Year Plan - 2016-2021

FY	2016-17	%	2017-18	%	2018-19	%	2019-20	%	2012-21	%
Revenue										
Revenue (less 5% uncollectable)	4,275,018	27.98%	4,381,022	28.70%	4,512,453	33.46%	4,647,826	39.04%	4,787,261	42.57%
Cash Forward	10,601,702	69.40%	10,789,796	70.68%	8,948,163	66.35%	7,232,667	60.75%	6,433,617	57.21%
Outside Revenue	399,990	2.62%	94,040	0.62%	25,000	0.19%	25,000	0.21%	25,000	0.22%
Total Revenue	15,276,710	100.00%	15,264,858	100.00%	13,485,616	100.00%	11,905,493	100.00%	11,245,878	100.00%
Expenditures										
Administration										
Personnel	432,499	2.83%	577,354	3.78%	594,675	4.41%	612,515	5.14%	630,890	5.61%
Operating Expenses	314,180	2.06%	316,767	2.08%	332,605	2.47%	349,236	2.93%	366,697	3.26%
Capital Outlay	-	0.00%	-	0.00%	50,000	0.37%	50,000	0.42%	50,000	0.44%
Sub Total Administration	746,679	4.89%	894,121	5.86%	977,280	7.25%	1,011,750	8.50%	1,047,588	9.32%
Hickory Point										
Operating Expenses	149,300	0.98%	122,600	0.80%	128,730	0.95%	135,167	1.14%	141,925	1.26%
Capital Outlay					25,000	0.19%	25,000	0.21%	25,000	0.22%
Sub Total Parks and Rec	149,300	0.98%	122,600	0.80%	153,730	1.14%	160,167	1.35%	166,925	1.48%
Water Resources										
Personnel	256,079	1.68%	265,476	1.74%	273,440	2.03%	281,643	2.37%	290,093	2.58%
Operating Expenses	150,255	0.98%	164,563	1.08%	169,500	1.26%	174,585	1.47%	179,822	1.60%
Palatlakaha Restoration (M-5 & M-6 Design)										
Palatlakaha Restoration (M-5 & M-6 Construction Mgmt.)	60,000	0.39%								
Palatlakaha Restoration (Villa City Design)	75,000	0.49%	75,000	0.49%						
Palatlakaha Restoration (Construction Management)			60,000	0.39%						
Palatlakaha Restoration (Construction)			400,000	2.62%						
Nutrient Source Evaluations (Lakes Denham, Trout or Yale)										
Lakes Yale and Trout Nutriuent Evaluation	30,000	0.20%								
Lake Carlton Nutrient Evaluation	93,000	0.61%								
Project Design	200,000	1.31%	500,000	3.28%						
Nutrient Source Projects (Lakes Denham, Trout or Yale)	850,000	5.56%								
Construction			1,600,000	10.48%	750,000	5.56%	750,000	6.30%		
Palatlakaha Restoration (M-5 & M-6 Construction)	600,000	3.93%								
Palatlakaha Restoration			400,000	2.62%	400,000	2.97%	400,000	3.36%	400,000	3.56%
NuRF - Maintenance	51,500	0.34%	51,500	0.34%	250,000	1.85%	250,000	2.10%	250,000	2.22%
NuRF - Maintenance Reserve	604,101	3.95%	432,655	2.83%	575,000	4.26%	575,000	4.83%	575,000	5.11%
NuRF - Equipment	4,000	0.03%	5,000	0.03%	25,000	0.19%	25,000	0.21%	25,000	0.22%
NuRF - Alum	2,000,000	13.09%	2,000,000	13.10%	2,000,000	14.83%	2,000,000	16.80%	2,000,000	17.78%
NuRF - Polymer	100,000	0.65%	100,000	0.66%	100,000	0.74%	100,000	0.84%	100,000	0.89%
Waterway Signs	10,000	0.07%	-	0.00%	15,000	0.11%	15,000	0.13%	15,000	0.13%
Adopt a Lake Sampling	35,000	0.23%	35,000	0.23%	35,000	0.26%	35,000	0.29%	35,000	0.31%
Benthic invertebrate Re-identification	13,000	0.09%	1,600	0.01%	13,000	0.10%	13,000	0.11%	13,000	0.12%
Aquatic Plant Harvesting	35,000	0.23%	-	0.00%	5,000	0.04%	5,000	0.04%	5,000	0.04%
USGS monitoring network	138,900	0.91%	146,000	0.96%	140,000	1.04%	140,000	1.18%	140,000	1.24%
Waterway Tree Removal	20,000	0.13%	20,000	0.13%	30,000	0.22%	30,000	0.25%	30,000	0.27%
Sheriff - Marine Patrol (85% of full amount)	211,779	1.39%	222,368	1.46%	233,486	1.73%	245,161	2.06%	257,419	2.29%
Sheriff - Boat for Marine Unit			50,000	0.33%						
Aids To Government Agencies										
2012 Stormwater Retrofit Grants										
City of Tavares (Downtown Stormwater Improvements)	253,000	1.66%								
2014 Stormwater Retrofit Grants										
Lake County (Wolf Branch Rd Treatment)	200,000	1.31%								
Umatilla (Lake Yale Stormwater Reuse)	100,000	0.65%								
Tavares (Downtown Stormwater Treatment)	100,000	0.65%								
2015 Stormwater Retrofit Projects										
Leesburg (Heritage Estates Stormwater Park)	78,250	0.51%			78,250	0.58%				
Leesburg (Lake Griffin Stormwater Improvement)	100,500	0.66%	100,500	0.66%	100,500	0.75%				
Clermont (Lake Winona Stormwater Improvements)										

Lake County Water Authority
Five Year Plan - 2016-2021

FY	2016-17	%	2017-18	%	2018-19	%	2019-20	%	2012-21	%	
Clermont (Drew and East Ave. Improvements)	169,656	1.11%			169,656	1.26%					
Montverde Boat Ramp	25,000	0.16%									
2016 Stormwater Retrofit Projects											
Tavares (Downtown Stormwater Treatment)	286,330	1.87%	245,000	1.60%	286,330	2.12%					
Clermont West Project	643,030	4.21%	643,030	4.21%	643,030	4.77%					
2017 Stormwater Retrofit Projects	900,000	5.89%									
Umatilla (Lake Yale Stormwater Reuse)			150,000	0.98%							
2018 Stormwater Retrofit Projects			-	0.00%							
Lake Denham Muck Farm Acquisition			1,000,000	0.00%							
Future Stormwater Projects					1,000,000	7.42%	1,000,000	8.40%	1,000,000	8.89%	
Dock on Clermont Chain	387,259	2.53%			350,000	2.60%					
Lake Restoration Grant											
Eustis Lake Gracie Dredge Design	80,000	0.52%	80,000	0.52%							
Replace Vehicle					30,000	0.22%			30,000	0.27%	
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	10,000	0.07%	9,850	0.06%	10,000	0.07%	10,000	0.08%	10,000	0.09%	
SubTotal - Water Resources:	8,875,639	58.10%	8,762,542	57.40%	7,234,252	53.64%	5,588,161	46.94%	4,880,419	43.40%	
Field Services											
Personnel	232,614	1.52%	237,589	1.56%	244,717	1.81%	252,058	2.12%	259,620	2.31%	
Operating Expenses	128,200	0.84%	121,598	0.80%	125,246	0.93%	129,003	1.08%	132,873	1.18%	
SubTotal - Field Services:	360,814	2.36%	359,187	2.35%	369,963	2.74%	381,061	3.20%	392,493	3.49%	(0)
Land Resources											
Personnel	278,952	1.83%	285,193	1.87%	293,749	2.18%	302,561	2.54%	311,638	2.77%	
Operating Expenses	19,926	0.13%	20,524	0.13%	21,139	0.16%	21,774	0.18%	22,427	0.20%	
Acquisition	100,000	0.65%	300,000	1.97%	100,000	0.74%	100,000	0.84%	100,000	0.89%	
Burn Plan Development			1,500	0.01%	4,000	0.03%	4,000	0.03%	4,000	0.04%	
Exotic Invasive Hog Removal	10,000	0.07%	10,000	0.07%	10,000	0.07%	10,000	0.08%	10,000	0.09%	
Contract Burning	48,000	0.31%	67,000	0.44%	45,000	0.33%	45,000	0.38%	45,000	0.40%	
Fencing of Preserves	5,000	0.03%	15,000	0.10%	5,000	0.04%	5,000	0.04%	5,000	0.04%	
Repair & Maintenance	25,000	0.16%	76,751	0.50%	100,000	0.74%	100,000	0.84%	100,000	0.89%	
Contract Mowing and Fireline Maintenance	12,000	0.08%	25,000	0.16%	25,000	0.19%	25,000	0.21%	25,000	0.22%	
Exotic/Invasive Plant Control	13,000	0.09%	15,000	0.10%	13,000	0.10%	13,000	0.11%	13,000	0.12%	
Sawgrass Island Preserve Restoration (USFWS Grant)											
Sawgrass Island Preserve Restroom	58,000										
Replace Vehicle					30,000	0.22%			30,000	0.27%	
Replace Tractor							40,000	0.34%			
Restoration Projects	25,000	0.16%			25,000	0.19%	25,000	0.21%	25,000	0.22%	
Bear Track Boardwalk and Canoe Launch			60,000	0.39%							
Crooked River Canoe/Kayak Launch Dock	15,000										
Sawgrass Island Preserve Observation Deck	30,000										
Site Improvements	49,000	0.32%	7,500	0.05%	7,500	0.06%	7,500	0.06%	7,500	0.07%	
SubTotal - Land Resources:	688,878	4.51%	883,468	5.79%	364,500	2.70%	374,500	3.15%	364,500	3.24%	

Lake County Water Authority
Five Year Plan - 2016-2021

FY	2016-17	%	2017-18	%	2018-19	%	2019-20	%	2012-21	%
Resource Communication										
Education										
Education Limit - 3.5 % of ad valorem	157,501		153,336		157,936		162,674		167,554	
Operating Expenses			600	0.00%	618	0.00%	637	0.01%	656	0.01%
Other Contractual Services										
Sheriff - Marine Patrol (15% of full amount)	17,171	0.11%	17,171	0.11%	18,030	0.13%	18,931	0.16%	19,878	0.18%
Naturalist Contractor	10,000	0.07%	10,000	0.07%	15,000	0.11%	15,000	0.13%	15,000	0.13%
Education Contractor	10,000	0.07%	10,000	0.07%	15,000	0.11%	15,000	0.13%	15,000	0.13%
Education and Graphics Design Services	10,000	0.07%	2,000	0.01%	10,000	0.07%	10,000	0.08%	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	10,500	0.07%	2,000	0.01%	2,000	0.01%	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%
LCWA Events/Project Advertisements	1,700	0.01%	1,000	0.01%	2,000	0.01%	2,000	0.02%	2,000	0.02%
Operating Supplies										
Limnology Education & Misc. Supplies	650	0.00%	450	0.00%	700	0.01%	700	0.01%	700	0.01%
Aids to Government Agencies										
Public School Transportation Funds	5,000	0.03%	-	0.00%	-	0.00%	-	0.00%	-	0.00%
Water Resource Education Mini-Grants	20,000	0.13%	-	0.00%	-	0.00%	-	0.00%	-	0.00%
Aids to Private Agencies										
Trout Lake Center Grant	7,500	0.05%	15,500	0.10%	15,500	0.11%	15,500	0.13%	15,500	0.14%
Community Water Resource Mini-Grants (50%)	8,700	0.06%	-	0.00%	-	0.00%	-	0.00%	-	0.00%
SubTotal - Education:	104,871	0.69%	62,871	0.41%	83,348	0.62%	84,268	0.71%	85,233	0.76%
Public Outreach										
Community Water Resource Mini-Grants (50%)	5,000	0.03%	-	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	17,620	0.12%	2,000	0.01%	17,620	0.13%	17,620	0.15%	17,620	0.16%
Media & Graphics Services	5,000	0.03%	6,325	0.04%	15,000	0.11%	15,000	0.13%	15,000	0.13%
Preserve Brochures/Reprinting	4,000	0.03%	10,000	0.07%	10,000	0.07%	10,000	0.08%	10,000	0.09%
Grant to Trout Lake for New Building			25,000	0.16%						
SubTotal - Public Outreach:	34,370	0.22%	46,075	0.30%	36,120	0.27%	36,120	0.30%	36,120	0.32%
Resource Data										
Personnel	115,432	0.76%								
Operating Expenses	14,925	0.10%	8,375							
GIS Projects										
LCWA Web Site Upgrades	1,000	0.01%	1,500	0.01%	1,000	0.01%	1,000	0.01%	1,000	0.01%
Network Maintenance	3,000	0.02%	3,500	0.02%	3,000	0.02%	3,000	0.03%	3,000	0.03%
Lake County Water Resource Atlas	25,000	0.16%	25,000	0.16%	25,000	0.19%	25,000	0.21%	25,000	0.22%
Migration Consulting to MS Office 360			5,500	0.04%						
Future GIS Projects					30,000	0.22%	30,000	0.25%	30,000	0.27%
Communication Services	19,200	0.13%	14,400	0.09%	14,000	0.10%	14,000	0.12%	14,000	0.12%
GIS Equipment										
Workstation Replacement	4,500	0.03%	4,500	0.03%	4,500	0.03%	4,500	0.04%	4,500	0.04%
Supplies and Equipment	2,000	0.01%	2,000	0.01%	2,000	0.01%	2,000	0.02%	2,000	0.02%
Solar Power for New Building			45,000	0.29%						
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%

Lake County Water Authority
Five Year Plan - 2016-2021

FY	2016-17	%	2017-18	%	2018-19	%	2019-20	%	2012-21	%
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%	250	0.00%	5,000	0.04%	5,000	0.04%	5,000	0.04%
Server O/P System Upgrade	5,000	0.03%	-	0.00%	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:	205,557	1.35%	120,525	0.79%	100,000	0.74%	100,000	0.84%	100,000	0.89%
Comm. Redev. Trust Fund Reimbursement	95,602	0.63%	98,470	0.65%	101,424	0.75%	104,466	0.88%	107,600	0.96%
Contingency and Fund Balance										
Fund Balance - End of Year	200,000	1.31%	200,000	1.31%	200,000	1.48%	200,000	1.68%	200,000	1.78%
NuRF Closure Reserve	850,000	5.56%	850,000	5.57%	850,000	6.30%	850,000	7.14%	850,000	7.56%
Alum Reserve	2,000,000	13.09%	2,000,000	13.10%	2,000,000	14.83%	2,000,000	16.80%	2,000,000	17.78%
Surplus of Water Authority Property	315,000	2.06%	315,000	2.06%	315,000	2.34%	315,000	2.65%	315,000	2.80%
Self-Insurance Reserve	150,000	0.98%	200,000	1.31%	200,000	1.48%	200,000	1.68%	200,000	1.78%
Water Authority Building Maintenance Fund	350,000	2.29%	200,000	1.31%	350,000	2.60%	350,000	2.94%	350,000	3.11%
Contingency Reserve	150,000	0.98%	150,000	0.98%	150,000	1.11%	150,000	1.26%	150,000	1.33%
Total Expenditures	15,276,710	100.00%	15,264,858	100.00%	13,485,616	100.00%	11,905,493	100.00%	11,245,878	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