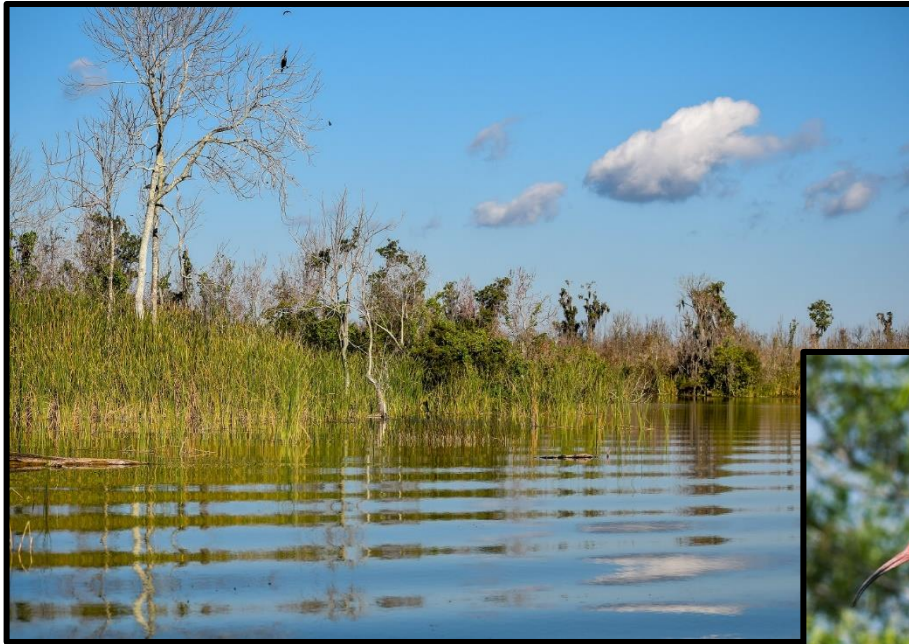


Harris Chain of Lakes

RESTORATION COUNCIL



2019 Report to the Legislature

Executive Summary enclosed within this report

harrischainoflakescouncil.com

Issued by:

Harris Chains of Lakes Restoration Council

harrischainoflakescouncil.com

Keith Truenow, Chairman
Stephanie Bishop, Vice-Chairman
Wade Boyette
Joe Dunn
Skip Goerner
Sid Grow
Don Nicholson
[Dr. Mike Smith](#)
John Stump

Views [Images of Lake Harris, Lake County, Florida](#) ~~Text to be added once figures approved.~~
[Photographs courtesy of SJRWMD](#)

Harris Chains of Lakes Restoration Council

2019 Report to the Florida Legislature

EXECUTIVE SUMMARY

The Harris Chain of Lakes Restoration Council (Council) was established by the Florida Legislature in 2001 with the powers and duties to (a) review audits and all data specifically related to lake restoration techniques and sport fish population recovery strategies, including data and strategies for shoreline restoration, sediment control and removal, exotic species management, floating tussock management or removal, navigation, water quality, and fish and wildlife habitat improvement, particularly as they may apply to the Harris Chain of Lakes; (b) evaluate whether additional studies are needed; (c) explore all possible sources of funding to conduct the restoration activities; and (d) report to the President of the Senate and the Speaker of the House of Representatives each year on the progress of the Harris Chain of Lakes restoration program, and any recommendations for the next fiscal year.

The mission of the Council is to maximize successful restoration of the Harris Chain of Lakes, by ensuring sensible efforts to restore clean water quality, sound environmental policy, ecological diversity, and economic stability, now and into the future. The Council conducted eleven meetings during the reporting period of Nov. 2018 through Oct. 2019, including a tour of the Lake Apopka North Shore in July 2019. The Council reviewed projects, received technical presentations, and discussed water resources issues throughout this period on Harris Chain of Lakes restoration, lake water level management, fisheries research, water quality, and aquatic plant management. This report represents the recommendations of the Council to the Legislature.

To maximize successful restoration of the Harris Chain of Lakes in 2019, the Council specifically supports and recommends the following:

Lake Level Water Management

- [Support SJRWMD efforts to increase the maximum desirable elevation in Lake Apopka and emergency on the Lake Apopka North Shore.](#)
- Encourage SJRWMD to accelerate the Lake Apopka MFL (minimum flows and levels) update

Water Quality

- [Support efforts by the Florida State Legislature to pass legislation that provides for inspection and correction of home septic systems that do not function correctly.](#)
- Support Orange & Lake County septic system inventory efforts.
- Encourage replacement of septic systems near lakes and canals with municipal central sewer where feasible.
- Encourage local governments to revise local codes regarding replacement of failing septic systems near lakes and canals.

Aquatic Plant Management

- Request dedicated legislative funding of \$10 million for the Florida Fish and Wildlife Conservation Commission (FWC) for *Hydrilla* management on the Harris Chain of Lakes in response to both public input and the scope of the problem.

- Council supports aggressive treatment of hydrilla. Legislature to provide funding for research into new herbicides for eradication of hydrilla. Hydrilla may become immune to current herbicides.

DRAFT

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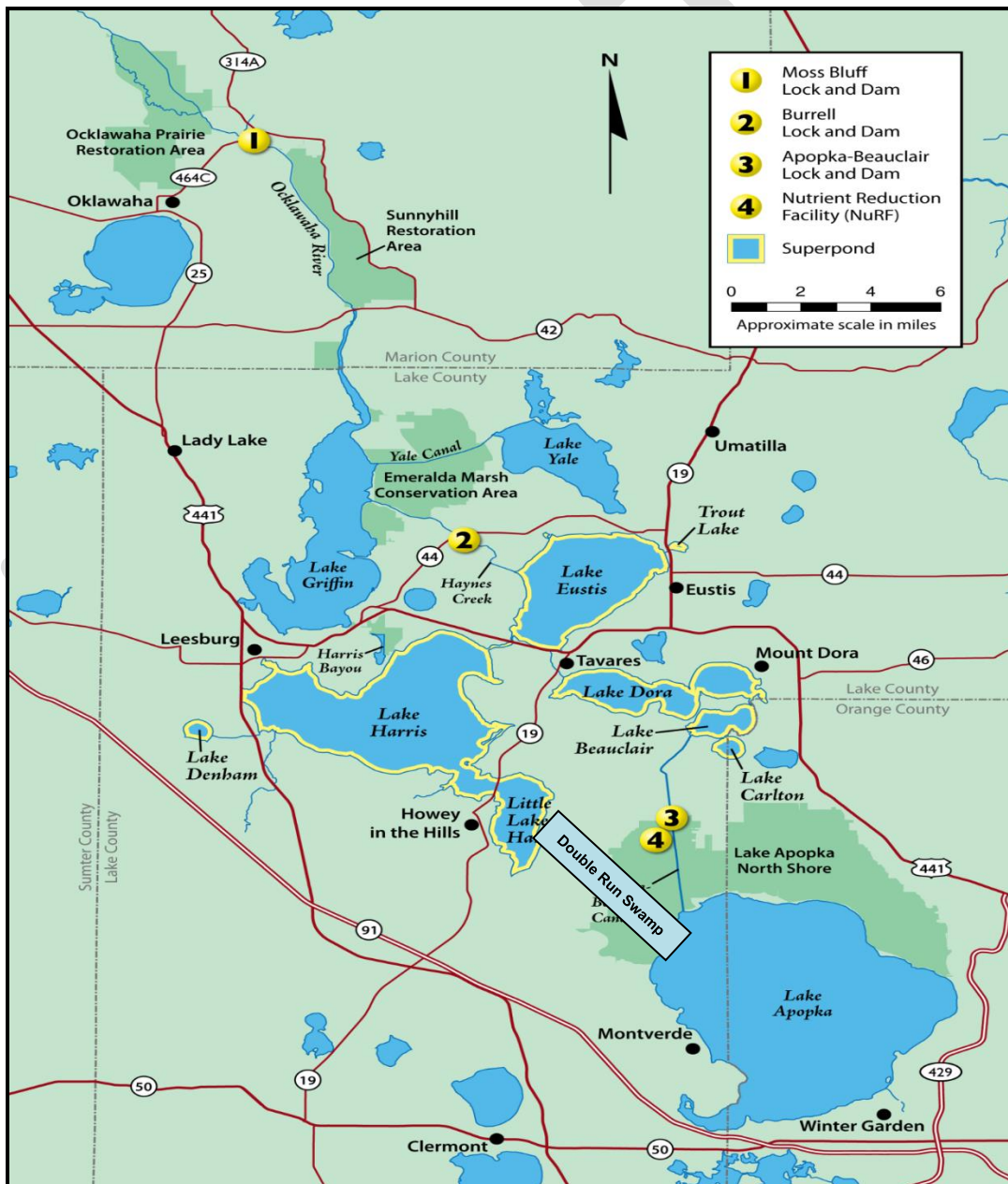
LIST OF ACRONYMS

<u>BOD</u>	<u>Biological Oxygen Demand</u>
FDEP	Florida Department of Environmental Protection
<u>FDOH</u>	<u>Florida Department of Health</u>
FDOT	Florida Department of Transportation
FWC	Florida Fish and Wildlife Conservation Commission
IFAS	Institute of Food and Agricultural Sciences
LANS	Lake Apopka North Shore
LCWA	Lake County Water Authority
MFLs	Minimum Flows and Levels
NuRF	Nutrient Reduction Facility
<u>OSTDS</u>	<u>Onsite Sewage Treatment and Disposal Systems</u>
SAV	Submerged Aquatic Vegetation
SJRWMD	St. Johns River Water Management District
TAG	Technical Advisory Group
TP	Total Phosphorus
UF	University of Florida
UORB	Upper Ocklawaha River Basin

1.0 ENABLING LEGISLATION & LEGAL DISCUSSIONS

The Florida Legislature enacted legislation in 2001 creating the Harris Chain of Lakes Restoration Council (Council) to review audits and all data specifically related to lake restoration techniques and sport fish population recovery strategies, including data and strategies for shoreline restoration, sediment control and removal, exotic species management, floating tussock management or removal, navigation, water quality, and fish and wildlife habitat improvement, particularly as they may apply to the Harris Chain of Lakes (Figure 1), evaluate whether additional studies are needed, explore all possible sources of funding to conduct the restoration activities, and report to the President of the Senate and the Speaker of the House of Representatives before Nov.25 of each year on the progress of the Harris Chain of Lakes restoration program, and any recommendations for the next fiscal year. Statutory authority is included as Appendix A.

Figure 1: Map of the Harris Chain of Lakes



In Sept. 2019, Ms. Melanie Marsh, Lake County Attorney, briefed the Council on the Florida Sunshine Law. Ms. Marsh reported the Sunshine Law operates under the concept that everything a public body does needs to be in the public.

Public bodies must operate under three basic tenets:

1. Public meetings must open to the public; when one or more Council Members meet to discuss Council items, it must be in a public forum.
2. Public meetings must be reasonably noticed.
3. Public meetings must minutes.

Ms. Marsh discussed penalties under the Sunshine Law, noting the Florida Attorney General has a public crimes section that investigates wrongdoing not only from direct contact, but from social media and other outlets. Ms. Marsh cautioned Council about using social media. Inappropriate electronic communications can be in violation of Sunshine Laws. Council Members need to be cognizant of who they are talking to. Violations can result in a up to a \$500 fine and up to 60 days in prison.

Ms. Marsh also noted if two Council Members discuss something that will occur in the future it is a violation. In addition, recusing oneself from voting from something that was inappropriately discussed would still be a Sunshine Law violation. Council Members are required to vote on motions unless directly involve private gain or impropriety. Ms. Marsh reported Council Members can communicate individually with TAG Members, but Tag Members cannot be used as a liaison to communicate information between Council Members.

2.0 REPRESENTATION

The Council consists of nine voting representatives each appointed by the Lake County Legislative Delegation, as listed in Table 1. Officers serve a two-year term. Elections for new officers occurred at the Apr. 6, 2018, meeting. Mr. Sid Grow was elected Chairman, Mr. Keith Truenow was elected Vice-Chairman, and Mr. Bob Johnson was elected Secretary. Two additional members were appointed to the Council in September 2018. Mr. Wade Boyette filled the position for Attorney, and Mr. Joe Dunn filled a Member-at-Large position.

Chairman Grow resigned his position effective Sept. 6, 2019, with Vice-Chairman Truenow assuming the duties of Chairman. Chairman Grow agreed to continue as a regular member of the Council. Council Member Stephanie Bishop was elected interim Vice-Chairwoman to fill the position vacated by Chairman Truenow until the next election in February 2020. Secretary Johnson resigned his position effective Sept. 10, 2019. Council agreed to leave the position vacant until elections in February 2020.

Table 1: 2019 Harris Chain of Lakes Restoration Council Members

Member	Representative
Keith Truenow, Chairman	Member-at-Large
Stephanie Bishop, PE, Vice- Chairman	Engineer
Don Nicholson	Waterfront Property Owners
Skip Goerner	Sport Fishing
Sid Grow	Member-at-Large
John Stump, PG	Environmental Science/Regulation
Wade Boyette	Attorney

Member	Representative
Joe Dunn	Member-at-Large
Dr. Mike Smith Vacant	Biology

The Council is supported by a Technical Advisory Group (TAG) consisting of agency representatives as listed in Table 2.

Table 2: 2018 Technical Advisory Group (TAG) Members

Agency	Representative
FDEP	Kevin Coyne
FDOT	Vacant
FWC	Scott Bisping
LCWA	Jason Danaher
SJRWMD	Not assigned
UF	Mark Hoyer
U.S. Army Corps of Engineers	Vacant

All Council meetings were noticed in the Florida Administrative Weekly and open to the public. Members of the public regularly attended Council meetings and provided information and feedback to the Council. Information from the technical presentations, TAG member updates, and the public was reviewed and discussed in detail by the Council. This information was used by the Council as the basis for developing recommendations for future restorative measures and management practices for the Harris Chain of Lakes.

The Council meeting minutes and technical presentations for the reporting period may be found on the Council’s website: harrischainoflakescouncil.com.

3.0 2019 MEETINGS, PRESENTATIONS, AND COUNCIL ACTIONS

The Council conducted ten regular meetings during the 2019 reporting period (November 2018 to Oct.2019). In addition, on Jan.18, 2019, Council held a special workshop to discuss 2019 Council agenda priorities. Council also participated in a tour of the Lake Apopka North Shore on July 12, 2019, in lieu of a regular meeting. A listing of Council presentations and actions are summarized in Table 3.

Table 3. Harris Chain of Lakes Restoration Council Meetings Summary

Meeting Date	Council Member Attendance	Presentations	Council Actions
Nov. 2, 2018	5	<ul style="list-style-type: none"> Update on the Harris Chain of Lakes Recreational Fishery, Ryan Hamm, FWC 	<ul style="list-style-type: none"> Approval of September (unanimous) and October 2018 meeting minutes (7-1, Goerner dissent) Approval of the 2018 Annual Report (unanimous)
Dec. 7, 2018	0	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> Meeting cancelled by Chairman Grow

Meeting Date	Council Member Attendance	Presentations	Council Actions
Jan.18, 2019	7	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • Regular meeting cancelled. Special workshop held January 18, 2019.
Feb. 1, 2019	8	<ul style="list-style-type: none"> • Updates on the SJRWMD water resources projects Lindsey Porter, P.E., SJRWMD project manager 	<ul style="list-style-type: none"> • Approval of a list of prioritized projects for Council review in 2019 (unanimous).
Mar. 2, 2019	9	<ul style="list-style-type: none"> • Council discussion on SJRWMD nonconformance to Florida Statute 373.467 (1)(b). Review and approval of letters to the Lake County Legislative Delegation, Florida Senate President and Florida House Speaker. • SJRWMD to provide information related to Water Quality Memorandum 56. • SJRWMD to discuss lake level control for upcoming hurricane season, David Watt, SJRWMD. 	<ul style="list-style-type: none"> • Approval of the November 2018, January 2019, and February 2019 minutes (unanimous) • Motion to approve letters to the Lake County Legislative Delegation, Florida Senate President and Florida House Speaker stating that Council considers SJRWMD in nonconformance to Florida Statute 373.467 (1)(b). The motion was rejected 5-4.
Apr. 5, 2019	7	<ul style="list-style-type: none"> • Update on FWC Hydrilla Control, Nathalie Visscher, FWC. 	<ul style="list-style-type: none"> • Approval of March 2019 minutes (unanimous).
May 4, 2019	4	<ul style="list-style-type: none"> • Updates by TAG on Phosphorus Removal: identifying package septic systems (apartments, group of trailers) and municipal septic systems around the Harris Chain. Mike Perry, LCWA. • Update on SJRWMD contract with Phosphorus Free Solutions to remove phosphorus from Lake Apopka, presented by SJRWMD's Robert Zammataro, P.E., Bureau Chief for the Bureau of 	<ul style="list-style-type: none"> • None

Meeting Date	Council Member Attendance	Presentations	Council Actions
		District Projects and Construction.	
June 7, 2019	5	<ul style="list-style-type: none"> • Discussion of Onsite Sewage Treatment and Disposal Systems and Phosphorus Removal, Roxanne Groover, Executive Director, Florida Onsite Wastewater Association. • Review of DEP and DOH OSTDS Coordination in Lake County, Mary Paulic, DEP. 	<ul style="list-style-type: none"> • Approval of the Apr. 2019 and May 2019 meeting minutes (unanimous)
July 12, 2019	7	<ul style="list-style-type: none"> • Tour of the Lake Apopka North Shore. 	<ul style="list-style-type: none"> • None
Aug. 2, 2019	6	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • Approval of the June 2019 (unanimous) and July 2019 meeting minutes (5-1, Goerner in dissent) • Approval to Change the Council Meeting Schedule from Monthly to Every Other Month (5-1, Grow in dissent) • Approval of a List of Specific Questions for the Lake County Attorney to Address Regarding the Sunshine Law (unanimous)
Sept. 6, 2019	8	<ul style="list-style-type: none"> • Discussion of the Florida Sunshine Law as it Pertains to the Harris Chain of Lakes Restoration Council, Lake County Attorney 	<ul style="list-style-type: none"> • Approval of the August 2019 meeting minutes (unanimous) • Approval of election of new Vice-Chairwoman (unanimous). • Approval of 2019-2020 Meeting Dates (7, Grow abstained) • Approval to set new elections for February 2020 (unanimous)
Oct. 4, 2019	4	<ul style="list-style-type: none"> • Update on FWC Fisheries Surveys and Creel 	<ul style="list-style-type: none"> • None

Meeting Date	Council Member Attendance	Presentations	Council Actions
		Sampling, Scott Bisping, FWC. <ul style="list-style-type: none"> • Alternative Conveyance from Lake Apopka, Amy Wright, SJRWMD. 	

Technical presentations listed in Table 3 are summarized by area of interest as follows:

Harris Chain of Lakes Restoration

In Feb. 2019, Lindsey Porter, P.E., SJRWMD project manager provided updates on a number of projects focused on Lake Apopka restoration, as follows:

- The **Lake Apopka North Shore Levee Improvements** project is a \$1,160,000 project funded by SJRWMD sources, to improve the existing levee. The levee will be raised to 70 feet.
- The **Innovative Total Phosphorus Removal Project**, with a budget of \$1,160,000, is anticipated to remove over 10,000 lbs. of phosphorus over 2 years.
- The **Lake Apopka Submerged Aquatic Vegetation (SAV) Restoration** project is a joint project with UF, with a total project cost of \$750,000, with \$250,000 being spent each year over 3 years. The primary goal is to re-establish beds of submerged aquatic vegetation, with project completion scheduled for 2020.
- The **Lake Apopka Unconsolidated Flocc Removal** project is a \$562,000 effort using DEP/FWC money through legislative appropriations, as part of a larger project totaling about \$2.5 million. The goal of the project is to remove flocculent material along the north shore where SAV has high growth potential.
- The **Lake Apopka Vegetation Restoration** project is a \$200,000 FWC (legislative appropriations) project in which the Council previously received an update in November 2018. The goal is to restore emergent aquatic vegetation such as spatterdock, white water lily, and American lotus to improve water quality, habitat and reduce wave action and provides additional levee protection.
- The **North Shore Infrastructure Improvements** effort is a DEP-funded project with an FY 19 budget of \$1.05 million (legislative appropriations) and the total budget is \$2.1 million. The purpose is to design and construct improvements to the north shore infrastructure, including raising the roads around phase 4 totaling 2000 acres. A pump station to pump from the other areas of the north shore into phase 4 is also under design.
- The **Lake Apopka Sump Dredging** project is located in the northwest portion of Lake Apopka, near the mouth of the Apopka-Beauclair Canal, and includes a dredged channel connection to the canal and improve access to the lake. The sump is complete, with navigation dredging to begin after a permit is obtained from the U.S. Army Corps of Engineers. Expected completion date for dredging is July 2019. Over 500,000 cubic yards of material will have been removed on project. The project does not include future removal of sediments collected in the sump as no funds have yet been allocated.

In May 2019, Robert Zammataro P.E., SJRWMD Bureau Chief for the Bureau of District Projects and Construction, provided an update on the Lake Apopka Innovative Total Phosphorus (TP) Removal

Project. Mr. Zammataro reported the SJRWMD awarded a pay for performance contract to Phosphorus Free Water Solutions, LLC to remove approximately 6-12,000 pounds of TP from Lake Apopka. Mr. Zammataro gave a brief overview of the \$2 million project, designed to treat 7,000 gallons per minutes, or 10 million gallons per day, at a site off Hooper Road in the northeast quadrant of the North Shore. Water from an intake pipe receives primary filtration to remove particulates. The effluent is then pH adjusted and passed through a proprietary filter system to remove dissolved P. Water is then discharged back to the lake with total suspended solids, particulate P and dissolved P removed.

Mr. Zammataro also updated Council on the SJRWMD North Shore Interconnect Project. The purpose of the project is to construct a pumping station to move water back and forth across a north-south canal separating a Duda property from other cells in the north shore. The project will give staff the ability to move water within the north shore to prevent discharges to the lake. The project contractor is Four Waters Engineering. The contract allocates \$185,000 for design of the \$1.2 million-dollar project.

In Aug. 2019, Bob Naleway, P.E., SJRWMD Project Manager, provided an additional update on the Lake Apopka North Shore Interconnect Pumping System, reiterating that the project includes the design and construct a pumping system to better utilize existing storage on the north shore rather than discharging to the lake, and the installation of a 50 cubic foot per second pumping system to move water across lake level canal to take advantage of additional storage areas. The project will provide access to an additional 640 million gallons of storage.

In July 2019, the Council participated in a tour of the Lake Apopka North Shore (LANS), with SJRWMD staff and members of the public. Erich Marzolf, Ph.D., SJRWMD Director of Water and Land Resources, acted as the guide for the tour of the Lake Apopka North Shore. Dr. Marzolf provided an overview and history of Lake Apopka and the LANS as the tour got underway. Dr. Marzolf noted the goals of the LANS Project are to reduce phosphorus in Lake Apopka, thereby reducing plankton concentrations, which will allow for more submerged aquatic vegetation and improved recreational fishing opportunities.

The tour entered the LANS at the Duda property and visited the new public boat ramp on the McDonald Canal. Ms. Kelley, SJRWMD Assistant Executive Director, noted this particular ramp was designed to provide ADA access for kayaking. The location also houses the rough fish (gizzard shad) landing facility, though it was not operating at the time of the tour. The tour group then traveled to the West Marsh F&G cells on the LANS where sediments from the Lake Apopka sump dredging projects are deposited. The sump, constructed offshore from the Apopka-Beauclair Canal, is approximately 2,000 feet wide with a maximum depth of 5 feet. The sump is expected to collect about 500,000 cubic yards of nutrient-laden sediment.

The tour returned to the Duda property and viewed a newly completed pump station that provides alum treatment. The tour group was able to see the relative elevation differences of water on the LANS prior to being lifted back to lake elevation at the pump station at this location. Dr. Marzolf noted the nine feet of subsidence that occurred on the LANS as the result of over 5 decades of oxidation of the highly organic soils from farming. The group then travelled to the Lake Level Canal. Dr. Marzolf discussed the capture of alum flocculent in the sand farm pond at this location.

The tour ended with a return north to the Unit 1 pump station and exit via Wildlife Drive. Ms. Lisa Kelley, discussed the public use of the wildlife drive, noting more the 100,000 visitors in the past year.

The tour group observed more than a dozen vehicles, as well as bicyclists on the wildlife drive as the eco-tour buggy exited the LANS and returned to the Apopka Field Station.

Lake Water Level Management

There were no specific presentations on minimum flows and levels (MFLs) during the reporting period; however, there were Council discussions on alternative forms of conveyance from Lake Apopka.

In Jan. 2019, the Council discussed plans to control Lake Apopka surge in an emergency, including using some of the north shore property as a reservoir in dealing with hurricane surges. In March and June 2019 Council again discussed whether there should be a secondary conveyance from Lake Apopka and suggested the Double Run Swamp should be studied as an alternative since the Lake County owns much of the easements.

In Aug. 2019, the Council discussed MFLs in relation to alternative conveyance and recommended SJRWMD accelerate the development of MFLs for Lake Apopka.

In Mar. 2019, David Watt, P.E., Supervising Professional Engineer within SJRWMD's Bureau of Operations and Maintenance, discussed lake level control for upcoming hurricane season. Mr. Watt discussed the Upper Ocklawaha River Basin (UORB) system design to help Council Members understand the systems design constraints, as well as to put discussions about flooding and hurricane preparedness in the proper context.

Mr. Watt noted scientists and engineers use statistical return frequency to describe the likelihood and magnitude of flooding. According to the ACOE, the UORB system was designed to control the 10-year flood, which has a 10% chance of occurring in any given year. The Hurricane Irma rain event was considered to be between a 100 and 200-year flood in this area, which has between a 0.5 and 1% chance of occurring in any given year. Mr. Watt reported that the 30 days surrounding Hurricane Irma was so wet, the whole month's rain was considered to be a 50-year flood, with only a 2% chance of occurring in any given year.

Mr. Watt presented a table showing the difference between what the system was designed to handle, and what happened as a result of Hurricane Irma. SJRWMD estimated the peak stage for Lake Apopka would have risen another foot had the levee not failed to let water into the north shore properties. The peak stage for the Burrell system, also known as the superpond, would also have been higher had it not been for the additional flow capacity of the Harris Bayou improvements.

Mr. Watt discussed additional improvements to the system that will help with future storms. Several gated culverts are now installed that are designed to allow water from Lake Apopka to enter the north shore properties. This is possible as the U.S. Fish and Wildlife Service has removed the restrictions on SJRWMD management of water levels on the north shore, so the option to store excess lake water on those properties is now possible.

[In Oct. 2019, Ms. Amy Wright, P.E., SJRWMD flood control operations manager discussed alternative conveyance from Lake Apopka. Ms. Wright provided background on the Upper Ocklawaha River Basin \(UORB\) flood control screening analysis. Ms. Wright noted the existing conveyance systems in the UORB can accommodate a 10-year flood event, and the UORB](#)

system functions well under typical Florida rainfall events. Ms. Reported that Hurricane Irma was between a 50-year and 100-year rainfall event, and due to the amount of rain and wind from the storm, the Perimeter Lake Levee was compromised and the northeastern portion of the Lake Apopka North Shore (LANS) was flooded. A decision was subsequently made to investigate the flood protection level of service.

Three options were considered in the review of level of service; a new conveyance between Lake Apopka and Little Lake Harris, a new conveyance between Lake Dora and Lake Harris (Double Run Swamp), and additional storage in Lake Apopka and the Lake Apopka Norths Shores (LANS).

The Lake Dora to Lake Harris option was determined not feasible for many reasons, including that a large elevation change would require large pump station, and the conveyance would require crossing railroad tracks & SR 19. There would also be access issues for properties to be crossed including existing stormwater facilities, high value commercially zoned properties, and the existing dock/boardwalk at City of Tavares Nature Park

The Lake Apopka to Little Lake Harris (Double Run) option would use the existing marsh flowwayflow way plus a new canal, with a flow path along a possible historic drainage route from Lake Apopka. The option has a 10-foot elevation difference so no pump station would be needed. The potential issues for this option include construction of water quality treatment facility, installation of two large box culverts, significant wetland impacts and associate permitting issues, costly real estate acquisition, and local resident concerns.

Would move through wetland areas, permitting issues. Right angle canals to address property boundaries

The preliminary cost estimate for the Double Run Swamp option, based on 1,000 cubic feet per second of flow, including modeling, design, construction, public outreach, wetland impacts, land acquisition, and contingency was nearly \$70 million. There would ~~is~~ be additional costs for ongoing treatment, estimated a \$51/acre-feet (ac-ft).

The third option proposes both raising the max desirable elevation on Lake Apopka from 66.4 feet to 67 feet and increasing storage in the LANS. The elevation increase is proposed since during Hurricane Irma Lake Apopka reached 67 feet with apparently no flooding of adjacent properties. Raising the max desirable elevation to 67 feet would add approximately 32,500 ac-ft in storage to Lake Apopka (not including LANS). Ms. Wright noted the advantages for raising max desirable elevation were greater flexibility in flood control operations, less high-volume discharges would benefit Nutrient Reduction Facility (NuRF) operation, and water quality benefits. Ms. Wright indicated expanded storage within the LANS is about 8,500 ac-ft of available storage in a wet year, equivalent to 3-inches of elevation on Lake Apopka. Water can be moved through ten existing inlet structures, with the LANS additional storage only used in emergencies. The costs for option three were minimal. The costs for raising the max desirable elevation in Lake Apopka included modeling and public outreach, and for storing floodwater on the LANS. There were also costs associated with pumping water off the north shore.

In summarizing her presentation, Ms. Wright advised the District is interested in exploring option three, increasing the maximum desirable elevation in Lake Apopka and emergency storage on the Lake Apopka North Shore, and requested Council support for this endeavor.

Council Recommendations 2019:

- [Support SJRWMD efforts to increase the maximum desirable elevation in Lake Apopka and emergency on the Lake Apopka North Shore.](#)
- Encourage SJRWMD to accelerate the Lake Apopka MFL (minimum flows and levels) update

Fishery Research

In Nov. 2018, Mr. Ryan Hamm, FWC provided an update on the Harris Chain of Lakes Recreational Fishery. Mr. Hamm reported FWC currently has numerous projects on the Harris Chain of Lakes including management of fisheries, habitat enhancements, aquatic plant control/management, and research. Mr. Hamm provided a few highlights of fisheries trends and agency activities at Lake Griffin, Lake Harris, Lake Dora and Lake Apopka.

- On **Lake Griffin**, improved water quality from reduced nutrient loading and reconnection of marshes has improved clarity of the water and submersed vegetation has expanded. Vegetation on Lake Griffin increased from 4% in 2006 to over 30% in 2018. Mr. Hamm discussed the Lake Griffin bass population and angler effort, reporting current estimated catch rates of 0.8 bass per hour for the past 3 years indicates a highly productive bass fishery.

In addition to bass, Lake Griffin has long been recognized as a top “speck” fishery. Despite regulations that set size and bag limits on crappie, the yield of crappie per angler hour has met or exceeded pre-regulation levels. While anglers are harvesting a lower number of black crappie, they are obtaining a higher poundage in fillets.

- On **Lake Harris**, Mr. Hamm noted that since 2015 the water clarity has increased from less than a meter to almost 2 meters in 2018. Electrofishing catch rates of adult and age-1 bass were the highest on the chain in 2018, and creel survey results indicate Lake Harris is a premier bass fishery with over 70,000 angler hours and 0.55 bass per hour.
- **Lake Dora** catch rates of adult bass similar to those from Lakes Harris and Griffin, though Lake Dora has highest catch rates of bass >16” on the chain. Fish attractors have been a major project in Lake Dora with plastic fish attractors placed at 10 sites with either 50 or 100 units per site for a total of 750 plastic units. Anglers have been catching high numbers of bass and crappie thus far on the attractors with one bass being submitted to TrophyCatch at 8.6 pounds.
- On **Lake Apopka**, aquatic vegetation is low, although eel grass has expanded in some areas. Mr. Hamm reported FWC planted bulrush and spatterdock to increase habitat from 2012-2014 and pads have filled in nicely. As expected, the catch rates of bass at Lake Apopka are by far the lowest in the chain. However, about a third of the sites that FWC samples, primarily on the south and southwest side, have suitable habitat and good populations of bass. Mr. Hamm noted each year, in the spring, FWC has encountered some of the largest bass in the Harris Chain at Lake Apopka.

Mr. Hamm reported since the early 2000s, water quality has improved in part due to management actions by state and local agencies from sources such as nutrient reductions, connection of marshes, water fluctuations, plantings. In the past 10 years, FWC has observed water clarity (based on secchi depth) increase at most lakes on the chain. Mr. Hamm noted this increased clarity has allowed native vegetation

to expand along with *Hydrilla*. In particular, submersed vegetation (e.g., eelgrass, southern naiad, Illinois pondweed, bladderwort, and *Hydrilla*) provides critical rearing cover for young fish to survive and this has resulted in a drastic increase in fish populations such as bass at many lakes.

Mr. Hamm noted the habitat and fishing overall continues to improve at the Harris Chain which is attracting recreational anglers and tournaments for bass and crappie alike. In addition, data collected by FWC fisheries monitoring collaborates what many anglers are saying; that the Harris Chain is quickly becoming one of the premier bass fishing destinations in Florida.

In Sept. 2019 Scott Bisping, FWC, provided information on exotic species in the Harris Chain of Lakes. Mr. Bisping reported FWC maintains a fisheries database, started in 2006, that lists four different species of invasive fish in the area. These include two species of tilapia, the armored catfish, and the sailfin catfish. Mr. Bisping showed a graph of tilapia showing population numbers dropping dramatically in 2008 in response to cold weather. The graph also showed very little recovery in these populations since that time.

Separately, Mr. Bisping noted that seven ball pythons and boas had been reported in Lake County. He noted according to FWC the only species reproducing in Florida is the Burmese python and none have been reported in Lake County. There are currently no reproducing populations of constrictors outside of south Florida.

[In Oct. 2019, Mr. Bisping discussed recent results of creel and fisheries surveys on the Harris Chain of Lakes, noting that FWC currently has a number of efforts underway way within the Harris Chain of Lakes, including management of fisheries, habitat enhancements, aquatic plant control/management, and research. The focus of this presentation is on fisheries trends and agency activities at each lake on the chain.](#)

[Lake Apopka reports the lowest catch rates, but south shoreline has good habitat and catch rates, with numerous fish over 16 inches being caught. Lake Dora has generally good catch rates, including the highest rates of bass over 16 inches. Catch rates of small juvenile fish are up, likely related to expansion of aquatic vegetation.](#)

[Mr. Bisping reported that Lake Griffin was heavily vegetated at the time of sampling, with the adult population relatively level. The catch rates of juveniles were also level. In 2009 there were an estimated 30,000 bass in the lake with nearly 200,000 bass in the lake now.](#)

[A review of angler surveys using game cameras showed Lake Apopka with relatively low fishing effort on the lake. Lake Griffin, with a peak fishing season running from November to May, totaled 49,000 fishing hours. This was primarily a largemouth bass effort. Mr. Bisping noted in the early 2000's Lake Griffin was mostly a black crappie fishing lake, whereas now it is primarily a largemouth bass fishing lake.](#)

[Lake Harris totaled 92,000 hours of fishing effort, with 80% of that effort aimed at bass. Over the last 5 years there has been an increase in bass fishing effort, with some reduction in crappie fishing, likely because of increased vegetation. The angler success rate is currently at 1 fish per hour.](#)

Council Recommendations 2019:

To be Completed by Council

Water Quality

In Mar. 2019, Jim Troiano, the SJRWMD Intergovernmental Coordinator, provided Council with an update on Water Quality Memorandum #56, Dr. Erich Marzolf, SJRWMD, reported no SJRWMD plans to update Water Quality Memorandum 56. However, Memorandum #54 is to be updated by Dr. Fulton with data through 2018. This update is expected to be completed in early 2020. Mr. Troiano noted Dr. Fulton had made a presentation to Council on Memorandum #56 in January 2017 and reported the video of the presentation is on the Council website.

In May 2019, Mike Perry, LCWA, updated Council on phosphorus removal and identified: package septic systems (apartments, group of trailers) and municipal septic systems around the Harris Chain. Mr. Perry provided spreadsheets downloaded from the DEP website identifying permitted RV/mobile home wastewater facilities, domestic, and industrial waste facilities. Mr. Perry noted there are only a few county owned facilities, mostly schools.

Mr. Perry discussed onsite sewage treatment and disposal systems (OSTDS) noting they are regulated by the Florida Department of Health (DOH) in coordination with DEP. Mr. Perry reported 24,076 (18.1%) known OSTDS and 43,563 (32.8 %) likely OSTDS parcels, noting the data are available on the FDOH website. Mr. Perry also discussed a series of loading estimates for lake systems, for all sources, including point sources/septic and provided a summary table of 2017 TP loading estimates to Upper Ocklawaha River Basin lakes. The highest estimated contributions from septic tanks 7.3% and 7.2% for Lakes Harris and Eustis respectively. The bottom line is that OSTDS are not contributing much to TP loading in the Harris Chain of Lakes. [However, Council has expressed concern that individual septic systems near lakes and canals can allow untreated effluent into surface waters if not operating as designed. Council was supportive of Florida Legislature efforts to pass legislation that provides for inspection and correction of home septic systems that do not function correctly, and suggested FDOH or the designated agency selected by the State of Florida to be assigned to do the inspections and make recommendations needed to repair nonfunctioning septic systems on private property.](#)

Mr. Perry reviewed the DEP reuse inventory database, providing paper copies of the 2016 reuse inventory as of May 2017 to Council. Mr. Perry noted Florida ranks #1 with reported reuse. Most significant was a summary table of reuse, showing Lake County reusing 100% of wastewater, through a combination of residential, golf course, or municipal irrigation.

In June 2019, Roxanne Groover, Executive Director, Florida Onsite Wastewater Association (FOWA) discussed OSTDS and phosphorus removal. Ms. Groover noted that in Florida, the fate of nutrients and fecal matter are currently major wastewater issues. Ms. Groover reported the primary device is a conventional (septic) treatment system consisting of a tank and drainfield. There are approximately 2.5 million conventional systems in Florida, and they are to treat fecal and biological oxygen demand (BOD), not nitrogen and phosphorus.

The focus of Ms. Groover's presentation was on a variety of non-conventional systems that focus on nutrient (nitrogen and phosphorus) reduction in addition to conventional treatment. These systems include aerobic treatment units (ATU), Performance Based Treatment Systems (PBTS), and both proprietary and non-proprietary nitrogen reducing systems.

ATUs lower BOD and total suspended solids (TSS), facilitating the construction of larger houses on smaller property. Ms. Groover noted in the Florida Keys nutrients are also removed. Nitrogen is removed through a recirculation system that adds air, converting ammonia to nitrite, to nitrate. The solution is then denitrified into air, ultimately as nitrogen gas. Phosphorus is removed by passing effluent through a material that traps the phosphorus. The trapping material is replaced over time.

Also, in June 2019, Mary Paulic, FDEP, reviewed FDEP and FDOH OSTDS coordination in Lake County. Ms. Paulic reviewed the data collection for septic systems, noting data from the FDOH web site was used along with maps linking parcels with drinking water source and wastewater treatment method. The data was completed by county, and for Lake Apopka and the Harris Chain of Lakes, data was collected in 2017. The data represent known septic and likely septic (high confidence that property has septic system) parcels. Ms. Paulic presented a map of Upper Ocklawaha septic systems, comprising approximately 66,000 systems basinwide. Within the Harris Chain of Lakes there are an estimated 23,357 septic systems, and 10,854 septic systems in the Lake Apopka Basin (Lake County 7,199 and Orange County 3,655).

Ms. Paulic discussed the development of septic systems and phosphorus (P) BMAP maps, noting FDEP only considered septic systems located 200 meters or less from lakes. The rationale for this delineation was because P does not migrate that far from drainfields. Ms. Paulic showed a final map of septic system locations within 200 meters of waterbodies in the Harris Chain, indicating relatively few septic systems within 200 meters from the lake or contributing waterbodies. A map of Lake Apopka with the same 200-meter buffer delineated, showed 235 septic systems within the 200-meter zone.

Council Recommendations 2019:

- [Support efforts by the Florida State Legislature to pass legislation that provides for inspection and correction of home septic systems that do not function correctly.](#)
- Support Orange & Lake County septic system inventory efforts.
- Encourage replacement of septic systems near lakes and canals with municipal central sewer where feasible.
- Encourage local governments to revise local codes regarding replacement of failing septic systems near lakes and canals.

Aquatic Plant Management

In Apr. 2019, Nathalie Visscher, FWC, updated Council on Hydrilla Control in the Harris Chain of Lakes, discussing the outcome of a series of workshops held throughout the state regarding aquatic plant management. Ms. Visscher reviewed hydrilla treatments on Harris Chain lakes since July 1, 2018. In Aug. 2018, 475 acres of Lake Harris were treated by boat with the herbicide Aquasrike, focusing on navigation areas and an area near Long Island. Ms. Visscher noted a major infestation throughout Little Lake Harris, with 640 acres treated by boat with Aquasrike in Aug. 2018. The treatment focus was on navigation channels for temporary relief. Little Lake Harris was treated again in Oct. 2018, with a whole lake treatment of Diquat covering 890 acres to reduce the biomass.

In Nov. and Dec. 2018, and Jan. 2019, Little Lake Harris follow-up treatments were made using Sonar AS, covering 2,700 acres. A secondary treatment with SonarOne pellets was conducted on areas still containing high levels of hydrilla. Ms. Visscher noted the pellet treatment did have some transient impacts on Spadderdock but no impact on *Vallisneria*.

The north side of Lake Eustis, covering 470 acres was treated with Aquastrike in Sept. and Oct. 2018. Ms. Visscher reported the total treatment expenditures to date were over \$1.5 million.

Ms. Visscher discussed the proposed spring treatment schedule, facilitated through an additional \$1.5 million for this fiscal year provided by the Lake County Water Authority. Treatments are planned all along the north shore of Lake Dora, around the main access points and navigation areas of Lake Harris, navigation areas around the south side of Lake Eustis, and around the Herlong Park boat ramp and canal in Lake Griffin. On Lake Beauclair, the mouth of the Apopka canal will be treated for navigation use, and on Lake Yale, the south end by Marsh Park and East boat ramp will be treated. Once these treatments are completed all lakes will be re-mapped, and new stakeholder meetings will be held in the fall to develop the new treatment schedule.

In Sept. 2019, Scott Bisping, FWC, reported aquatic plant mapping of Harris Lakes complete as of September 6, 2019. The data in the final maps will be used to assess the need for additional herbicide treatments in the fall 2019. Mr. Bisping noted there were signs of aquatic plant reduction in Lake Harris, and all other lakes. Mr. Bisping reported the occurrence of more native vegetation in Lake Beauclair.

[In Oct. 2019, Mr. Bisping updated Council on aquatic vegetation monitoring. FWC sampled 6 lakes and found improved water quality from reduced nutrient loading and reconnection of marshes. Improved clarity of the water has allowed for the expansion of SAV. Lake Griffin SAV increased from 4% in 2006 to over 30% in 2018.](#)

[Studies have shown that hydrilla can significantly improve the bass population where submerged vegetation is lacking. However, Lake Griffin is an example of a lake that has dramatically improved primarily from native submersed vegetation. Of the submersed vegetation encountered by FWC plant surveyors this past summer, 75% of the submersed plants were native with only 25% hydrilla. This is compared to the fishery at Lake Harris where 70% of the submersed plants were hydrilla. The data shows that native plants can produce an amazing bass fishery without the necessary control needed with exotic plants.](#)

[Mr. Bisping discussed increased native vegetation on Lake Beauclair, and an expansion of eel grass on Lake Dora. Surveys of Lakes Yale, and Eustis showed some offshore vegetation that is hydrilla, but it has not topped out. Lake Griffin has some hydrilla, but on the northwest side there is mostly native vegetation with some topped out hydrilla in marsh areas. Lake Harris has seen the biggest change as most hydrilla has been eliminated. There are no reported navigation issues.](#)

Council Recommendations 2019

- Request dedicated legislative funding of \$10 million for *Hydrilla* management on the Harris Chain of Lakes in response to both public input and the scope of the problem.
- Council supports aggressive treatment of hydrilla. Legislature to provide funding for research into new herbicides for eradication of hydrilla. Hydrilla may become immune to current herbicides.

4.0 BUDGET AND EXPENDITURES

The LCWA FY 18-19 budget included \$9,026.20 for the Harris Chain of Lakes Restoration Council under account 710-349, Water Resources Operating Expenses. In July 2018, Council approved the placement of advertisements in the Leesburg Commercial and Villages Daily Sun newspapers to advertise Council vacancies and agendas using these funds. Council also authorized the acquisition of name tags for Council Members from Moore Awards. Expenditures made by Council advertising are listed in Table 4. These expenditures do not include recurring monthly agency administrative and staffing expenses.

Table 4. Harris Chain of Lakes Restoration Council Expenditure Statement

Date	Assets	Budget
10/1/18	Previous legislative funds	\$9,026.20
	Total Assets	\$9,026.20
	Expenditures	
11/16/18	Villages Daily Sun Advertising	\$203.40
12/21/18	Villages Daily Sun Advertising	\$86.40
3/29/19	Leesburg Daily Commercial Advertising	\$285.00
5/31/19	Moore Awards Inc.	82.80
	Total Expenditures through 8/16/19	\$657.60
	Balance	\$8,368.60

5.0 MEETING INFORMATION

Meeting information including agendas, minutes, and presentation information may be found in digital format and downloaded from the Council's website at www.harrischainoflakescouncil.com.

Meeting 1: November 2, 2018

Meeting 2: January 18, 2019

Meeting 3: February 1, 2019

Meeting 4: March 2, 2019

Meeting 5: April 5, 2019

Meeting 6: May 4, 2019

Meeting 7: June 7, 2019

Meeting 8: July 12, 2019

Meeting 9: August 2, 2019

Meeting 10: September 6, 2019

Meeting 11: October 4, 2019

6.0 APPENDICES

6.1 APPENDIX A: Statutory Authority

2019 Florida Statutes
Title XXVIII
NATURAL RESOURCES; CONSERVATION, RECLAMATION, AND USE
Chapter 373
WATER RESOURCES

373.467 The Harris Chain of Lakes Restoration Council. —There is created within the St. Johns River Water Management District, with assistance from the Fish and Wildlife Conservation Commission and the Lake County Water Authority, the Harris Chain of Lakes Restoration Council.

(1)(a) The council shall consist of nine voting members which shall include a representative of waterfront property owners, a representative of the sport fishing industry, a person with experience in environmental science or regulation, a person with training in biology or another scientific discipline, an attorney, a physician, an engineer, and two residents of the county who are not required to meet any additional qualifications for membership, each to be appointed by the Lake County legislative delegation. The Lake County legislative delegation may waive the qualifications for membership on a case-by-case basis if good cause is shown. A person serving on the council may not be appointed to a council, board, or commission of any council advisory group agency. The council members shall serve as advisors to the governing board of the St. Johns River Water Management District. The council is subject to chapters 119 and 120.

(b) There shall be an advisory group to the council which shall consist of one representative each from the St. Johns River Water Management District, the Department of Environmental Protection, the Department of Transportation, the Fish and Wildlife Conservation Commission, the Lake County Water Authority, the United States Army Corps of Engineers, and the University of Florida, each of whom shall be appointed by his or her respective agency, and each of whom, with the exception of the representatives from the Lake County Water Authority and the University of Florida, shall have had training in biology or another scientific discipline.

(2) Immediately after appointment, the council shall meet and organize by electing a chair, a vice chair, and a secretary, whose terms shall be for 2 years each. Council officers shall not serve consecutive terms. Each council member shall be a voting member.

(3) The council shall meet at the call of its chair, at the request of six of its members, or at the request of the chair of the governing board of the St. Johns River Water Management District. Resignation by a council member, or failure by a council member to attend three consecutive meetings without an excuse approved by the chair, results in a vacancy on the council.

(4) The council shall have the powers and duties to:

(a) Review audits and all data specifically related to lake restoration techniques and sport fish population recovery strategies, including data and strategies for shoreline restoration, sediment control and removal, exotic species management, floating tussock management or removal, navigation, water quality, and fish and wildlife habitat improvement, particularly as they may apply to the Harris Chain of Lakes.

(b) Evaluate whether additional studies are needed.

(c) Explore all possible sources of funding to conduct the restoration activities.

(d) Report to the President of the Senate and the Speaker of the House of Representatives before November 25 of each year on the progress of the Harris Chain of Lakes restoration program and any recommendations for the next fiscal year.

(5) The St. Johns River Water Management District shall provide staff to assist the council in carrying out the provisions of this act.

(6) Members of the council shall receive no compensation for their services but are entitled to be reimbursed for per diem and travel expenses incurred during execution of their official duties, as provided in s. 112.061. State and federal agencies shall be responsible for the per diem and travel expenses of their respective appointees to the council, and the St. Johns River Water Management District shall be responsible for per diem and travel expenses of other appointees to the council.

History. —s. 1, ch. 2001-246; s. 16, ch. 2016-1.

373.468 The Harris Chain of Lakes restoration program. —

(1) The Fish and Wildlife Conservation Commission and the St. Johns River Water Management District, in conjunction with the Department of Environmental Protection, pertinent local governments, and the Harris Chain of Lakes Restoration Council, shall review existing restoration proposals to determine which ones are the most environmentally sound and economically feasible methods of improving the fish and wildlife habitat and natural systems of the Harris Chain of Lakes.

(2) To initiate the Harris Chain of Lakes restoration program recommended by the Harris Chain of Lakes Restoration Council, the Fish and Wildlife Conservation Commission, with assistance from the St. Johns River Water Management District and in consultation and by agreement with the Department of Environmental Protection and pertinent local governments, shall develop tasks to be undertaken by those entities for the enhancement of fish and wildlife habitat. These agencies shall:

(a) Evaluate different methodologies for removing the extensive tussocks and buildup of organic matter along the shoreline and of the aquatic vegetation in the lake.

(b) Conduct any additional studies as recommended by the Harris Chain of Lakes Restoration Council.

(3) Contingent on the Legislature's appropriating funds for the Harris Chain of Lakes restoration program and in conjunction with financial participation by federal, other state, and local governments, the appropriate agencies shall, through competitive bid, award contracts to implement the activities of the Harris Chain of Lakes restoration program.

(4) The Fish and Wildlife Conservation Commission is authorized to conduct a demonstration restoration project on the Harris Chain of Lakes for the purpose of creating better habitat for fish and wildlife.

History. —ss. 2, 3, ch. 2001-246.