

# Harris Chain of Lakes

## RESTORATION COUNCIL



## 2018 Report to the Legislature

Executive Summary enclosed within this report

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Issued by:

## Harris Chains of Lakes Restoration Council

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**DRAFT**

Sid Grow, Chairman  
Keith Truenow, Vice Chairman  
Bob Johnson, Secretary  
Stephanie Bishop  
Wade Boyette  
Joe Dunn  
Skip Goerner  
Don Nicholson  
John Stump

About the cover photograph  
Largemouth Bass (*Micropterus salmoides*)

## **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 seven meetings during the reporting period of November 2017 through October 2018. The Council reviewed projects and received technical presentations throughout this period on studies and initiatives to restore and manage the Harris Chain of Lakes. This report represents the recommendations of the Council to the Legislature.

**To maximize successful restoration of the Harris Chain of Lakes in 2018, the Council specifically supports and recommends the following:**

- Investigate or study the feasibility of creating a secondary form of conveyance for water from Lake Apopka, to include Double Run Swamp.
- Other recommendations to be completed by motion of the Council.
- Request the SRWMD to expedite development of min flows and levels for the Harris Chain of Lakes

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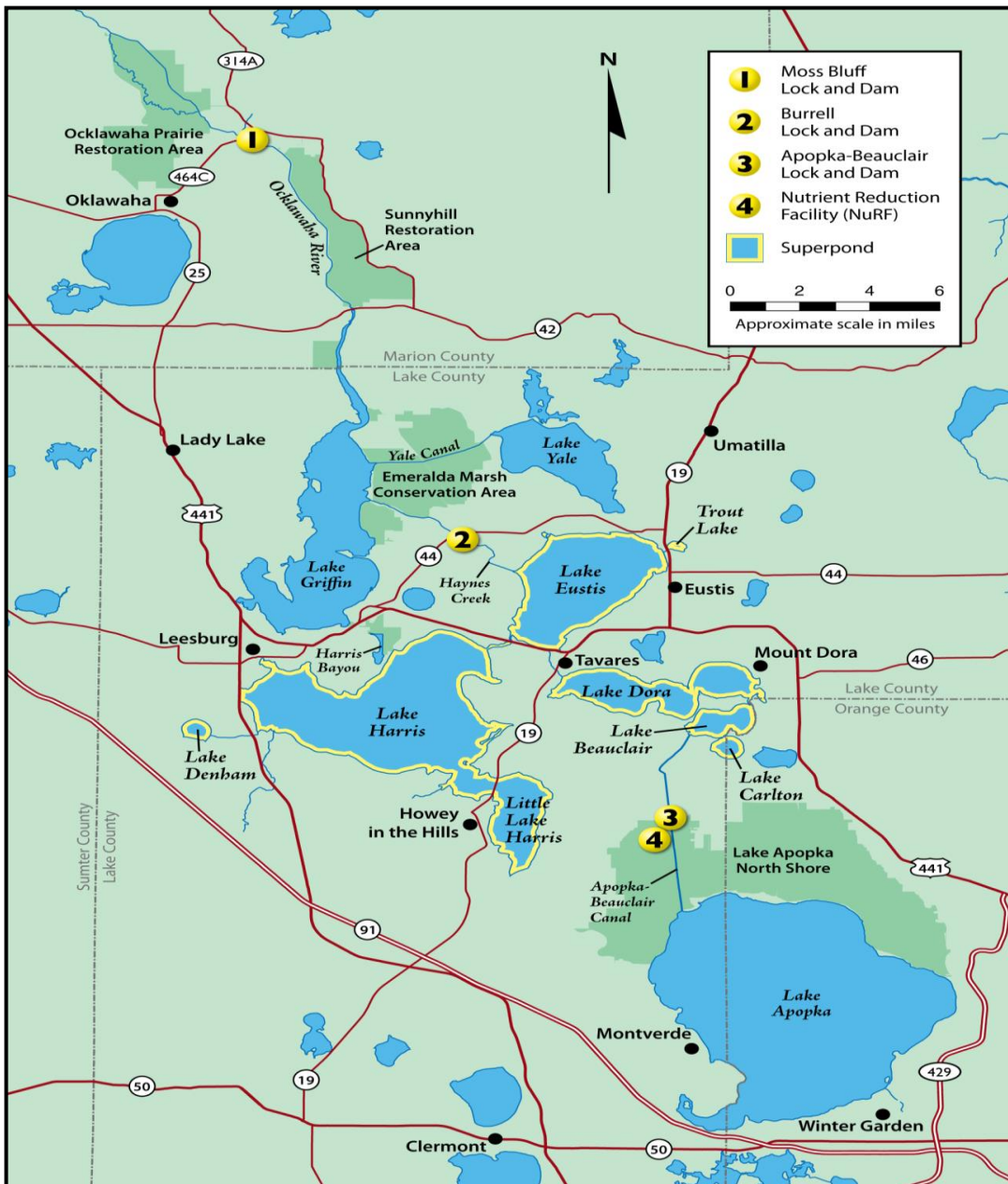
**LIST OF ACRONYMS**

<b>FDEP</b>	Florida Department of Environmental Protection
<b>FDOT</b>	Florida Department of Transportation
<b>FWC</b>	Florida Fish and Wildlife Conservation Commission
<b>LANS</b>	Lake Apopka North Shore
<b>LCWA</b>	Lake County Water Authority
<b>MFLs</b>	Minimum Flows and Levels
<b>MFW</b>	Marsh Flowway
<b>NuRF</b>	Nutrient Reduction Facility
<b>SJRWMD</b>	St. Johns River Water Management District
<b>TAG</b>	Technical Advisory Group
<b>TP</b>	Total Phosphorus
<b>UF</b>	University of Florida
<b>UORB</b>	Upper Ocklawaha River Basin

## 1.0 ENABLING LEGISLATION

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 November 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



## 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 April 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.

**Table 1: 2018 Harris Chain of Lakes Restoration Council Members**

Member	Representative
Sid Grow, Chairman	Member at Large
Keith Truenow, Vice-Chairman	Member at Large
Don Nicholson, Secretary	Waterfront Property Owners
Robert (Bob) Johnson	Science/Biology
Skip Goerner	Sport Fishing
Stephanie Bishop, PE	Engineer
John Stump	Environmental Science/Regulation
Wade Boyette	Attorney
Joe Dunn	Physician

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	Ryan Hamm
LCWA	Michael Perry
SJRWMD	Rolland Fulton
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 at [harrischainoflakescouncil.com](http://harrischainoflakescouncil.com).

### 3.0 2018 MEETINGS AND PRESENTATIONS

The Council conducted eight meetings during the 2018 reporting period (November 2017 to October 2018) 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 Attendances	Presentations	Council Actions
November 3, 2017	5		Approval of the 2017 Annual Report
December 1, 2017	0		Meeting cancelled by Chairman Johnson
January 5, 2018	0		Meeting cancelled by Chairman Johnson due to lack of quorum
February 2, 2018	0		Meeting cancelled by Chairman Johnson due to lack of quorum
March 2, 2018	0		Meeting cancelled by Chairman Johnson
April 6, 2018	7		Approval to request an SJRWMD presentation on sump dredging.
April 24, 2018		Special meeting called by SJRWMD Governing Board Chairman John Miklos	
May 4, 2018	0		Meeting cancelled by Chairman Grow due to lack of quorum
June 1, 2018	7	<ul style="list-style-type: none"> <li>• Lake Yale Hydrologic / Nutrient Budgets and Water Quality Management Plans, Mike Perry, Lake County Water Authority</li> <li>• SJRWMD Hurricane Preparation Update, Steve Miller, Land Resources Bureau Chief, SJRWMD</li> <li>• Harris Chain of Lakes Minimum Flows and Levels (MFLs) Update, Andrew Sutherland, PhD, MFLs Technical Program Manager, Bureau of Resource Evaluation and Modeling, SJRWMD</li> </ul>	Approval of a request for information on the amount of effluent that came down the Apopka-Beauclair Canal because of Hurricane Irma, and how much of it went into the side canal and how much is in the navigable part of the A-B canal, and what is it going to take to remove it.

Meeting Date	Council Member Attendances	Presentations	Council Actions
July 13, 2018	6	<ul style="list-style-type: none"> <li>• Lake Apopka Dredging Update, Bob Naleway, P.E., SJRWMD</li> </ul>	Approval to place advertisements in the Leesburg Commercial and Villages Daily Sun newspapers to advertise Council vacancies and agendas.
August 3, 2018	7	<ul style="list-style-type: none"> <li>• Harris Chain of Lakes Restoration Council Discussion, Ann B. Shortelle, Ph.D., Executive Director, SJRWMD</li> <li>• Update on Lake Apopka targeted lake wide restoration-dredging, Bob Naleway, SJRWMD</li> <li>• Update on the Lake Apopka Newton Park dredging project, Bob Naleway, SJRWMD</li> <li>• Update on the Apopka Flowway-10 pack rehab project, Lindsey Porter, SJRWMD</li> </ul>	Approval to recommend an investigation or to study the feasibility of creating a secondary form of conveyance for water from Lake Apopka.
September 14, 2018	8	<ul style="list-style-type: none"> <li>• Water depth and water quality in Lake Apopka, Karl Havens, PhD., Director, Florida Sea Grant Program, Professor, University of Florida/IFAS</li> </ul>	Approval to purchase nametags for Council members from Council budget
October 5, 2018		<ul style="list-style-type: none"> <li>• Review of Aquatic Plants and Ecology with an Emphasis on Hydrilla, Mark Hoyer, IFAS</li> </ul>	To Be Completed

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

**Harris Chain of Lakes Restoration**

In June 2018, Mike Perry, Lake County Water Authority (LCWA), discussed hydrologic and nutrient budgets and water quality management plans for Lake Yale, developed from hydrologic data collected from the consulting firm Environmental Research and Design (ERD). The goal of the



project was to quantify and rank hydrologic and pollutant loadings to Lake Yale, and to identify potential water quality improvement projects.

In July 2018, Bob Naleway, P.E., SJRWMD, updated Council on efforts to improve Lake Apopka water quality through sediment dredging from an in-lake sump. Mr. Naleway reported the goals of the project were to test the concept of using a sump to capture mobile surficial sediments and remove accumulated phosphorus from the lake and increase water clarity by removing captured sediments.

In August 2018, Mr. Naleway provided updates on the Lake Apopka Newton Park dredging project and Lake Apopka targeted lake wide restoration-dredging. Mr. Naleway discussed the 2013 conceptual footprint of the project and how the boundary was modified near shore to avoid impacts to submerged and emergent aquatic vegetation. The conceptual design was completed in February 2018, with final design, permitting and construction currently on hold, awaiting funding.

Mr. Naleway reported that with Lake Apopka targeted lake wide restoration-dredging project SJRWMD had completed an archeological study that identified high probability and avoidance zone areas, had completed remote sensing in potential dredge areas, and received approval from State Division of Historic Resources to proceed. In addition, SJRWMD had completed a hydrodynamic study in which current velocities at the lake bottom (ability for material to be picked up and moved by currents) had been calculated. Mr. Naleway noted some funds had been spent for the development plan, but the \$500,000 budget did not include actual dredging activity. Additional funding would be needed in the future to complete the project.

Ms. Lindsey Porter, SJRWMD, provided an update on the Apopka Flowway-10 pack rehabilitation project. The 10-pack refers to the series of 10 structures (vertical culverts) along the inflow canal to the Lake Apopka Marsh Flow-Way (MFW) that are responsible for regulating flow and water levels in the MFW inflow canal. The goal of the project is to rehabilitate structures as both the culverts and gates were decaying. Ms. Porter noted construction started in December 2017 and will be completed by the end of August 2018

### **Lake Water Level Management**

In November 2017, Mr. John Zediak, civil engineer with the U.S. Army Corps of Engineers (Corps), discussed regulation schedules of the Harris Chain of Lakes, and water levels both before and after Hurricane Irma. Council discussed Lake Apopka water stage graphs and speculated that in August and September, during hurricane season, water levels should be kept lower than regulation schedule.

In June 2018, Council received an update on Harris Chain of Lakes Minimum Flows and Levels (MFLs) from Andrew Sutherland, PhD, the SJRWMD MFLs Technical Program Manager. Dr. Sutherland provided an overview of the SJRWMD MFL program noting the water management districts are statutorily mandated to establish MFLs that set the limit at which further withdrawals would be significantly harmful to the water resources or the ecology of the area.

Also, in June 2018, Council was briefed by Steve Miller, SJRWMD emergency coordinator, on SJRWMD emergency management actions during Hurricane Irma. Mr. Miller described the incident command system within SJRWMD's Emergency Operations Center, noting the monitoring of tropical systems is a priority with the beginning of hurricane season on June 1. Mr. Miller presented a series of graphs of water levels of the Upper St. Johns River Basin and the Upper Ocklawaha River Basin (UORB) to illustrate how SJRWMD monitors water levels, in this case in relation to the

rainfall from Sub-tropical Storm Alberto. Water levels and flow in the UORB are managed through water control structures, including the Apopka Lock and Dam, Harris Bayou, the Burrell Lock and Dam, and the Moss Bluff Lock and Dam.

In August 2018, Dr. Ann Shortelle, Executive Director, SJRWMD, presented information to Council on Lake Apopka North Shore (LANS) reconnection. Dr. Shortelle noted a managed reconnection of the LANS would protect water quality by reducing nutrients, improve the lake fishery, and provide water storage and flood protection. Dr. Shortelle discussed the changes in the north shore that occurred because of Hurricane Irma that allowed SRJWMD to revise the north shore status prior to the planned 2021 review date. Dr. Shortelle noted that pre-Irma there was 5 billion gallons of water storage in Phase 1, Phase 2, and the Duda Ranch properties in the NSRA. Post-Irma all the remaining NSRA phases were inadvertently flooded by unprecedented storm rainfall and levee overtopping, creating another 4.1 million gallons of storage.

Dr. Shortelle noted the expanded storage capacity in the LANS is helpful, as the stored water can be used for lake level augmentation, wetland restoration and aquifer recharge. The various inlet structures in the LANS allow SJRWMD to now provide emergency floodwater storage. However, discharge capacity through Apopka-Beauclair (AB) and Dora canals is still limiting during floods

#### **Council recommendations 2018:**

- Investigate or study the feasibility of creating a secondary form of conveyance for water from Lake Apopka, to include Double Run swamp.

#### **Fishery Research**

In August 2018, Dr. Shortelle addressed the issue of the effectiveness of gizzard shad harvesting for nutrient reduction in Lake Apopka in response to longstanding questions and concerns about harvesting gizzard shad by Council. Dr. Shortelle reviewed the concept of bioturbation in relation to gizzard shad noting large numbers of these fish impede water quality and habitat goals. Dr. Shortelle discussed the results of studies on gizzard shad in Lake Dora by Michael Allen and Thomas Frazer. The study was commissioned by SJRWMD in 2007 and concluded that the whole lake experiment did not result in reduction on chlorophyll or water clarity. Part of the problem was that if harvest was to be effective, a small net mesh size would have been needed, which would adversely affect gamefish catches. Dr. Shortelle noted SJRWMD concurred with the results, but most importantly noted cost-effectiveness was not part of the study scope. SJRWMD data does demonstrate the cost-effectiveness of shad removal as a nutrient reduction tool in both Lake Apopka and Lake George.

Dr. Shortelle reported on the demonstrated success of shad harvest with benefits including reduced total suspended solids and chlorophyll concentrations. It is a cost-effective means of removing P from Lake Apopka, with nearly 100,000 lbs. of P remove between 2007-and 2017. The average cost of this removal was \$57 per pound.

#### **Water Quality**

In July 2018, Mike Perry presented an Apopka-Beauclair Canal sediment update based on discussions about sediment and silt from the AB Canal impeding flow in adjacent canals at the June 2018 Council meeting. Mr. Perry reported the LCWA took sediment cores at seven stations along the AB Canal extending from Lake Beauclair south toward the Nutrient Reduction Facility (NuRF) project. An additional core was obtained from Lake Beauclair at the mouth of the AB Canal. Mr. Perry presented photographs of the sediment cores from each of the stations (included in meeting

materials). The goal was to determine if there was any residual alum flocculent material collecting in the AB Canal. The sediment samples showed varying amounts of unconsolidated flocculent material, but no material consisting of alum.

In September 2018, Dr. Karl Havens, PhD., Director, Florida Sea Grant Program, Professor, University of Florida/IFAS discussed water depth and water quality in Lake Apopka. Dr. Havens provided an overview of his research, noting the intent of his study was to determine if variation in depth can affect limnology of shallow Florida lakes. The study was not a test of the efficacy of restoration; it was a case study of climate variability effects. Dr. Havens used data developed by SJRWMD from 1999-2016 on the Harris Chain of Lakes. The dataset was originally used to examine zooplankton and phytoplankton.

The data showed correlations with transparency (light penetration) and depth and inverse correlations between chlorophyll, total nitrogen (TN), and total phosphorus (TP) and depth. Dr. Havens concluded this relationship occurred in all Harris lakes tested, though it was strongest in Lake Apopka. In general, Dr. Havens suggested that during drought, depth and volume decline, fish, nutrients and algae are concentrated, and blooms become more severe. Dr. Havens then expanded his study to include additional data extending from 1985 to 2018. Mann-Kendall non-parametric trends tests showed overall significant decreases in TP, TN and chlorophyll, and a significant increase in transparency (secchi depth) despite short-term increases in those parameters during drought.

Dr. Havens concluded there were statistically-significant long-term declines in TP, TN and chlorophyll in the 1985-2018 dataset, and increased secchi depth. Comparing high water periods only, Dr. Havens noted improved water quality during the last three high water periods compared to an earlier high-water period. Dr. Havens reiterated his conclusions that there were statistically significant decreases in nutrients and chlorophyll and significant increases in light penetration over the long term despite short term fluctuations in lake level.

#### 4.0 BUDGET AND EXPENDITURES

The LCWA FY 17-18 budget included \$9,850 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. Expenditures made by Council for the advertising are listed in Table 4.

Table 4. Harris Chain of Lakes Restoration Council Expenditure Statement

<b>Date</b>	<b>Assets</b>	<b>Budget</b>
11/1/17	Previous legislative funds	\$9,850
	Total Assets	\$9,850
	<b>Expenditures</b>	
8/31/18	Leesburg Daily Commercial and Villages Daily Sun Advertising - August	\$343.40
9/1/18	Leesburg Daily Commercial and Villages Daily Sun Advertising – September	\$343.40
10/1/18	Leesburg Daily Commercial and Villages Daily Sun Advertising – October	\$343.40
	Total Expenditures through 10/31/18	\$1,030.20
	Balance	\$8,476.40

## 5.0 APPENDICES

### 5.1 Appendix A: Statutory Authority

**2018 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.

**6.0 MEETING INFORMATION**

Meeting information including agendas, minutes, and presentation information may be found in digital format and downloaded from the Council's website at [harrischainoflakescouncil.com](http://harrischainoflakescouncil.com).

Meeting 1: November 3, 2017

Meeting 2: April 6, 2018

Meeting 3: June 1, 2018

Meeting 4: July 13, 2018

Meeting 5: August 3, 2018

Meeting 6: September 7, 2018

Meeting 7: October 5, 2018