

Harris Chain of Lakes Restoration Council 2011 Report to the Florida Legislature

Council Members

Skip Goerner, Chairman

Hugh Davis, Vice Chairman

Richard Powers, Secretary

Donald Nicholson

Edward Schlein, M.D.

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November 2011



HARRIS CHAIN OF LAKES RESTORATION COUNCIL

2011 REPORT TO THE FLORIDA LEGISLATURE

In compliance with Chapter 373.467, Florida Statutes

Issued by:

Harris Chain of Lakes Restoration Council

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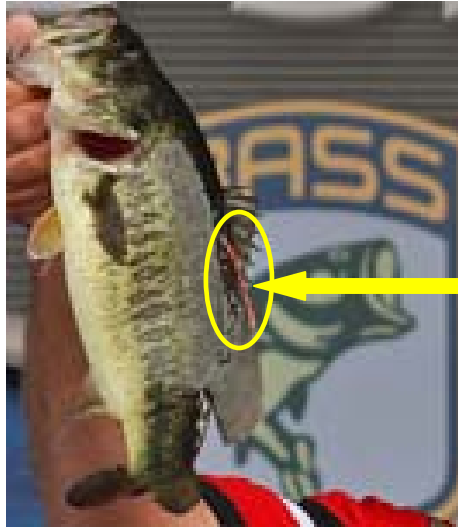
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November 2011

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- Harris Chain of Lakes Restoration Council;
- Lake County Water Authority;
- Florida Fish and Wildlife Conservation Commission; and
- University of Florida’s LAKEWATCH program.

LIST OF ACRONYMS

BMAP	Basin Management Action Plan
cfs	Cubic Feet Per Second
FDEP	Florida Department of Environmental Protection
FWC	Florida Fish and Wildlife Conservation Commission
LCWA	Lake County Water Authority
NSRA	North Shore Restoration Area
NuRF	Nutrient Reduction Facility
ppb	Parts Per Billion
PVC	Polyvinyl Chloride
SAV	Submerged Aquatic Vegetation
SJRWMD	St. Johns River Water Management District
SWIM	Surface Water Improvement and Management
TAG	Technical Advisory Group
TMDL	Total Maximum Daily Load
TP	Total Phosphorus
UF	University of Florida
USFWS	U.S. Fish and Wildlife Service

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EXECUTIVE SUMMARY

The Harris Chain of Lakes Restoration Council (Council), in conjunction with their state and local agency partners, met regularly during the reporting period of November 2010 through October 2011. The Council was given technical presentations throughout this time period on studies of and efforts to restore and manage the Harris Chain of Lakes. Based on these technical presentations, the Council has made recommendations on how to best proceed with restoration and lake management efforts. These recommendations are summarized below and are detailed in this annual report to the Florida Legislature.

Lake Apopka and North Shore Restoration

The Council recommends that the St. Johns River Water Management District (SJRWMD) continue with its restoration effort to the extent that the North Shore Restoration Area (NSRA) becomes a usable tool for the restoration of Lake Apopka. The Council also recommends that options be investigated to connect the entire NSRA to Lake Apopka in a timely manner.

Hydrilla Management

The Council recommends that the Florida Fish and Wildlife Conservation Commission (FWC) implement adaptive management measures for hydrilla control and, if needed, \$1 million from the Aquatic Plant Management Trust Fund should be held in reserve in the event that hydrilla exceeds management target goals.

Lake Beauclair and Apopka-Beauclair Canal Dredging

The Council supports the ongoing dredging of Lake Beauclair and the Apopka-Beauclair Canal by the Lake County Water Authority (LCWA) in cooperation with the FWC and SJRWMD.

Lake Apopka Dredging

There is Council consensus that Lake Apopka would benefit from dredging in select areas because internal nutrient cycling appears to contribute to the lake's impairment. The Council recommends that the Technical Advisory Group (TAG) continue to look for areas of the lake to dredge, determine the cost of the dredging, estimate the quantity of material that could be removed, and identify locations for sediment disposal. The Council further recommends that the appropriate local, state, and federal agencies review the information provided by the TAG to determine project feasibility and report back to the Council.

Lake Water Level Management

The Council requests that the SJRWMD in cooperation with appropriate state, local, and federal agencies focus its efforts to maintain the highest water levels achievable in the Harris Chain of Lakes during critical sport fish spawning seasons.

Reconnecting Marshes to Lake Griffin

The Council supports the efforts of the SJRWMD and FWC to reconnect Lake Griffin to its adjoining marshes.

Shoreline and Aquatic Habitat Restoration

To enhance the restoration of the sport fishery in the Harris Chain of Lakes, the Council requests that the Florida Legislature reallocate state and federal environmental trust funds to provide

\$595,000 for the first year, \$390,000 for the second year, and \$305,000 for the third year to support placement of additional artificial reefs and fish attractors in the lake system. The Council has committed the balance of its existing funds received through Legislative appropriations to this priority effort.

Sport Fish Stocking

The Council recognizes that restoration of the Harris Chain of Lakes will most likely take decades and believes funding the transfer of largemouth bass from other waterbodies to the Harris Chain of Lake is important until habitat can be restored. The most cost-effective measure to maintain the economic vitality of the largemouth bass fisheries in the lakes is to support stocking programs. The Council, therefore, recommends an annual appropriation of \$150,000 for the continuation of the bass stocking program for the Harris Chain of Lakes.

Nutrient Reduction Facility

In discussions related to the NuRF, the Council determined that it should work with LCWA, SJRWMD, FWC, FDEP, and the Legislature to obtain the necessary funding for the facility. Being that the NuRF is a critical component of the restoration strategy for the Harris Chain of Lakes the Council recommends that the Legislature provide an appropriation of \$1,500,000 for alum and \$65,000 for polymer to operate the NuRF.

1.0 STATUTORY AUTHORITY

The Harris Chain of Lakes Restoration Council (Council) was established by the Florida Legislature in 2001 ([Chapter 373.467 Florida Statutes](#)) with the powers and duties to: (a) review and audit all data specifically related to lake restoration techniques and sport fish population recovery strategies, (b) evaluate whether additional studies are needed, and (c) explore all possible sources of funding to conduct restoration activities. The Legislature also established the Harris Chain of Lakes Restoration Program ([Chapter 373.468 Florida Statutes](#)), which directed the Florida Fish and Wildlife Conservation Commission (FWC) and St. Johns River Water Management District (SJRWMD), in conjunction with the Florida Department of Environmental Protection (FDEP), pertinent local governments, and the Council to review existing restoration proposals to determine which 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.

2.0 SUMMARY OF 2011 MEETINGS AND PRESENTATIONS

During the period of November 2010 through October 2011, the Council held eight regular monthly meetings. Throughout the year, the Council received scientific information and data concerning water quality and aquatic ecological conditions and information on restorative measures for the Harris Chain of Lakes from several state and local agencies. These entities include SJRWMD, the Lake County Water Authority (LCWA), FWC, and the University of Florida (UF). The technical presentations given by these partners to the Council are listed in Table 1. Specific topics included:

- Water quality conditions and trends;
- Toxicology;
- Re-establishment of littoral vegetation and fish habitat;
- Sport fish stocking to provide economic benefits to the region;
- In-lake and canal dredging to improve water quality and provide boat access; and
- Several other lake science and management topics.

The Council also was presented with information on previous, ongoing, and future projects in the Upper Ocklawaha River Basin for improving water quality and aquatic habitat. The information received was reviewed and discussed by the Council in detail, and used as the basis for developing recommendations for future restorative measures and management practices for the Harris Chain of Lakes. Copies of the meeting minutes and the presentations given during the 2011 reporting period (November 2010 through October 2011) are provided as appendices to this report. The appendices are provided in digital format on the enclosed compact disc and also may be downloaded from the Council's website at www.harrischainoflakescouncil.com.

TABLE 1: TECHNICAL PRESENTATIONS FROM NOVEMBER 2010 THROUGH OCTOBER 2011

Meeting Date	Presentations
November 5, 2010	No technical presentations.
January 7, 2011	Jim Gross, SJRWMD, gave a presentation on the water storage considerations for the North Shore Restoration Area. Dave Walker, SJRWMD, gave a presentation on the temporary changes to the Lake Apopka and Burrell Dam discharge schedule. Walt Godwin, SJRWMD, provided information on the use of alum in restoration projects. Mike Perry, LCWA, gave an update on the continuing costs of alum for the Nutrient Reduction Facility.
February 4, 2011	Bruce Jagers, FWC, gave an update on the Lowrie Brown restoration project.
March 4, 2011	Dennis Renfro, FWC, presented FWC's freshwater fisheries management of the Harris Chain of Lakes. Dave Walker, SJRWMD, gave a presentation on the laws and procedures for discharges at Lake Apopka, Burrell Dam, and Moss Bluff.
May 6, 2011	William Caton, FWC, gave a presentation on FWC's position and guidance on hydrilla management.
June 3, 2011	Dan Canfield, UF, gave an update on the status of the U.S. Environmental Protection Agency's numeric nutrient criteria and how they affect the Harris Chain of Lakes.
September 9, 2011	Dave Walker, SFWMD, provided an update on the Ocklawaha River Basin budget. Dennis Renfro and Dale Jones, FWC, provided updates on the FWC's ongoing activities.
October 7, 2011	No technical presentations.

Also during the 2011 reporting year, several members of the Council's Technical Advisory Group (TAG) provided periodic updates on lake water quality and restoration issues being reviewed by the Council. The members of the TAG are listed in Table 2.

TABLE 2: 2011 TECHNICAL ADVISORY GROUP MEMBERS

Agency or Organization	Representative
SJRWMD	Walt Godwin
FDEP	Dave Herbster
FWC	Dennis Renfro
Florida Department of Transportation	Stephen Tonjes
U.S. Army Corps of Engineers	Vacant
UF/LAKEWATCH	Daniel E. Canfield Jr.
LCWA	Michael Perry

3.0 COUNCIL FINDINGS AND RECOMMENDATIONS

This section outlines the discussions and recommendations by the Council based on information received during the reporting period. These recommendations include additional projects and funding needed to effectively implement restoration measures for the Harris Chain of Lakes in the upcoming year.

3.1 Lake Apopka and North Shore Restoration

To restore Lake Apopka to its former position of being a nationally acclaimed largemouth bass fishery, federal, state, and local governmental agencies have focused on nutrient control, primarily phosphorus. Modern-day restoration efforts for Lake Apopka began with the purchase

of farmland around the lake in 1988 and have continued for more than 20 years until the present day. The SJRWMD adopted the [Lake Apopka Surface Water Improvement and Management \(SWIM\) Plan](#) in 1989 and revised it in 2003. This plan provides details on the causes of lake impairment and outlines restoration studies and projects designed to restore the lake. Also, in 2003, FDEP adopted total maximum daily loads (TMDLs) for the Harris Chain of Lakes, which limits the amount of total phosphorus (TP) loading to each lake, with the goal of removing the lakes, including Lake Apopka, from the state's list of impaired waterbodies. To implement the phosphorus reductions required by the TMDLs, FDEP adopted the [Upper Ocklawaha River Basin Management Action Plan \(BMAP\)](#) in 2007, which outlines projects and programs designed to restore the lakes.

While “full restoration” of Lake Apopka will require at a minimum several more years of effort and possibly decades (see [past Council reports to the Legislature](#)), the SJRWMD provided the Council with scientific data that indicates the projects implemented thus far as part of the SWIM Plan and BMAP have accomplished measurable improvements in water quality and slight improvements in aquatic habitat. The conceptual model being followed by the SJRWMD to restore Lake Apopka is to reduce phosphorus loads from the sub-watersheds contributing water to the lake, which will reduce phytoplankton densities in the lake's water column. The resulting increased water transparency will encourage the re-establishment of highly desirable submerged aquatic vegetation (SAV), which in turn will increase the number of sport fish. SJRWMD surveys have shown increased SAV along Lake Apopka's shoreline. Although the extent and density of SAV do not approach historical levels, this is a potential indicator of improved lake water transparency and water quality. Such positive findings are encouraging, and the Council believes nutrient control is an important factor to the restoration of Lake Apopka. However, due to the long timeframe of restoration solely through nutrient control, other options need to be considered as discussed in this report. To promote a timely restoration of Lake Apopka, the Council recommends that the TAG investigate additional options, as outlined below, to augment ongoing restoration activities in Lake Apopka.

3.1.1 Restoration of the Lake Apopka North Shore Farmlands to Wetlands

During the January 2011 meeting, Jim Gross, SJRWMD, made a presentation on water storage considerations for the North Shore Restoration Area (NSRA). The SJRWMD first looked for water supply opportunities from Lake Apopka and the North Shore in the 2000 District Water Supply Plan. The subsequent 2005 District Water Supply Plan included a water resources development study to evaluate alternative water supply options for the Lake Apopka area. Options evaluated in the study included modifications to the lake regulation and release schedules and water storage augmentation, such as creation of deep-water storage areas, use of wetlands, and construction of small reservoirs. One difficulty encountered in identifying feasible water development projects is the small size of Lake Apopka's watershed. While the total watershed is approximately 84,000 acres, the drainage area contributing surface runoff to the lake is only 48,350 acres or about 42% of the watershed. As a result, the lake's contributing watershed is relatively small as compared to its large size, which means that there is not as much surface runoff entering the lake. In addition, elevated pesticide concentrations in the shallow soils of the NSRA may prevent the creation of deep-water storage areas in the flooded farmlands.

To address this latter issue, research by the SJRWMD has demonstrated that inversion (plowing) of the shallow soils prior to flooding can reduce the bioavailability of the pesticides by 65%. However, to ensure that the buried pesticides are not mobilized, water depths must be restricted to 1.5 – 2 feet, although depths of up to 4 feet can be allowed for short periods of time (not to exceed 14 days). Based on this research, the SJRWMD received a concurrence letter from the U.S. Fish and Wildlife Service (USFWS) approving the Biological Assessment for the shallow flooding of Phases 6 and 7 of the NSRA. Limited shallow flooding of Phases 6 and 7 began in January 2011 and initial sampling results are promising. Samples collected in June 2011 showed safe levels of pesticides in the whole fish.

The SJRWMD has obtained the regulatory approvals required for construction of the infrastructure needed to internally connect and manage water flow and distribution in the flooded lands of the NSRA, Duda, and Sand Farm system. Construction of this final component of the NSRA project has been initiated and Phases 4 and 5 are nearly complete. Construction for the NSRA project is scheduled to be completed in 2012.

As of October 2011, the SJRWMD's plan for long-term management after it receives concurrence from the USFWS and floods the remaining phases of the NSRA (expected by the end of 2012) may include several options. The highest priority remains further reduction of pesticide levels in the soils of the NSRA, including the former Zellwood and Duda properties, the Marsh Flow-Way, and the West Marsh. The former Zellwood and Duda properties will be managed at an average water depth of 1 – 2 feet for an extended period of time. If the pesticide levels in the fish in the western area of the NSRA are deemed safe for human consumption, this area could be reconnected to Lake Apopka. The West Marsh area is on the west side of Lake Apopka and the Apopka-Beauclair Canal and north of the Marsh Flow-Way. Here, Cells F and G are being capped with dredged sediments from Lake Beauclair. After capping of Cells F and G, there may be opportunities to reconnect portions of these properties to the Apopka-Beauclair Canal; however, that would be several years out. The SJRWMD will continue to provide the Council updates as options are developed.

The Council recommends that the SJRWMD continue with its restoration effort to the extent that the NSRA becomes a usable tool for the restoration of Lake Apopka. The Council also recommends that options be investigated to connect the entire NSRA to Lake Apopka in a timely manner.

3.1.2 Hydrilla Management

Bill Caton, FWC, presented the agency's new position statement (see Appendix 4) on hydrilla control at the May 2011 meeting. Hydrilla is considered an invasive plant that affects native plant species, sport fisheries, recreational uses, flood control, and dissolved oxygen concentrations in lakes and river systems. The FWC has been the lead agency for hydrilla management throughout the state since 2008. They are responsible for aquatic plant management in public waterbodies and upland plant management in public conservation lands. To support their hydrilla control efforts, the FWC created an agency position statement to provide guidance to staff on establishing a process to manage hydrilla for each waterbody. As part of this effort, FWC is organizing working groups, including a group to discuss invasive plant management for the Harris Chain of Lakes.

In the Harris Chain of Lakes, the FWC periodically conducts lake surveys to identify areas impacted by hydrilla that would benefit from control. They determine appropriate control measures and implement a control plan in cooperation with Lake County and SJRWMD, which are responsible for spraying herbicides on the hydrilla. The Council had several discussions throughout the reporting year about hydrilla control for Lake Apopka. Because of limited native aquatic vegetation in the lake, allowing some areas of hydrilla to remain untreated could be beneficial for fish and wildlife. On March 16, 2011, the Council sent a letter to the FWC requesting that they incorporate adaptive management strategies, including provisions for experimental and demonstration projects, in their hydrilla position statement (see Appendix 4).

The Council recommends that FWC implement adaptive management measures for hydrilla control and, if needed, \$1 million from the Aquatic Plant Management Trust Fund should be held in reserve in the event that hydrilla exceeds management target goals.

3.2 Dredging as a Tool for Restoration

The Council continues to support access canal dredging as a viable lake management/restoration tool on the Harris Chain of Lakes. With the successful completion of canal dredging at Lake Griffin, the Council will continue to review canal access concerns at other lakes to determine if and where additional access dredging is needed to improve navigability during periods of low water levels. Maintaining navigation is critical to fostering continued public support for lake restoration and enhanced water level fluctuations.

Dredging or the removal of organic sediments from the Harris Chain of Lakes is an important management/restoration tool. Organic sediments need to be removed from existing canals to enhance property values, improve navigation, and re-establish fish spawning sites. The dredging of canals also permits water fluctuations to proceed without adversely affecting riparian users. Removal of organic mucks from the lakes improves fish, plant and wildlife habitat. Two dredging projects, one at Lake Beauclair and one at Lake Apopka, are currently being implemented in the Harris Chain of Lakes, as described below.

3.2.1 Lake Beauclair and Apopka-Beauclair Canal Dredging

The purpose of the dredging project in Lake Beauclair and the Apopka-Beauclair Canal is to improve navigation and prevent the nutrient and organic rich bottom sediments from being re-suspended by boat and wind activity. The LCWA has entered into an agreement with the FWC for \$1 million for the sediment removal. Mike Perry, LCWA, reported at the February 2011 meeting that they had to rebid the dredging project since the bids received in 2010 were rejected by the LCWA Board. The project was awarded to Jahna Dredging of Lake Wales, Florida in June 2011. Dredging began in September 2011 and could take up to two years to complete.

The Council supports the ongoing dredging of Lake Beauclair and the Apopka-Beauclair Canal by the LCWA in cooperation with the FWC and SJRWMD.

3.2.2 Lake Apopka Dredging

In response to past Council recommendations for selected dredging of Lake Apopka, the Florida Legislature requested that UF conduct a demonstration project at Lake Apopka using the Clean

to Green dredging system and Genesis dewatering solution. The Legislature asked for the cost per yard to dredge and whether the cost could be reduced by the resale or reuse of the dredged material. The purpose of the demonstration project is to determine if the process has possible applications for other lakes in the state having limited areas for disposal of dredged spoils, if native aquatic plants will re-establish after dredging, and if sediment from other areas of the lake will settle in the dredged area. The \$500,000 funding for this project was allocated to the FWC Lake Restoration Trust Fund (total fund amount is \$2 million). It was proposed that the demonstration project be conducted at Magnolia Park in Orange County with the focus being the dredging of the navigation channel to open water.

Upon applying for the dredging permit from the FDEP, several issues arose requiring additional information. As reported by Dan Canfield, UF, at the January 2011 meeting, a major issue was FDEP's interpretation that the removed lake bottom sediments represent an economic resource owned by the state and, as a result, the applicants must pay the state a fee that is based on the volume of sediments removed from Lake Apopka. Florida Administrative Code Rule 18-21.011, Subsection 3C provides for an exemption for such payments and an exemption for the Magnolia Park demonstration project was granted. Another issue was that the lake sediments had arsenic concentrations that exceed the applicable human use standard. This standard was applied because the demonstration calls for the dewatered lake sediments to be mixed with peat to create a soil additive for commercial and residential landscaping and gardening uses. The FDEP also expressed concern that the quantity of the polymer used in the dewatering process could be toxic.

The FDEP conducted a toxicity test of the lake sediment-polymer mixture. Dave Herbster, FDEP, reported at the February 2011 meeting that this test found high concentrations of unionized ammonia. It appears that the ammonia is a byproduct of anaerobic bacteria processes as they break down the muck on the bottom of the lake. The dredging project, as proposed, seems to liberate the ammonia from the sediments into the water column at a concentration that is considered acutely toxic by the U.S. Environmental Protection Agency. The dredging project, as proposed, cannot be used to remove sediments in Lake Apopka.

Clean to Green contacted an experienced dredging group that has worked worldwide with toxicity issues. The Florida Legislature appropriated an additional \$750,000 for fiscal year 2011-2012 to conduct sufficient tests to develop a system where Lake Apopka sediments can be safely dredged. Laboratory tests were conducted during summer 2011 to evaluate engineering requirements to reduce the threat of ammonia toxicity and maintain a small "footprint" on land. A revised permit application for the Lake Apopka dredging project will be submitted to the FDEP in fall 2011. Legislative funding is available through June 2012.

There is Council consensus that Lake Apopka would benefit from dredging in select areas because internal nutrient cycling appears to contribute to the lake's impairment. The Council recommends that the TAG continue to look for areas of the lake to dredge, determine the cost of the dredging, estimate the quantity of material that could be removed, and identify locations for sediment disposal. The Council further recommends that the appropriate local, state, and federal agencies review the information provided by the TAG to determine project feasibility and report back to the Council.

3.3 Lake Water Level Management

Dave Walker, SJRWMD, reported at the January 2011 meeting that the SJRWMD was making temporary changes to the discharge schedules for Lake Apopka and Burrell Dam. From December 2010 to April 2011 releases from Lake Apopka and Burrell Dam were temporarily stopped. The purpose of the temporary action was to help maintain water levels in the Harris Chain of Lakes during expected drought conditions in early 2011 associated with a predicted La Niña event. This time period is also during the critical sport fish spawning period. The Council expressed concern about the effect of the temporary change in the discharge schedules on water levels in Lake Griffin. If the predicted drought conditions were to occur, water levels in Lake Griffin could be reduced during the critical, sport fish spawning period thus having a potential longer term effect on fish populations. Effects on the local economy and property owners on Lake Griffin also could result. In response to these concerns, the SJRWMD reduced the discharge from Moss Bluff Dam from 30 cubic feet per second (cfs) to 10 cfs on January 18, 2011 to help maintain water levels in Lake Griffin.

Early 2011 brought higher than normal rainfall, which resulted in lake levels in the Harris Chain of Lakes being higher in April 2011 as compared to December 2010 when the temporary action was implemented. Beginning in April 2011, rainfall deficits occurred throughout the calendar year, which resulted in lake levels at or considerably below the minimum desirable levels. As of October 2011, Lake Apopka and Lake Griffin are well below minimum desirable levels, and the other lakes are at minimum desirable levels.

The Council requests that the SJRWMD in cooperation with appropriate state, local, and federal agencies focus its efforts to maintain the highest water levels achievable in the Harris Chain of Lakes during critical sport fish spawning seasons.

3.4 Reconnecting Marshes to Lake Griffin

At the February 2011 meeting, Bruce Jagers, FWC, gave an update on the Lowrie Brown Restoration Project, which is located adjacent to Lake Griffin. This project is part of the Emerald Marsh Long-Term Management Plan, which was developed by the SJRWMD, FWC, LCWA, and the Council. The purpose of the Management Plan is to improve biodiversity and bird nesting success, reduce tussock forming species (including cattails, hydrilla, and water lettuce), maintain breach openings for water flow, provide public access, create a cypress swamp, and enhance fish and wildlife habitat. The levee breach plan at Lowrie Brown was completed in 2007, and included two breaches for boat access. Historically, water moved across this area as sheetflow and the purpose of the breaches is to recreate this flow under high water conditions. In August 2010, the FWC and SJRWMD planted over 19,000 cypress trees in the southern portion of the project area to create a cypress swamp. While there are some impacts from invasive species and cattle from nearby farms, more than 90% of the planted cypress trees survived.

The Council supports the efforts of the SJRWMD and FWC to reconnect Lake Griffin to its adjoining marshes.

3.5 Shoreline and Aquatic Habitat Restoration

The Council supports the proven efforts of the FWC and UF's LAKEWATCH to establish near shore artificial habitat to create areas for fish spawning and cover, and vegetation establishment resulting in improved sport fishing opportunities, which can be accessed from shorelines, public docks, and boats. Improved fishing is an economic boost for communities and the emphasis on habitat enhancement adjacent to shoreline and docks increases opportunities for education programs to utilize the lakes.

The Council continues to partner with the FWC and UF's LAKEWATCH to implement a major habitat/plant restoration program using concrete blocks to provide artificial fish habitat and barriers for aquatic plant protection. Through this project, 47 cement block reefs were installed in Lakes Dora, Eustis, Harris, Little Lake Harris, and Griffin. In addition, Dennis Renfro, FWC, reported at the March 2011 meeting that the FWC is planning to install fish attractors as part of the proposed Harris Chain of Lakes Fish Attractor Habitat Enhancement Project. The goals of the project are to improve the fisheries by establishing new habitat, increasing angler catch and effort, and generating community support and ownership of the program. Brush and concrete rubble will be strategically placed in the five largest lakes of the chain (Apopka, Griffin, Harris/Little Lake Harris, Eustis and Beauclair/Dora) to concentrate sport fish and enhance angler utilization of existing fish populations. The Fish Attractor Habitat Improvement Program is a component of the Council's 2012-2015 plans to improve fishing. The FWC will provide coordination and administration of the project, and attractor construction will be accomplished through a fixed-cost contract with UF.

To enhance the restoration of the sport fishery in the Harris Chain of Lakes, the Council requests that the Florida Legislature reallocate state and federal environmental trust funds to provide \$595,000 for the first year, \$390,000 for the second year, and \$305,000 for the third year to support placement of additional artificial reefs and fish attractors in the lake system. The Council has committed the balance of its existing funds received through Legislative appropriations to this priority effort.

3.6 Sport Fish Stocking

During 2009-2011, largemouth and sunshine bass were stocked in selected lakes in the Harris Chain. Dan Canfield, UF, reported at the January 2011 meeting that UF's LAKEWATCH conducted a mortality study of the stocked fish and they found that the stocked fish have a similar survival as the native populations. In 2011, the FWC stocked 393,000 sunshine hybrid bass into Lake Apopka and 94,000 into Lake Harris. Dennis Renfro, FWC, at the March 2011 meeting stated that the FWC collects genetic information on the Phase II largemouth bass (80 millimeters in length) they stock so they can determine recruitment of stocked largemouth bass into the fishery. Dale Jones stated at the September 2011 meeting that it was now FWC's permitting requirements that all largemouth bass stocking programs south and east of the Suwannee River Basin be limited to genetically-confirmed Florida largemouth bass (*Micropterus salmoides floridanus*).

The Council recognizes that restoration of the Harris Chain of Lakes will most likely take decades and believes funding the transfer of largemouth bass from other waterbodies to the Harris Chain of Lake is important until habitat can be restored. The most cost-effective measure

to maintain the economic vitality of the largemouth bass fisheries in the lakes is to support stocking programs. The Council, therefore, recommends an annual appropriation of \$150,000 for the continuation of the bass stocking program for the Harris Chain of Lakes.

3.7 Nutrient Reduction Facility

The LCWA Nutrient Reduction Facility (NuRF) removes TP from discharges from Lake Apopka, with the capacity to treat up to approximately 300 cfs. Average inflow TP concentration to date is 83 parts per billion (ppb) and average TP concentration in the NuRF discharge to date is 36 ppb, which is only slightly above the Lake Beauclair TMDL target concentration for TP (32 ppb). Based on SJRWMD water quality sampling, the NuRF is removing on average 57% of the TP coming into the facility. The water clarity downstream of the NuRF has also improved.

There were some issues with microfloc at the facility. However, as reported by Mike Perry, LCWA, in January 2011, the LCWA has changed the location of the alum injection point to limit problems with microfloc. Previously, the water was treated with alum as it entered the facility; however, there is a sharp right turn to the settling ponds. During high flow events, this turn caused tearing of the floc leading to microfloc that did not settle properly in the ponds. The water is now treated at this turn, instead of at the entry to the facility, to prevent microfloc.

When operating at a flow rate of 280 cfs, the NuRF uses 25 gallons of alum per minute at \$0.50 per gallon. This results in an estimated \$1.5 million per year for alum, with an additional \$60,000 - \$70,000 per year for the polymer used in dewatering. The LCWA Board decided to create an alum reserve fund for years with higher than average flow conditions. In May 2011, lightning struck a power line near the NuRF and the surge damaged the electrical equipment at the facility. The LCWA replaced the damaged equipment and added a generator and redundant pump to allow the facility to continue operation in the event of a power outage.

In discussions related to the NuRF, the Council determined that it should work with LCWA, SJRWMD, FWC, FDEP, and the Legislature to obtain the necessary funding for the facility. Being that the NuRF is a critical component of the restoration strategy for the Harris Chain of Lakes the Council recommends that the Legislature provide an appropriation of \$1,500,000 for alum and \$65,000 for polymer to operate the NuRF.