

Harris Chain of Lakes Restoration Council 2010 Report to the Florida Legislature

Council Members

Skip Goerner, Chairman

Hugh Davis, Vice Chairman

Richard Powers, Secretary

Keith Farner

Donald Nicholson

Richard Royal

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November 2010

HARRIS CHAIN OF LAKES RESTORATION COUNCIL

2010 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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Prepared by:

Wildwood Consulting, Inc.



November 2010

ACKNOWLEDGEMENTS

This report is produced in honor of the late Councilman Robert Kaiser, for his dedication to the restoration of the Harris Chain of Lakes.

LIST OF ACRONYMS

A-B Canal	Apopka-Beauclair Canal
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
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
UF	University of Florida
USACE	United States Army Corps of Engineers
USFWS	United States 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 2009 through October 2010. 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

To restore the Lake Apopka North Shore Restoration Area to wetlands, the Council recommends that members of the Technical Advisory Group (TAG) develop a strategy to create a reservoir on the north shore, which can be a water supply resource for local municipalities and provide an alternative to the detrimental discharge of nutrient-rich waters into Lake Apopka. The Council believes that this strategy would improve water storage capacity, along with fish and wildlife habitat.

To help accelerate the process for improvement in water clarity and the return of the native vegetation in Lake Apopka, the Council recommends that the TAG investigate if it is economically and technically feasible for a large scale replanting, as opposed to natural regeneration, and to determine desirable locations for such replanting. The TAG will also explore the option of opening the dike on the north shore.

To manage hydrilla, the Council recommends that members of the TAG research and discuss the pros and cons of allowing hydrilla to grow in Lake Apopka, which is a management strategy used elsewhere in Florida that *could* have a benefit if it is deemed an option by the Florida Fish and Wildlife Conservation Commission (FWC). The TAG will provide feedback to the Council for a future recommendation on hydrilla management.

Dredging as a Tool for Restoration

The Council recommends a Legislative appropriation of \$5,000,000 to provide a 50/50 cost share with the Lake County Water Authority (LCWA) for the Lake Beauclair and Apopka-Beauclair Canal dredging project.

There is general Council consensus that Lake Apopka would benefit from dredging in select areas. The Council recommends that the TAG look for areas to dredge, determine the cost of the partial dredging, estimate the quantity of material that could be removed, and identify locations for muck disposal.

Reconnecting Marshes to the Lakes

The Council supports the efforts of St. Johns River Water Management District (SJRWMD) and FWC to reconnect Lake Griffin to its adjoining marshes.

Shoreline and Aquatic Habitat Restoration

To quickly enhance the restoration of the sport fishery and the establishment of native water lilies, the Council requests that the Florida Legislature reallocate state and federal environmental

trust funds to provide \$250,000 per year for five years, to put in place substantial structural-complexes using concrete blocks to provide artificial fish habitat and barriers for aquatic plant protection. The Council has already committed the balance of its existing funds received through Legislative appropriations to this effort.

Mechanical Harvesting of Nuisance Aquatic Vegetation

The Council supports the efforts of the University of Florida's (UF's) LAKEWATCH volunteers and the continued use of the mechanical harvester to remove nuisance aquatic vegetation when and where it is economically feasible.

Sport Fish Restocking

The Council recommends an annual appropriation of \$150,000 for the continuation of the adult-largemouth restocking program on the Harris Chain of Lakes being conducted through UF's LAKEWATCH program.

Gizzard Shad Harvesting

The Council continues to support its past recommendations to the Legislature that commercial harvest of gizzard shad will not significantly improve water quality unless netting is conducted at a level that would be extremely detrimental to sport fish populations, something which is not acceptable. The Council supports efforts by other agencies including FWC, to increase sport fish populations, which serve as predators of gizzard shad. The money saved by delaying gizzard shad harvesting could be used to fund other effective projects, such as the Nutrient Reduction Facility (NuRF), fish restocking, and limited dredging.

Black Crappie Fishery Management

The Council supports efforts of FWC to establish a minimum size limit for black crappie in Lake Griffin. The Council will provide FWC with a letter of support during the rule adoption process, when FWC is ready to move forward with this regulation.

Nutrient Reduction Facility

In discussions related to the NuRF, the Council determined that they should coordinate with LCWA, SJRWMD, FWC, Florida Department of Environmental Protection (FDEP), and the Legislature to obtain the necessary funding for the facility. The Council recommends that the Legislature provide an appropriation of \$143,000 for improvements to the NuRF including a backup generator system, controls for dredges, video camera, shed, and service vehicle. The Council also recommends an additional \$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 2010 MEETINGS AND PRESENTATIONS

During the period of November 2009 through October 2010, the Council held nine regular monthly meetings, attended one meeting of the SJRWMD Governing Board – Projects and Land Committee, and took a tour of the Lake County Water Authority (LCWA) – Nutrient Reduction Facility (NuRF). Throughout the year, the Council was presented with scientific information and data concerning water quality and aquatic ecological conditions, and information on restorative measures for the Harris Chain of Lakes. 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, gizzard shad harvesting to improve water quality, in-lake and canal dredging to improve water quality as well as provide for 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 2010 reporting period (November 2009 through October 2010) 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 <http://harrischaincouncil.ifas.ufl.edu/>.

During the 2010 reporting year, technical presentations were given and information was provided by several state and local agencies, which work in partnership with the Council on the restoration of the Harris Chain of Lakes. These entities include the SJRWMD, FDEP, FWC, LCWA, and the University of Florida (UF). The technical presentations given by these partners to the Council are listed in Table 1.

Harris Chain of Lakes Restoration Council – 2010 Report to the Florida Legislature

TABLE 1: TECHNICAL PRESENTATIONS FROM NOVEMBER 2009 THROUGH OCTOBER 2010

Meeting Date	Presentations
November 6, 2009	No technical presentations.
January 8, 2010	No technical presentations.
February 5, 2010	David Walker, SJRWMD, gave a presentation on the status of Lake Apopka restoration efforts including historic lake discharges and water levels, north shore restoration strategies, targeted dredging, soil remediation, and gizzard shad harvesting.
March 5, 2010	David Walker, SJRWMD, provided information on water quality, water levels, and discharges for Lake Apopka, as well as groundwater levels near the lake. Joe Branham, Bug Spring landowner, presented nitrogen and phosphorus data for water samples he had collected from Bug Spring.
April 2, 2010	Dave Fisk and David Walker, SJRWMD, provided information on aquatic vegetation and habitat restoration efforts for Lake Apopka.
May 7, 2010	Mike Perry and Lance Lumbard, LCWA, gave the Council members a tour of the LCWA – NuRF.
June 4, 2010	Jason Dotson, FWC, gave a presentation on the evaluation of the black crappie fishery in Lake Griffin and implications for fisheries management.
August 6, 2010	Bill Johnson and Marty Hale, FWC, summarized their agency’s research findings and provided recommendations for regulating the black crappie fishery in Lake Griffin; and stocking black bass, controlling hydrilla, and installing artificial reefs/fish attractors in the Harris Chain of Lakes.
September 10, 2010	David Walker, SJRWMD, gave an overview of SJRWMD’s restoration efforts in the Harris Chain of Lakes and Upper Ocklawaha River Basin including Emeralda Marsh, Harris Bayou, Lake Apopka North Shore Restoration Area, and gizzard shad harvesting. Christianne Ferraro, FDEP, gave an update on the Upper Ocklawaha Basin Working Group and the Basin Management Action Plan.
October 7, 2010	Tom Champeau, FWC Division Director of Fresh Water Fisheries, provided information on the new direction for FWC. Mike Perry, LCWA Executive Director, gave a report on LCWA’s annual activities including stormwater retrofit projects, NuRF operation, and Lake Beauclair restoration.

Also during the 2010 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: 2010 TECHNICAL ADVISORY GROUP MEMBERS

Agency or Organization	Representative
SJRWMD	Walt Godwin
FDEP	Christianne Ferraro
FWC	Bill Johnson
Florida Department of Transportation	Stephen Tonjes
U.S. Army Corps of Engineers (USACE)	Pete Milam
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. 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, the FDEP adopted total maximum daily loads (TMDLs) for the Harris Chain of Lakes, which limit the amount of total phosphorus 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, the 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 of several more years of effort and possibly decades (see [past Council reports to the Legislature](#)), 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 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. Dr. Dan Canfield of the TAG and his colleagues at UF (see [2009 Council report to the Legislature](#)) have disputed the efficacy of SJRWMD's approach for restoring Lake Apopka. It is important to note that ongoing surveys of Lake Apopka conducted by the SJRWMD revealed increased SAV along the lake's shoreline (see Section 3.1.2). 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 February 2010 meeting, David Walker, SJRWMD, made a presentation on the status of the SJRWMD's efforts to restore Lake Apopka. The primary focus of their restoration efforts continues to be to revert vegetable and other farmlands in the 9,000-acre North Shore

Restoration Area (NSRA) back to marshlands. Reestablishing the former marshlands has multiple benefits for this portion of the lake's watershed: (1) eliminating future applications of agricultural nutrients and pesticides to the land surface, (2) preventing the further direct discharge of nutrient rich waters to the lake, and (3) providing for natural attenuation of the nutrient rich waters by the marshland's ecosystem. The SJRWMD has completed remediation of contaminated soil on 4,000 acres (Phases 1 and 2) of the NSRA achieving a 65% reduction of DDE pesticide in the treated soils. This remediation consisted of deep plowing to invert the soil. This plowing was completed on the 4,000 acres for a total cost of \$10,000,000. SJRWMD anticipates flooding an additional 1,900 treated acres (Phases 6 and 7) in the NSRA by the end of 2010. Pesticide data collected during and after flooding of Phases 1 and 2 of the NSRA will be used to support the decision to flood Phases 6 and 7, which also must be approved by the U.S. Fish and Wildlife Service (USFWS). Phases 3, 4, and 5 are scheduled to be flooded in early 2012. Phase 8 will also be flooded in early 2012 but will involve shallow flooding due to residual pesticide concentrations in this portion of the NSRA (approximately 900 acres). Concentrations of residual pesticides in the sediments of the NSRA, even after the remediation plowing, prevent this area from being hydrologically reconnected to Lake Apopka¹.

The Council recommends that members of the TAG continue to develop a strategy to create a reservoir on the north shore, which can be a water supply resource for local municipalities and provide an alternative to the detrimental discharge of nutrient-rich waters into Lake Apopka. The Council believes that this strategy would improve water storage capacity, along with fish and wildlife habitat.

3.1.2 Lake Apopka Restoration

A major issue for restoration of Lake Apopka is the re-suspension and transport of the nutrient-rich bottom sediments. Dredging of the bottom sediments has been proposed in the past. However, at the February 2010 meeting, David Walker stated that there is no suitable location for dredging identified by SJRWMD at this time, and a better option would be to raise the lake's average water level to improve water quality. In general, scientists agree that raising the water level could potentially reduce the effects of wind currents on re-suspending bottom sediments and could enhance consolidation of bottom materials. In addition, increasing water retention time in the lake may help reduce nutrient loads to the downstream lakes. *Therefore, the Council recommends that the SJRWMD continue to pursue this effort and report back to the Council on the positives and negatives of such an action.*

One method to assess restoration success in Lake Apopka is to evaluate the extent of native vegetation. In 2009-2010, the SJRWMD found 350 beds of eelgrass across Lake Apopka, which is a positive indicator of improved water clarity and quality conditions after severe droughts during 2001-2002 and 2007-2008 exposed and killed most of the recolonized eelgrass beds. However, this amount of eelgrass is far short of the desired coverage. The SJRWMD predicts that the extent and density of eelgrass beds should continue to expand during normal lake water level periods as water clarity and quality continue to improve. There is some disagreement on the success of SAV restoration and the Council will continue to monitor the expansion of beneficial plants.

¹ Contact Barbara Jadcak @ BJadcak@sjrwmd.com to receive copies of the Lake Apopka North Shore Restoration Area – Phase 2 Biological Assessment, November 2008 Report or the Lake Apopka Memorandum of Understanding between SJRWMD and USA.

To help accelerate the process for improvement in water clarity and the return of the native vegetation in Lake Apopka, the Council recommends that the TAG investigate if it is economically and technically feasible for a large scale replanting, as opposed to natural regeneration, and to determine desirable locations for such replanting. SJRWMD estimates the cost of large-scale replanting at approximately \$1,000-\$2,000 per acre. The TAG will also explore the option of opening the dike on the north shore.

3.1.3 Hydrilla Management

Currently, the SJRWMD controls hydrilla in Lake Apopka by surveying for the nuisance aquatic plant and spot treating affected areas. Under current conditions, this has proven to be a cost-effective method for controlling hydrilla in the lake; however, as the water clarity improves, invasive hydrilla will most likely expand and could be more difficult to control with spot treatments. The FWC is currently developing a statewide policy for hydrilla management, which could affect the current approach in Lake Apopka. The FWC will continue to update the Council on progress and issues associated with the development of their hydrilla management policy, and how it may affect hydrilla control in Lake Apopka.

To manage hydrilla, the Council recommends that members of the TAG research and discuss the pros and cons of allowing hydrilla to grow in Lake Apopka, which is a management strategy used elsewhere in Florida that could have a benefit if it is deemed an option by FWC. The TAG will provide feedback to the Council for a future recommendation on hydrilla management.

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, as maintaining navigation is critical to fostering and maintaining public support for lake restoration and enhanced lake level fluctuations.

3.2.1 Lake Beauclair and Apopka-Beauclair Canal Dredging

The Council supports the efforts of LCWA, FWC, and SJRWMD on the planned project to dredge Lake Beauclair and the Apopka-Beauclair Canal (A-B Canal). The purpose of the planned dredging is to improve navigation and prevent the nutrient and organic rich bottom sediments from being re-suspended by boat and wind activity. LCWA has entered into an agreement with FWC for \$1 million for the sediment removal. As of the time of this report, the initial bids for the project were not accepted, and the project will be rebid later in 2010 with dredging expected in 2011.

The Council recommends a Legislative appropriation of \$5,000,000 to provide a 50/50 cost share with the LCWA for this important project.

3.2.2 Lake Apopka Dredging

In response to past Council recommendations for dredging in 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 resale or reuse of the dredged material. The demonstration project will determine if the process has possible use in other lakes with limited areas of disposal, if plants will establish in the lake after dredging, and if material 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). The demonstration project will be conducted at Magnolia Park in Orange County with the focus being the maintenance dredging of the navigation channel to open water.

Upon applying for the dredging permit from the FDEP, several issues arose requiring additional information. A major issue was the 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 \$1.23 per cubic yard 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 is being requested.

The Council had several discussions throughout the year related to dredging Lake Apopka and there is general Council consensus that the lake 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 look for areas to dredge, determine the cost of the partial dredging, estimate the quantity of material that could be removed, and identify locations for muck disposal. Once the TAG has identified options, the Council would like SJRWMD to review the information since they have the technical expertise and resources to determine the feasibility of the recommendations.

3.3 Reconnecting Marshes to the Lakes

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

The SJRWMD has begun efforts to reconnect Emeralda Marsh. A box culvert was installed under Emeralda Island Road to reconnect Areas 6 and 7 to Area 2 and then to Lake Griffin. Recent aerial photographs of Area 2 show significant expansion of spatterdock beds, which at one time dominated large areas of Lake Griffin. This is an important habitat to return to the Lake Griffin/Emeralda Marsh system.

In December 2009, the SJRWMD contractor finished construction to reconnect the K cell and install a pump station at Emeralda Marsh. However, wave action from boats in Haynes Creek caused some erosion of the levee banks of the K cell connection. The SJRWMD has installed vinyl sheet-pile to stabilize the levee banks.

3.4 Shoreline and Aquatic Habitat Restoration

The Council supports the proven efforts of 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

shoreline and dock habitat enhancement increases opportunities for education programs to utilize the lakes.

3.4.1 Near Shore Artificial Habitat

The Council continues to partner with the FWC and UF's LAKEWATCH to implement a major fish/plant restoration program using concrete blocks to provide artificial fish habitat and barriers for aquatic plant protection.

To quickly enhance the restoration of the sport fishery and the establishment of Spatterdock (Nuphar lutea) or native water lilies, the Council requests that the Florida Legislature reallocate state and federal environmental trust funds to provide \$250,000 per year for five years, to put in place substantial structural-complexes. The Council has already committed the balance of its existing funds received through Legislative appropriations to this effort.

Mike Perry, LCWA, reported at the March 2010 Council meeting that the LCWA Board of Trustees had approved the installation of artificial fish habitat at Hickory Point on Lake Harris as part of the Council's plan for establishing fish/plant habitat restoration sites throughout the Harris Chain of Lakes. In addition, at the June 2010 meeting, Dan Canfield, UF, reported that artificial reefs are being installed at Deer Creek Point on Lake Dora and Buzzard Bay on Lake Eustis. Each reef is made up of 90 concrete blocks and is 5 feet x 5 feet x 2 feet in size. All the artificial reef habitat sites are located in at least eight feet of water to ensure they remain submerged even in low water conditions. Most of the sites are accessible by a public fishing dock or pier. At several of these sites, native water lilies have been attached to the structures to foster the establishment of the native plants. As of the August 2010 meeting, 43 artificial reefs have been installed in lakes Dora, Eustis, Harris, Little Lake Harris, and Griffin, and additional reefs will be installed in the future.

3.5 Mechanical Harvesting of Nuisance Aquatic Vegetation

In January 2007, the Council purchased a mechanical harvester utilizing \$25,000 in Legislative appropriations. The harvester is maintained and operated by UF's LAKEWATCH volunteers, and used to remove near shore, invasive aquatic vegetation at the request of property owners and homeowner associations throughout Lake County. This program has been very successful at maintaining waterways and, based on the high demand for its services, has proven to be very popular with the citizens of the county. This method of aquatic weed control not only removes organic material and nutrients from the waterbody but also maintains boating access for local residents. Herbicide applications, while lower in cost, introduce nutrients and particulate matter into the water as targeted plants decay. *The Council supports the efforts of UF's LAKEWATCH volunteers and the continued use of the mechanical harvester to remove nuisance aquatic vegetation when and where it is economically feasible.*

3.6 Sport Fish Restocking

In November 2009, Daniel Canfield, UF, informed the Council that there was an opportunity to relocate a large number of bass from Lake Medard in Hillsborough County that was scheduled to undergo a massive drawdown in 2010. The Council recommended relocating the bass to either Lake Harris or Lake Dora, since artificial fish attractors were planned for these lakes.

Approximately 5,000 bass greater than 8 inches in length from Lake Medard were subsequently stocked into Lake Dora.

During 2009-2010, 4,833 largemouth bass greater than 10 inches were stocked into Lake Dora. To continue stimulating angler interest, 2,327 largemouth bass greater than 14 inches (the legal length limit) and 839 bass greater than 17 inches (up to 10 pounds) were stocked into Lake Dora. These fish were tagged so that they could be tracked. Between December 15, 2009 and July 30, 2010, 87 anglers reported catching tagged fish from Lake Dora and 167 anglers reported catching tagged fish from other lakes in the Harris Chain of Lakes. Anglers have been and continue to be extremely supportive of the stocking program. In July 2010, UF's LAKEWATCH conducted an electrofishing survey of Lake Dora found that 24% of captured largemouth bass greater than 10 inches were fish stocked from Lake Medard. Electrofishing by FWC in spring 2010 reported that 21% of the bass captured in Lake Beauclair and 24% of the fish captured in Lake Carlton (two upstream lakes) were fish stocked into Lake Dora. To assess the potential economic impact of the stocking program on the local communities, various assessment methods were used by the FWC with all assessment methods indicating a positive return on the investment ranging from \$2 to \$7 for every dollar expended on stocking.

Also in 2010, the FWC stocked approximately 180,000 advanced-fingerling bass (3 to 4 inches) into Lake Griffin and approximately 11,000 advanced-fingerling bass into Lake Carlton. These fish were tagged and genetically mapped so that they could be tracked. The FWC reported that there are approximately 2,900 bass over 10 inches in Lake Carlton in 2010, compared to approximately 1,300 bass in 2009. Over the next two years, FWC plans to stock an additional 200,000 advanced-fingerling bass in Lake Griffin. Bill Johnson, FWC, noted that the SJRWMD's water level regulation schedule for the Harris Chain of Lakes calls for lake drawdown to occur in April of each year, which is right after bass spawn. In the past, this drawdown has affected the bass populations. However, in 2010, the SJRWMD left the water levels higher in the spring, which improved survival rates for the bass and crappie populations.

After analyzing samples from a recent 2010 creel survey, the FWC found that no fish from the 2008 sunshine bass stocking into Lake Apopka survived the 2008 fish kill, but that the 2009 stocking (approximately 300,000 fish) is doing well. The benefits of the 2009 stocking should be apparent in the winter 2010 fisheries. The FWC will not be stocking Lake Apopka in 2010, but they are planning a large scale stocking in 2011 of approximately 400,000 sunshine bass. In 2009, the FWC also stocked approximately 120,000 sunshine bass into Lake Harris have received positive feedback on this stocking from anglers. The FWC also stocked 35,000 sunshine bass in Lake Eustis in 2010.

Since 2004, the Legislative appropriations for support of sport fish restocking in the Harris Chain of Lakes have provided a positive economic benefit to Lake County (non-local anglers). The stocking program has also increased the total number of adult fish in the stocked lakes, where the ability of the adult bass to spawn is an important link to the recovery of the sport fish populations in the Harris Chain of Lakes. The stocking also assists in restoring the balance between predator and prey fish.

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 waters into the Harris Chain of Lakes is, until habitat can be restored, the most cost-effective measure to maintain the economic vitality of the largemouth bass fisheries in the lakes. The Council, therefore, recommends an annual appropriation of \$150,000 for the continuation of the restocking program on the Harris Chain of Lakes being conducted through UF's LAKEWATCH program.

3.7 Gizzard Shad Harvesting

In the February meeting, David Walker reported that the SJRWMD started gizzard shad harvesting in Lake Apopka on October 1, 2009 and completed the harvest by November 30, 2009. Approximately 380,000 pounds of gizzard shad were removed from Lake Apopka. The SJRWMD reported that there has been approximately an 85% decline in harvestable shad biomass and abundance in Lake Apopka between 1993 and 2009. These reductions in shad populations have been achieved using the larger mesh nets without harming sport fish populations. A similar decline in harvestable shad biomass has also been observed in Lake Griffin. Water quality data for both Lake Apopka and Lake Griffin, according to the SJRWMD, showed reductions in total phosphorus, total nitrogen, and chlorophyll-a, as well as an increase in water transparency. The SJRWMD believes that harvesting gizzard shad, in conjunction with the other restoration projects for these lakes, has contributed to the observed water quality improvements.

The Council continues to support its past recommendations to the Legislature that commercial harvest of gizzard shad will not significantly improve water quality unless netting is conducted at a level that would be extremely detrimental to sport fish populations, which is not acceptable. The Council supports efforts by other agencies including FWC, to increase sport fish populations, which serve as predators of gizzard shad. The money saved by delaying gizzard shad harvesting could be used to fund other effective projects, such as NuRF.

3.8 Black Crappie Fishery Management

During the August 2010 meeting, Bill Johnson and Marty Hale, FWC, provided an update on the FWC's efforts to determine an appropriate approach to black crappie fishery management in Lake Griffin. The FWC conducted a survey of anglers using Lake Griffin to evaluate the current level of black crappie fishing and assess potential changes in fishing intensity if a minimum size limit regulation was implemented. Most of the anglers were generally receptive to some degree of regulation of the fishery with a 10-inch minimum size limit having wide support.

It takes about four years for the black crappie in Lake Griffin to reach 10 inches in size. Setting a size limit regulation would help prevent overharvesting of the crappie, since the fish would have several years for reproduction before they are large enough to be fished. The FWC analysis indicated that the 10-inch minimum size limit would result in an approximately 15% increase in black crappie abundance and a 19% increase in crappie that are 10 inches and larger.

The FWC is continuing to study the feasibility of implementing a 10-inch minimum size limit for black crappie in Lake Griffin. It is possible that a rule change could occur in 2011 but is most likely to occur in 2012 when FWC rule amendments are scheduled. If this regulation is

implemented and is successful, a similar regulation will be considered for the other lakes in the Harris Chain of Lakes.

During the August meeting, the Council unanimously supported efforts of the FWC to establish a minimum size limit for black crappie in Lake Griffin. The Council will provide the FWC with a letter of support during the rule adoption process, when the FWC is ready to move forward with this regulation.

3.9 Nutrient Reduction Facility

The LCWA NuRF removes total phosphorus from discharges from Lake Apopka, with the capacity to treat up to approximately 300 cubic feet per second (cfs). Mike Perry, LCWA, reported to the Council in April 2010 that the NuRF was operational for one year in March and had removed 65% of the total phosphorus from the Lake Apopka discharge. Based on weekly total phosphorus data and average flow rate reported by SJRWMD, the NuRF removed 5,502 pounds of total phosphorus between March 2, 2009 and August 31, 2010 and injected 2,872,883 gallons of alum at a cost of \$1,625,681. During this period, the facility treated almost 16 billion gallons of nutrient-rich water from Lake Apopka, which represents over 2.16 billion cubic feet or the equivalent of 6.67 volumes of Lake Beauclair.

The NuRF has removed 67% of the incoming total phosphorus loading from Lake Apopka to the downstream lakes. Average inflow total phosphorus concentration to date is 89 ppb and average total phosphorus concentration in the NuRF discharge to date is 34 ppb, which is equal to the Lake Beauclair TMDL target concentration for total phosphorus. SJRWMD data through the first week in July 2010 indicate the lowest total phosphorus concentrations on record for Lake Beauclair (40 and 42 parts per billion [ppb]) and also indicate that the flocculent is settling out by the time it reaches the sampling station. Downstream of the NuRF, eelgrass and Spatterdock are growing, and there has been improvement in the water clarity and fish populations.

When operating at 280 cfs, the NuRF uses 25 gallons of alum per minute at \$0.50 per gallon. The LCWA has started an alum reserve fund. An estimated \$4 million is needed to support normal operation of the facility (approximately \$1.5 million per year) while providing a funding reserve. The LCWA asked the Council for assistance in obtaining additional funds.

In discussions related to the NuRF, the Council determined that it should work with the LCWA, SJRWMD, FWC, FDEP, and the Legislature to obtain the necessary funding for the facility. The Council recommends that the Legislature provide an appropriation of \$143,000 for improvements to the NuRF including a backup generator system, controls for dredges, video camera, shed, and service vehicle. The Council also recommends an additional \$1,500,000 for alum and \$65,000 for polymer to operate the NuRF