

Draft

**Upper Ocklawaha River Basin
State Funding Initiative
(including Lake Apopka)
Fiscal Year 2007–2008**

St. Johns River Water Management District
Palatka, Florida

2006

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Introduction—The District

Water is Florida's most important natural resource and is central to our quality of life. The mission of the St. Johns River Water Management District is to ensure the sustainable use and protection of water resources for the benefit of the people of the District and the state of Florida.

Within the District boundaries are the longest river in the state, the St. Johns; more than one-third of the state's 7,700 lakes, including the second largest lake, Lake George; and the Indian River Lagoon, one of four Florida estuaries in the National Estuary Program.

The rapid growth of Florida's population has increased efforts on water resource development and restoration. Partnerships with other governmental agencies, organizations, and the public are a key element to successful implementation of projects aimed at protecting and restoring our water resources. The District recognizes the benefits of working cooperatively with others and that many projects require input and resources from numerous organizations.

The District has established partnerships with many federal agencies over the years. The U.S. Environmental Protection Agency has provided funds for the National Estuary Program and the Nonpoint Source Management Program. The U.S. Army Corps of Engineers has provided technical expertise and funding through several different programs. Hydrologic data

collection and scientific analysis have progressed in cooperation with the U.S. Geological Survey.

The District has formed a partnership with the U.S. Department of Agriculture under the Wetlands Reserve Program, the Farmland Protection Program, the Rural Utilities Service, and the Environmental Quality Incentives Program. In addition, the U.S. Department of Commerce has provided funding for economically disadvantaged communities in the District for public works projects, including water and sewer infrastructure related to designated Surface Water Improvement and Management areas.

Insert districtwide map

Introduction—The Upper Ocklawaha River Basin

The Upper Ocklawaha River Basin initiative combines two Surface Water Improvement and Management (SWIM) projects – the Upper Ocklawaha River Basin (UORB) and Lake Apopka – located in Orange, Lake, and Marion counties. This initiative includes seven major lakes (including Lake Apopka, the fourth largest lake in the state) covering more than 75 square miles and includes portions of the Ocklawaha River in central Florida. The upper Ocklawaha River, from Lake Griffin to the Silver River, occupies the northern third of the project area. The state has designated the Silver River as an Outstanding Florida Water.

Historical Overview

The river and lakes in the upper Ocklawaha River project have undergone drastic declines in water quality and have lost river and marsh habitat over the last century. In the late 1800s, the Ocklawaha River was dredged to improve navigation for steamboats. Construction of the Apopka-Beauclair Canal in 1888 lowered Lake Apopka water levels. In the 1920s, 15 miles of the upper Ocklawaha River were abandoned when a parallel canal was dug to drain 5,800 acres of sawgrass marsh for farming. Beginning in the 1940s, 26,500 acres of sawgrass marsh and lake bottom were drained for farming on the north shore of Lake Apopka and at Emerald Marsh along Lake Griffin. Three dams were constructed in the Harris Chain of Lakes to stabilize water levels for flood protection of farms and lakeside homes and businesses.

For 70 years, farms established on former marshes pumped water loaded with nutrients into the lakes and the river of the UORB. Untreated sewage and industrial effluents were discharged into the lakes.

The water bodies were unable to absorb naturally excessive nutrients because vegetable fields had mostly replaced filtering marshes. Nutrient-fed algae flourished, turning the water pea-green. Submersed plants, important for fish habitat, died because sunlight could not penetrate the murky waters. Deep organic sediments rich in nutrients accumulated on the lake bottoms as dead algae settled. Stabilized water levels further degraded water quality.

The St. Johns River Water Management District (SJRWMD) developed a 5-year restoration plan for the upper Ocklawaha River project that calls for SJRWMD resources to be combined with federal and state funding to complete subprojects outlined in the SWIM plans for the UORB and Lake Apopka.

The water quality in the lakes in the UORB and Lake Apopka has significantly improved. This improvement is the result of SJRWMD efforts to reduce external nutrient loading to the lakes by harvesting gizzard shad and operating the marsh flow-way, which recycles nutrients already within the lakes.

Citizen Involvement

The Friends of Lake Apopka (FOLA), a citizen advocacy group founded in 1991, is dedicated to restoring Lake Apopka. FOLA hosts forums to foster open communication among the lake's stakeholders and is working with the East-Central Florida Regional Planning Council and local governments to develop a regional planning effort for areas surrounding the lake; efforts include establishing appropriate development rules and a regionwide loop trail.

The Lake Griffin Restoration Task Force was convened in 1999 and consisted of state and local agencies as well as concerned citizens. Its mission was to evaluate information pertinent to the restoration of Lake Griffin, which was comparable to Lake Apopka in water quality. The task force unanimously recommended completion of an array of complementary restoration subprojects implemented by a partnership of state and local agencies. This task force was disbanded in 2001.

The Harris Chain of Lakes Restoration Council was created by the 2001 Florida Legislature to advise the SJRWMD Governing Board and the Legislature on subprojects to restore water quality and fish and wildlife habitats in the Harris Chain of Lakes. Nine citizens appointed to the council by the Lake County legislative delegation began regular meetings in August 2001.

Key Efforts

- Purchased more than 35,000 acres of land and began wetland re-creation in the previously farmed muck soils
- Began construction of the Sunnyhill Restoration area in southern Marion County with funding assistance from the U.S. Department of Agriculture-Natural Resource Conservation Service (NRCS)
- Constructed the Lake Apopka and Lake Griffin flow-ways to filter suspended sediments and associated nutrients from circulated lake water
- Harvested more than 7,300 tons of gizzard shad, removing about 102,000 pounds of phosphorus from Lake Apopka, Lake Beauclair, Lake Dora, and Lake Griffin

- Planted desirable wetland and aquatic vegetation at restoration sites and around lake edges
- Adopted final pollutant load reduction goals for nutrients, which formed the basis of developing total maximum daily loads (TMDLs) by the Florida Department of Environmental Protection (FDEP).
- Adopted final TMDLs by the U.S. Environmental Protection Agency (EPA) for the Harris Chain of Lakes and Lake Apopka
- Adopted a phosphorous load rule for Lake Apopka through the environmental resource permitting process
- Adopted a plan to change the way water levels on Lake Griffin are managed and planned future changes for other lakes to restore more-natural water levels and flows in the basin
- Began construction of the Harris Bayou Project, which will establish a connection between Lake Harris and Lake Griffin for environmental and flood control improvements

Upper Ocklawaha River Basin Partners

SJRWMD has formed cooperative partnerships with federal, state, regional, county, and city governments; citizen support groups; environmental organizations; and other nonprofit institutions. The list of partners includes U.S. Army Corps of Engineers (USACE); EPA; NRCS; the U.S. Fish and Wildlife Service; FDEP; the Florida Fish and Wildlife Conservation Commission; the Florida Department of Transportation; the Lake County Water Authority; the University of Florida; Lake, Marion, and Orange counties;

Astatula; Eustis; Fruitland Park; Groveland; Howey-in-the-Hills; Lady Lake; Leesburg; Mascotte; Montverde; Mount Dora; Oakland; Ocala; Ocoee; Tavares; Umatilla; Winter Garden; the Friends of Lake Apopka; and the Harris Chain of Lakes Restoration Council.

SJRWMD Governing Board 1–3 Year Priorities

For the Lake Apopka Basin, the goal is to restore the lake to Class III water quality standards (fit for wildlife and recreational activities) or better. In working toward this goal, the SJRWMD Governing Board has established the following priorities.

- Implement an interim restoration of the North Shore
- Develop a long-term restoration plan for the North Shore Restoration Area
- Implement a water resource development project in the basin
- Implement harvesting of shad
- Operate the marsh flow-way

- Conduct vegetation management

For the UORB, the goal is to meet or exceed Class III water quality standards for basin lakes and the upper river and to attain the quality of surface water and habitat necessary to restore and maintain healthy and productive natural systems in the basin. In working toward this goal, the SJRWMD Governing Board has established the following priorities.

- Implement harvesting of shad
- Complete and operate the Harris Bayou subproject
- Continue restoring Emeraldal Marsh
- Complete restoring Sunnyhill Farm
- Continue vegetation management

Total for This Basin

Funding package total
(FY 2007–2008): \$_____

Insert project map

Capital Subprojects

In-Lake Nutrient Reduction via Rough Fish Harvesting

Formerly: “Enhanced Lake Level Fluctuations and Lake Management”

Priority Ranking: ___

Budget Request: \$___

Partner: Lake County Water Authority (LCWA), Florida Fish and Wildlife Conservation Commission (FWC), South Florida Water Management District, Orange County

Core Mission: Water quality/surface water protection

Funding Administration: St. Johns River Water Management District (SJRWMD)

Description: The requested funds will be used to support the shad harvesting program within the Ocklawaha River Basin and Lake Apopka. The removal of gizzard shad is a cost-effective method of removing phosphorus to improve water quality and vegetated habitat for game fish and wildlife.

Almost 16 million pounds of gizzard shad have been harvested from Ocklawaha River Basin lakes. This harvesting has resulted in direct removal of about 112,000 pounds of phosphorus and 336,000 pounds of nitrogen from these lakes. In addition, research indicates that the more recent shad harvests have reduced internal recycling of nutrients within the lakes by 50,000 pounds per year of total phosphorus and over 200,000 pounds per year of total nitrogen. These reductions may play a major role in helping the lakes meet the requirements for the total maximum daily loads (TMDLs).

Restoration of the North Shore of Lake Apopka

Priority Ranking: ___

Budget Request: \$___

Partners: U.S. Department of Agriculture—Natural Resources Conservation Service, U.S. Fish and Wildlife Service, and Florida Department of Environmental Protection (FDEP)

Core Mission: Water quality/surface water protection

Funding Administration: SJRWMD

Description: Part of the requested funding will be used to remediate high pesticide levels in fields on the north shore of Lake Apopka. Residual pesticide levels in some of the previously farmed soils will require remediation prior to reflooding. Remediation techniques have been examined and testing is underway for low-cost alternatives. Methods that are finally used may include enhanced *in situ* (on-site) degradation, tilling or mixing soil, as well as capping with dredged material.

Part of the requested funding will be used to test and monitor the soils in support of the remediation.

Control of Nuisance Aquatic Vegetation

Priority Ranking: ___

Budget Request: \$___

Partners: Lake County, LCWA, and Florida Fish and Wildlife Conservation Commission (FWC)

Core Mission: Surface water restoration/protection

Funding Administration: SJRWMD

Description: The requested funding will be used to fund an additional spraying crew for control of nuisance aquatic vegetation in the Harris Chain of Lakes. Recent improvements in water quality in basin lakes have led to improved water clarity. In turn, this has allowed hydrilla to expand in many areas. Efforts by Lake County will not

be sufficient to control hydrilla in the Upper Ocklawaha River Basin (UORB). This support is needed to sustain the long-term improvements that are desired for the Harris Chain of Lakes.

Apopka-Beauclair Canal Nutrient Reduction

Priority Ranking: ___

Budget Request: \$ ___

Partner: LCWA

Core Mission: Water quality/surface water protection

Funding Administration: SJRWMD

Description: The requested funding will be used to improve the water quality discharging through the Apopka-Beauclair Canal to Lake Beauclair by implementing an off-line nutrient reduction treatment alternative that provides the highest treatment efficiency, lowest construction costs, and lowest long-term operation and maintenance costs possible.

SJRWMD is operating the Lake Apopka Marsh Flow-Way. Phase 1 of the flow-way was designed to treat flows up to 150 cubic feet per second (cfs). Flows through the canal can exceed 150 cfs – discharges in the summer of 2003 approached 300 cfs. During these periods of higher flows, high phosphorus loads are released downstream into Lake Beauclair. The discharge from Lake Apopka represents nearly 90% of the phosphorous load to Lake Beauclair.

The LCWA anticipates receiving a portion of the funding for this subproject from the FDEP TMDL program.

Nutrient Loading Reduction

Priority Ranking: ___

Budget Request: \$ ___

Partners: Lake County, LCWA, U.S. Department of Agriculture – Natural

Resources Conservation Service, and U.S. Army Corps of Engineers

Core Mission: Water quality/surface water protection

Funding Administration: SJRWMD

Description: Part of the requested funding will be applied toward a 50% cost-share endeavor with local partners to construct stormwater treatment systems in high-priority existing developments to reduce nutrient loading to these lakes. Storm water is a significant source of nutrients entering the Harris Chain of Lakes.

Part of the requested funding will be used to reduce nutrient loading from the former muck farm properties during the interim restoration process to protect the receiving waters. Alum injection systems at the North Shore Restoration Area on Lake Apopka and at Emeraldal Marsh along Lake Griffin provide significant protection to these lakes during the interim restoration period to control phosphorous loading during periods when discharge is necessary. When habitat at Emeraldal Marsh is sufficiently restored, the different properties may be reconnected to Lake Griffin – Area 2 was reconnected in 2005.

Lake Beauclair Aquatic Enhancement

Priority Ranking: ___

Budget Request: \$ ___

Partners: LCWA and FWC

Core Mission: Water quality/surface water protection

Funding Administration: SJRWMD

Description: The requested funding will be used for phase 1 of a 2-phase plan to improve water quality and habitat in Lake Beauclair. In phase 1, fine-grained, organic-bearing sediments will be removed by hydraulic dredge from an estimated 260 acres in the western portion of Lake Beauclair. These sediments are compromising the quality of the aquatic habitat in Lake Beauclair and are impeding

navigation. Removing the accumulated sediments near the point where the Apopka-Beauclair Canal enters Lake Beauclair will prevent the resuspension and distribution of this fine-grained organic material into areas where desirable aquatic plants will be established or into downstream lakes.

Phase 2 involves isolation of Lake Beauclair via sheetpile structures and pumping down water levels to oxidize shallow-zone organic sediments and to facilitate revegetation in appropriate areas with native aquatic plants.

The LCWA and FWC developed this subproject and will provide matching funds to complete this effort.

Wetland and Aquatic Habitat Restoration

Priority Ranking: __

Budget Request: \$ ____

Partners: University of Florida, FWC—Florida Cooperative Fish and Wildlife Unit, and LCWA

Core Mission: Surface water restoration/protection

Funding Administration: SJRWMD

Description: Part of the requested funding will be used to plant a diversity of native aquatic and wetland plants in the Harris Chain of Lakes. Lake vegetation has declined dramatically since the 1960s. Native emergent wetland vegetation will be planted along lake shorelines to achieve desirable plant coverage along the shorelines. Planting will reintroduce long-lived native wetland and aquatic plants to the restoration sites, allowing these species to spread naturally and form more diverse wetland plant communities.

Part of the requested funding will be used to continue aerial photography and geographic information system (GIS) work

for spatial data analyses, map preparation and editing, and basic spatial coverage creation. Low-level aerial photography and GIS data are essential to determine the success of wetland restoration efforts at restoration sites in the UORB and in the basin lakes.

Habitat Restoration—Planting of Desirable Vegetation on Lake Apopka

Priority Ranking: __

Budget Request: \$ ____

Partner: FWC

Core Mission: Surface water restoration/protection

Funding Administration: SJRWMD

Description: The requested funding will be used to build on the small-scale planting work that SJRWMD has had under way since 1992. Restoration of native, desirable vegetation in shallow-water areas is a primary performance measure for the restoration of Lake Apopka. Plants in shallow near-shore areas will provide habitat for fish and other wildlife.

Silver River/Half Mile Creek Comprehensive Watershed Management Plan

Priority Ranking: __

Budget Request: \$ ____

Partners: City of Ocala, Marion County, and Florida Department of Transportation

Core Mission: Water quality/surface water protection

Funding Administration: SJRWMD

Description: The requested funding will be applied toward the cost of implementing phase 1 of this plan—State Road (SR) 40/Half Mile Creek stormwater retrofit. About 269 acres of untreated urban runoff discharges through five cascading drainage basins directly into Half Mile Creek, which discharges into the Silver River near the spring boil. The goal of this retrofit project is to improve the water

quality and the biological integrity of the Silver River by implementing best management practices to reduce

stormwater pollution in the SR 40 drainage basin.

The Silver River is designated by the state as an Outstanding Florida Water.

Assessment Subprojects

Support of Pollutant Load Reduction Goals for the Harris Chain of Lakes

Priority Ranking: __

Budget Request: \$__

Partners: None

Core Mission: Water quality/surface water protection

Funding Administration: SJRWMD

Description: Part of the requested funding will be used to continue collecting water quality and plankton samples and to analyze plankton samples, while part of the request will fund management of the scientific database. SJRWMD has adopted final pollutant load reduction goals (PLRGs)

for the UORB. The PLRGs were used by FDEP to develop total maximum daily loads (TMDLs) for the Harris Chain of Lakes. The TMDLs have been adopted by the U.S. Environmental Protection Agency and will be updated every 5 years. PLRGs and TMDLs require continuing monitoring of water quality conditions in basin lakes and at SJRWMD restoration sites discharging into the lakes. Water quality and plankton data are essential to determine conditions in basin lakes and at restoration sites as well as to determine trends in response to restoration activities.