

## **Lake County Water Authority Annual Progress Report to the Harris Chain of Lakes Restoration Council**

The Lake County Water Authority Board of Trustees continues to place an emphasis on implementing projects that will make physical improvements to the degraded water quality of the area lakes, particularly the Harris Chain of Lakes. The Water Authority has worked to maintain and/or improve navigability between the lakes in the Harris Chain of Lakes.

### **Restoration and Improvements to Water Resources**

The Water Authority has been working to implement projects that make improvements to water quality and natural systems. The following are brief descriptions of the major efforts:

#### Cooperative Stormwater Initiative –

The Board has placed emphasis on working with local governments to implement stormwater treatment projects. Since 1996, the Board has offered grants to local governments for stormwater retrofit projects aimed at improving the quality of water in Lake County’s waterbodies. There have been a total of thirty stormwater projects completed under this initiative.



There are five additional stormwater projects that are either under construction or have been approved but not yet commenced. These projects include:

<i><b>Project Name</b></i>	<i><b>Cooperator</b></i>	<i><b>Water Authority Contribution</b></i>
Downtown Master Stormwater Project	Eustis	\$ 1,312,605
Cardinal & Bates Ave. Stormwater Pond	Eustis	\$ 150,000
4 <sup>th</sup> & Donnely St Sediment Box	Mount Dora	\$ 45,383
Grandview & Johns Ave Sediment Box	Mount Dora	\$ 50,121
24 Inlet Boxes	Mount Dora	\$ 2,466
	<b>Total:</b>	<b>\$ 1,781,850</b>

Public Waterway Maintenance - The Water Authority has historically responded to concerns from the public about navigable access to the lakes and in particular, maintaining the access between public lakes in the Harris and the Clermont Chains of Lakes.

The Board has implemented a maintenance program that provides for the removal of navigational hazards (such as fallen trees) from public waterways including the Apopka-Beauclair Canal, the Dora Canal, Haines Creek, Trout Lake Canal, and Helena Run. The Water Authority may also act to remove sediment, tussocks, and debris from waterways that impede boat movement through these public waterways. In 2009-10, the agency responded and removed numerous obstructions to navigation in public waterways throughout the county.

Apopka-Beauclair Canal Nutrient Reduction Facility – The LCWA’s Nutrient Reduction Facility (NuRF) became operational in March, 2009 and is currently the world’s largest alum-based surface water restoration facility. The St. Johns River Water Management District provided the land on which to build the facility and the LCWA received \$3,700,000 in cooperative funds from the Florida Department of Environmental

Protection (FDEP) to construct the facility. Annual operating cost of the NuRF is expected to average \$1.5 million.



The scale of the facility and cooperative management with the St. Johns River Water Management District make it possible to treat nearly all of the discharge from Lake Apopka allowing significantly cleaner water to flow north into the Harris Chain of Lakes.

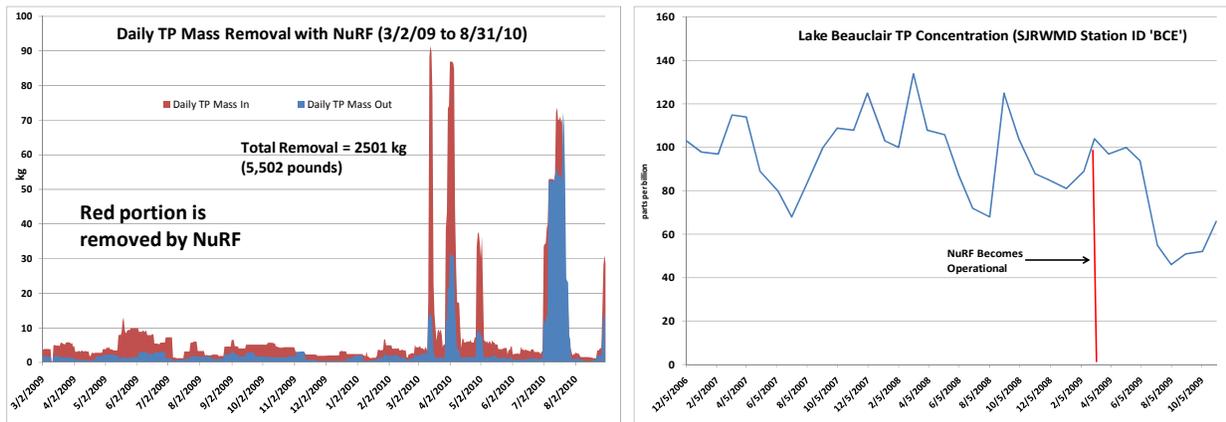


NuRF Site, October 4, 2007, pre-construction

Lake Apopka water quality has improved in recent years but, left untreated, still presents the largest source of phosphorus pollution in the Harris Chain of Lakes. Phosphorus is the limiting nutrient contributing to persistent algal blooms in Lake Apopka and throughout the Harris Chain of Lakes. Average Lake Apopka total phosphorus concentration remains higher than the Total Maximum Daily Load (TMDL) goal established by the FDEP. A TMDL is the maximum amount of a given pollutant that a waterbody can assimilate and still maintain its designated uses. It is important to point out that Lake Beauclair’s TMDL

is nearly half that of Lake Apopka. Therefore, even if Lake Apopka were to reach its TMDL goals, additional treatment would be required to achieve the Lake Beauclair TMDL.

Initial performance results during FY 2009-10 indicate that the NuRF operated as expected and average removal rate for total phosphorus was sixty-five percent. Based on weekly total phosphorus data and average flow rate reported by SJRWMD, the NuRF removed 2,501 kg (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. The facility treated 15,979,374,400 gallons (over 2.16 billion cubic feet - the equivalent of 6.67 volumes of Lake Beauclair) of water.



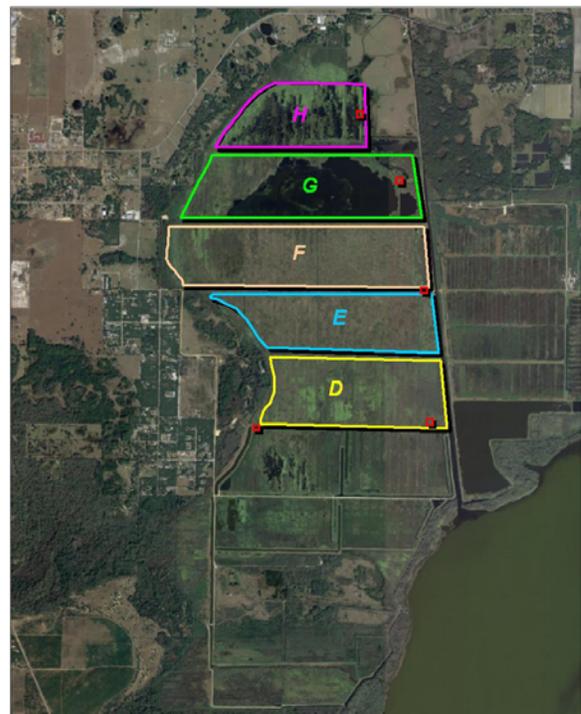
The NuRF has removed 67% of the incoming total phosphorus mass to date. It is important to note that District data through the first week in July 2010 indicate the lowest TP concentrations on record for Lake Beauclair (40 and 42 ppb) and also indicate that the floc is settling out by the time it reaches the sampling station. Average total phosphorus concentration in the NuRF discharge to date is 34 ppb and equal to the Lake Beauclair TMDL. Average inflow total phosphorus concentration to date is 89 ppb.

Lake Beauclair Aquatic Enhancement Project – Over 50 years of organic-laden discharges from the Apopka-Beauclair Canal has resulted in a 260-acre sediment delta in the western end of Lake Beauclair. During average and low water levels, the delta creates a severe navigational hazard that has trapped vessels and prevents navigation to Lake Apopka. To eliminate this hazard, the LCWA is working in cooperation with the Florida Fish and Wildlife Conservation Commission and the St. John’s River Water Management District on a restoration project that will eliminate the hazard by dredging the organic sediments and improving aquatic habitat. The LCWA Board of Trustees has also voted to include several muck-filled tributary canals near the end of the Apopka-Beauclair Canal in the overall project design.

Sediment samples have been analyzed from the delta and it was recommended that the top five feet of muck should be removed for a total estimated volume of 1.2 million cubic yards. This would not only eliminate the navigational hazard, but would also remove the organic sediments in the western end of the lake that were the result of anthropogenic (man-made) sources. These anthropogenic sediments are high in nutrients and have the ability to degrade water quality. The projected cost for the dredging is expected to range from \$7.4 to \$8.5 million. The original Preliminary Design Report (PDR) proposed that the Lake Beauclair sediments would be used in restoring the G-cell within the St. Johns River Water Management District's North Shore Restoration Area.



During 2005 and 2006, the PDR was updated to include an alternate disposal area located in Unit 2 of the North Shore Restoration Area. The selected location was approximately nine miles from the target sediments in Lake Beauclair. Following a risk assessment completed in 2006, the site was deemed an acceptable location for the Lake Beauclair sediment. The report addendum was completed in early 2007, however, St. Johns later determined that the original disposal area proposed for the project was more acceptable and that the adjacent F-cell could potentially be utilized as well. This change effectively doubled the area available for sediment deposition and was much less costly than the proposed Unit 2 deposition area. The Water Authority resumed its efforts to design the project using the G and F cells. In addition, St. Johns began efforts on a new risk assessment for the F and G cells.



F and G Cell Disposal Location

The Biological Risk Assessment for the F and G Cells was completed in FY 2009-10 along with the Final Conceptual Design Report as well as the 60% design plans. These reports were all compiled and submitted to FDEP along with a permit application for the project.

Biological Lake Assessments – In 2004, the LCWA began assessing the condition of lakes around the county using benthic macroinvertebrates. This assessment tool, based on the presence or absence of benthic macroinvertebrates, was developed by the Florida Department of Environmental Protection to indicate ‘health’ and identify impairment in Florida lakes. Benthic macroinvertebrates include snails, worms, crayfish and larval (or young) dragonflies, midges, beetles and many other organisms that live in and on the bottom of our lakes. This information provides quantifiable evidence of any changes in the benthic community associated with restoration efforts. These Biological Assessments are available on the LCWA website and are updated as new benthic data is collected.



In FY 2009-10, the LCWA completed a fourth year of assessments on Lakes Beauclair, Dora, Griffin, Eustis, Harris, Little Harris, and Yale.

Waterway Sign Inventory and Maintenance – As part of the Water Authority’s mission “to improve the streams, lakes, and canals in the county for the tourists, citizens and taxpayers”, the Water Authority permits, installs, and maintains navigational waterway markers, such as speed zones and lighted navigational aids.

The Authority initiated a waterway sign maintenance program in 2004 for the Harris Chain. The project involved a GIS database that specified locations and characteristics of each sign within the Harris Chain. All identified signs were permitted as necessary and were replaced as needed to adhere to the Uniform Waterway Marker standards set by the Florida Fish and Wildlife Conservation Commission (FFWCC). The Authority currently maintains a comprehensive database of 111 waterway signs and is in the process of identifying and replacing additional signs as necessary.

LAKEWATCH Program - Coordinated through the University of Florida, the Florida LAKEWATCH Program trains and certifies volunteers to collect water samples and gather water quality data about their lakes. This 16-year-old program is one of the biggest lake monitoring programs in the United States.

The Water Authority assists the LAKEWATCH Program in Lake County, which currently involves the analysis of 50 county lakes for major nutrients, algae, and clarity. The presence of “total phosphorus” and “chlorophyll a” in a lake body provides valuable information to scientists regarding the growth of algae. At the request of the Florida LAKEWATCH Program, the Board provided funding to cover the FY 2009-10 Lake County operating expenses.

Harris Chain Restoration Council - The Board has continued its financial support of the Harris Chain Restoration Council in FY 2009-10 by budgeting \$40,000 to cover their operating expenses.