



The Restoration of Lake Apopka From Science to Nature

'After years of neglect, Lake Apopka has begun a healing process'. The restoration has been underway for several years now and following some bumps in the road, is finally taking off -- ecological conditions are improving and Apopka should be shedding the title of 'Florida's most polluted large lake'. The phosphorous levels in the lake are fairly steady at levels in the 70ppm range. This is a great improvement over earlier readings of over 200ppm, though there is still progress to be made to reach the goal of less than 55ppm. Nutrients have always been the big problem for the lake, causing the algae blooms and the resulting discoloration of the water. The St. Johns River Water Management District (SJRWMD), which has responsibility for the restoration, is using a science-based, multi-pronged strategy to restore the lake and the surrounding wetlands.

A Multi-pronged Approach

The first and most important step was to reduce the amount of nutrients entering the lake from the farms, which made up 97% of the external wastewater entering the lake. This was accomplished with the 1996 Lake Apopka Improvement and Management Act that granted funding for the SJRWMD to buy the farmland surrounding the north shore. The act also set phosphorous discharge limitations, which reduced the amount of phosphorous loading to the lake.

Next, the restoration program had to address the pollution already in the lake: how to remove it in a cost effective manner and minimize its availability to the algae. Many strategies were evaluated, but only two chosen; construction of a wetland filter (Marsh Flow-Way) and harvesting gizzard shad.

The Marsh Flow-Way, alongside the Apopka-Beauclair Canal, receives lake water via gravity and removes particles and associated nutrients as the water flows through it. The clear water plume leaving the flow-way is very obvious when seen from the air. Since it's beginning in 2003 the Flow-Way has removed tons of suspended solids, nitrogen and phosphorus.

The gizzard shad removal program also helps remove phosphorous and reduce nutrient recycling. These shad feed on bottom mud and associated fauna and their waste encourages algae by returning phosphorus and nitrogen to the lake. The shad, labeled 'phosphorous pumps', recycle nutrients from the lake bottom and make them available to the algae living in the water column. In addition by removing the shad from the lake, the phosphorous in their bodies is also removed. To date more than 12 million pounds of the rough fish, which is equivalent to about 30,000 pounds of phosphorous, have been removed from the lake through this method.

Wetlands are the Key

Wetland restoration and management around Lake Apopka is the key to restoration of the lake itself. A large percentage of Lake Apopka's pollution was caused by vegetable farming on its northern shore. These highly-productive "muck-farms" were created in the 1940's by diking and draining the marshes that once formed the northern third of the lake. Vegetables like the famous Zellwood corn thrived on the rich organic soils and irrigation water from the lake. Destroying these marshes reduced the lake's natural cleansing capacity, while at the same time vastly increasing its pollution load as billions of gallons of excess water -- laden with nutrients, fertilizers and pesticides -- were pumped back into the lake. The purchase of the muck farms surrounding Lake Apopka was key to the Districts restoration efforts because restoring the wetlands would reduce the amount of water and nutrients that would be discharged from the north shore into the lake. It would also create thousands of acres of wetland habitat, a habitat type that has been in serious decline. From 1936 through 1987, 56% or > 3 million acres of herbaceous wetlands have been lost in Florida (Kautz 1993). Over the last 200 years, more than 9 million acres of wetland have been lost in Florida (US Dept. Interior 1994).

The marshlands play a critical role in creating foraging, breeding and roosting habitats for thousands of shorebirds, wading birds and other aquatic species of migrant birds that pass through the area in late summer and fall on their way to wintering grounds in Central and South America. The challenge on the north shore is that there are residual pesticides in the former farm fields, and the restoration to wetlands has to be accomplished in a manner that is protective of avian wildlife.

Careful planning and monitoring led to the successful flooding of 2000 acres on the former Duda farm, which has proven to be very beneficial. Staff at St. John's is working towards expanding the wetland restoration another 1100 acres in 2006. They hope to be able to flood this area in the near future and continue flooding equal acreage plots on a yearly basis, all in a manner that is protective of birds. Since the farmlands are lower than the lake levels this restoration process carries several long-term benefits: reduced discharge, reduction of alum use (cost savings) and increased wetland habitat.

FOLA feels that deep-flooding of the fields will eliminate crucial foraging habitats for many birds. We propose that in order to maintain the diversity of species that use the farms, there is a need to maintain a diversity of habitats. Habitats should include shallow-flooded fields, short-grass uplands, and fallow fields.

One unique wetland site on the north shore is CC Ranch, 255 acres along the Apopka-Beauclair Canal. The only parcel not tilled by farming, this site can be restored to a wet prairie, making it an extremely valuable habitat. Lake County Water Authority is looking at leasing this site for their proposed NuRF project (story on page ___), which FOLA adamantly objects to since restoration of the adjacent lands for habitat value has always been a critical part of our mission advocating for the restoration of Lake Apopka.

All of these strategies combine to make the lake and its environs a more habitable place for fish and wildlife and throughout Florida it is increasingly being recognized that what's good for the environment is good for business.

Birds, Birders and Fishing for the 'Big' One

Nature based tourism is one of the fastest growing segments of Florida tourism worldwide averaging 30% annual increase since 1987 (Ruskin and Bock 1995).

There are several positive economic impacts that the restoration process has stimulated. Hopefully, the lake will return to a productive fishery. It is a well-told story of the great fishing that used to be available on Lake Apopka. Fishermen would travel from all over the country to fish its fabled, clear waters. Fishing cabins dotted the shoreline creating an economic boon for many local residents. Today the fishing cabins are gone and with the current pace of development around the lake, will never return, but the economic impact of fishing should not be underestimated.

In 2001, 16% of the U.S. population 16 years old and older spent an average of 16 days fishing. In 1996, 2,854,021 fisher-people over 16 years of age spent 45,464,00 angler days fishing the Sunshine State's waters in search of a wide variety of finny targets spending more than \$3,288,843,000. This translates into the creation of 81,815 jobs in which people earned \$1,711,404,281. On top of this, the Sport Fish Restoration Excise Tax Apportionment, a user-pays, user-benefits tax that is generally strongly supported by anglers themselves, received \$5,114,792 to be used for supporting Florida's fisheries conservation and management program. If Lake Apopka could attract a small percentage of this economic activity it would have a major impact on the region, and restoration of the lake will do that. Anecdotal reports from the field indicate that fishing activity in the lake is already rebounding, so there is much hope.

Perhaps the most significant economic impact possibility comes from birders and wildlife watchers since the most popular type of wildlife viewing by Florida resident's and non-residents was watching birds. In 1996, over 1.5 million people watched birds in Florida, and over 1.3 million of these watched shorebirds. It is noted further that the number one habitat type visited by Florida nature-based tourist was wetlands (FGFWFC 1998).

A federal economic report found that 46 million birdwatchers across America spent \$32 billion in 2001. Nearly 1 out of every 5 Americans considers themselves a birdwatcher. A different study revealed that 31 percent of the U.S. population 16 years old and older fed, observed, or photographed wildlife in 2001.

Florida funnels migratory birds from the entire eastern side of North America, from the Arctic Circle to the tropics. They travel the peninsula before and after crossing the Gulf of Mexico. Large bodies of water and the surrounding wetlands naturally attract birds on migration due to their conspicuousness, and the availability of food and shelter. Lake Apopka and the wetlands and marshes surrounding it attract these birds and the birders that follow them. The area was named an Important Bird Area by both the American Bird Conservancy and Audubon of Florida.

The sheer numbers of species and individual birds attracted to the area is phenomenal. ***The total list of birds observed on the north shore of Lake Apopka is 336, second only in the state to Everglades National Park.*** Many of the experienced birders in Florida view the north shore of Lake Apopka as one of the premier birding sites in the Southeastern US. A large birder population has already become attracted to this area and with the continued improvement in the quality of habitat, and increased public access to the former farming area, the economic impact will just continue to grow.

Public Access

As the restoration of Lake Apopka progresses the District continues to examine possibilities for public access. Clay Island is a perfect example of the many recreational benefits the area has to offer. FOLA is working with staff for an entrance into Clay Island off of CR 455, now a designated Scenic Byway, which is not far from the Ferndale Preserve. There is also potential for wildlife viewing opportunities on the Duda farms where flooded marshes have created habitat for mass numbers of birds. Improving public access will be critical to realize the economic benefits of nature-based tourism.

FOLA and Orange Audubon continue to work with staff to look at long-term opportunities for an environmental education center on site. FOLA is also working with the District to secure access across the farms to connect the Lake Apopka Loop Trail. We encourage the District to improve existing, significant wildlife viewing opportunities, which will benefit Florida's residents and tourist alike. These efforts will help tell the story of Lake Apopka's restoration, which is becoming an example of how citizen support and good public policy combined with sound scientific principles and an adaptive management approach is leading to the restoration of a heavily degraded 50,000-acre ecosystem.