

**St. Johns River Water Management District**  
**Lake Apopka Wildlife Drive**  
**Self-guided audio tour**

**1. Entrance (welcome)**

Welcome and thank you for visiting the St. Johns River Water Management District's Lake Apopka Wildlife Drive. This 11-mile, one-way drive opened in May 2015 with the goal of providing visitors an opportunity to explore the wildlife and natural systems found within this incredible network of wetlands, levees, and canals. For your safety, the speed limit is 10 miles per hour. Directional signs are located along the route and gates will be closed/locked for the public's safety in areas where work is ongoing. Several pull over areas provide visitors a chance to stop along the drive. A portion of the drive intersects with a multi-use trail and visitors are encouraged to watch for hikers, bicycle riders and wildlife who share the road.

The land that you are driving on was once underwater, as it was part of floodplain wetlands along Lake Apopka's northern shore. Farming operations in the 1940s drained 20,000 acres of wetlands and the resulting agricultural runoff, combined with other factors, contributed to the lake's eventual decline. While many of the former fields still have pesticide residues, their decline is being managed.

The St. Johns River Water Management District acquired farm lands within the Lake Apopka North Shore between 1988 and 1999 with the goal of restoring water quality and fish and wildlife habitat within the lake and also the Upper Ocklawaha River Basin.

While these public lands help protect water quality and storage, they also are home to a wide variety of indigenous flora and fauna. We ask that you do not interact with or remove any plants or animals. Do not go into the fields or canals, most of which have very steep banks. Because large alligators are abundant, all pets must be kept on a leash and not allowed to run freely. Also, remember to drive slowly to avoid harming any wildlife, including turtles and snakes, with whom you share the road.

If you have an emergency, please dial 911. For immediate wildlife concerns, including a wildlife crime in progress, please call the Florida Fish and Wildlife Conservation Commission at 888-404-3922. For non-emergencies, please contact the St. Johns River Water Management District at 386-329-4404.

**2. Bird population (Lust Road)**

The Lake Apopka North Shore has become one of the premier locations to observe birds in the southeastern United States. This is due to the extraordinary diversity of birds that have been documented here, to date more than 360 species. The area is so attractive to birds because it has great geography and expansive habitat - Lake Apopka and its north shore is a 50,000-acre ecosystem located directly in the middle of the state, which makes it highly appealing to birds migrating through the Florida peninsula.

This site's attractiveness to birds was highlighted during the 1998 Christmas Bird Count — a one-day count performed annually during the holiday season — in which 174 species of birds were identified, the highest species total for an inland count in North America (north of Mexico) in the 115-year history of the Christmas Bird Count. Although great wildlife viewing opportunities are available year-round, the best times to birdwatch are in the fall, winter and spring. An exception is the mid-July spectacle of Swallow-tailed Kites foraging over the north shore prior to their migration to South America. Kites can be seen in good numbers during July and early August, but peak counts of more than 1,500 individuals can occur during the middle of July.

Some conspicuous species on the Lake Apopka North Shore include osprey, anhinga, Gallinule, Great Blue Heron, Black-necked Stilt, Red-winged Blackbird and Red-shouldered Hawk. Less conspicuous but seasonally present in healthy numbers are the American bittern, sora rail, black-bellied and fulvous whistling duck. Songbirds are also abundant and include swamp sparrows, marsh wrens, and if you are lucky, painted buntings.

### **3. Historic pump house**

The story of Lake Apopka is familiar to many — the state's fourth-largest lake was once a world-class bass fishery but impacts to the lake over many decades led it to being named Florida's most polluted large lake, following a century of abuse that began in the 1890s with construction of the Apopka-Beauclair Canal. Compounding the problem was decades of residual agricultural pesticides, fertilizers and treated wastewater discharges. These events led to a substantial increase in nutrients, primarily phosphorus, entering the lake, which triggered a chronic algal bloom, and Lake Apopka's waters turned pea green. The green water did not allow enough light to reach the plants that live on the lake's bottom and eventually, these submersed plants disappeared. Without this critical habitat, the bass population that Lake Apopka was famous for also disappeared. With the bass gone, dozens of fish camps - some of Central Florida's earliest tourist attractions - closed their doors.

In recent years, the St. Johns River Water Management District and its partners have been writing a new chapter in Lake Apopka's story — a story about creating improvements in water quality and the restoration of a wildlife habitat.

The large structure on the shore is called the pump house. The pump house was originally used by farmers in the 1940s to drain the north shore, pumping water into the lake to dry out land and make it possible to farm. During the years of active farming, the fields around you lost about one foot of elevation per decade through a process called soil oxidation. As the soil oxidized, it released phosphorus and exposed residual pesticides. Today, the pump house is still in use, but with a different goal. Now the pump house helps maintain water levels of the wetlands — just the right amount of water prevents further loss of soil and helps the St. Johns River Water Management District manage residual pesticides.

In addition to maintaining water levels, the pumps also add a chemical called aluminum sulfate, or alum for short, into the water. The addition of alum helps improve the water quality by

binding to things like dirt and sediment, making phosphorus unavailable to the algae and helping to prevent algal blooms.

#### **4. Water quality history**

Located in northwest Orange and southeast Lake counties, Lake Apopka is the headwaters of the Ocklawaha Chain of Lakes. Lake Apopka is fed by a natural spring, rainfall and stormwater runoff.

But years of excessive phosphorus discharges, residual farming pesticides and periods of drought threatened the health of the lake. These factors led to chronic algal blooms, and eventually the lake's cloudy water prevented sunlight from reaching underwater vegetation that's critical to fish and wildlife habitat. To accelerate improvements in the lake's water quality, the district implemented several strategies and projects on the surrounding land — as a result, the lake has experienced a 50% decrease in the concentration of phosphorus and a 43% decline in algae in the lake. This means clearer water and a better environment for plants to grow and fish to live. During the early years of restoration, the district also planted aquatic species behind protective barriers in Lake Apopka to create habitat for fish and wildlife. These planting efforts are becoming less necessary as the lake's water quality and clarity improve and native aquatic plants re-establish themselves.

Improving the lake's water quality is still critical because of the lake's size and its impact on downstream water bodies such as lakes Dora, Eustis and Griffin. Not only do improvements mean a return of plants, wildlife and sportfish, but it also means improved opportunities for nature-based recreation.

#### **5. Alligator population**

These days, there's a diverse group of wildlife that call the Lake Apopka North Shore home. In addition to the abundance of birds, there are also mammals including bobcats, coyotes, raccoons, armadillos, rats, mice, otters and occasionally hogs and bears on the property. There are also a great number of amphibians, including frogs, toads, salamanders and the eel-looking amphiumas (an-fe-u-mas). Additionally, many reptiles who call this place home — turtles, lizards, and snakes. The most common type of snake you'll see is a water snake, either the banded water snake, brown or green water snake – these are all non-venomous snakes. And then there's everyone's favorite reptile — the alligator.

Alligators play an important role in the ecosystem as top predators. Because of the abundance of food on the Lake Apopka North Shore, there is an abundance of alligators here as well. They are all indicators of the food chain working. Visitors to the North Shore usually have a lot of alligator questions, the most common being how big can they get? Well, Florida's state record is 14 feet, three and a half inches. The diversity of wildlife you'll witness is evidence of an active food chain, where birds eat fish and alligators are the top predator. Remember, these animals are a natural part of this system and they belong here, but we want you to enjoy viewing them safely.

To ensure you are safe around these ancient native creatures, respect them from afar. Alligators do not naturally prey on people but if you want a close-up photo, we recommend using a long

camera lens. Also, do not walk dogs near the water's edge and keep children at a safe distance as well. Most importantly, never feed an alligator — not even a small one, because feeding them causes alligators to associate people with food.

## **6. Agricultural history**

Much of Lake Apopka's North Shore was drained in the early 1940s for farming to support the war effort during World War Two. Farmers constructed levees mainly to drain land for farming carrots, corn and other row crops. The wildlife drive was built on some of the existing farm levees.

As a result of decades of agricultural and treated wastewater discharges, harmful pesticides still reside within the soil nearly 70 years later. After the district acquired the former farmland, work began to reduce decades' worth of residual pesticides. The district realized the magnitude of the work in the late 1990s, when many suggested the challenges were too great to remedy the situation. Instead, the St. Johns River Water Management District approached the challenge with science-based management efforts and implemented the largest remediation of residual pesticides in former farmland ever undertaken, moving forward with wetland restoration.

## **7. Restoration projects**

A result of residual pesticides, an avian mortality event in 1998-9 resulted in the death of 626 birds, including American white pelicans, wood storks, and great blue herons, on these former farmlands at Lake Apopka. Organochlorine pesticide residues remaining from agricultural practices were the primary cause of bird deaths. Birds accumulated the pesticide residues by consuming contaminated fish.

In response, the St. Johns River Water Management District conducted research to better understand the accumulation of this pesticide residue through the food chain — from soil to fish, and from fish to fish-eating birds. The knowledge generated through this research continues to guide restoration of the former farmlands. It's also applicable to other projects designed to restore wetland ecosystems impacted by agriculture, which you will hear about later on the drive.

Realizing the extent of the pesticides, the district also assessed any potential human health risks for staff working on the property or for members of the public engaged in various recreation activities. Although the area is still several years away from receiving a clean bill of health from the United States Fish and Wildlife Service, all monitoring of the pesticides indicates that science-based approach is working and that the restored wetlands are safe for wildlife. As fields receive a clean bill of health, management changes from using dense vegetation to reduce wildlife exposure to other vegetation types that are more attractive to wildlife. Years of science, hard work and patience are now being rewarded with unique recreational opportunities on the Lake Apopka North Shore, and a lake with improving ecological health.

## **8. Additional restoration information**

Over the last several years, the district has implemented a strategy to restore the area in a manner that is safe to wildlife. This strategy includes several new technologies and approaches aimed at reducing the amount of residual pesticides and improving the lake's water quality.

One project is the gizzard shad fish harvest from Lake Apopka. The harvesting of these fish, which thrive in heavily polluted lakes, removes the nutrients contained in their bodies, and reduces the internal recycling of these nutrients within the lake. Each year, about 1 million pounds of fish are removed by commercial fishermen; this improves water clarity by reducing the severity of algal blooms.

Another ongoing innovative project is operation of the Lake Apopka Marsh Flow-Way, a 760-acre constructed wetland located along the northwest shore of Lake Apopka and which began operation in 2003. The Marsh Flow-Way is a man-made filtration system, filtering about 40% of the lake's volume each year. As lake water passes through one of the Marsh Flow-Way's treatment cells, algae and sediments settle out of the water. As of 2012, the marsh flow-way had removed about 23 metric tons of total phosphorus and it eliminates approximately 4,200 metric tons of total suspended solids per year from Lake Apopka.

Soil inversion is another innovative tool used on the Lake Apopka North Shore. The inversion process used modified farm equipment to plow 4,000 acres, essentially flipping three feet of soil, burying residual pesticides below the soil surface and making them less accessible to wildlife. Following each phase of work, a biological assessment is prepared for review by the U.S. Fish and Wildlife Service before the area is flooded or its management plan is changed.

## **9. Land management activities**

You might not know it, but the St. Johns River Water Management District owns or manages nearly 700,000 acres of land across its 18-county service area, acquired for the purposes of water management, water supply, and the conservation and protection of water resources. These lands are teeming with plant and animal life. Some of the more remarkable plant species documented within the upland portions of the Lake Apopka North Shore include Florida bonamia (bo-name-e-a), pygmy fringe tree, scrub buckwheat, Britton's beargrass, scrub plum, and clasping warea (ware-e-a), all federally listed plants. The surrounding area is also home to listed animal species such as sand skink, gopher tortoise, eastern indigo snake, Florida scrub-jay, bald eagle, Florida black bear, and wood stork.

Here at the Lake Apopka North Shore, land managers use a variety of tactics to protect native plants and animals. Let's talk about two of those methods.

Prescribed fire is one way the district protects native plants and animals, since many plants and animals depended on fire for their survival. Prescribed fire is the use of carefully planned fire purposefully set under stringent conditions to control the fire's effects. Without fire, the plants

and animals unique to the original habitat maintained by fire are lost. These prescribed burns also reduce the accumulation of flammable materials, which if allowed to collect, make wildfires much more dangerous. Periodic “prescribed fires” - also known as controlled burns - are the only means land managers have to meet the needs of many plants and animals while also reducing the threat of wildfires on the north shore.

Land managers also administer an Invasive Plant Management Program that helps to bring invasive, nonindigenous aquatic and terrestrial weeds, under what's called maintenance control. Exotic, nonnative plants cover thousands of acres of the state's forests, wetlands and waterways. These marauders often choke out native plant species and dominate an area. The district works to control the plant species through the use of mechanical treatments, prescribed fire and approved herbicides. The herbicides permitted are those that have been determined to have the least potential for adverse effects on the public health, safety and welfare as well as on fish, wildlife and the environment.

## **10. Water quality**

As you near the exit of the Lake Apopka Wildlife Drive, work to improve the lake's water quality continues. Similar to the large pump house near the beginning of the drive, this system also helps improve water quality. It uses a pump to move water to a wetland area on the west side of the lake. From there it eventually flows into a nearby canal, and then onto other lakes. In addition to augmenting the water level on the surrounding wetland, and eventually the lake, the pump also injects alum to treat and help reduce the amount of nutrients and sediment carried downstream.

While the St. Johns River Water Management District's work continues, everyone can contribute to improving the lake's water quality. One way is by conserving water at home. During dry seasons, when lake levels are lower, water quality decreases and water conservation becomes critical. Additionally, using phosphorus free fertilizer around your home or business is another way to help reduce the amount of nutrients that run-off into nearby water bodies.

## **11. Exit**

When most farming operations ceased on the north shore in the late 1990s, the region suffered significant economic hardships in addition to ecological hardships. It's the hope of the St. Johns River Water Management District that new recreational opportunities on this former farmland will not only improve Lake Apopka's water quality but also improve the quality of life for local residents, including a return of sport fishing, that will stimulate economic activity to fill the void created when the farms were retired.

Thank you for visiting the Lake Apopka North Shore's Wildlife Drive. To learn more about sustainable use of Florida's water and the St. Johns River Water Management District's work to protect Florida's natural resources, visit [www.sjrwmd.com](http://www.sjrwmd.com) or search for us on Facebook and Twitter.

Sept. 22, 2016