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## LAKE OKEECHOBEE LOW LAKE STAGE RESTORATION PROJECTS

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**Mandate:**

Comprehensive Everglades Restoration Plan (CERP),  
Lake Okeechobee Watershed Protection Program (LOWPP)

**Background:**

The drought of 2007 provided challenges and opportunities for habitat improvement in the lake. The low water levels on Lake Okeechobee provided a management opportunity to cost effectively conduct a series of management activities. Continued low water levels in Lakes Okeechobee and Istokpoga in south Florida during 2008 prompted the South Florida Water Management District to garner input from a multi-agency perspective for the purpose of planning low lake stage restoration projects for the coming dry seasons, as well as help mitigate more frequent low lake stages that are anticipated with the new Lake Okeechobee Regulation Schedule (LORS2008).

Broad topics related with low lake level activities were discussed resulting in ten sub teams being identified to further research and formulate the projects. The projects included:

- Muck Scraping and Disking/Plowing
- Native Aquatic Plant Enhancement
- Exotic and Nuisance Plant Control
- Recreation and Navigation Area Enhancement
- In-Lake Debris Removal
- Apple Snails Enhancement

**Muck Scraping and Tilling/Disking****Objective/Scope:**

The Florida Fish and Wildlife Conservation Commission (FWC) and the SFWMD have been working jointly since the 2001 drought to enhance the littoral zone marsh of Lake Okeechobee. The project objectives fall into two major categories: 1) enhance the fish and wildlife habitat of the proposed area by removing cattail and associated organics that have built up due to lake

currents and 2) evaluate the biological succession that will take place in the scraped areas.

**Muck Scraping**– Continued low lake levels provided opportunities to remove accumulated organic material and muck sediments from the nearshore areas of Lake Okeechobee during 2007 and 2008. Once normal water levels return, an improvement in water clarity, emergent and submerged vegetation, fish spawning habitat and wildlife foraging is expected.

**Tilling/Disking** - The objective of this demonstration project is to restore the essential sand sediments of normally inundated areas of Lake Okeechobee by mechanically disking and/or plowing of sediment into the native soils. This process consists of flipping a thick layer of consolidated muck (organic material) under ground below native sand. This process shall cap the accumulated sediment below the near shore lake bed. Since these muck areas are exposed due to the drought, they are accessible by plows, tractors and other equipment used to disc and plow the undesirable sediment. The FWC and the SFWMD proposed this project 1) to enhance the fish and wildlife habitat of the proposed area by removing cattail and associated organics that has built up due to lake currents and 2) to evaluate the biological successions that takes place within the scraped areas.

## **Recreation and Navigation Area Enhancement**

As a result of the 2007 drought, the SFWMD provided financial assistance to the cities of Pahokee and Belle Glade, to re-dredge their respective waterways to their original design elevation. In conjunction with rebuilding the Pahokee Harbor and campground amenities from extensive storm-related damages, the City of Pahokee initiated dredging efforts to remove accumulated sediment in the harbor. The District provided cost-share funding to the city to dredge an additional two feet lower to accommodate the lower lake stages anticipated with the new Lake Okeechobee Regulation Schedule Study and to allow larger boats to enter the harbor.

The District has also provided funding to the City of Belle Glade to conduct mechanical maintenance dredging of the finger canals of the Belle Glade Marina, in conjunction with boat ramp and campground restoration efforts that are under way with grant funds from Palm Beach County.

The sediment removal projects may improve in-lake water quality through the removal of phosphorus from the lake in the dredged material, since both waterways are inside the Herbert Hoover Dike. Navigation is expected to be negatively impacted by the lower lake levels and this effort will moderate anticipated future impacts to the harbor and marina's access. These efforts will also enhance recreational activities in the lake for both cities.

Low water levels on Lake Okeechobee provided a management opportunity for the District to cost effectively remove muck sediments from nearshore regions of the lake. Once these muck sediments are removed and water levels return to normal, the anticipated environmental benefits include improved water clarity, return of submersed plants and increased critical habitat for fish and wildlife. Areas were selected for this project: (1) Northwest Marsh, (2) Eagle Bay Marsh, (3) Eagle Bay Island, (4) Horse Island, (5) Harney Pond Recreation Area, and (6) Fisheating

Bay.

### **Status of the Project (as of July 2008):**

During the drought of 2007, accumulated sediment was removed from the Pahokee Harbor. The Belle Glade Marina finger canals were also dredged during the 2008 drought to design elevations with the removal of accumulated hurricane debris for improved access to the Lake under low lake conditions.

### **Native Plant Enhancement**

Objective/Scope: The FWC and the SFWMD conducted habitat enhancement projects on the natural islands along the southern shore of the lake, including Ritta Island, through the removal of perimeter levees, ditches, and concrete water control structures that impeded the natural hydrology of the islands. This enhancement was accomplished by backfilling the adjacent ditches with the degraded levee material and the removal of exotic vegetation, from dikes and berms. Concomitant with these efforts, both the FWC and the SFWMD continued to re-establish pond apple and cypress forests along the restored shoreline of the islands as lake levels and funding allowed. During the 2007 drought, re-forestation efforts concentrated on the spoil islands closer to the rim canal because of access issues.

### **Status of the Project (as of July 2008):**

Because of the 2007 drought, Ritta Island was inaccessible; alternatives sites were considered and discussed with the other agencies in the event that permits were needed. As a result of several discussions with the USACE and FWC, native trees were planted near Clewiston instead. Approximately 1000 Pond Apple and Cypress trees were planted across from the S-310 locks (500 4'-8' trees) and on two spoil islands approximately 1 mile east of the locks along the rim canal (500 4'-5' trees).

1. Replanting 1,500 EAA Reservoir trees- Mature pond apple trees at the EAA Reservoir site are located within blast areas. These trees will be removed from the canal caprock, bagged and transported to Torry Island within the lake, to be replanted as part of water shortage environmental restoration project.

2. Future planting sites under consideration include:

- Alvin Ward – replant melaleuca removal areas
- Lake Istokpoga – enhance existing pond apple forest at the northwestern side of Big Island within the interior of the lake (complete).

### **In-Lake Debris Removal**

Objective/Scope: The objective of this effort is to remove shoreline and nearshore debris that has the potential to pose a navigational hazard to boats during higher lake levels. Removing

debris and accumulated sediment improves navigational access and enhances recreational activities. This project is a continuation of work conducted in the summer of 2007 during the record low lake levels. In 2007, as lake levels receded, hazardous debris such as concrete blocks, pipes, plastic drums, boat motors, and cow pen posts were exposed and the SFWMD removed many of these items from the northern nearshore area of the lake. However, not all debris was removed before lake levels increased making them inaccessible. Because lake levels are expected to recede again during the 2008 dry season, and possibly achieve even lower levels than in 2007, the opportunity will exist to remove more hazardous debris.

#### **Status of the Project (as of July 2008):**

Approximately 50 tons of discarded tires, representing 5000 tires in a large pile, were removed during two phases of work on Kreamer Island in Lake Okeechobee. Several thousand tires still remain, buried under heavy vegetation, but will not be removed at this time.

#### **Exotic and Nuisance Plant Control**

Objective/Scope: Due to the dry conditions in Lake Okeechobee's marsh, the distribution of torpedograss has expanded in untreated areas and other aquatic habitat has been replaced by thousands of acres of terrestrial vegetation. Additionally, large accumulations of cattail thatch are common in areas where the plants died from drought stress during the previous year and new infestations of cattail are starting to emerge along the lakeward edge of the marsh.

Fire is a management tool that can effectively remove dense stands of exotic and nuisance vegetative biomass from the marsh landscape. Using fire to remove unwanted plant biomass while the marsh is dry helps maintain pockets of open area within the marsh and enhances the management of torpedograss with herbicides. Burning terrestrial plants and other vegetation also will reduce the buildup of organic sediment and limit the release of stored nutrients that would normally occur when the marsh re-floods.

Prescribed burns will be used to remove dense stands of cattail thatch and other vegetation in the western marsh. However, a "burn ban" is likely to be imposed by the Division of Forestry early in 2008, as occurred in 2007. This will likely prohibit issuance of burn permits until water conditions improve.

Herbicide treatments of exotic plants (torpedograss, West Indian marsh grass) and nuisance vegetation, including cattail and phragmites, will proceed during dry conditions. These treatments aim to reduce these plants' aerial coverage and protect native plant communities and traditional shallow, open-water habitat. Particular emphasis is planned to aerially treat torpedograss areas mixed with buttonbush during January-February when buttonbush is senescent and has not suffered adverse impacts during similar treatments in the past.

#### **Status of the Project (as of July 2008):**

More than 40,000 acres of emergent vegetation, primarily in the Moore Haven region of the

western marsh, burned as a result of arson and wildfires in early 2008. The fires burned mostly grasses and terrestrial vegetation that established following wildfires that burned most of the marsh in 2007. Fire eliminated most of the above-ground torpedograss. However, in many areas the invasive torpedograss reestablished from underground rhizomes that were insulated from the damaging effects of fire and has been actively growing in response to recent spring and summer rain events. In WY2008 more than 5,000 ac (2,023 ha) of torpedograss have been treated chemically and effective control in these areas is anticipated.

## **Apple Snails Enhancement**

The Florida apple snail is well adapted to the fluctuating water conditions that exist in South Florida wetlands; however, this species has a limited capacity to survive prolonged periods of dry conditions. The long-term drought conditions that Lake Okeechobee has been experiencing has had severe negative impacts to the lake's apple snail population. This species is an important food resource for other vertebrate species; a depressed snail population, therefore, negatively impacts species higher up the food chain. To alleviate the effects of the diminished apple snail population, the SFWMD, in cooperation with Harbor Branch Oceanographic Institute, have developed a pilot program that would "jump-start" population re-establishment following a drought. The objectives of this program are:

- 1) Determine whether the Florida Apple Snail can be cultured at a scale large enough to adequately stock Lake Okeechobee marshes.
- 2) Determine whether the Florida Apple Snail will reproduce under artificial laboratory conditions.
- 3) Determine the ideal size of individuals to be stocked so as to improve survival rates.
- 4) Determine the survival rate and reproductive output of cultured snails under natural conditions.

Snails will not be stocked or monitored in Lake Okeechobee during drought conditions. This program was developed in response to low lake conditions and is meant to be used as a management tool directly following a drought.

In addition to the stock enhancement project, a survey of the littoral zone will be conducted during the dry season to identify apple snail refugia. The littoral zone landscape is dynamic and does not dry evenly across the marsh. Although the majority of snails die as a result of extensive droughts, remnant populations are likely to exist because snails typically rebound after a number of years. To date, no data exists that would provide an indication of how many snails survive a drought to breed when water conditions improve. Understanding the size and spatial distribution of remnant populations would give insight into the health of the snail population and would help to illuminate the mechanism by which snails repopulate the marsh. This survey will be conducted by SFWMD staff by flying transects across the Lake Okeechobee marshes by helicopter. Refugia would be noted using a combination of GPS, remote sensing and ground

truthing.

**Status of the Project (as of July 2008):**

Various stocking experiments showed promise, however the number of egg clutches produced per individual have been much lower than observed in the wild. Further experiments with diet and temperature are planned to determine more optimal conditions to breed these animals.

**Lake Istokpoga Environmental Enhancements****Objective/Scope:**

Environmental enhancement activities include the planting of 800 native pond apples in standing water northwest of Big Island in Lake Istokpoga. An in-house apple snail egg monitoring study is being conducted and a University of West Florida team is evaluating the density and distribution of adult snails and eggs. SFWMD torpedograss treatments (i.e. for sites away from snail kite nesting/foraging areas) on the north and eastern shorelines of Lake are being targeted so that they don't become vast monocultures. A detailed GIS based 2008 vegetation distribution map is being developed to quantify the areal coverage and distribution of emergent and submerged plant communities.