

# Lake Seminole History and Restoration Efforts

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Pinellas County Environmental Management

# Lake Seminole Characteristics

- 684 acres
- 5.5 feet average depth
- Control structures regulate lake level
- Primarily used for recreation
  - Fishing
  - Boating
- Historically dominated by
  - Cattail
  - Hydrilla
  - Eel-grass



# Lake Seminole History

1942

- Western arm of Long Bayou
- Tidal estuarine system composed of
  - Mangroves
  - Salt marshes
- Upland landscape dominated by
  - Orange Groves
  - Pasture Land
  - Sparse residential
- Freshwater from Long Creek to the North
- Estuarine from Boca Ciega Bay to the South



# Lake Seminole History

## Mid and Late 1940s

- Created in mid-1940s
  - Irrigation for orange groves
  - Potable water source
- Land use
  - low density residential and agricultural
- Created by
  - Impounding and arm of Long Bayou
  - Flooding existing mangrove and salt marsh systems
- Late 1940s second weir added at north end of lake
  - Necessary due to upstream flooding





# Lake Seminole History

1950s and 1960s

- Time of rapid expansion in the area
- Start of decline in ecological conditions
  - Rapid urbanization
  - High residence time
- Lake Seminole Park constructed
- Current semi-circular weir installed in late 1960s



# Lake Seminole History

## 1970s and 1980s

- Land use
  - High density residential and commercial
- 1976 Lake Seminole Bypass Canal created
- By the mid to late 1980s
  - Water quality was at an all-time low
  - Nuisance vegetation at an all time high
- 1989 Pinellas BOCC passes resolution
  - Urges for joint development of long-term management plan



# Lake Seminole

## 1990s to Present

- Built-out Watershed
- Water Quality Issues
  - Habitat loss
  - Poor sport fishery
  - Harmful algal blooms
- Restoration efforts kick into high gear
  - WMP finalized in 2001
  - Improvement projects start in mid 2000s



# Early Study Efforts

- 1989-BOCC passes resolution urging joint development of long-term lake management plan
- 1992-Joint Diagnostic Feasibility Study conducted
- 1999-Lake Seminole Sediment Removal Feasibility Study conducted (revised 2006)
- 2001-Lake Seminole Watershed Management Plan completed



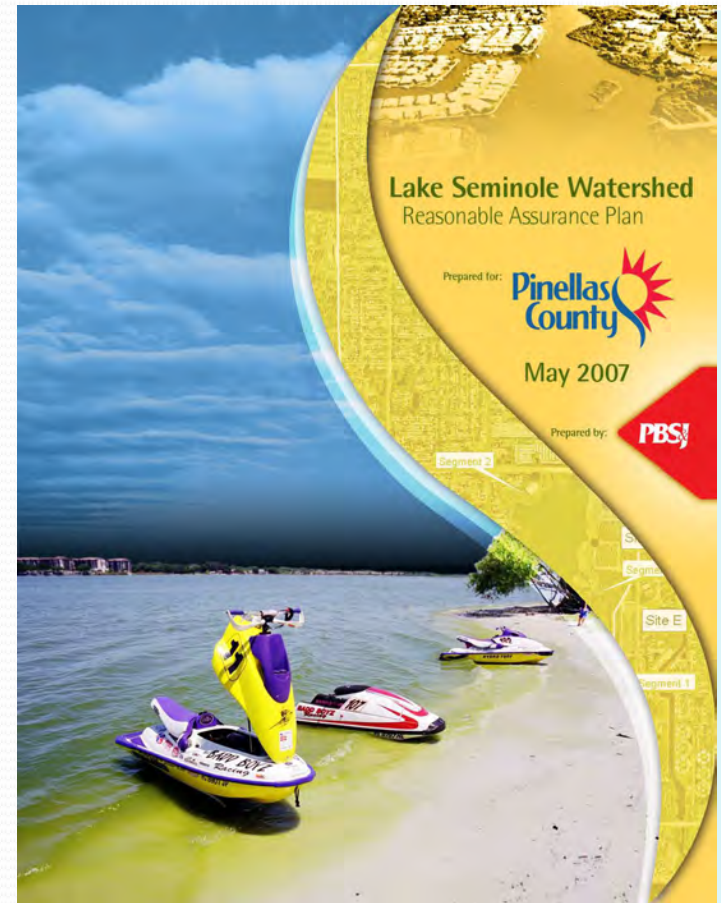
# Early Restoration Efforts

- 1960s - Point Sources for nutrient pollution evaluated and targeted for termination
- 1971 - Elimination of direct input from wastewater plant
- 1987 - Grass Carp Introduced
- 1990s - Stormwater pond rehabilitations
- 2002 - Littoral shelf sediment removal and revegetation
- 2006 - Largemouth Bass stocking
- 2006 - Lake draw-down and nuisance vegetation removal, replanting and drainage improvements



# Reasonable Assurance Plan

- Developed in response to being an impaired waterbody pursuant to section 303(d) of the federal Clean Water
- Plan finalized in 2007
- Defined Structural, Management, Legal and Policy Components



# Reasonable Assurance Plan

## Water Quality Goals

- Reduce chlorophyll-a concentrations to 30 ug/L or less
- Attain a mean annual multi-parametric TSI value of 60 or less
- Reduce current annual TP loads from external sources by 50%
- Annually calculate current water and nutrient budgets
- Maintain Class-III water quality standards for DO, pH, specific conductance and chlorides
- Attain an 80% TSS load reduction for all permitted MSSW facilities in the watershed

# Lake Seminole Restoration

## Key Components

- Six Structural components
- Five Management components
- Two Legal components
- Two Public Education components
- One Policy component
- One Compliance and Enforcement component





# Lake Seminole Restoration

## Public Education Components

- Develop and Implement a Comprehensive Public Involvement Program
  - Produce watershed specific brochures
  - Speaking engagements at HOA and other public events
  - Maintain updated Lake Seminole Website
  - Continuous Education and Outreach
- Develop and Implement a local Citizens LakeWatch Program
  - Due to robust County sampling this was not needed



# Education and Outreach

- Pet Waste Education
  - Education people on best practices
  - Install pet waste station bags
- Storm drain Markers
  - Provide storm drain marker kits
- Fertilizer Education Campaign
  - Education classes for lawn professionals
  - Mailers and website materials



**STORMWATER HOTLINE 727-464-5060**

You may remain anonymous.

**Only Rain Down the Drain**  
No Trash or Debris  
\$500 Fine for Violation



[www.Pinellas.WaterAtlas.org/StormwaterEd](http://www.Pinellas.WaterAtlas.org/StormwaterEd)

**June 1 - September 30**  
**Fertilizer Rules for True Floridians**

Pinellas County has passed a fertilizer law to keep nitrogen and phosphorus from ruining the lakes and bays that make our community so special. Here's how it works during the summer months:

- Just say no to nitrogen (and phosphorus). Pinellas County law bans the sale or use of any lawn or landscape fertilizer containing nitrogen or phosphorus from June 1 to September 30.
- Pump some iron. Use Florida-friendly fertilizer products that contain iron or other micronutrients to green up your lawn during the summer.
- Veggies get a pass. Nitrogen and phosphorus products can be used to fertilize vegetable gardens. Just watch the weather (no rain) and follow the package instructions. Our ability to swim, fish and boat in clean water is at stake.
- Get better dirt. Fertilizer isn't always the answer. You can give your garden a boost by adding compost, composted cow or chicken manure, perlite or other soil amendments.

*All products sold at this store comply with Pinellas County law. We care about the health of our lakes, bays and the Gulf of Mexico!*

Need more info? Call 727-464-4425 or visit [www.beFloridian.org](http://www.beFloridian.org).



**PROTECT FUN**

Skip the fertilizer this summer.  
Boca Ciega Bay will thank you.

*Be Floridian*

# www.BeFloridian.org

A SERVICE OF THE TAMPA BAY ESTUARY PROJECT

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## Floridians Know Better Than to Fertilize During the Summer.

Rains wash nitrogen to the nearest lake, bay or ocean, spoiling the reason we moved here in the first place.  
**Be Floridian. Design your yard for the place you live now.**

*Enjoy Florida. It's where you live now.*

### Map Your Yard

Find Your Yard's True Home State

You are a Floridian through and through. But does your yard belong in Ohio? Take our quiz to find your yard's true home state.

**Q. What does your yard need during the summer?**

- ☐ Fertilizer. And mowing. And fertilizer. And mowing.
- ☐ A seasonal outfit for my lawn goss! And I'm thinking of adding some gossings!
- ☐ My gratitude. With native plants that don't need much work, I'll be relaxing on the water instead.

[Continue Quiz ▶](#)

### Yard Matchup

Free Personality Matchup

Shrubbery speaks louder than words. What is your yard telling the neighbors about you?



[Find Your Match ▶](#)

### Yard 911

Emergency Help for Florida Yards

Dear Yard 911, Help, my lawn is brown! And I can't find fertilizer for sale anywhere! — *Can't Face the Neighbors, Oldsmar*

Dear Can't Face, Your lawn needs help — and you need some Floriducation. Sales of nitrogen-based fertilizer are banned in Pinellas, Sarasota and 37 other Florida communities from June to September to protect our water. Besides, there are better ways to fix your lawn!

[MORE 911 ▶](#)

### About BeFloridian

You could call us the Society for Preserving Florida for Boating, Fishing, and Drinks with Little Umbrellas.

[READ MORE](#)

### Get Help

Easy ways to welcome your yard back to Florida — whether you want to do it yourself or call in professionals [READ MORE](#)

### Shop the Store

Be Floridian in style with our hats, cell phone cases, T-shirts and more.

[START SHOPPING](#)



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# Lake Seminole Restoration

## Structural Components

- Excavate Organic Peat Sediments from shoreline areas
- Restore Priority wetland and upland habitats
- Install stage and flow measurement instruments on the outfall control structure
- Construct enhanced regional stormwater treatment facilities in priority sub-basins
- Divert Seminole Bypass canal flows to improve flushing and dilution
- Dredge organic silt sediments from submerged areas



# Littoral Shelf Organic Sediment Removal

- Completed in 2006
- Continuation of 2002 FWC project
- Focused on near shore areas and tussocks
- Removal
  - 130,000 CY of organic sediments
  - Over 26 tons of garbage and debris



# Restore Priority Wetland and Upland Habitats

- Target nuisance species for removal
  - Brazilian Pepper
  - Air Potato
  - Cattail
  - Willows
- Completed 2008
  - Continued maintenance on as-needed basis
- Revegetated areas with native plants
- Goal to improve near-shore and upland habitats



# Outfall Control Structure Gauge

- Accurately measure lake stage and flow volumes at the outfall control structure
- Completed in 2006
- Site measures stage
  - does not measure flow
- Aids in calculating loading models and water/nutrient budget balancing



Source: <http://water.usgs.gov/edu/watermonitoring.html>



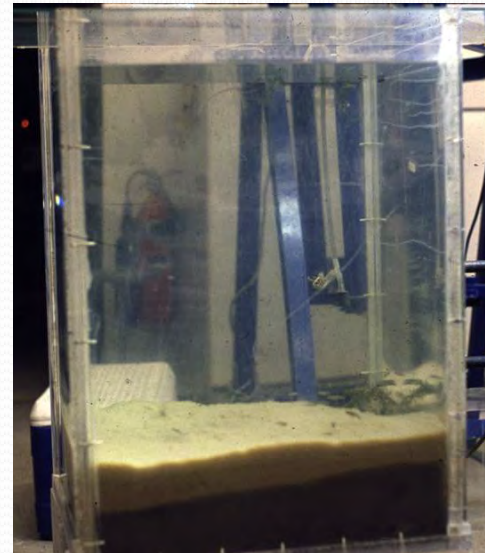
# Alum Facilities

## Alum 101

- Aluminum Sulfate
- Long history of use
  - Romans used to clarify drinking water
  - Wastewater treatment has used this for over a hundred years
- Forms gelatinous Floc that that is active for a long period
- High efficiency, stable end product



Before

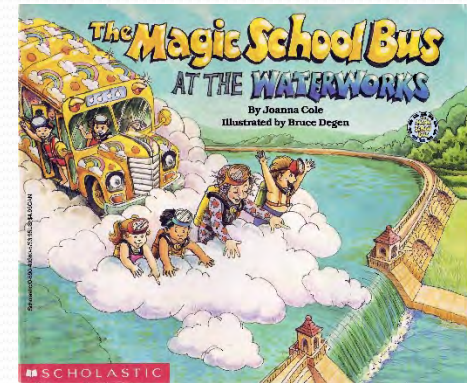


After



# Alum Facilities

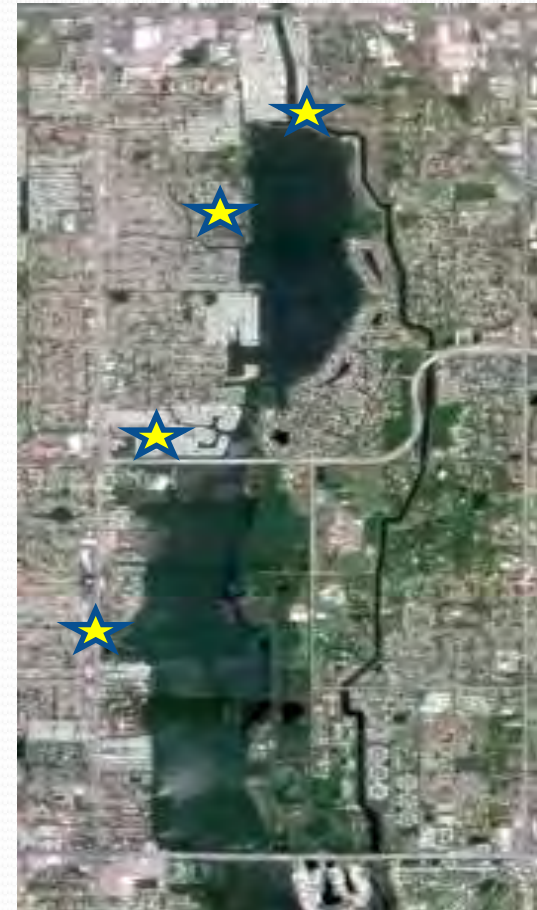
## How Alum Works



# Alum Facilities

## Lake Seminole Sites

- Total of 5 systems at 4 locations
- Selection based on basins that contribute the highest pollutant loads
- Most systems are flow activated
- Anticipated annual reductions
  - ~40% TN (~7,600 lbs/yr)
  - ~80% TP (~3,100 lbs/yr)
  - ~80% TSS (~200,000 lbs/yr)
- Goal is to reduce nutrient loadings prior to entering the lake





# Increase Flushing

- Development of operational schedule for outfall
- Summer-time diversion of Alum treated water from Lake Seminole Bypass Canal
- To be implemented once Alum facilities and dredge operations are completed
- Expected benefits are:
  - Reduce residence time in the lake
  - Reduction of nuisance aquatic vegetation



# Organic Sediment Dredge

- Number one recommended project
- Removal of 900,000 cubic yards of muck
  - Result in removal
    - 416 tons of TN
    - 77 Tons of TP
- Design started in 2010
- Goal is to reduce internal nutrient loads

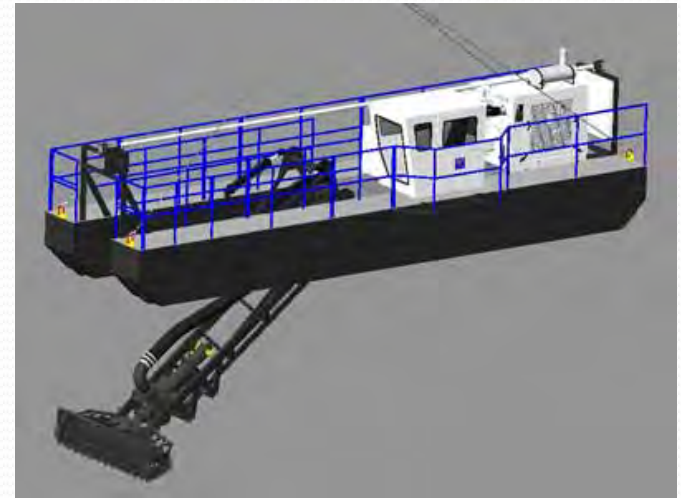




# Organic Sediment Dredge

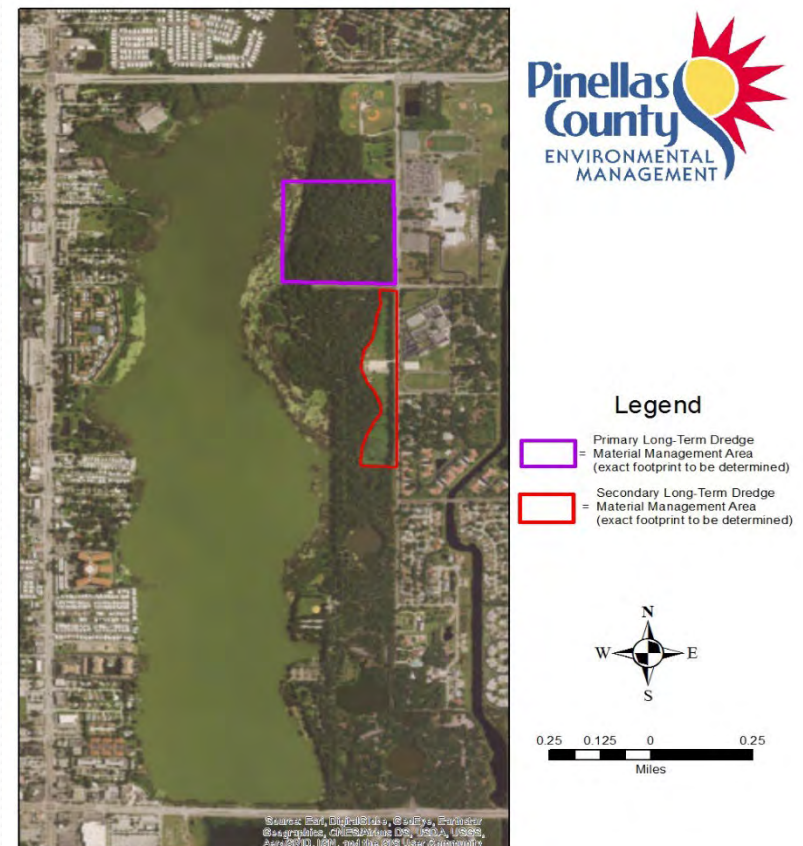
## How it Works

- Cutter head of barge will loosen, and vacuum will suck up sediment
- Sediment then sent by pipe to upland dewatering site
- Sediment and associate debris separated at upland site and clean sediment-free water returned to the lake



# Project Update

- July 18, 2017 - BOCC signs Contract to conduct Project
- Permit Modifications and Additional Pre-Construction Work over next 10 months
- Active dredging to begin in Summer 2018



# Lake Seminole Restoration

## Management Components

- Implement an enhanced lake level fluctuation schedule
  - Hope to implement during the 2018 year
  - Divert treated By-Pass Canal flow into the lake
- Biomanipulate sport fish populations
  - May continue post dredge
- Improve treatment efficiencies of existing stormwater infrastructure
  - On-going activities





# Lake Seminole Restoration

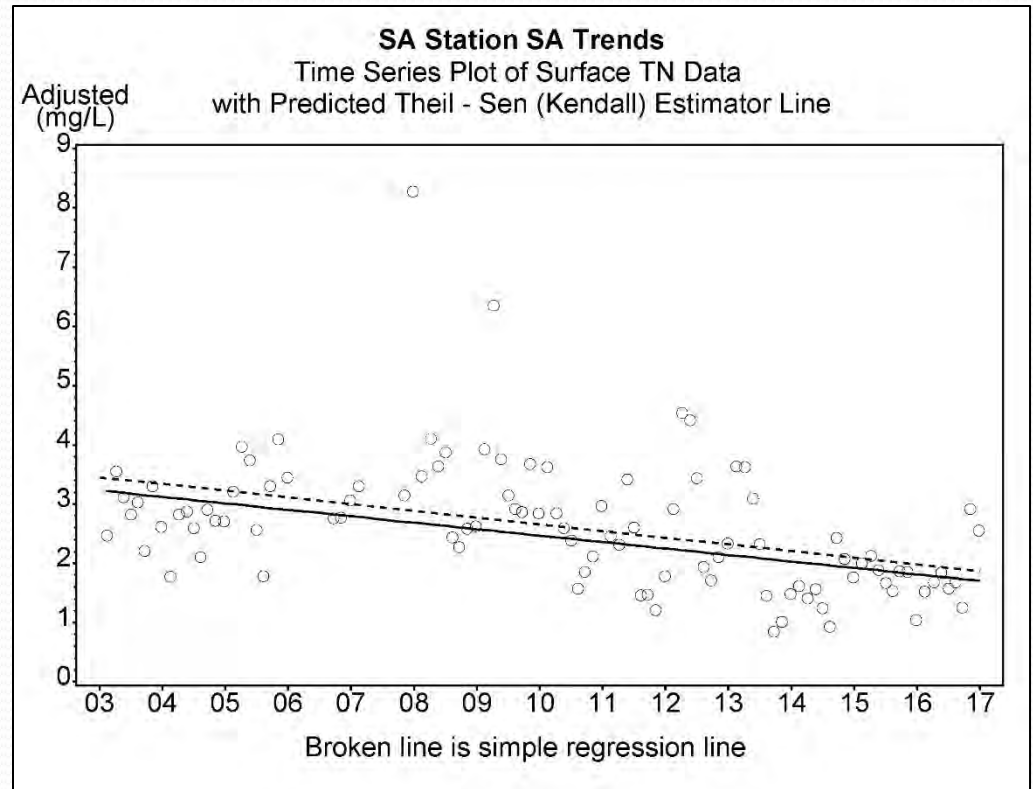
## Management Components (cont.)

- Inactivate phosphorus through whole lake Alum applications
  - Will re-evaluate the need for this after completion of the dredge project
  - May not be necessary
- Mechanical harvest of nuisance aquatic vegetation
  - Conducted as needed
  - Not necessary in recent years



# The Good News Recent Water Quality

- Time series analysis shows significant decreasing trends
  - Chl-a (Both Lobes)
  - TP (Both Lobes)
  - TN (Both Lobes)
  - Turbidity (Both Lobes)
  - TSS (Both Lobes)



# Where to Go from Here

- Continued public education
- Conduct the dredge project
- Monitor Alum systems
  - ERP Compliance
  - Annually to determine
    - Nutrient reductions
    - Removal efficiencies
    - Pond capacity status
- Continue monitoring lake water quality
- Continue updating compliance with Reasonable Assurance Plan





# Penny for Pinellas Accomplishments



## WATER QUALITY & FLOOD PREVENTION

A peninsula on a peninsula, Pinellas County is surrounded by water. Keeping our lakes, ponds, Bay and Gulf healthy, as well as protecting our citizens from flooding is essential to the whole community.

**116 REHABILITATION PROJECTS** to enhance our drainage systems and reduce flood risk

**28 FLOOD CONTROL PROJECTS** to protect homes

**12 CREEKS STABILIZED** to protect homes and the environment

**9 MAJOR WATER QUALITY PROJECTS** to remove pollutants from our waterways



Lake Tarpon Water Quality



Walsingham Reservoir  
Enlargement



Bee Branch Erosion Control



Joe's Creek Flood Control

# THANK YOU!

We would like to thank the following organizations and people for their efforts in managing and restoring Lake Seminole:



- SWFWMD (Primary Funding Partner)
- Atkins (Formerly PBS&J)
- Environmental Research and Design
- FDEP
- FFWCC
- AMEC Foster Wheeler
- Janicki Environmental
- Pinellas Environmental Management Staff
- Countless Volunteers and Volunteer Groups

