Monitoring Water Quality for Performance Evaluation of a Treatment Wetland

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Development of Farms on the North Shore of Lake Apopka 1941-1985

- Shallow marsh
- Shrub swamp
- Hardwood swamp
- Wet prairie
- Muck farm in prep
- Muck farm

Maps show the changes in land use from 1941 to 1985.
Lake Apopka

1930s
- North Shore Marsh
- Mesotrophic
- Clear water
- Abundant aquatic plants
- Abundant gamefish
- Firm organic and mineral sediments

1980s
- North Shore Farms
- Hypereutrophic
- Algal blooms
- Few aquatic plants
- Few gamefish
- Flocculent, nutrient-rich sediment
The Restoration Program for Lake Apopka

• Restore farmlands to wetlands (reduce P external loading and provide habitat)
• Remove rough fish (remove P, reduce P recycling)
• Plant native species and fluctuate water levels to develop habitat
• Prevent expansion of *Hydrilla verticillata*
• Wetland filtration (remove P from lake water)
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The Marsh Flow-Way

North Shore Restoration Area

- Marsh Flow-Way
  - C1
  - C2
  - B1
  - B2

- Clay Island

- West Marsh

- Apopka - Baskett Canal

Lake Apopka

- 310 ha
- 12,500 ha

St. Johns River Water Management District
**Dynamic management to sustain performance**

**Major Maintenance**
- Finger dike construction
- Ditch cleaning
- Mowing
- Alum injection

**Minor Maintenance & Operation**
- Manipulating levels and flows
- Drawdown, resting
- Turning off/on cells
- Planting
• Weekly water quality sampling at 10 stations
• Inflow and outflow structures are telemetered (hourly)
• Rain gauge (hourly)
Performance Evaluation

**Inflow**
- Volume of water
- Nutrient concentration

**Interior**
- Rainfall
- Evapotranspiration

**Outflow**
- Volume of water
- Nutrient concentration

Mass of Nutrient Removed by the Cell
Percent Nutrient Removal
Annual Total Phosphorus Removal
Data drives operational decisions

- Operational Goal: >30% TP Removal
Data drives operational decisions

- Operational Goal: >80% TSS Removal
Data drives operational decisions

- Operational Goal: >80% TSS Removal
Water Quality Monitoring to Inform Adaptive Management

Performance Evaluation

Provides rapid detection of problems in individual cells or the whole system

- Seasonal changes
- Flow
- Short-circuiting

Informs short- and long-term operational decision-making
Questions?