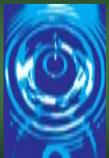


Everglades Restoration Using Large-Scale Treatment Wetlands on Former Agricultural Lands

November 17, 2005

Gary Goforth, P.E., Ph.D.



Gary Goforth, Inc.



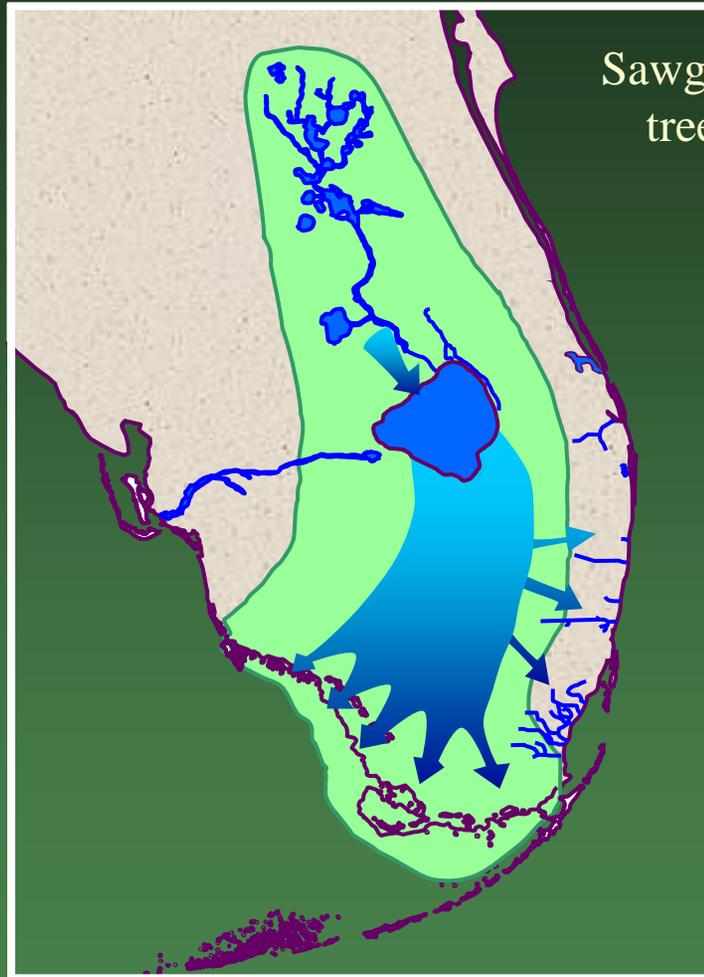
Overview

- **Everglades Restoration Background**
- **Stormwater Treatment Areas**
 - **Land Acquisition**
 - **Performance**
 - **Recreation**



The Historic Everglades Ecosystem

"River of Grass"



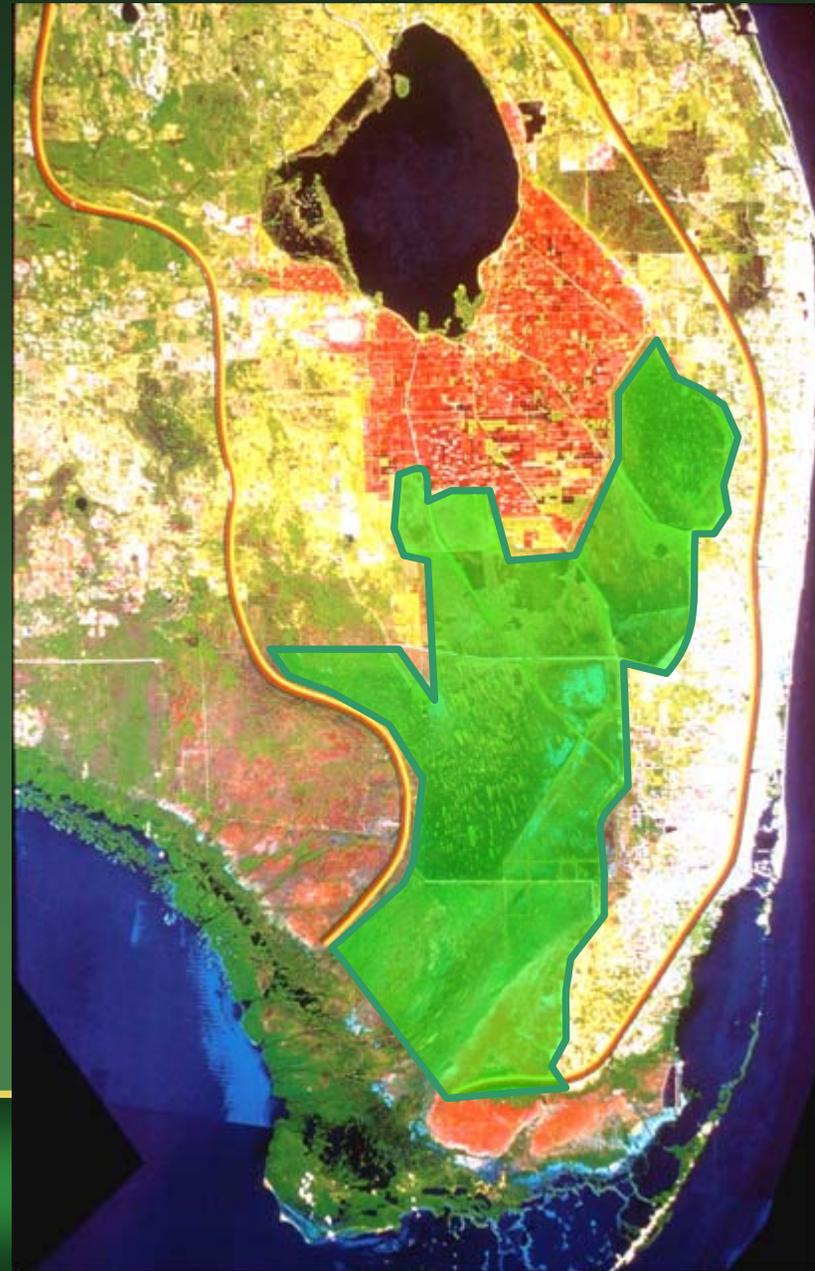
Sawgrass and
tree islands



Sawgrass prairie &
open water sloughs

Major Problems Facing Everglades

- Loss of Everglades habitat
- Disruption of hydropatterns (i.e., timing, volume & distribution)
 - Repetitive water shortages and salt water intrusion
 - 1.7 billion gallons of water a day wasted to tide
- Degradation of water quality
- Exotic plant species



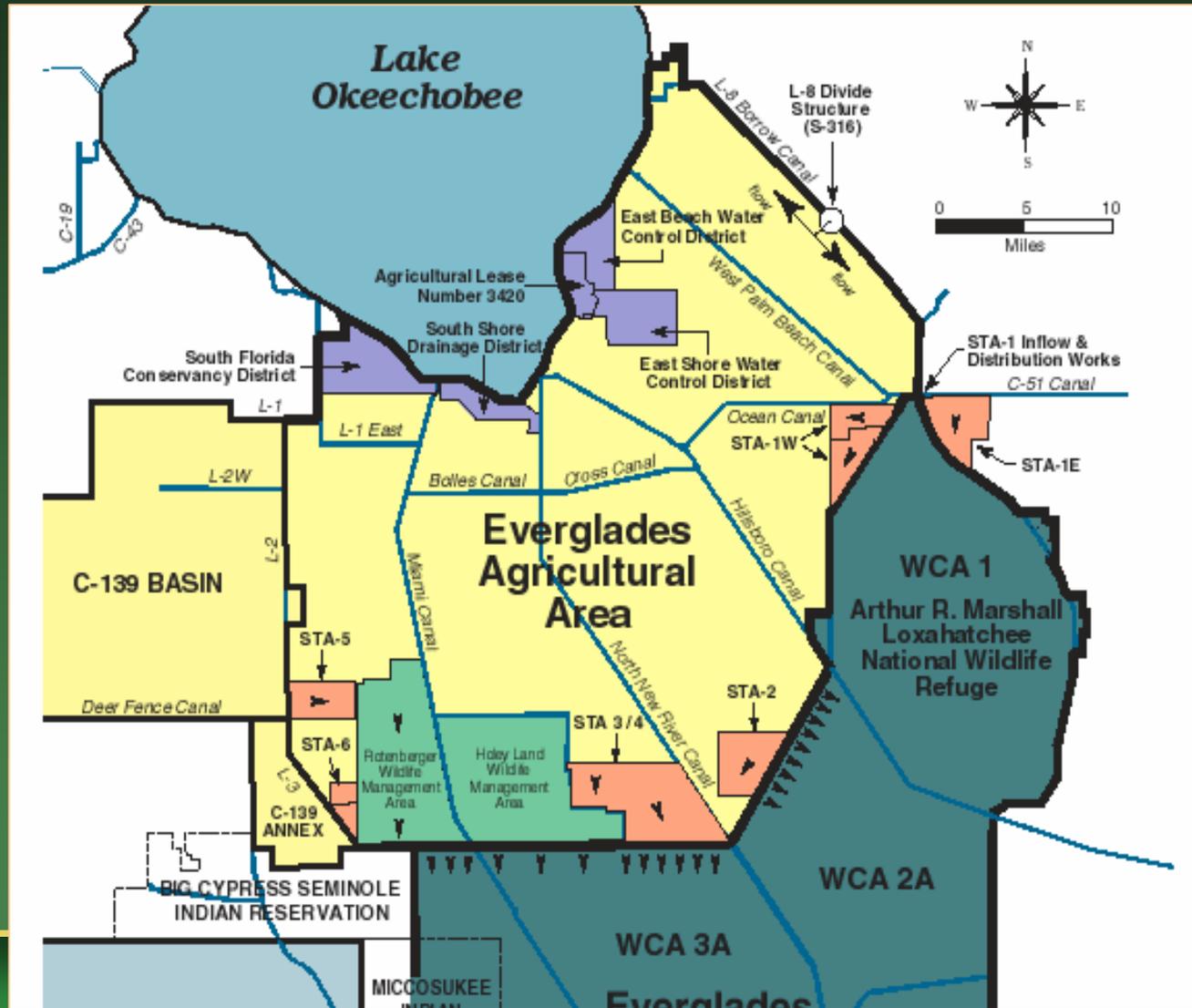
Everglades Forever Act

- 1991, amended 1994 and 2003
- Achieve state water quality standards by 12/31/06
- Construction
 - *Stormwater Treatment Areas*
 - Diversion and hydropattern restoration
- Research
 - Phosphorus criterion research
 - Advanced treatment technology research
- Regulation
 - *Best Management Practices (BMPs)*



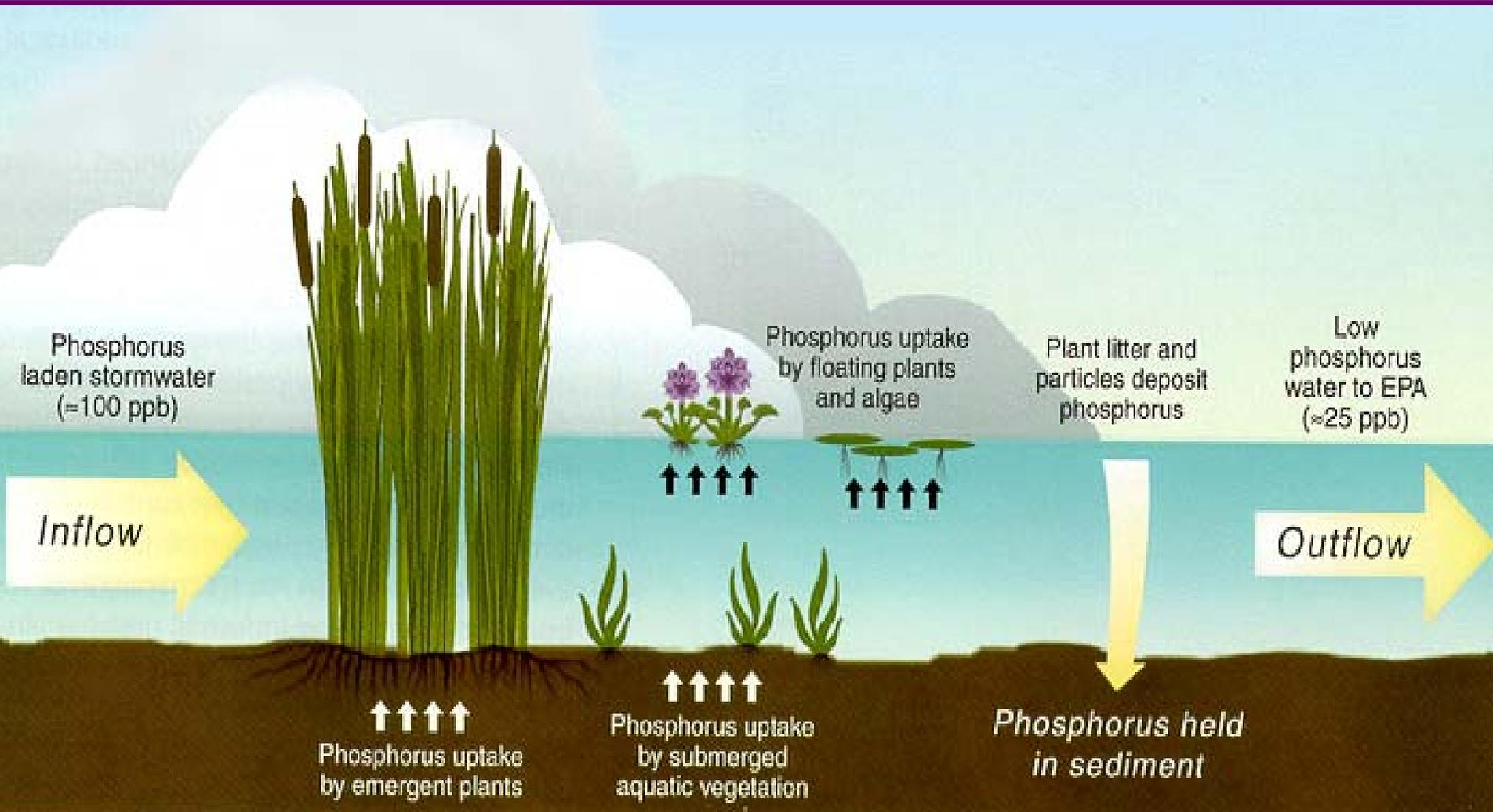
Everglades Construction Project

Multiple objectives:
Nutrient reduction,
Water supply,
Hydropattern restoration,
Reduce freshwater discharges to estuaries



Stormwater Treatment Areas

STAs are constructed wetlands that remove and store nutrients through plant growth and the accumulation of dead plant material in a layer of peat.



Everglades Restoration Using Large-Scale Treatment Wetlands

Emergent Vegetation



Submerged Aquatic Vegetation



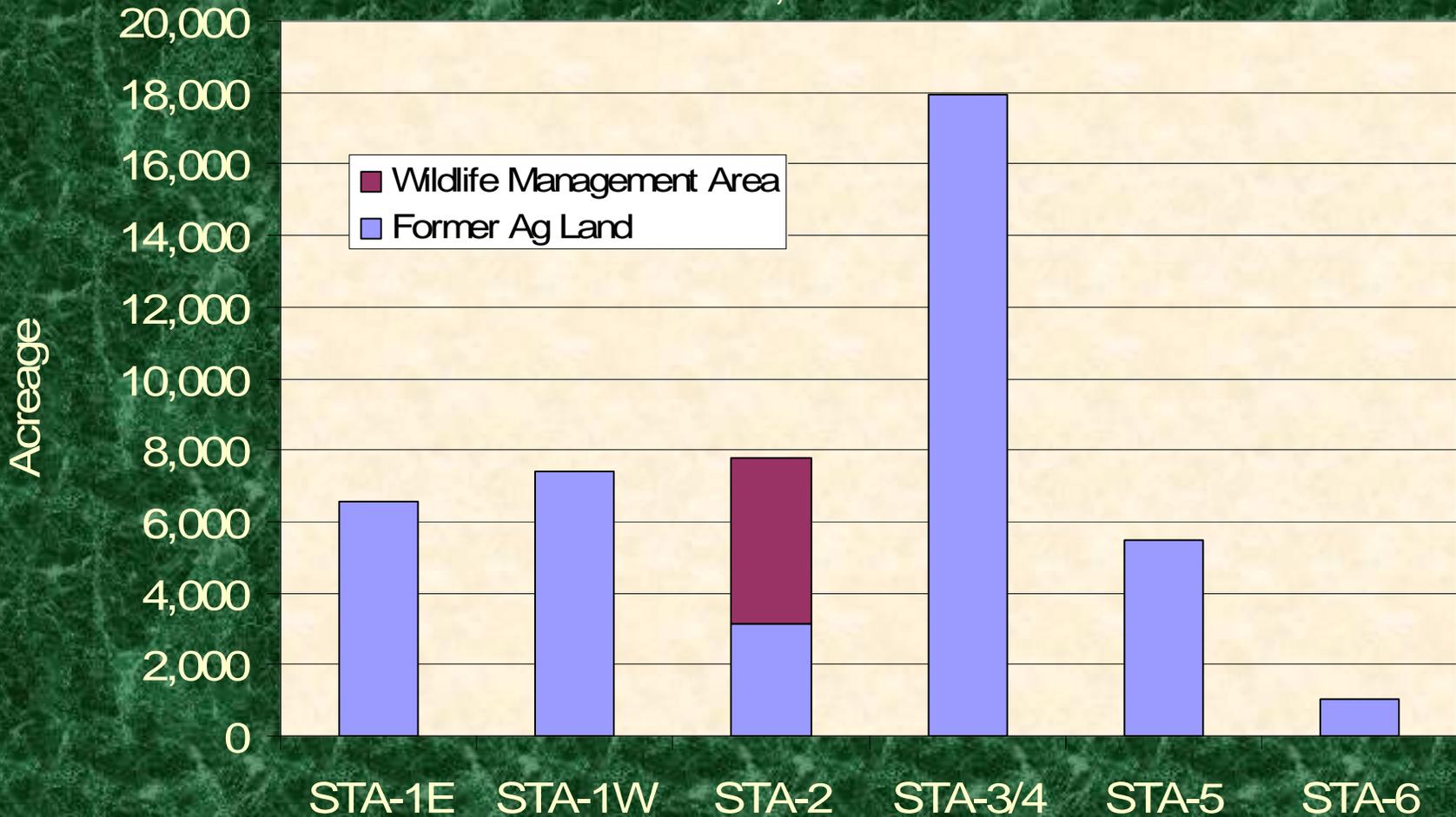
Periphyton-based Stormwater Treatment Area (PSTA)



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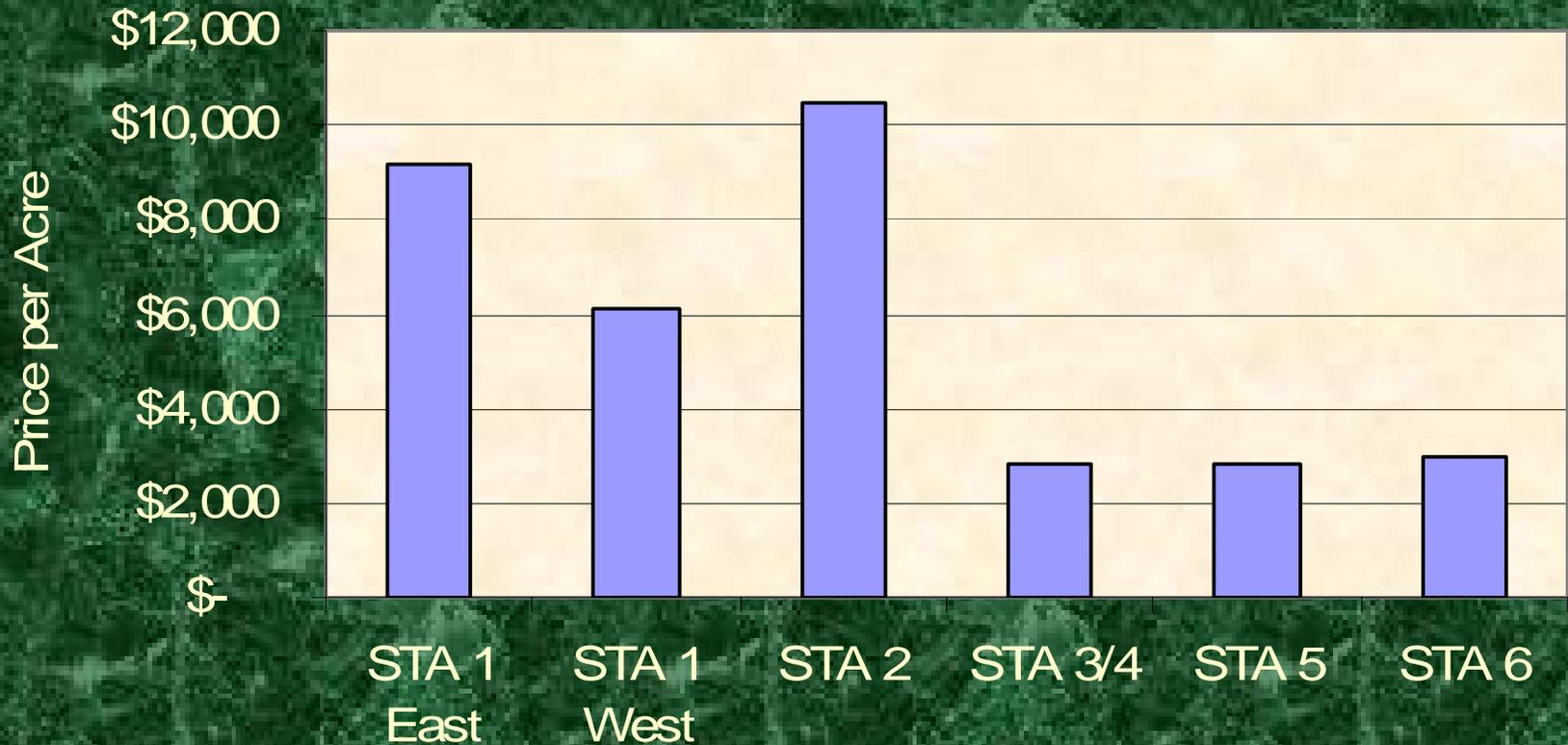
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Land Acquisition for the STAs
Total of 46,161 acres



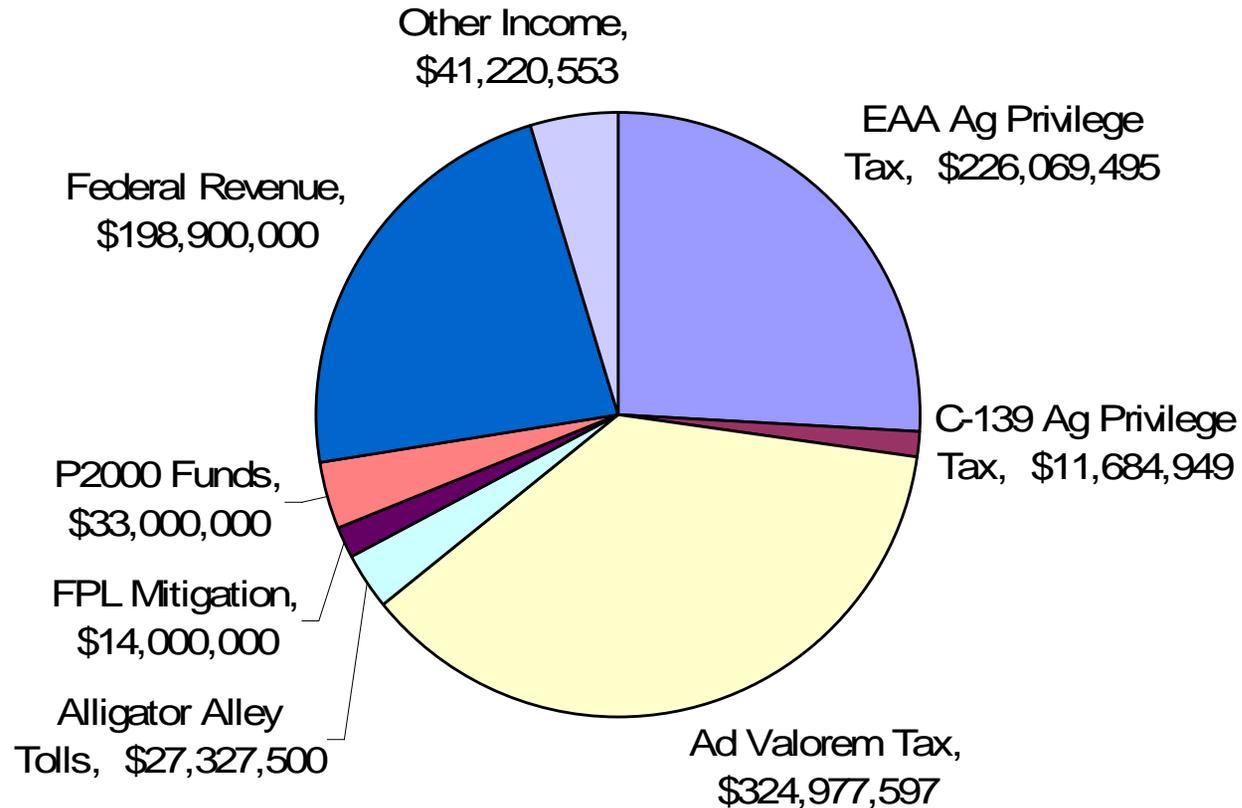
Everglades Restoration Using Large-Scale Treatment Wetlands

Land Acquisition Costs for the STAs
Averaged \$4,800/acre



Everglades Restoration Using Large-Scale Treatment Wetlands

Revenue Projections



Hazardous Waste Assessment Associated with Land Acquisition



1. Vastly different pesticide program than around Lake Apopka reduced potential for DDT-type contamination in the EAA.

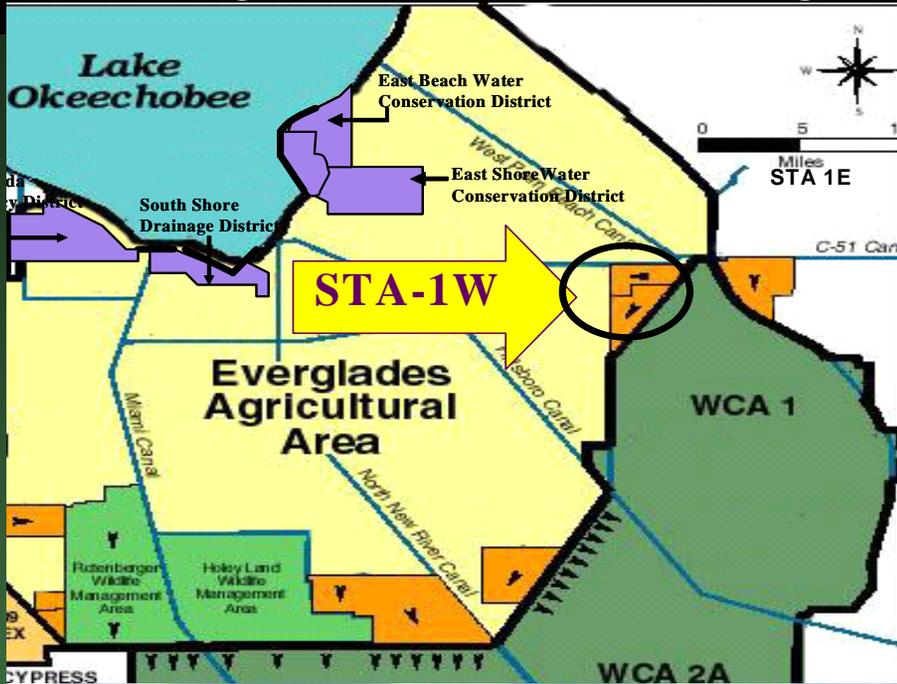


2. Very aggressive assessment and remediation process was used for the STAs – excavation and backfill

3. Extensive post-construction monitoring and observations have verified the efficacy of assessment and remediation.



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Everglades Restoration Using Large-Scale Treatment Wetlands

STA-2 has a mixture of emergent & submerged vegetation



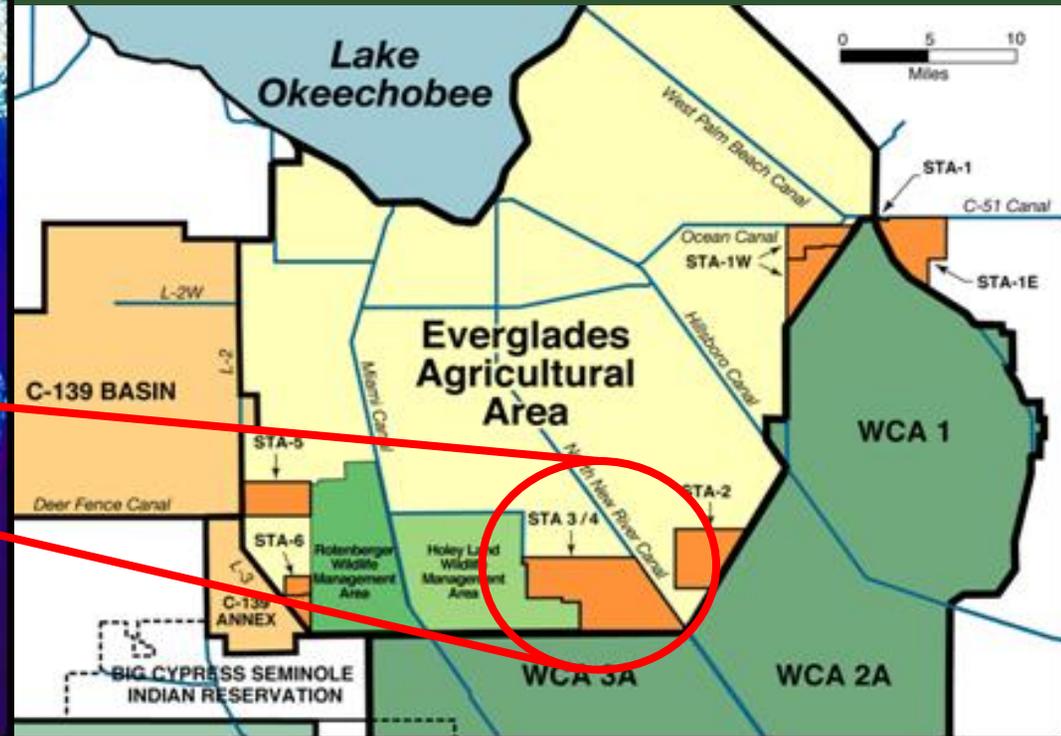
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Stormwater Treatment Area 3/4

is the world's largest constructed wetland:
over 16,500 acres of former agricultural land.
77 tons of phosphorus removed in WY2005



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STA-3/4 – 3 parallel flow-ways with emergent vegetation followed by SAV



STA-5

- 4,118 acres of effective treatment area
- Parallel flow-ways: emergent and the emergent followed by SAV
- Treated water helping to restore hydroperiod of Rotenberger WMA



Everglades Restoration Using Large-Scale Treatment Wetlands

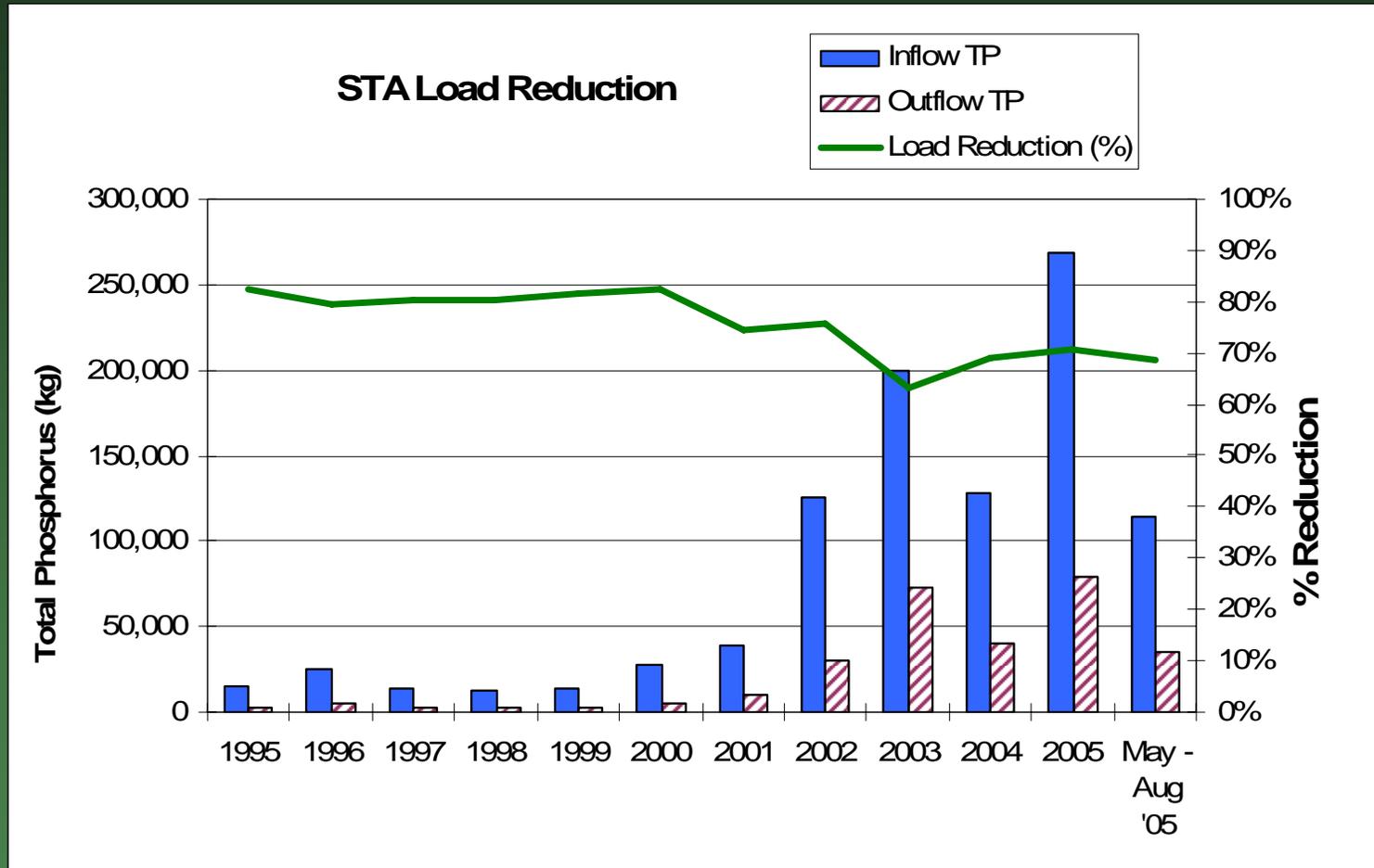


STA-6

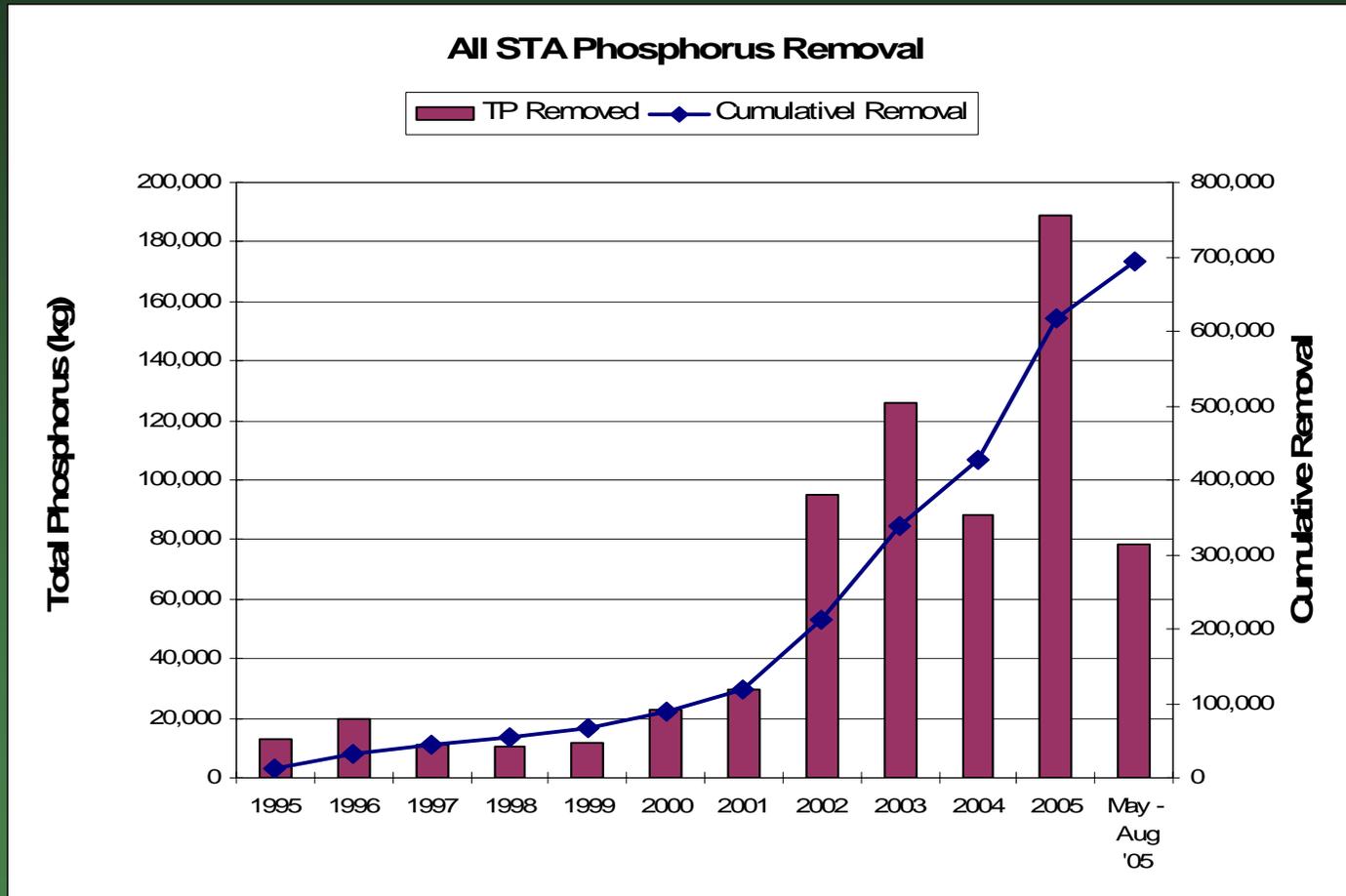
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STA Discharges Have Averaged 41 ppb



Over 700 metric Tons of TP Removed



Long-Term Water Quality Solutions

- Expansion of BMPs (esp. urban basins)
- Expansion of STAs – Additional 19,000 acres
- Enhancement of STAs
 - Continue strong science-based program to optimize performance
- Synchronization with CERP projects
- *ADAPTIVE MANAGEMENT*



Increasing Public Access

- **Fishing, hunting, bird watching, hiking & equestrian use**
- **Waterfowl hunting in STAs**
- **Bird watching in concert with federal and State agencies**
- **Plans underway for additional parking, kiosks, and other activities**



Everglades Restoration Using Large-Scale Treatment Wetlands



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