

Freedom Park Stormwater Treatment Wetlands

**COMPREHENSIVE WATERSHED IMPROVEMENT PROGRAM (CWIP)
TECHNICAL ADVISORY AD HOC COMMITTEE MEETING**

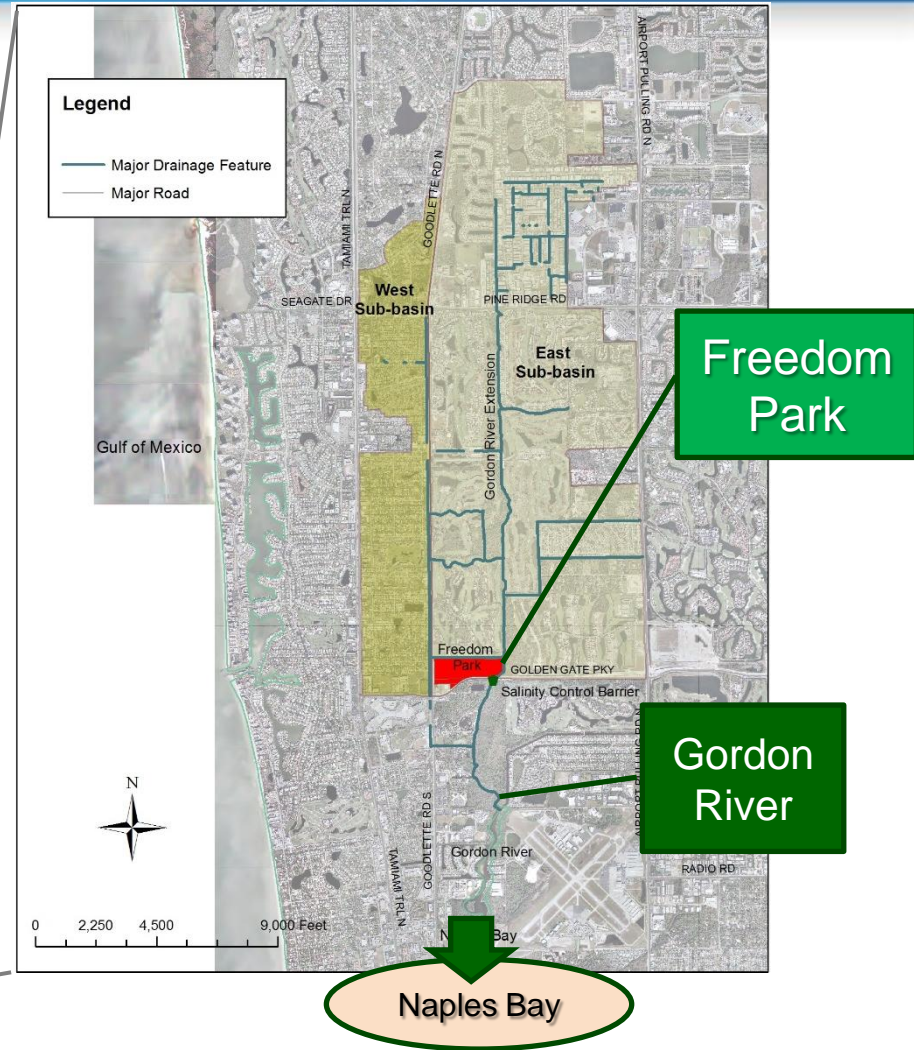
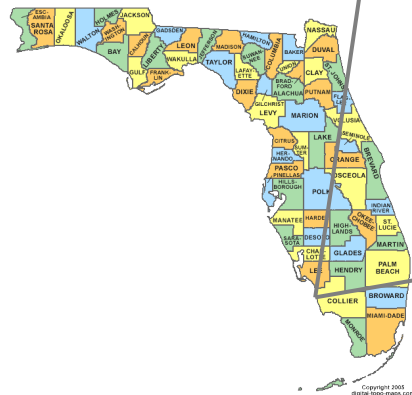
Rafael Vazquez-Burney, PE
Senior Technologist-Natural Treatment Systems
rvazque1@ch2m.com

November 8, 2016 1:00 p.m.
Growth Management Department Building
2800 N. Horseshoe Drive, Naples, Florida 34104



Freedom Park Wetlands Bought, Conserved, Planned for Multiple Uses

- Impaired watershed
- Gordon River Master Plan 2002
- 50-ac parcel ID'd
 - abandoned citrus grove
 - exotic plant infestation
 - recommended site to improve water quality
- County purchased in 2004



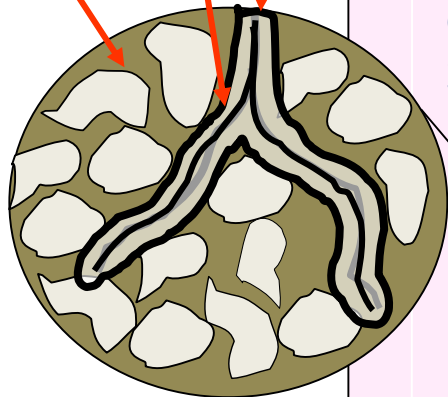


Wetlands Improve Water Quality Naturally

micro-aerobic

anaerobic

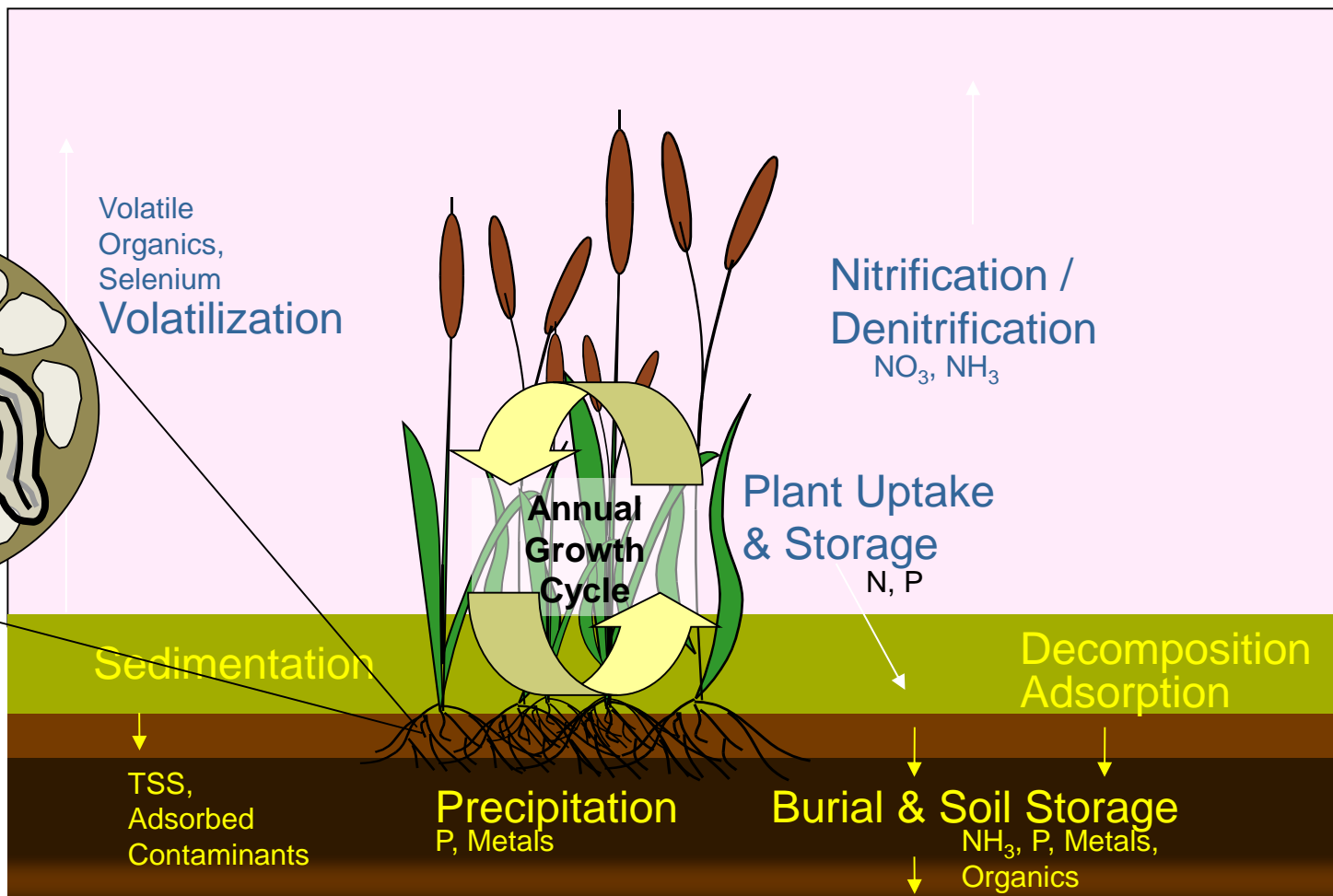
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Surface Water

Detritus

Sediments





Freedom Park Stormwater Treatment, Restoration, Recreation Treatment Wetlands and Native Diversity

- Treats runoff from 3,000-acres
- 200 MG/yr treated before Naples Bay
- TN reduced by 41% to 0.8 mg/L
- TP reduced by 84% to 33 ppb
- Metal reduced to background levels
- Rainfall driven hydroperiod
- 2011 FSA Excellence Award Winner



Public Use Exceed Expectations (25,000 visitors per year)



COASTALBREEZENews.COM



One of the ponds at Freedom Park surrounded by Florida flora. PHOTOS BY VICKIE KELBER

LOCAL GEM

SPEAKING OF TRAVEL
Vickie Kelber

The joy of discovering someplace new doesn't always have to involve a long car, train, ship, or plane ride. In the past, I've written a few columns on some of the wondrous places right in our own backyard including Shark Valley, Loop Road, and Bird Swamp Rookery.

Following all of the rain we had earlier this year, a friend and I set out to hike through Picayune Strand State Forest. As we feared, the ground was too saturated to walk on and another option we explored was also too wet. We then decided to head for Freedom Park, at the northeast corner of Goodlette-Frank Road and Golden Gate Parkway in Naples. Visiting a park barely a stone's throw from Coastland Mall seemed strange, but what we discovered was a little gem.

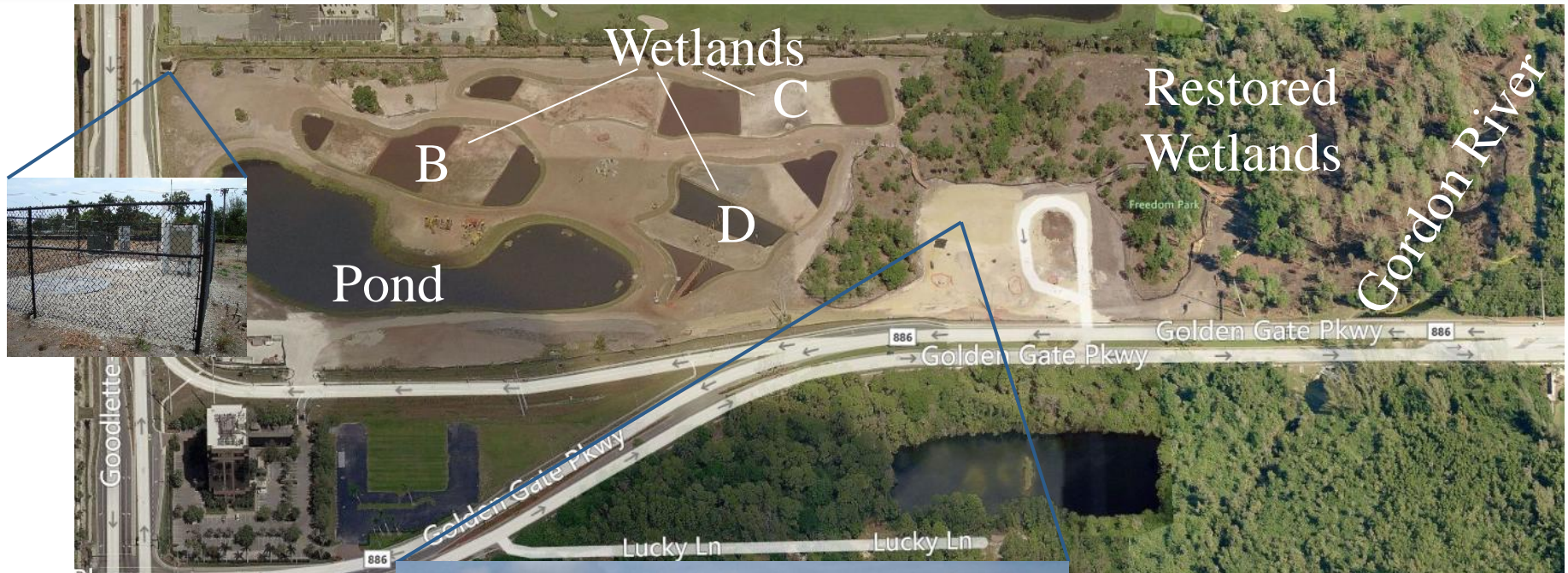


Red shouldered hawk

The Concept



Constructed and Natural Wetlands Combine Treatment and Restoration

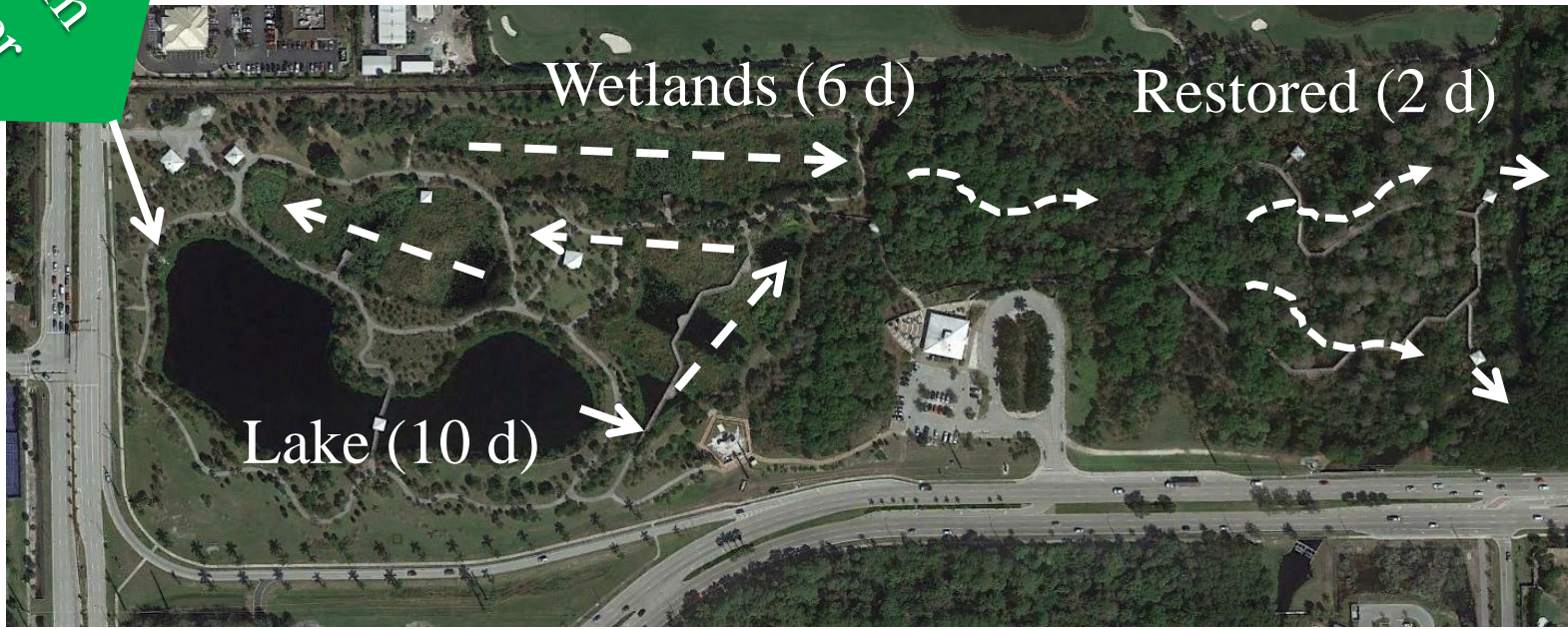


Begin: Dec 2007
Duration: 18 months
Opening: Oct 2009
Construction: \$10M

Pond: 4.7 ac
Treatment Wetlands: 6.7 ac
Restored Wetlands: 11.4 ac
Constructed WWAR: 2.9 %

Hydraulic Operation Centers on Treatment of Intercepted Wet Season Flow

Storm water



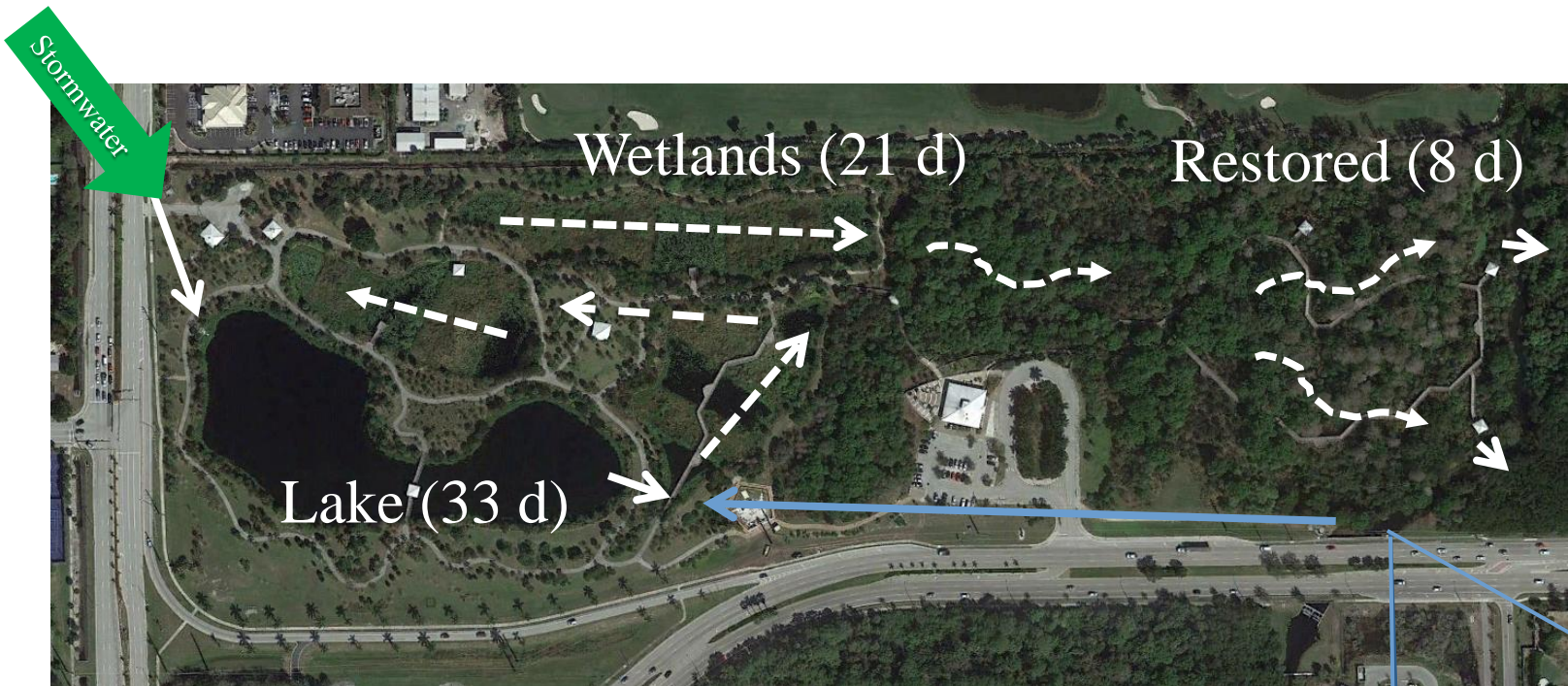
Total nHRT = <18 d

To River

O N D J F M A M J J A S

Wet Season

Dry Season Operation Allows for Pumped River Flow if Available



Total nHRT = >62 d

Pump from River through Wetlands



O N D J F M A M J J A S

Dry Season



Stormwater Lake Inlet and Pump Station Extends Treatment Beyond Storm Events

1,000 gpm



Pump Station Sends Water to Inlet Cascade



Submersed Intake

Overflow Weir Elevation Diverts Flow to Pond



Lake Provides Stormwater Detention, Pretreatment, and Passive Recreation



Cascade inflow to lake provides aeration



Lake overlook and walkway

Native Vegetation Cover Matched to Habitat Hydroperiods

Deep Zones



Water Lily, Spatterdock,
Submersed Aquatic
Vegetation

Shallow Marshes



Fireflag, Pickerelweed,
Spikerush, Duck potato,
Sawgrass

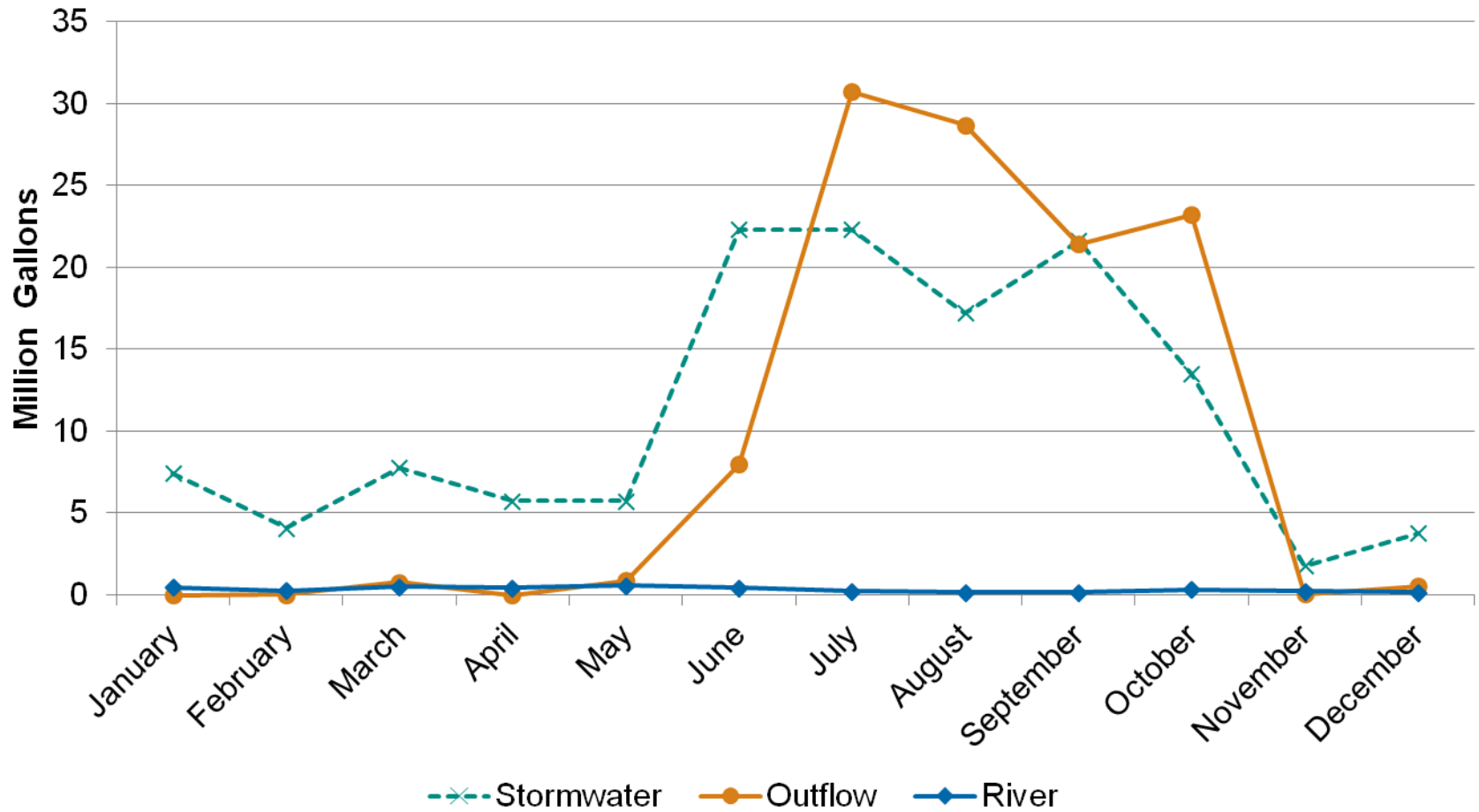
Periphyton Treatment Area—Limestone Bed Added for Phosphorus Removal



Wetland C Outlet Zone

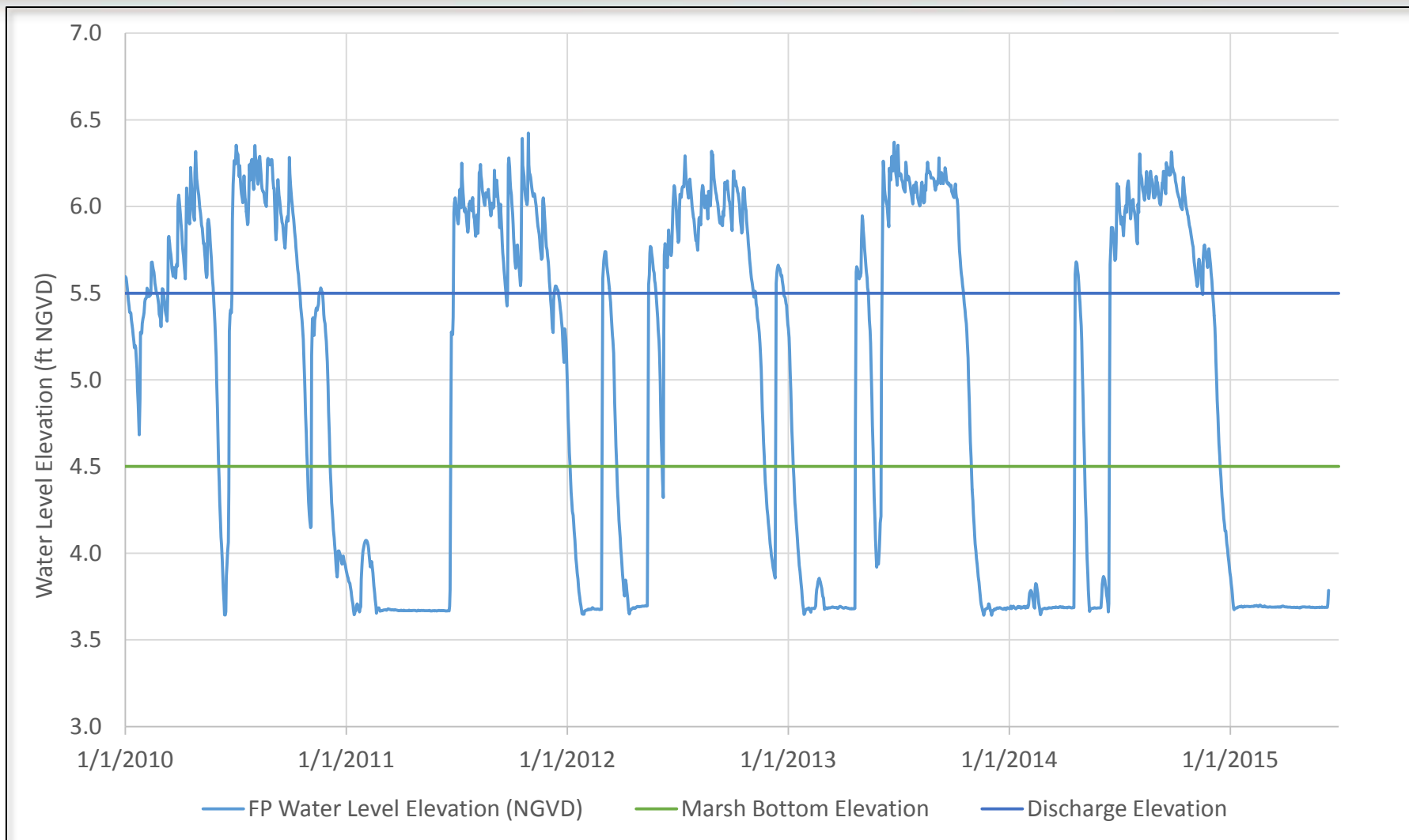


Monthly Flows Match Precipitation Seasonality





Observed Wetland Water Level Elevations





Some Challenges

Chronically low water levels in marsh zones

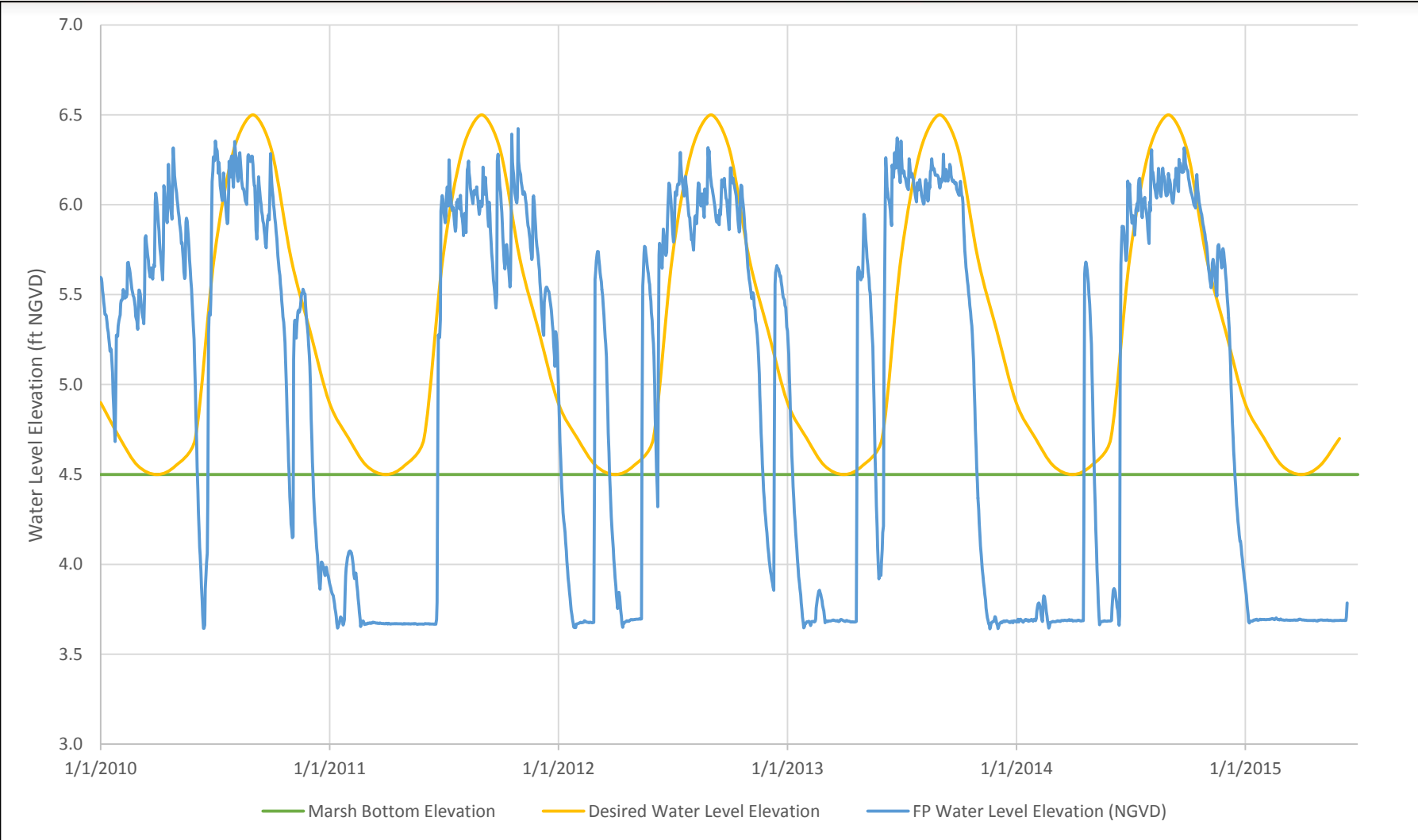


Torpedo Grass Invasion





Desired Wetland Water Level Elevations

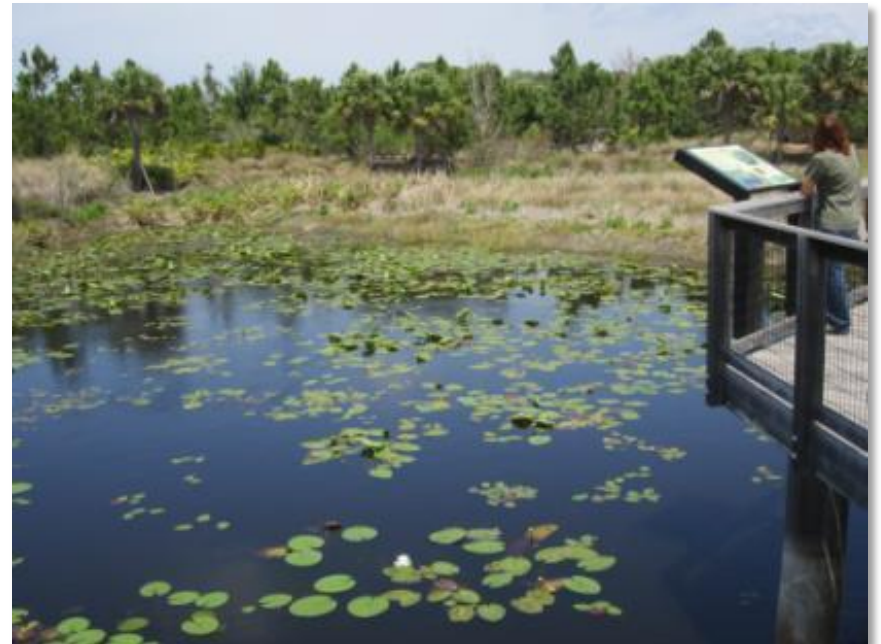


Deep Zones Help Sustain Marsh Ecology During Dry Season

Submersed Aquatic Vegetation

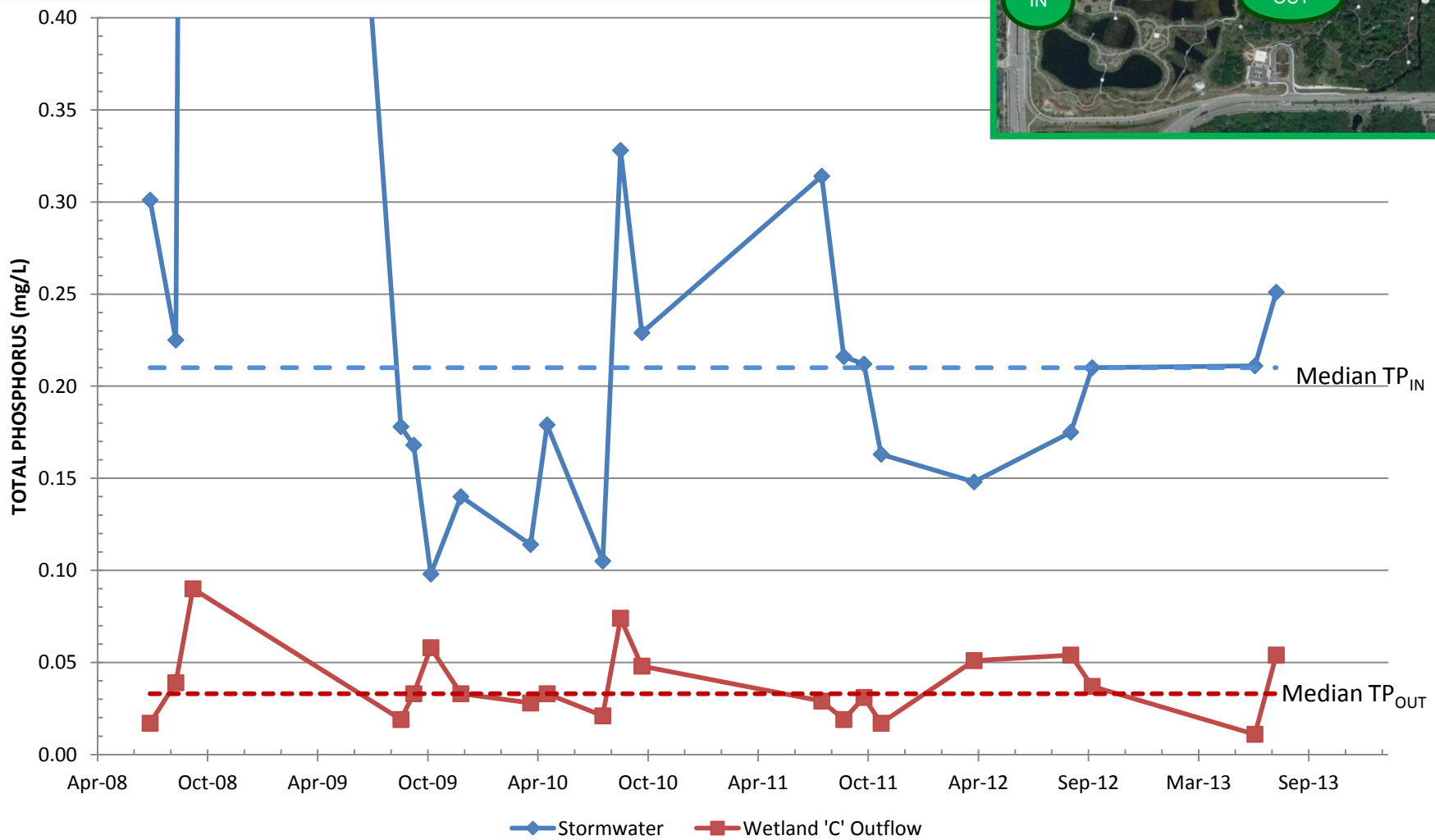


Floating Leaved Vegetation

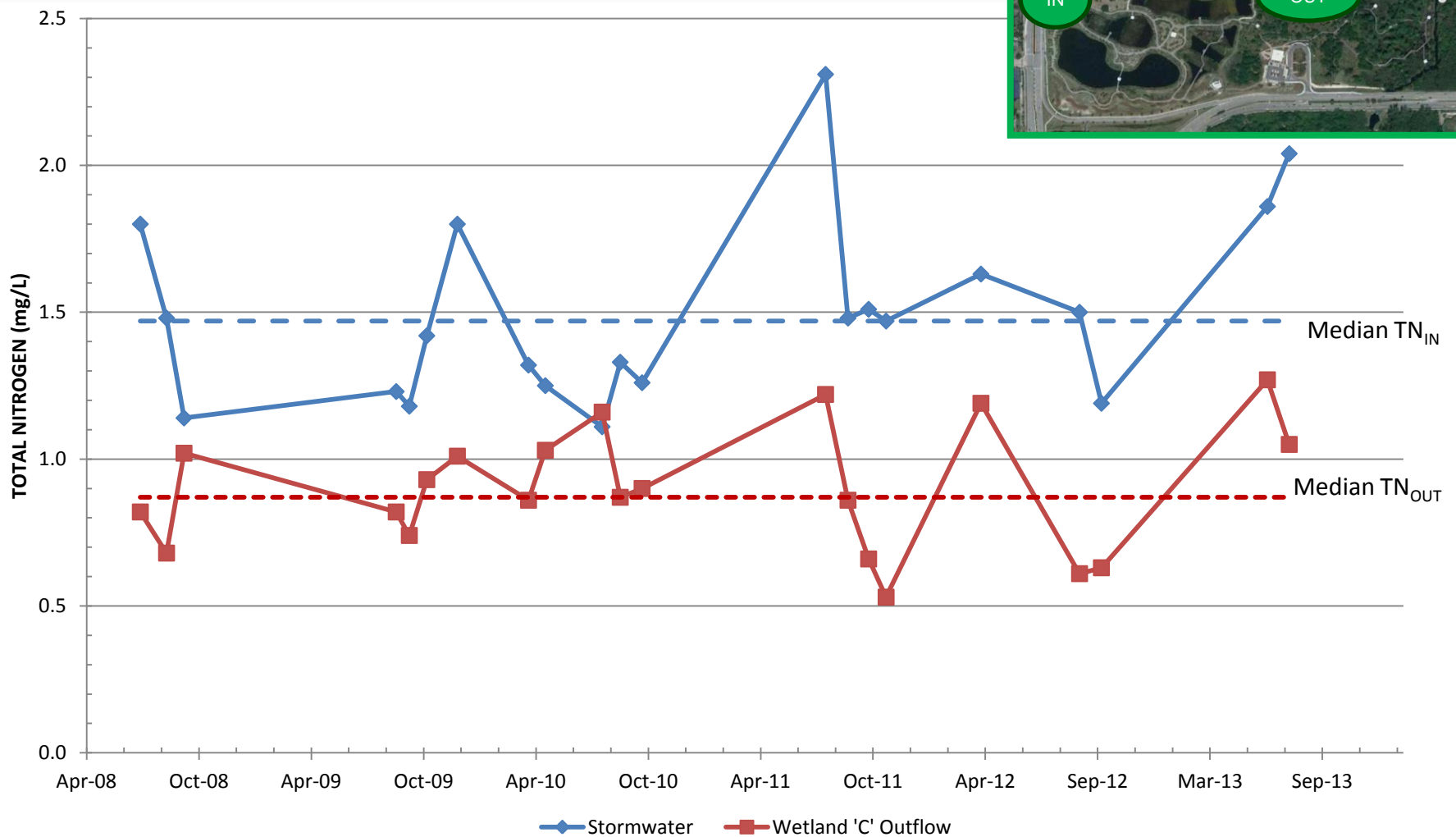




TP: 84% Reduction to Background

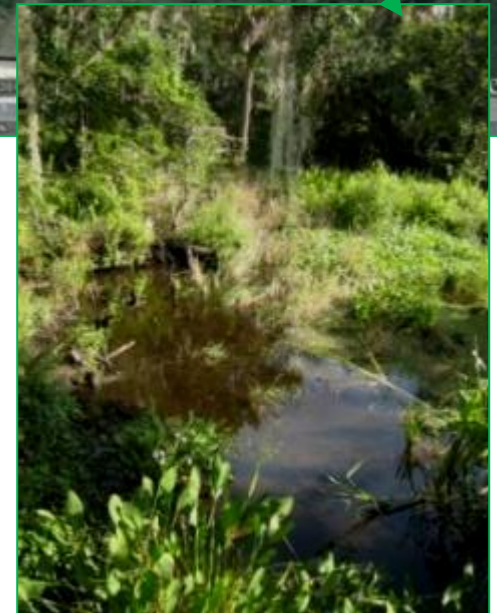


TN: 41% Reduction to Background





Removal of Non-native Plants Restored Natural Hardwood Swamp Forest Habitat



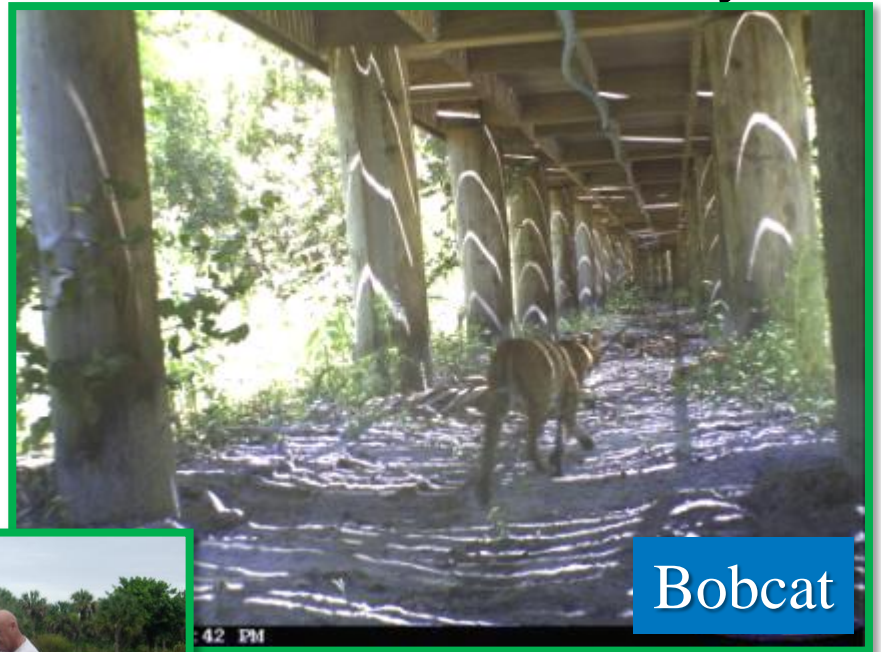


Boardwalk for Wetland Access Makes Sharing the Trail with Nature Easy and Safe

Wide Boardwalks Allow 2 People Walking Side-by-side



Height Allows Critters to Roam and Water Levels to Vary



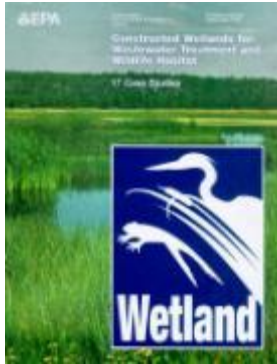
~25,000 visitors annually

This model really works...

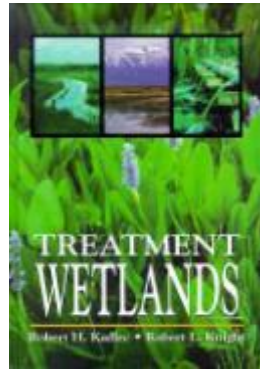
Progress in Treatment Wetlands Design



1989



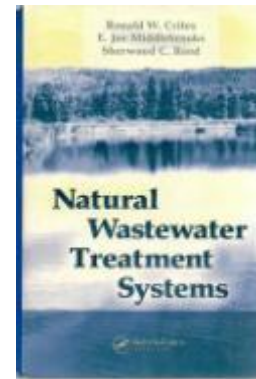
1993



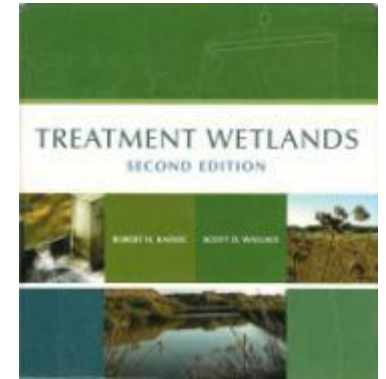
1996



2000



2006



2009



Annual South Florida Environmental Report

1990

2000

2010

Treatment Wetlands Proven Concept for Watershed Improvement



Treatment Wetlands improve

- Nutrients
- Metals
- Pathogens
- Flooding
- Ecology

To protect

- Fisheries
- Aquatic habitats
- Public safety
- Tourism
- Property values



Questions and Further Discussion

Rafael Vázquez-Burney, PE

Senior Technologist

East Region Technology Lead—Natural Treatment Systems

D 813.281.7766

M 727.366.3301

rvazque1@ch2m.com

4350 West Cypress Street Suite 600

Tampa, FL 33607