

Paynes Prairie Sheetflow Restoration

Amy Goodden PE | Jones Edmunds

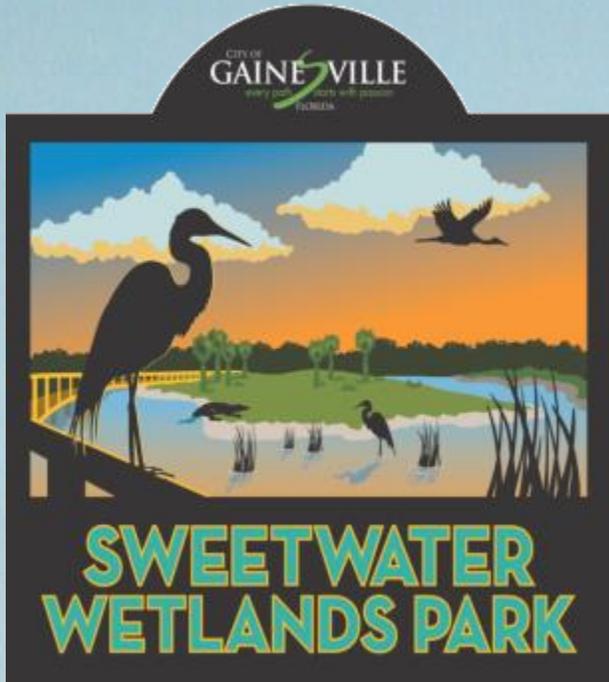
Rick Hutton PE | GRU

Chris Keller PE | Wetland Solutions

**Gail Mowry PE |
City of Gainesville Public Works**



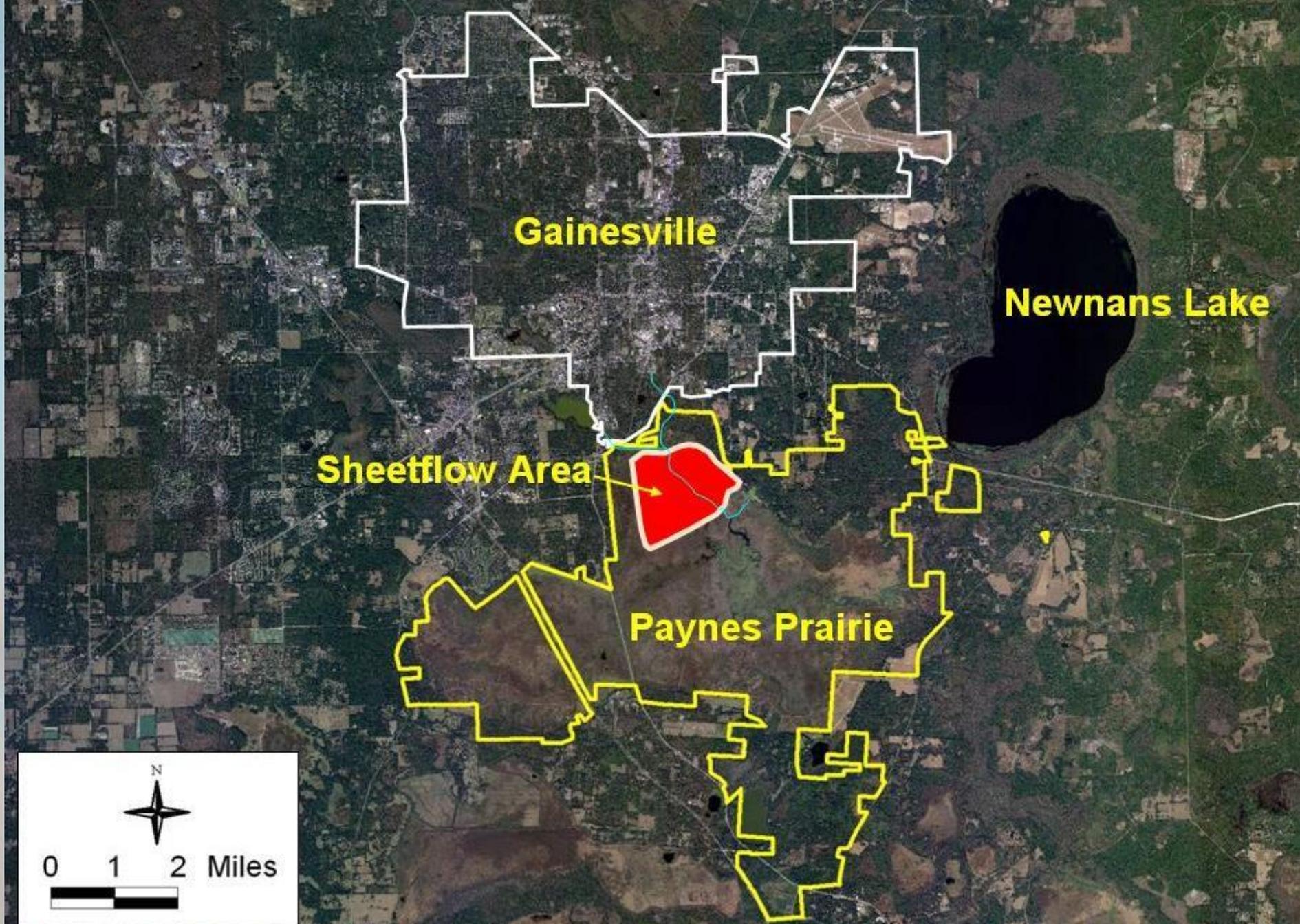
Florida Stormwater Association | December 1, 2022



*Project
Location*

0 100 KM 100 Miles

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Gainesville

Newnans Lake

Sheetflow Area

Paynes Prairie



0 1 2 Miles



Bivens Arm

441

Sweetwater Branch

Alachua Sink

Newnans Lake

Paynes Prairie Preserve
State Park

441

75

Prairie Creek
Control Structure

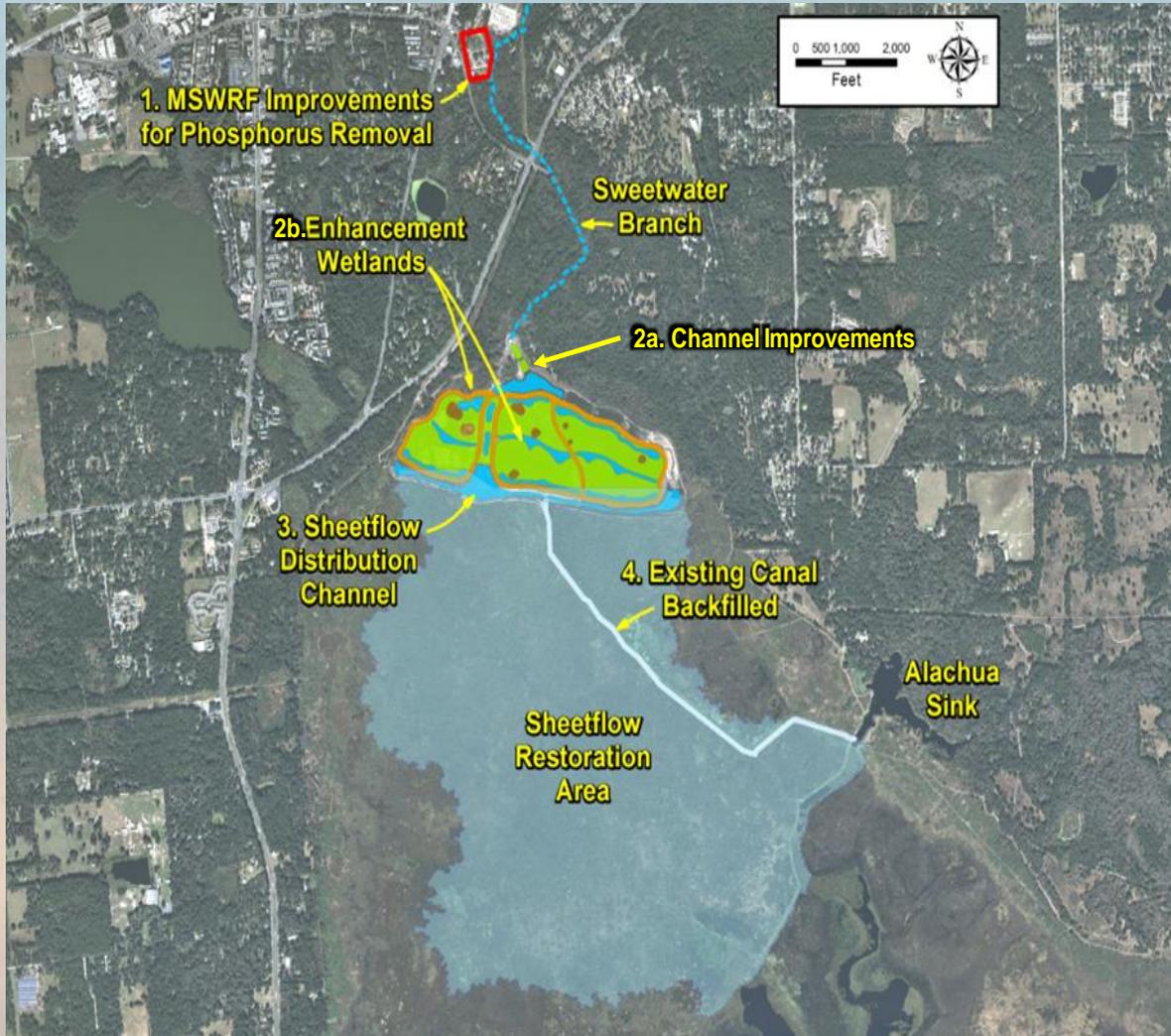
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Alachua Sink



- 2006 TMDL Adopted by FDEP
 - 55% N Reduction in Point Sources
 - 45% N Reduction in Non-Point Sources

Project Concept



- Upgrade Main Street WRF P Removal
 - TP < 0.3 mg/l
- Enhancement Wetland
 - Reduce TN from all sources in SWB
 - TN < 3.0 mg/l
- Fill in Sweetwater Canal
 - Additional Nutrient Removal on Paynes Prairie
 - TP < 0.09 mg/l
 - TN < 1.42 mg/l
- Overall Cost \$28.2M

Project Partners

- FDEP: \$3.2 M
 - Legislative, Section 319, TMDL & RTP
- SJRWMD: \$1.4 M
 - SWIM & Land Acquisition Programs
- FDOT: \$0.6 M
 - NPDES Cost Share
- FWC: \$0.5 M
 - AHRES Cost Share
- Alachua County: \$0.5 M
 - Land Conservation Program



Wetlands Process Design

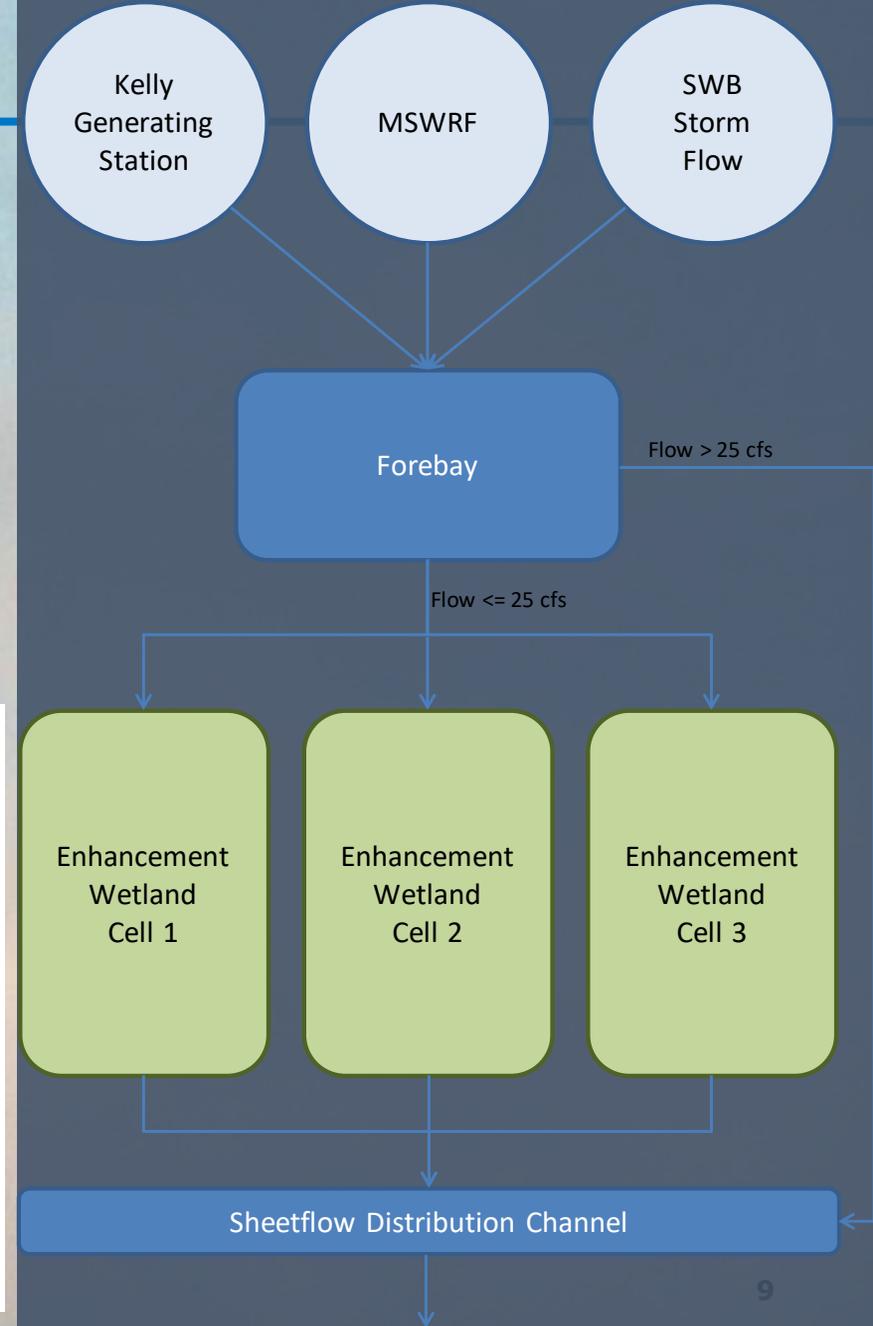
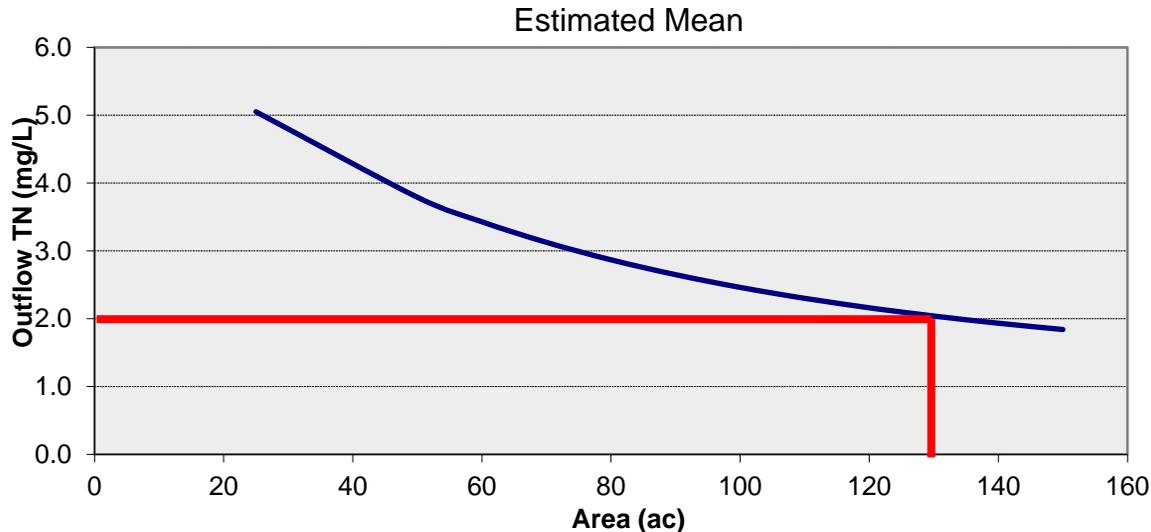
- Characterize source water variability in flows and concentrations
 - MSWRF
 - SWB base flow and storm flow
 - Kelly Generating Station
- Establish receiving water quality limits
- Estimate wetland area requirement
- For ultimate compliance with TMDL, account for additional polishing in the restoration area



Project Concept

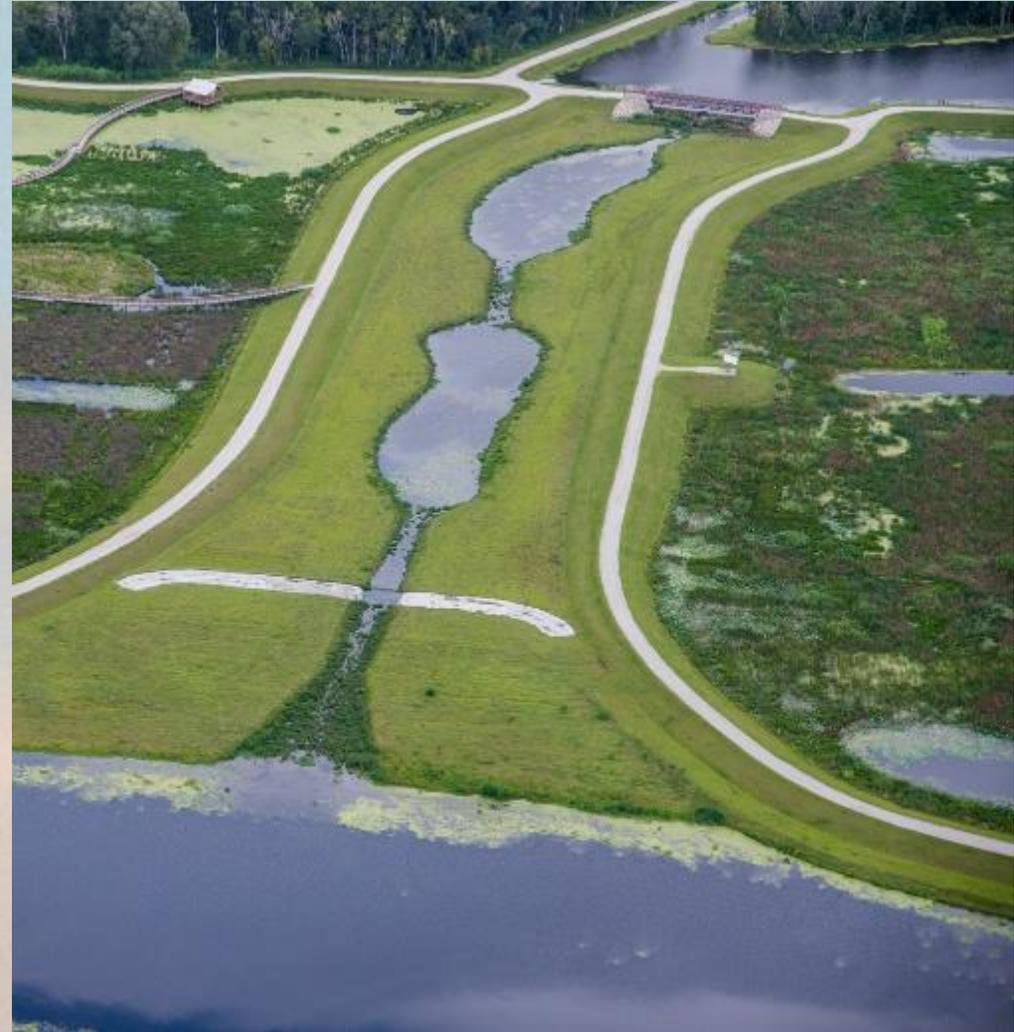
Combined Inflows

- Avg. Flow = 13 cfs
- Peak Flow = 25 cfs
- TN = 3 - 10 mg/L
- TP = 0.3 mg/L
- 97% TN load capture



Design Considerations

- WQ Improvement
 - Goal TN < 3 mg/L and TP < 0.3mg/L
 - Estimated at 7.5 MGD
 - 124,000 lb/yr TN
 - 2,900 lb/yr TP removal
- Sediment Loads
 - 1700 CY Per Year
- Trash Removal
- Peak Flows
 - Mean daily; 13 cfs
 - Peak hourly; 4000 cfs
- Floodplain – No Rise Criteria



Design Considerations

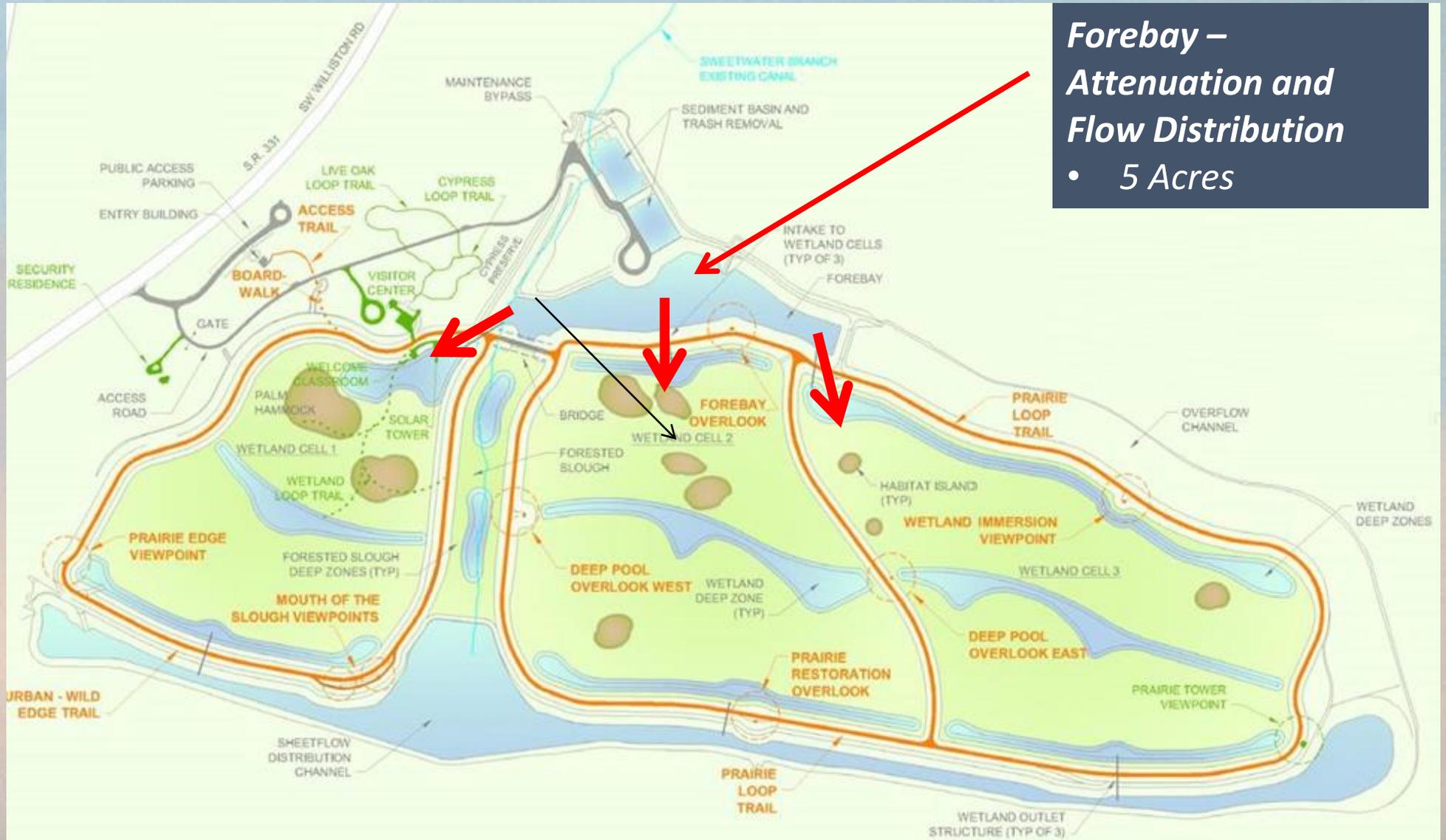
- Wetland Impacts
- Number, Size, and Location of Cells
- Cut and Fill Balance
- Permitting
- Public Access
- Heritage Trees
- Archeological Concerns
- O&M



Design Elements



Design Elements



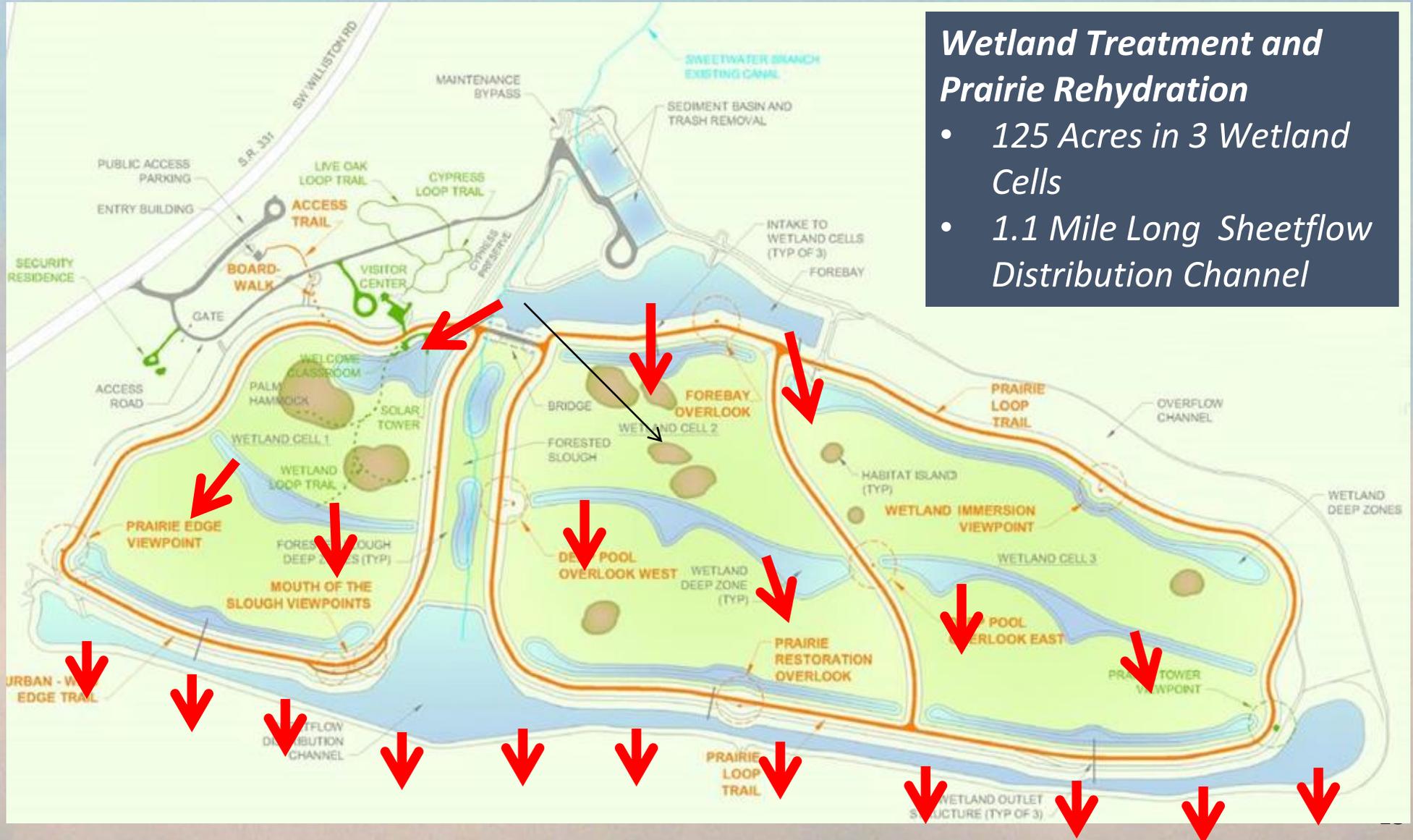
**Forebay –
Attenuation and
Flow Distribution**

- 5 Acres

Design Elements



Design Elements



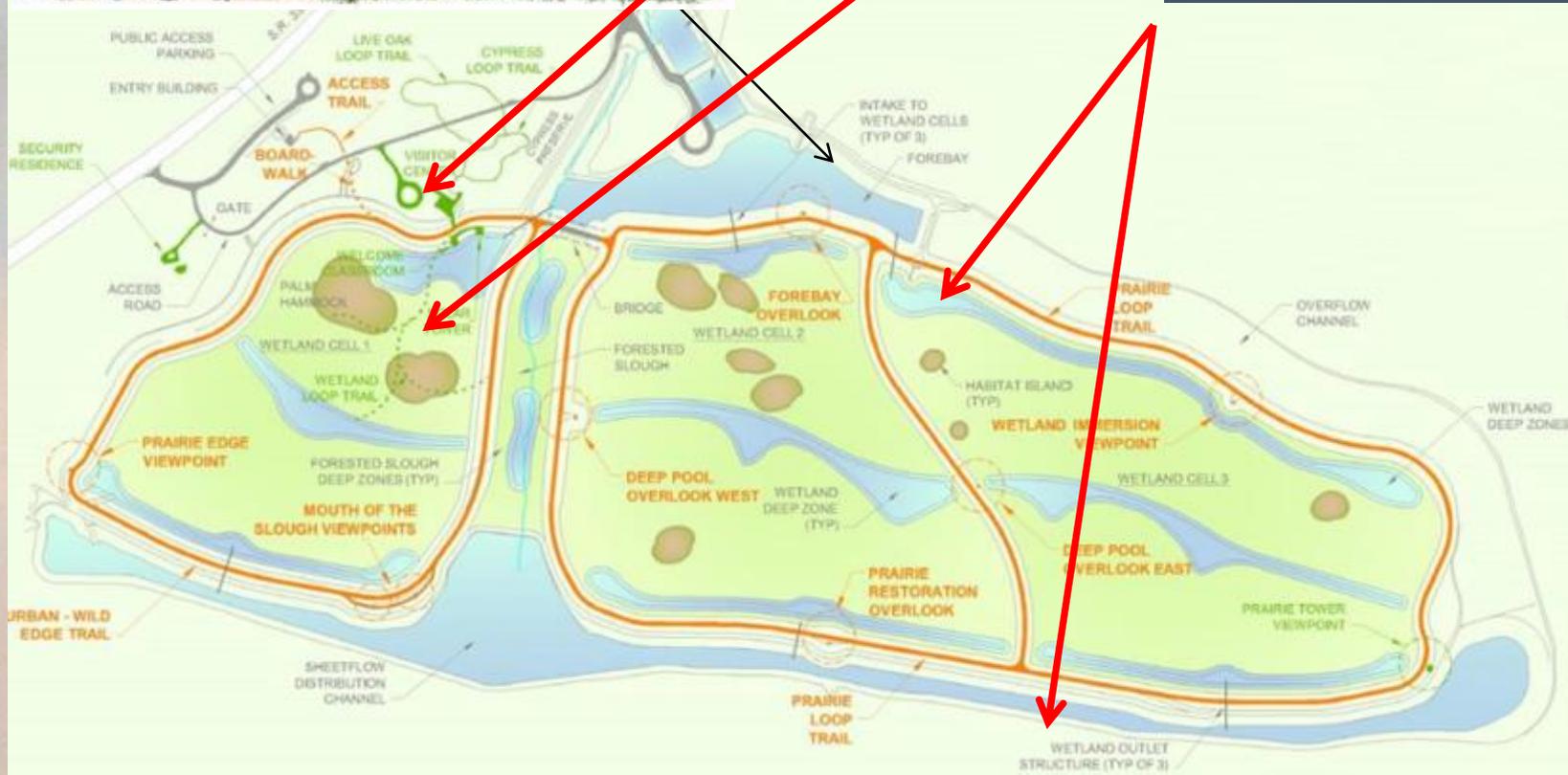
Design Elements

Public Access
3.6 mile berm

1,800 ft of boardwalks

Shaded viewing platforms

Interpretive signage

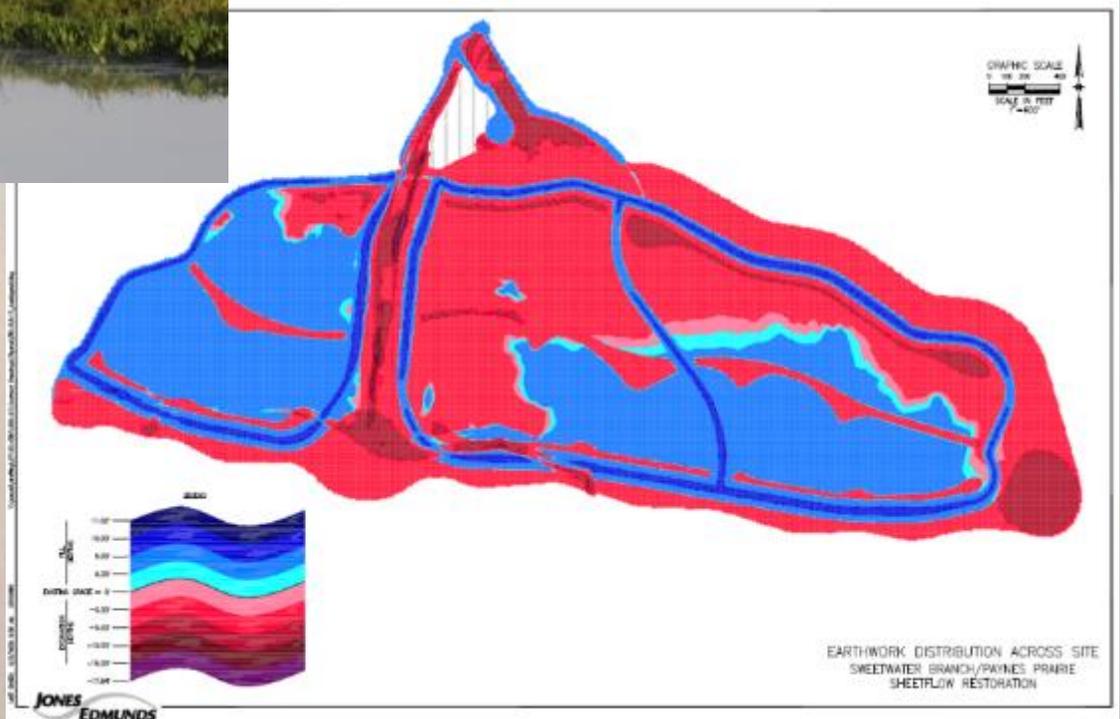


Design Elements



Earthwork

- 1.2 Million Cubic Yards of Cut and Fill
- BaP and Soil Management



EARTHWORK DISTRIBUTION ACROSS SITE
SWEETWATER BRANCH/PAINES PRAIRIE
SHEETFLOW RESTORATION

Construction Challenges

- Flow Control During Construction
- PPPSP Outstanding Florida Water
- Highly variable stormwater flows
- Turbidity Limits to PPPSP
- Vegetation Establishment Periods



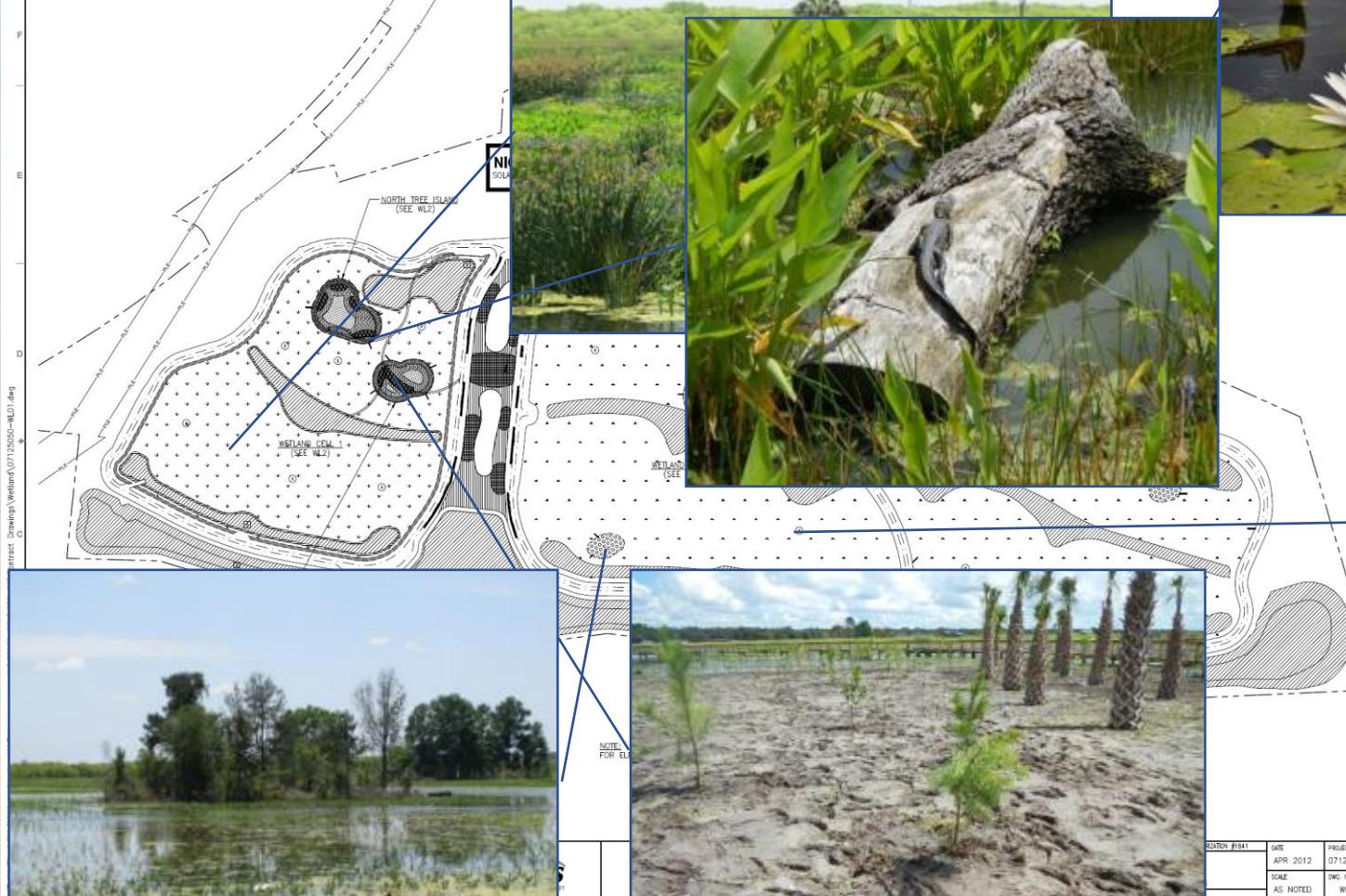






Wetlands Planting Plan

Plotted: 10/04/12 3:36pm jallen



Quantities
Emergent = 434,000
Submerged = 2,400
Floating = 800
Trees/shrubs = 8,000

Plant Establishment (+1 Month)



Plant Establishment (+2 Months)



Plant Establishment (+9 Months)



Transformation



Transformation



Transformation



Transformation



Transformation



Transformation



Transformation



12/8/21

Source: Aero Photo



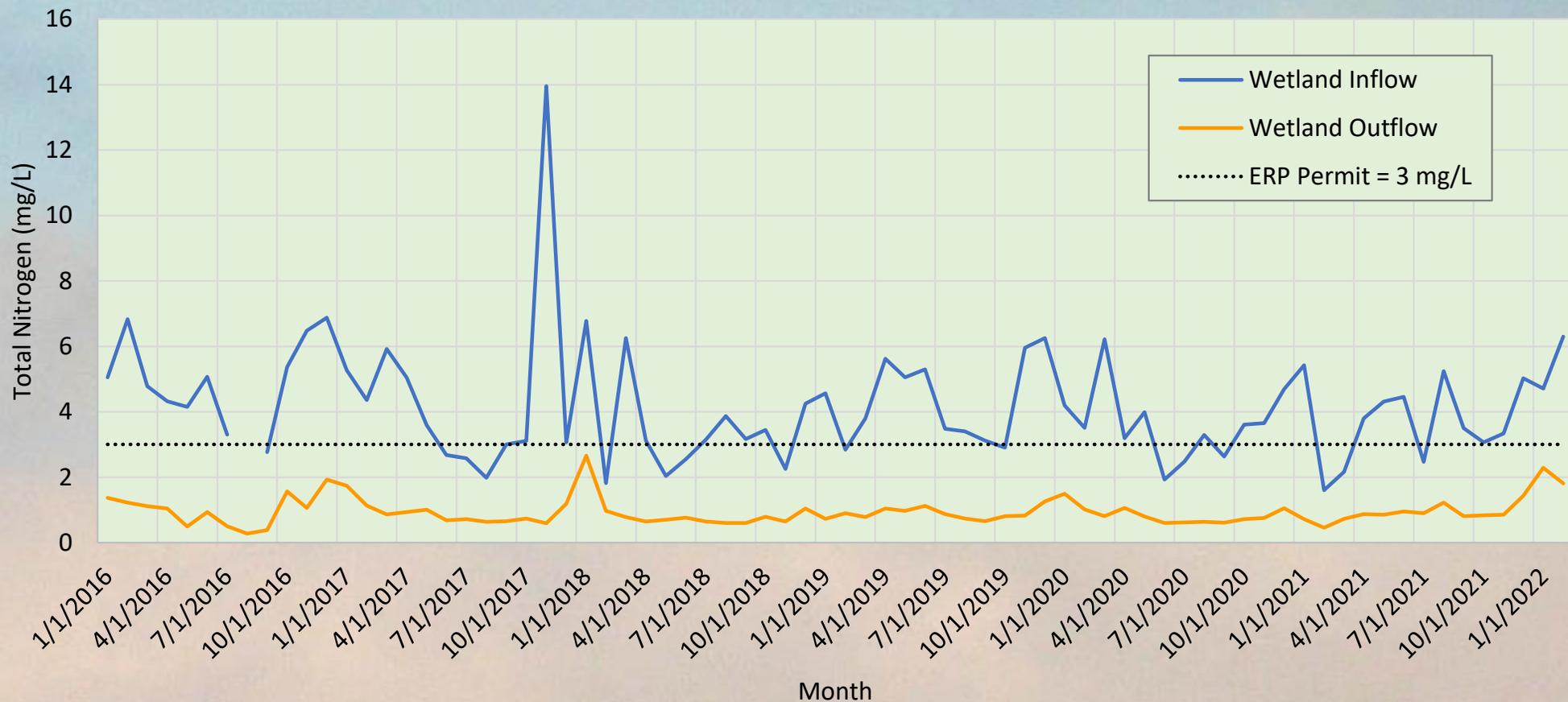
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Sweetwater Branch/Paynes Prairie
Sheet Flow Restoration

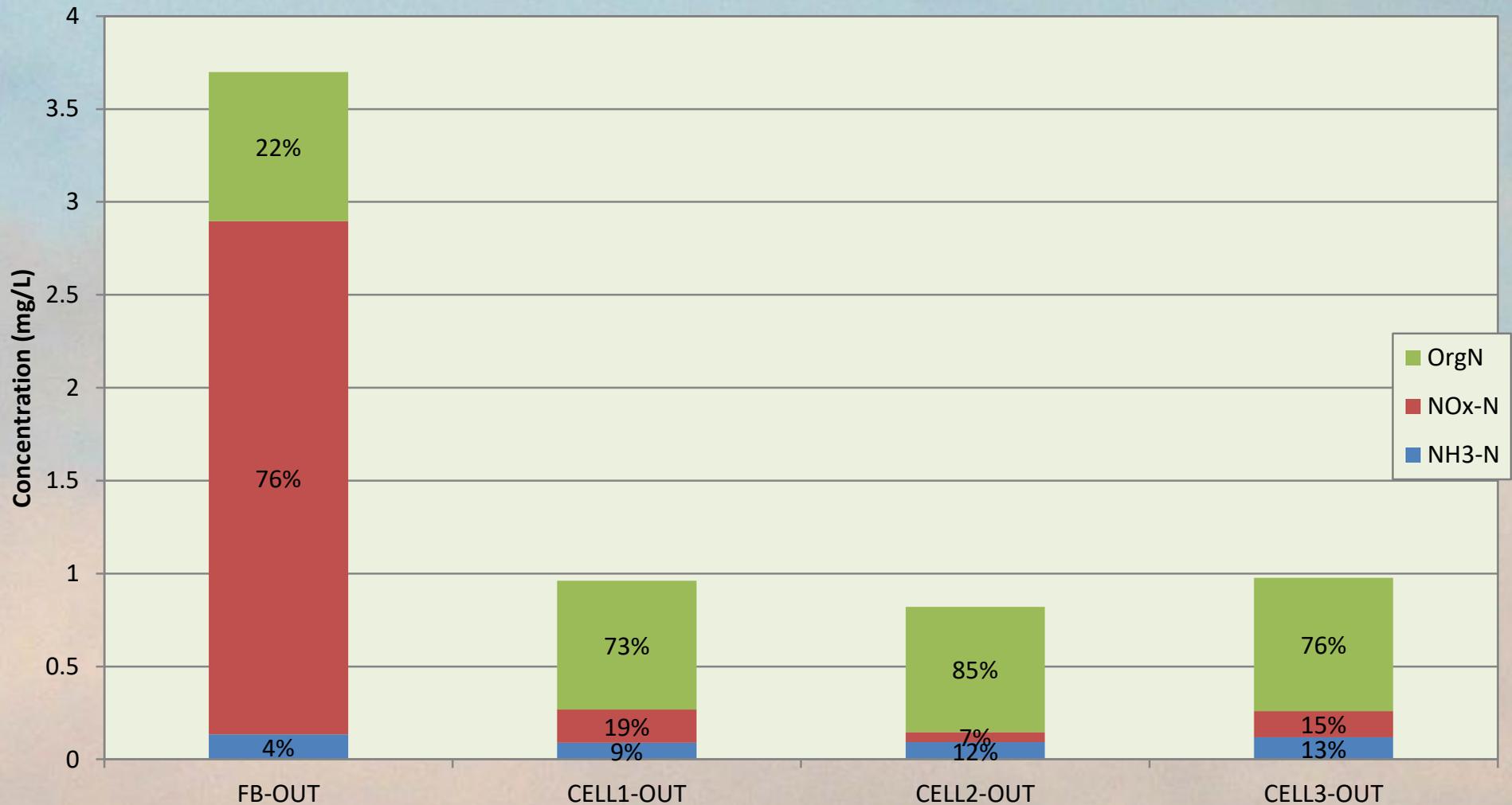
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Date

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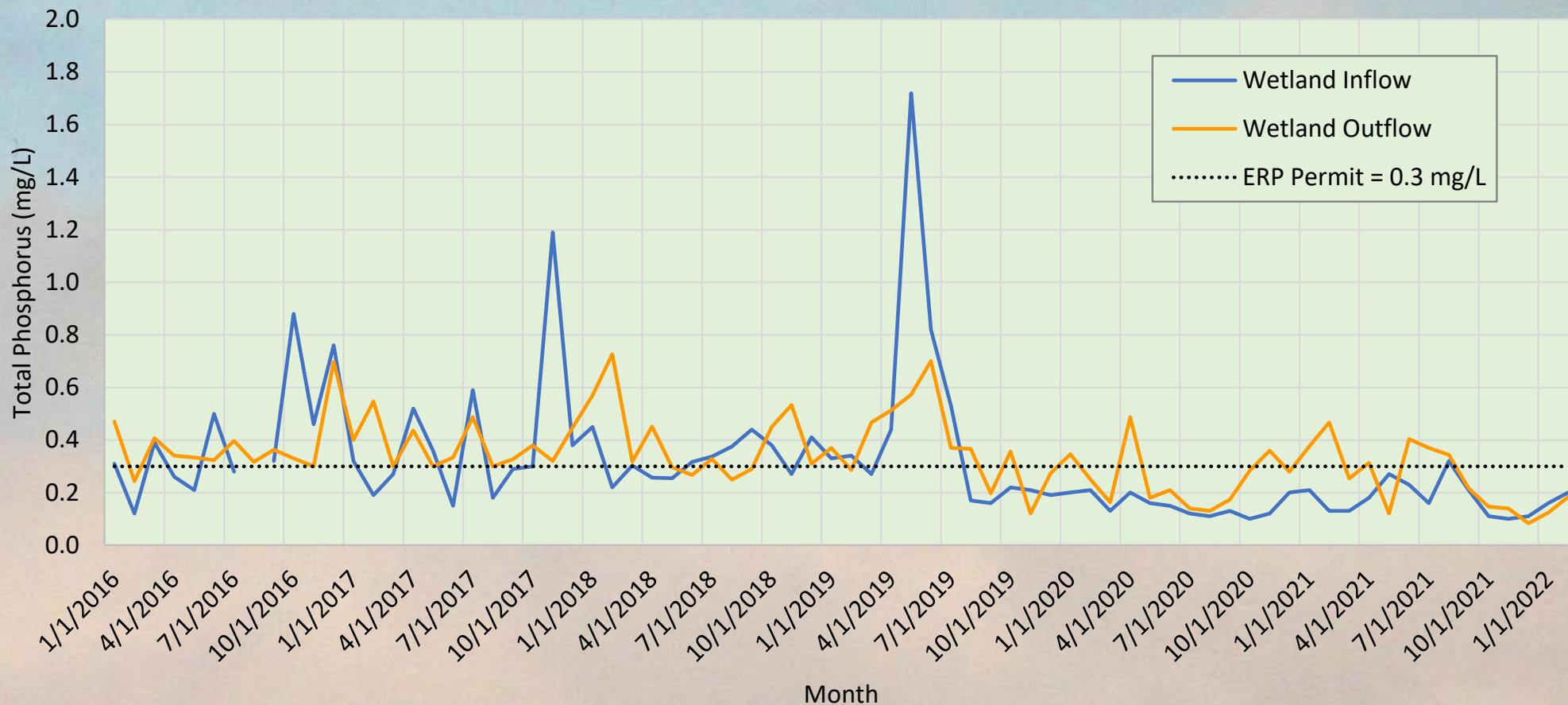
TN Removal Performance



Inflow and Outflow TN Speciation



TP Removal Performance



Benefits

- Cost-effectively improves water quality and meets City of Gainesville's and GRU's TMDL obligations
- Removes trash and sediment
- Rehydrates 1,300 acres of prairie wetlands
- Restores portion of prairie water budget
- Creates diverse wildlife habitat
- Creates new City of Gainesville park

Public Use



Lee Yoder, right, Bill Pennewille, and Lynn Whitman, left, look for birds and other wildlife as their bird-watching group from Penney Farms in Clay County walks through Sweetwater Wetlands Park in Gainesville in this April 2019 file photo. *Brad McClenny/The Gainesville Sun*

Fiscal Year	Number of Visitors
2015	6,420
2016	43,397
2017	49,601
2018	70,176
2019	83,459
2020	103,027
2021	85,079
2022	84,942

City web page:
sweetwaterwetlands.org

255 bird species
Sweetwater Wetlands Park
hotspot on: eBird.org

Park Operations - Shared Responsibility

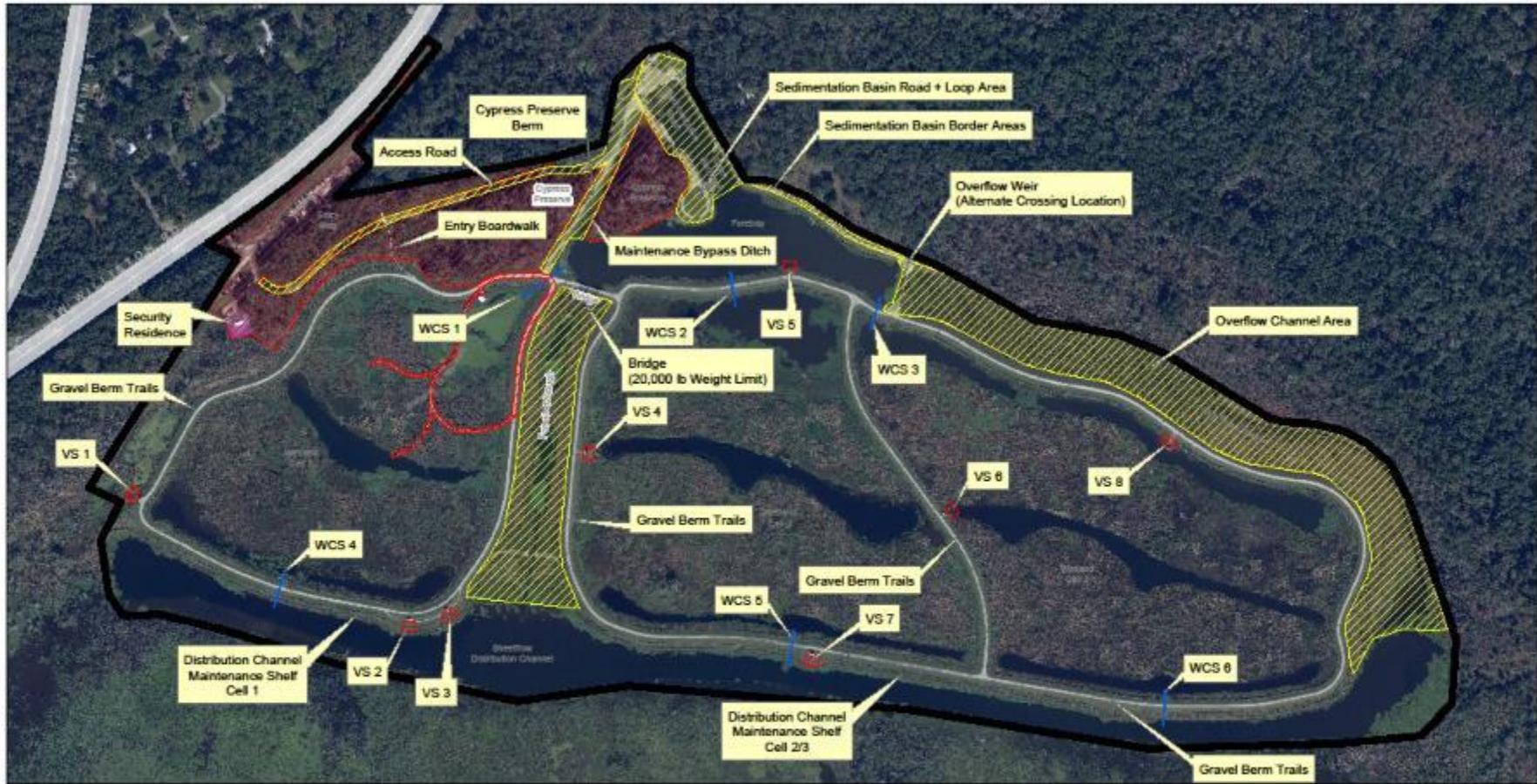


Figure 1
Sweetwater Wetlands Park
GRU, Public Works and PRCA
Areas of Responsibility

- Legend**
- Water Control Structures (WCS)
 - Non-shaded area within black boundary - GRU Responsibility
 - PW Responsibility
 - PRCA Responsibility

N

0 200 400
Feet

GRU
 More than Energy™

C:\WC\DATA\PA\RES\PRIME\DRAWING AND WHATS\WP\AREAS OF RESPONSIBILITY.MXD PLOTTED: 10/29/2021 BY: SLM

Annual Operational Costs

Tasks Performed by Each Party	Est Annual O&M Cost
Public Works Tasks	-
Sediment Removal & Disposal	\$150,000
Inlet Screen Cleaning	\$3,768
Trash Trap Cleaning	\$5,410
Annual Mowing	\$3,177
Rain Event Inspection	\$10,647
Herbicide Treatments	\$1,200
Sediment Testing	\$4,120
PW Operations Staff	\$8,594
TOTAL	\$186,915
GRU Tasks	-
Flow monitoring station	\$7,800
WQ Monitoring & Reporting to SJRWMD	\$28,700
Vegetation Management Assistance	\$8,700
GRU WQ Sample Analysis	\$8,136
Aquatic Vegetation Management	\$19,488
Revegetation	\$500
Feral Hog Removal	\$2,500
Mowing of wetland area & berms	\$17,000
Maintain unpaved berm trail & berms	\$5,000
GRU Operations Staff	\$9,585
TOTAL	\$107,409
GRAND TOTAL	\$294,324



Long-Term Maintenance

- Dredging Wetlands
 - Wetland berms designed to allow 50 years of accretion.
 - Drain, scrape and replant.
- Dredging Forebay
 - The sediment trap and control of aquatic vegetation will minimize the rate of accretion.
 - Wet dredging operation when needed.



Questions?

