

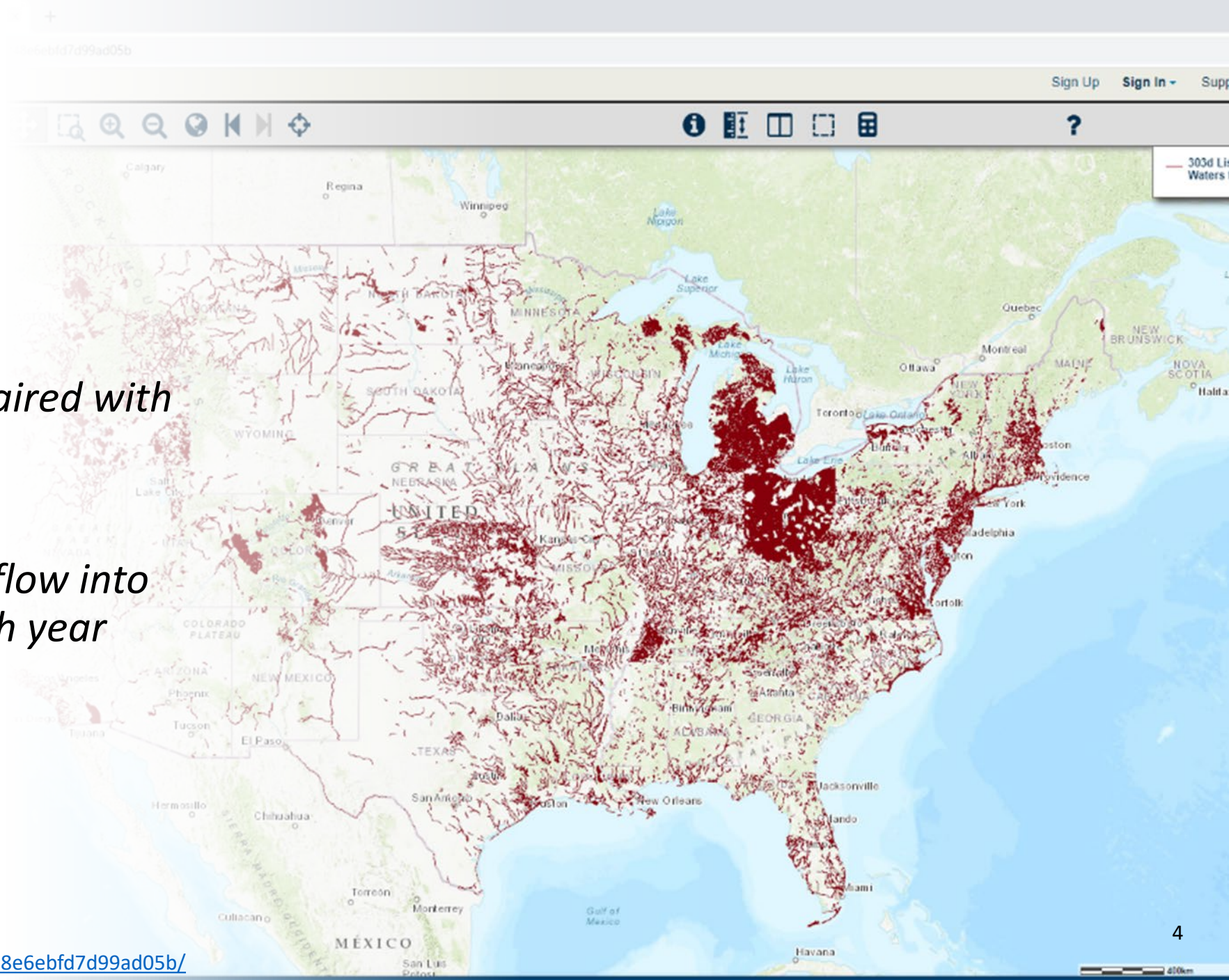
# **Accelerated Water Restoration in Florida**

**Pamela Dugan, PhD**

**IFAS Symposium  
February 21, 2021  
Gainesville, FL**



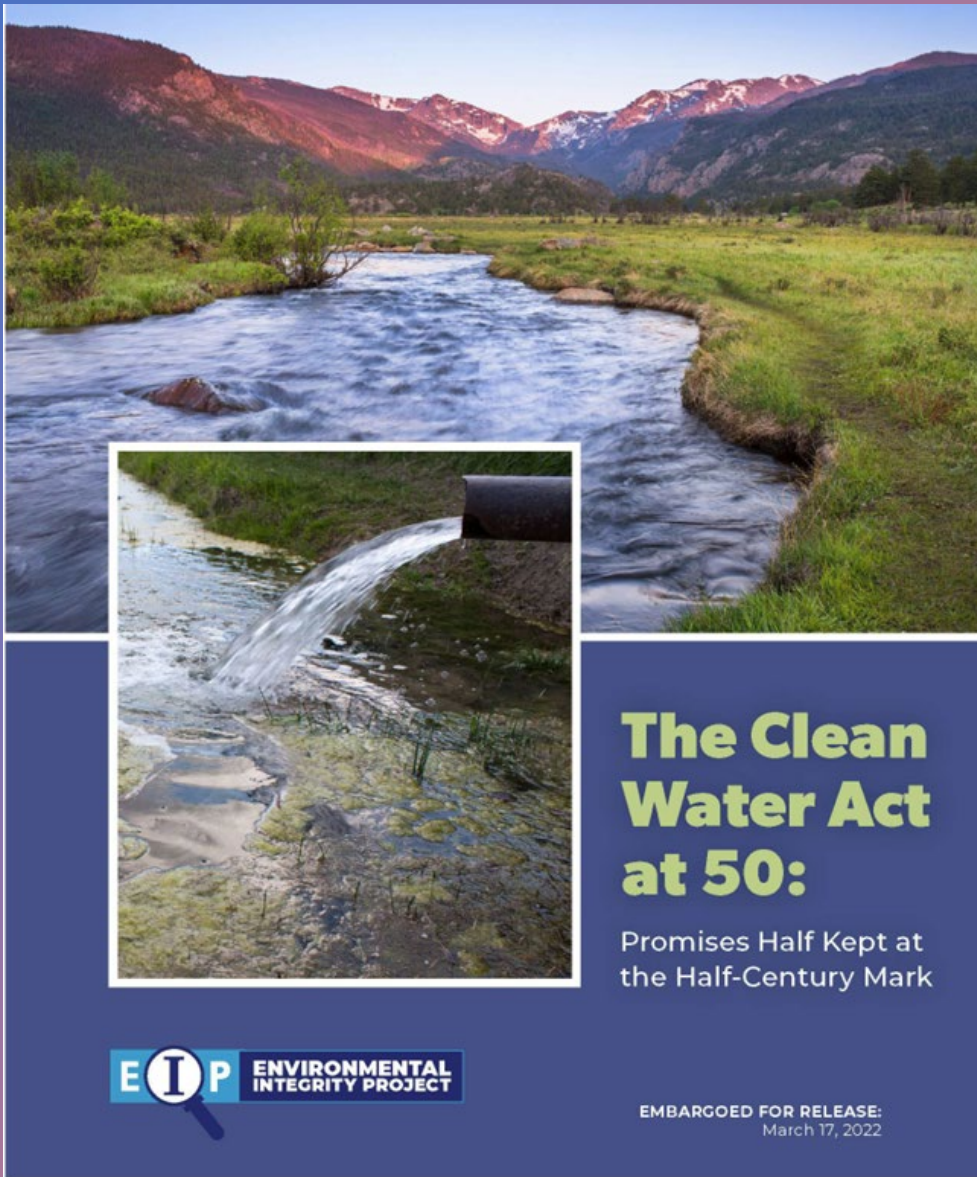
- *Over 50,000 lakes impaired with phosphorus in the US*
- *>300,000,000 pounds flow into the Gulf of Mexico each year*





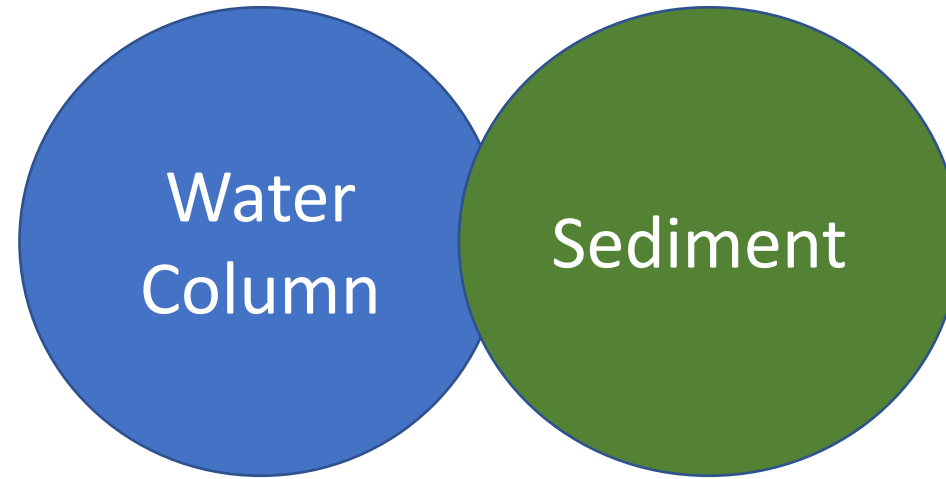
# Impaired Water Resources in Florida

- Rivers & Streams (47.7%)  
10,598 miles
- Lakes & Reservoirs (89.3%)  
935,808 acres
- Bays, Harbors, & Estuaries (99.6%)  
2,533 sq. miles



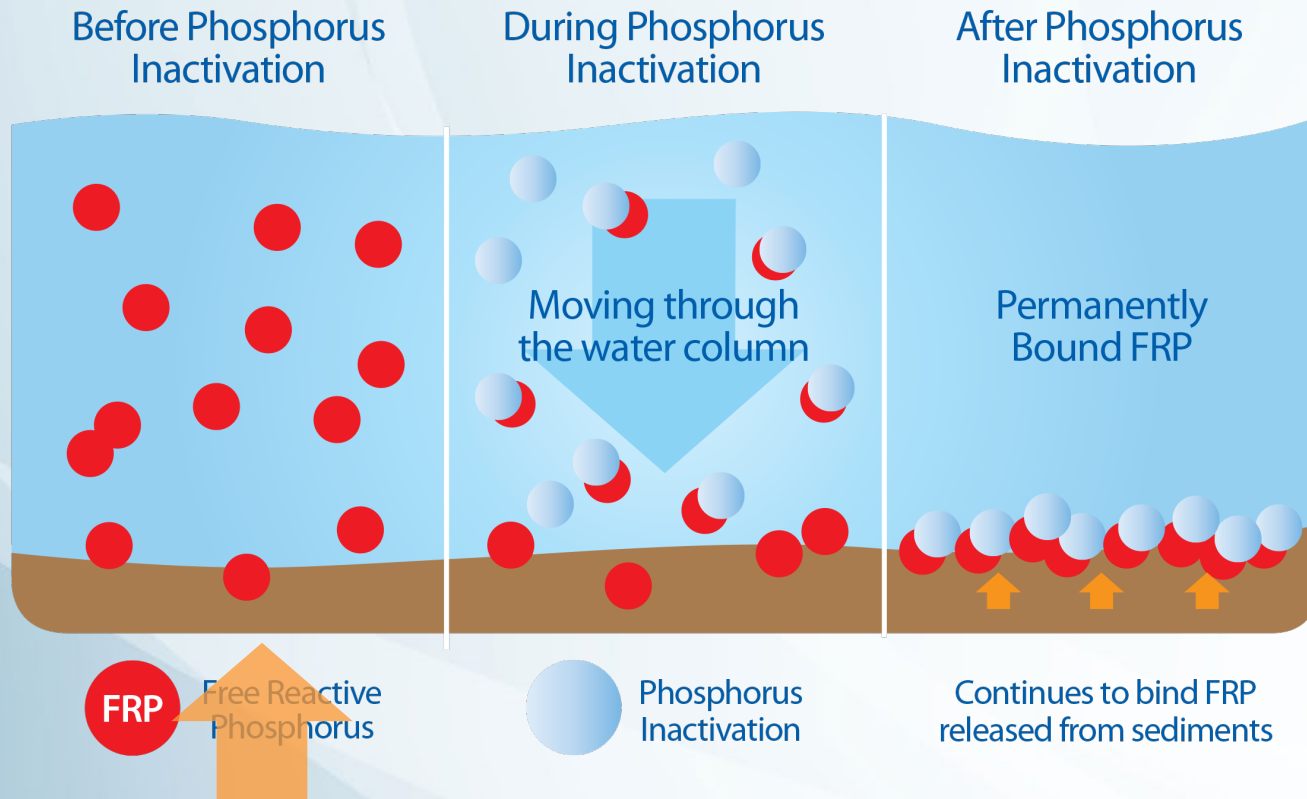
Overall Impairments													
State	Rivers and Streams (miles)				Lakes and Reservoirs (acres)				Bays, Harbors, and Estuaries (sq. miles)				
	Total	Assessed	Impaired	Percent Impaired	Total	Assessed	Impaired	Percent Impaired	Total	Assessed	Impaired	Percent Impaired	
Florida	103,964	22,200	10,598	47.7%	1,529,600	1,047,443	935,808	89.3%	3,625	2,544	2,533	99.6%	

# Phosphorus Removal Approaches





# Sediment P Inactivation



- Legacy phosphorus (internal load)  
Treatment Approaches

- Lanthanum
- Aluminum
- Calcium
- Ferric (iron)
- Cerium

***Unlike Alum, Lanthanum-Modified Bentonite (LMB) does not change pH, no floc formed, is benign and ecofriendly***

# Phosphorus Water Column Stripping

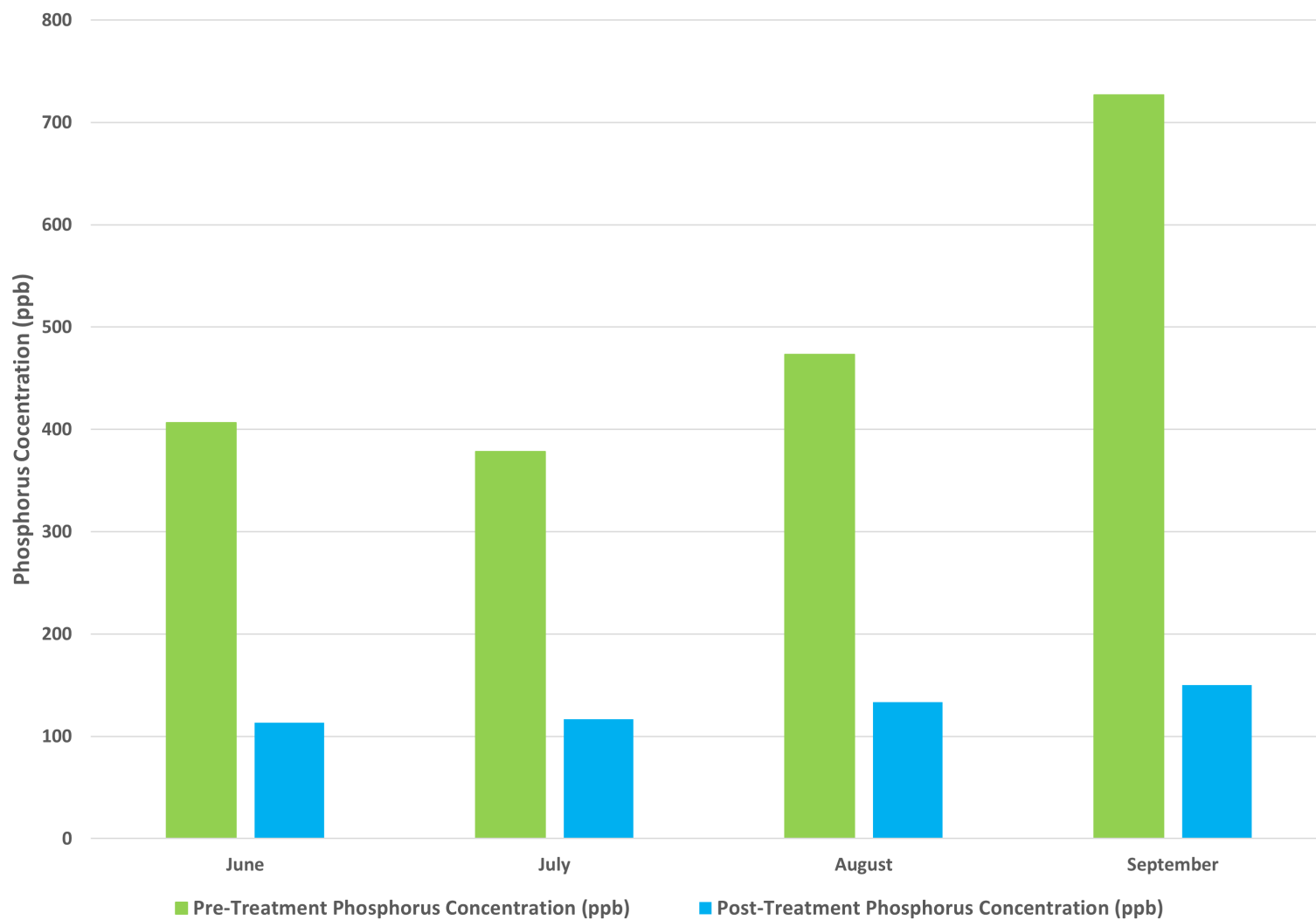
- Good for flowing water systems (stormwater culverts, wetland polishing, streams, farm ditch)
- Rapid/permanent binding of phosphorus
- Automated dosing system
  - Dosing rate varies with flow and phosphorus concentrations
  - Electric or solar-powered
  - Controlled remotely (cellular or satellite)



Solar-powered SATT system deployed at New Croton Dam, Croton River, NY



### Stephie Ditch Phosphorus Removal Utilizing EutroSORB F Filter Media (Installed June 2023)

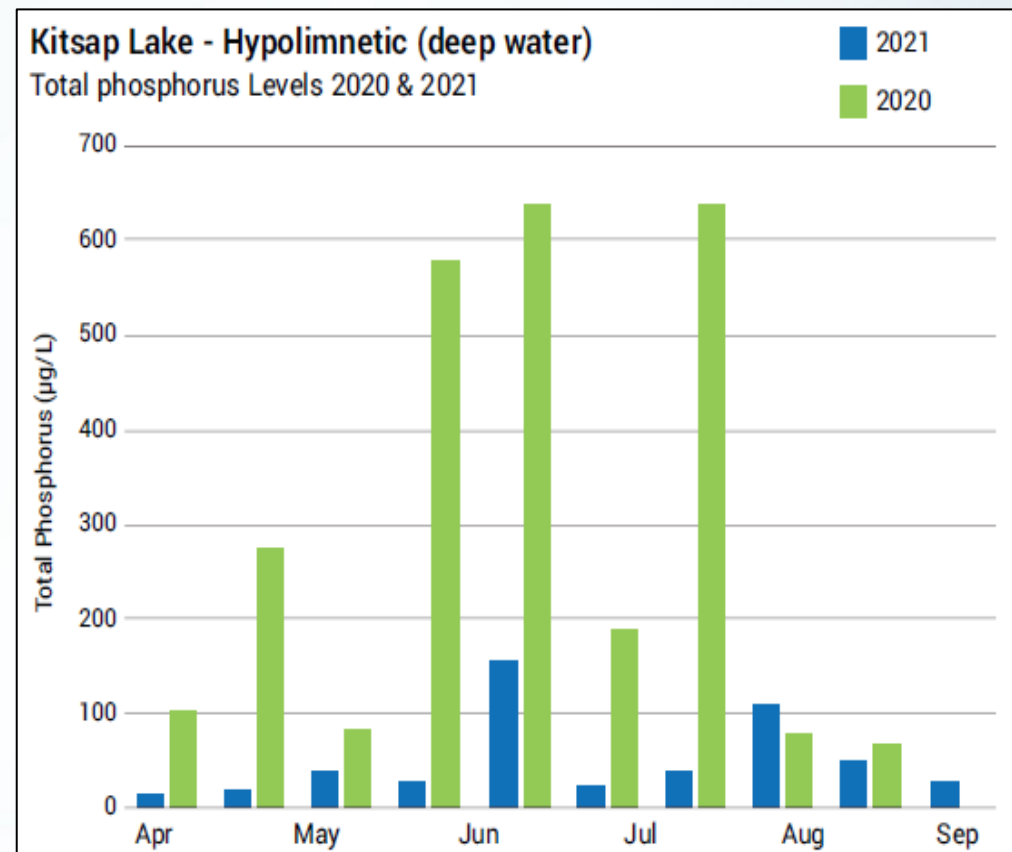




# Kitsap Lake (WA)

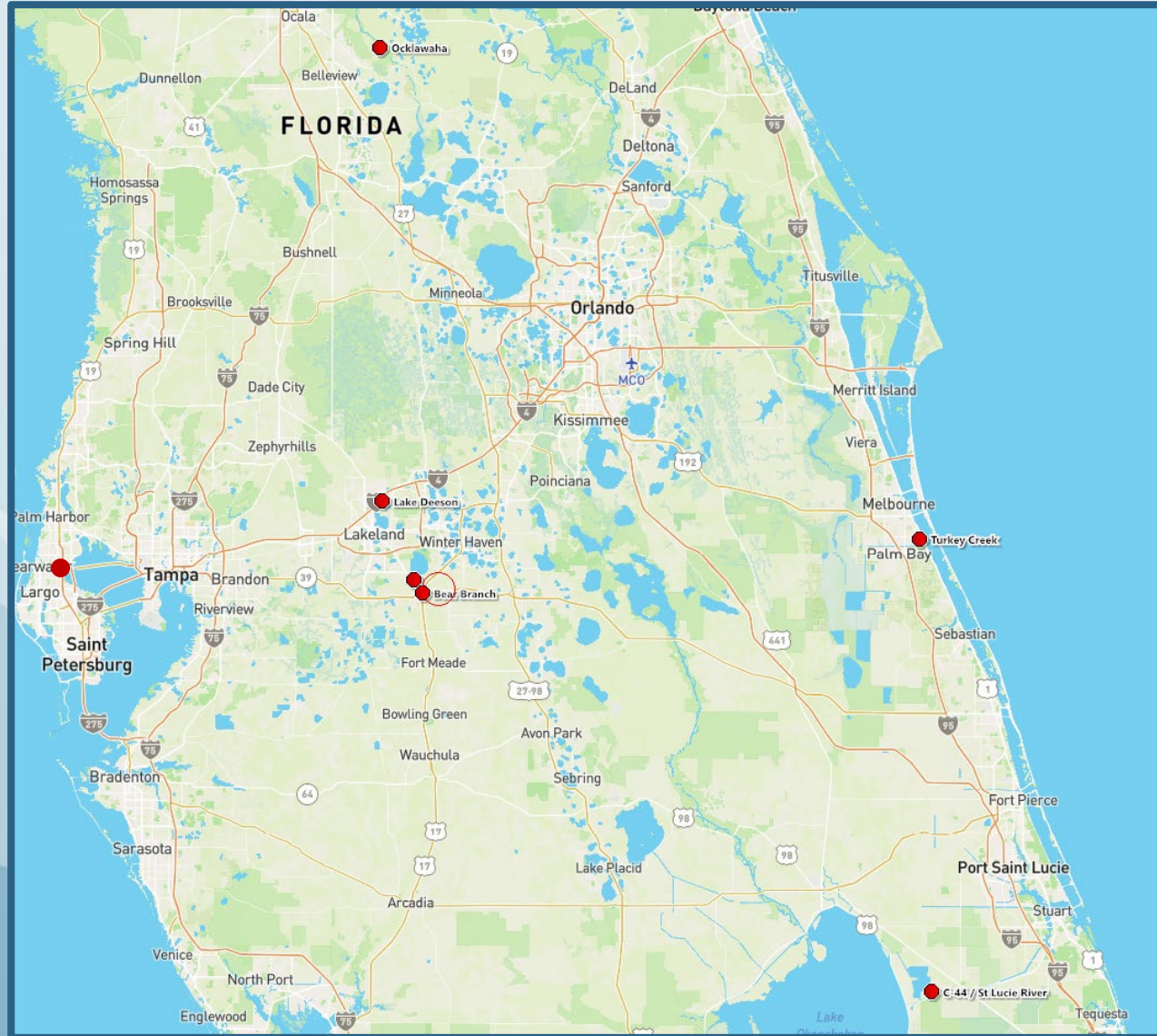


- 40% increase in water clarity
- 90% decrease in phosphorus release
- No more HABs
- Nutrient goals met





# Upcoming Restoration Initiatives in Florida (●)



- C-44 Canal / St. Lucie River (Army Corps)
- Ocklawaha Prairie Restoration Area (SJRWMD)
- Lake Deeson (Polk County)
- Bear Branch (Polk County)
- Saddle Creek (Polk County)
- Joe's Creek (Pinellas County)

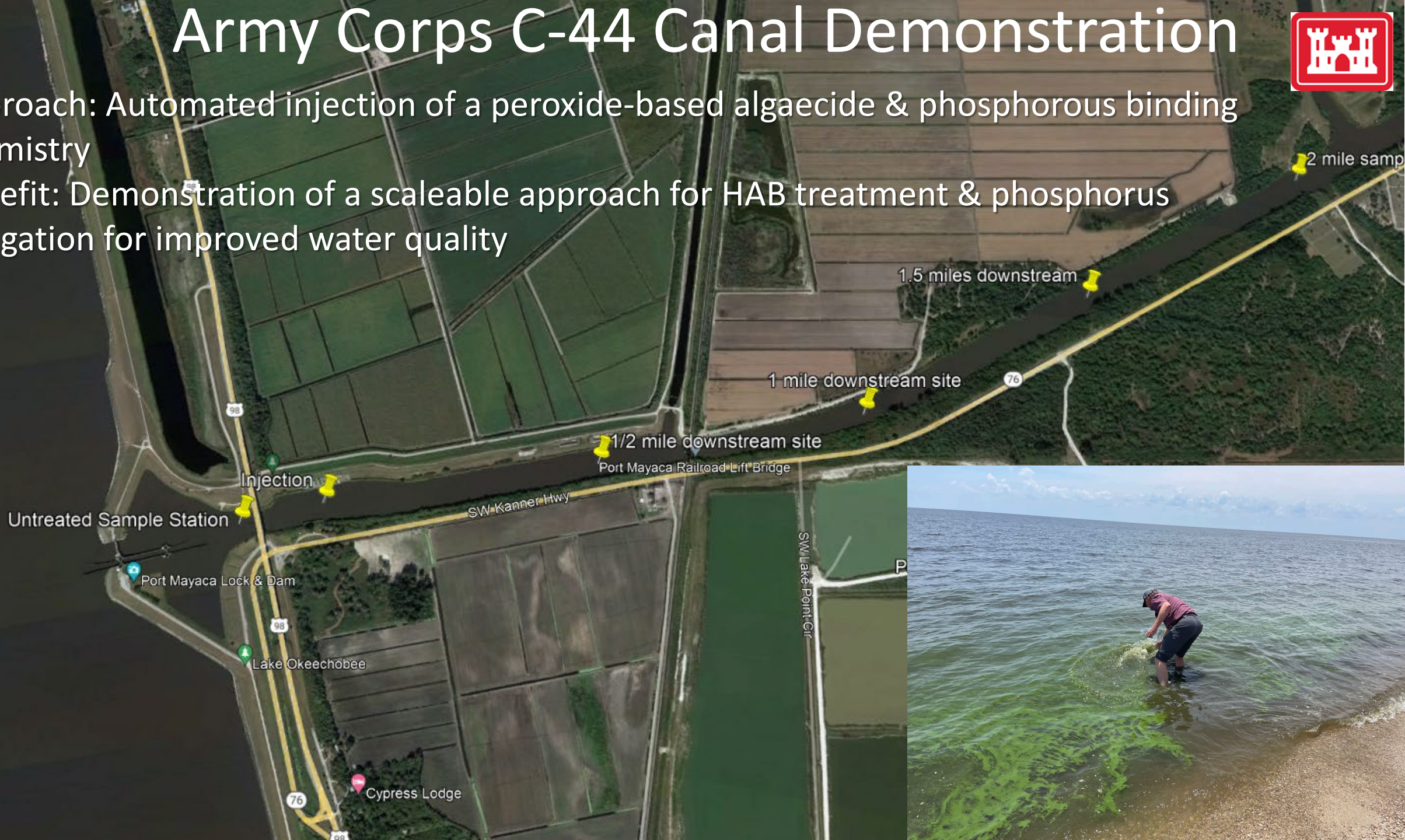


# Army Corps C-44 Canal Demonstration



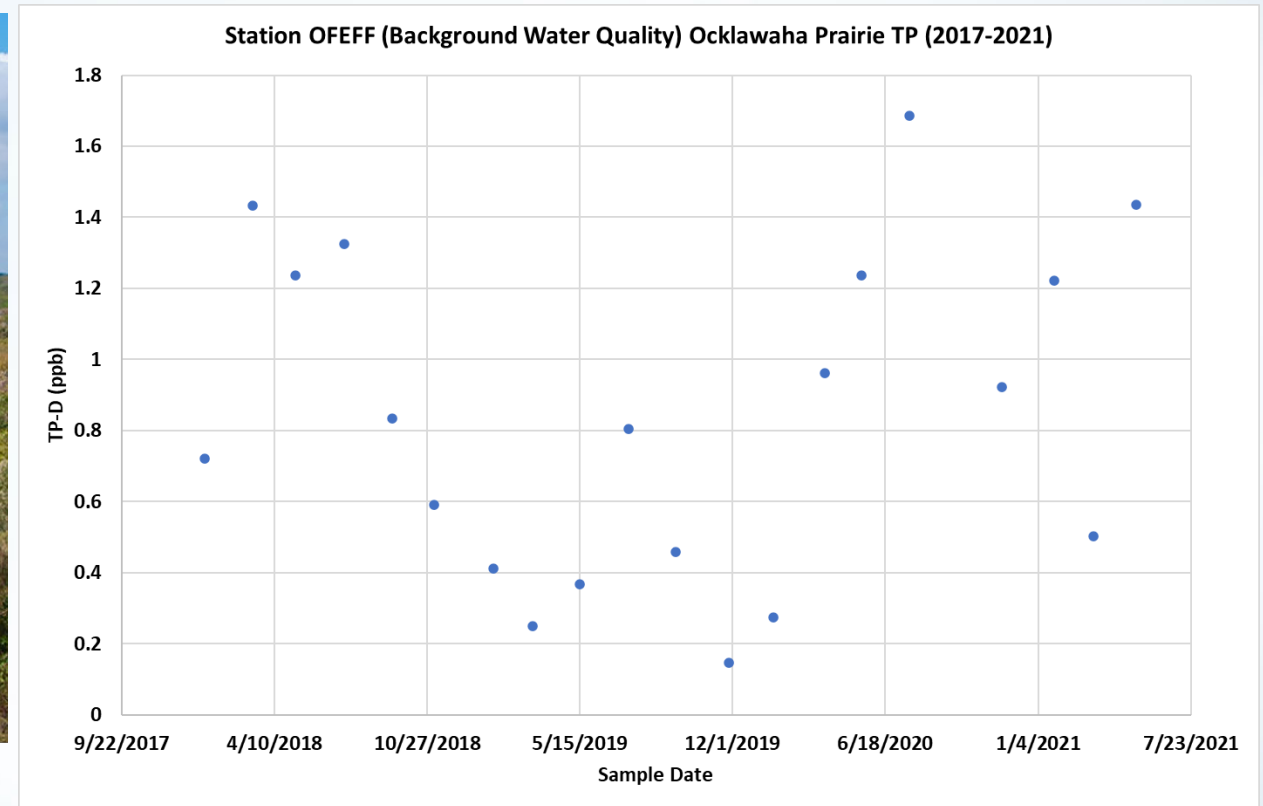
Approach: Automated injection of a peroxide-based algaecide & phosphorous binding chemistry

Benefit: Demonstration of a scaleable approach for HAB treatment & phosphorus mitigation for improved water quality





# Ocklawaha Prairie Restoration Area



- 6,230 acres acquired by mid-1990s
- Reverted to prairie and wetlands yet poor water quality still exists today (mean TP = 800 ppb)
- Phosphorus levels 10x higher than WQ standards
- Hydrologic reconnection suspended until restoration of legacy phosphorus initiated
- Sediment inactivation & water column stripping
- Reconnection of prairie to Ocklawaha River



# Treatment and Trails: Saddle Creek & Bear Branch

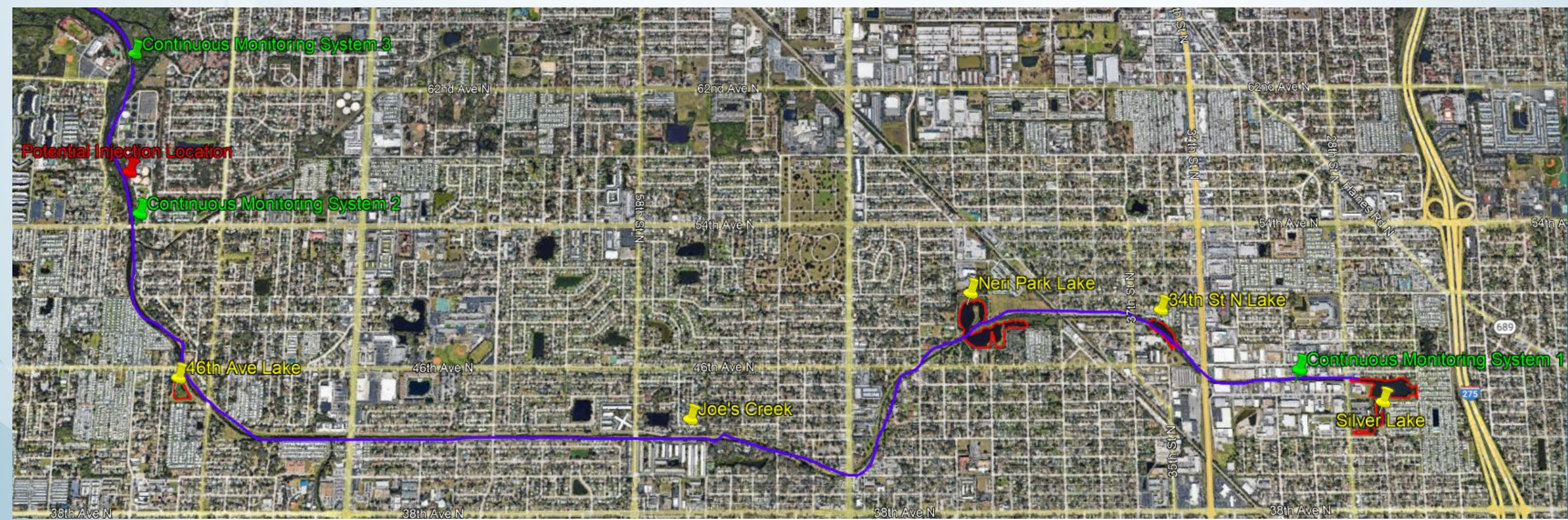


1. Land acquisition for a regional Treatment and Trails
2. Large-scale P management using:
  - Automated application of P-binding materials
  - Real-time monitoring to quantify performance
- Decreased P loading into the Peace River





# Joe's Creek (Pinellas County)



- Urban Stream Phosphorus Mitigation (1-year demonstration)
  - Automated inline injection of P binding materials
  - Sediment inactivation (4 ponds)
  - Continuous nutrient monitoring (3)
- Improved WQ flowing to Charlotte Harbor



Thank you!  
Questions?



Pamela Dugan, Ph.D.  
[pamelad@eutrophix.com](mailto:pamelad@eutrophix.com)  
317-495-5657

