



Water Quality in Guana Estuary: From Monitoring to Management

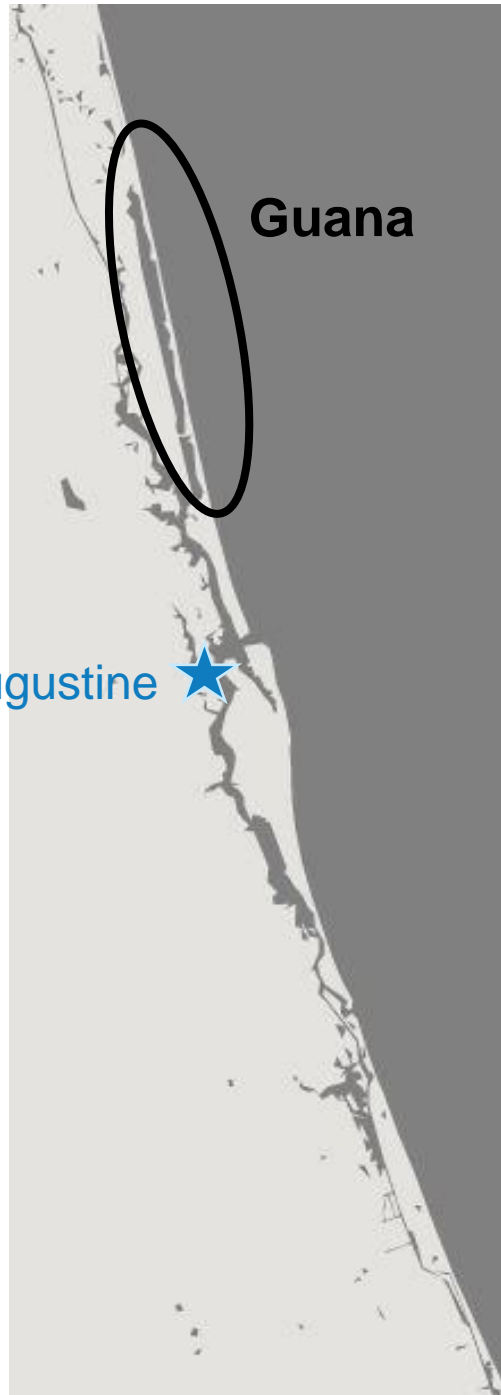
Nikki Dix, Jessica Lee, Olivia Roorbach, Shannon Dunnigan, Savanna Mathis
Guana Tolomato Matanzas National Estuarine Research Reserve

GTMNERR State of the Reserve | February 16, 2023



St. Augustine ★

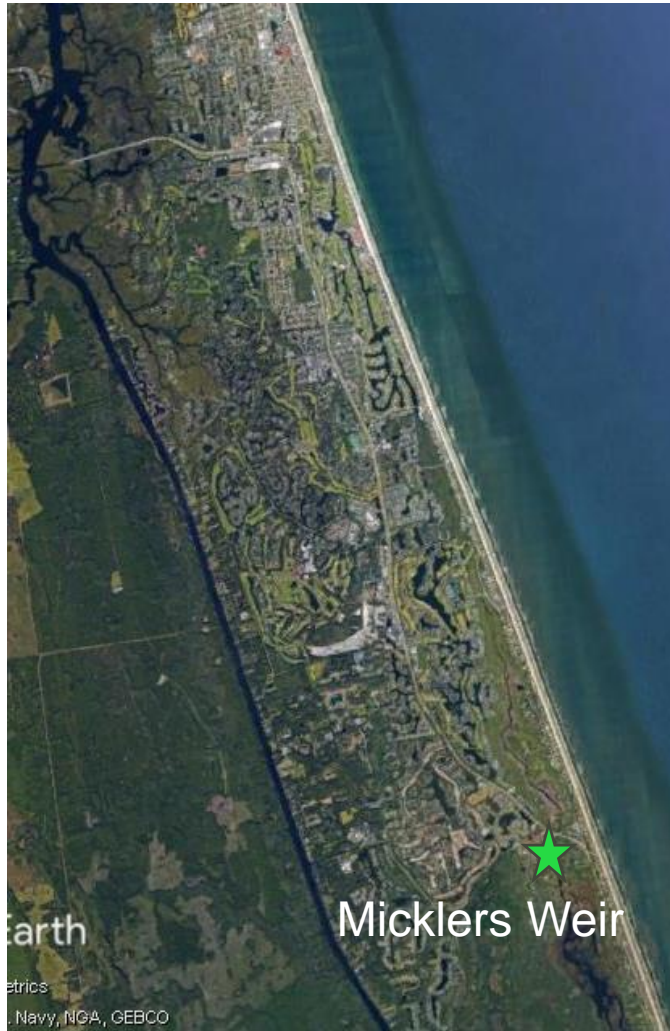
Guana





Guana Estuary

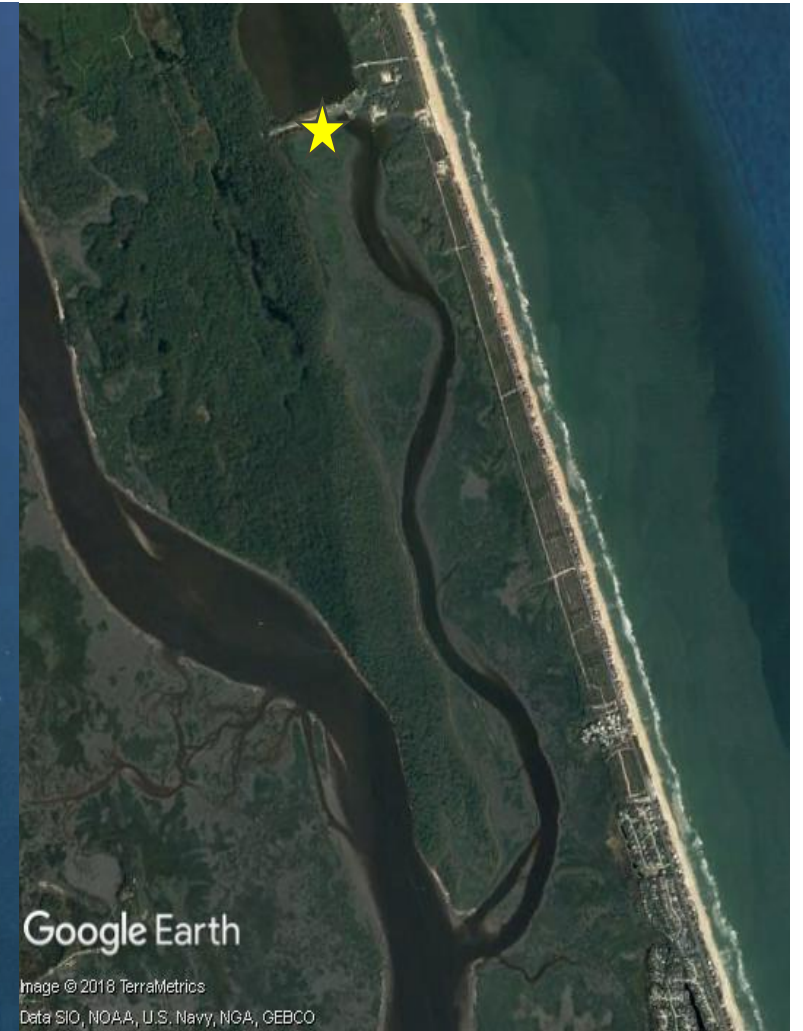
Headwaters ~7 miles



Lake ~10 miles

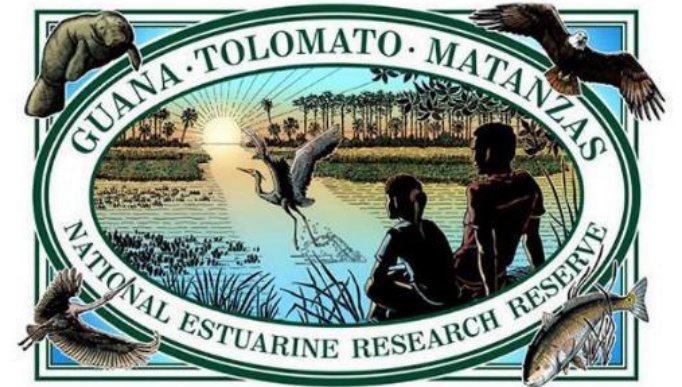
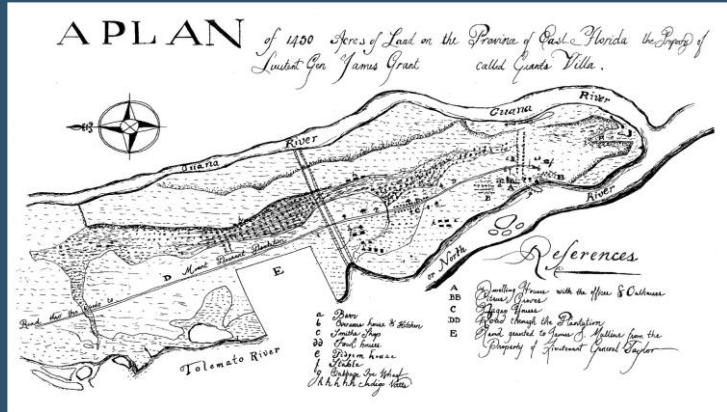


River ~3 miles





Guana Estuary



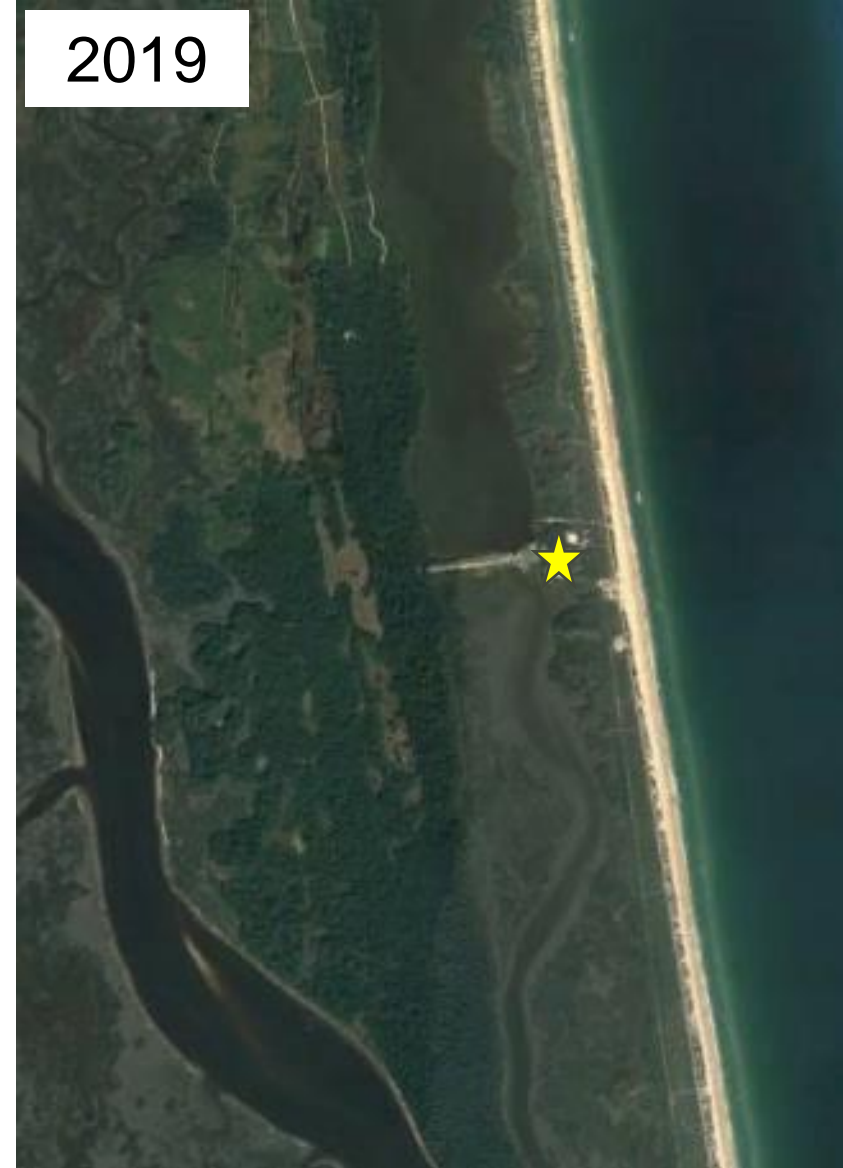


Guana Dam

1942



2019





Guana Dam

1953





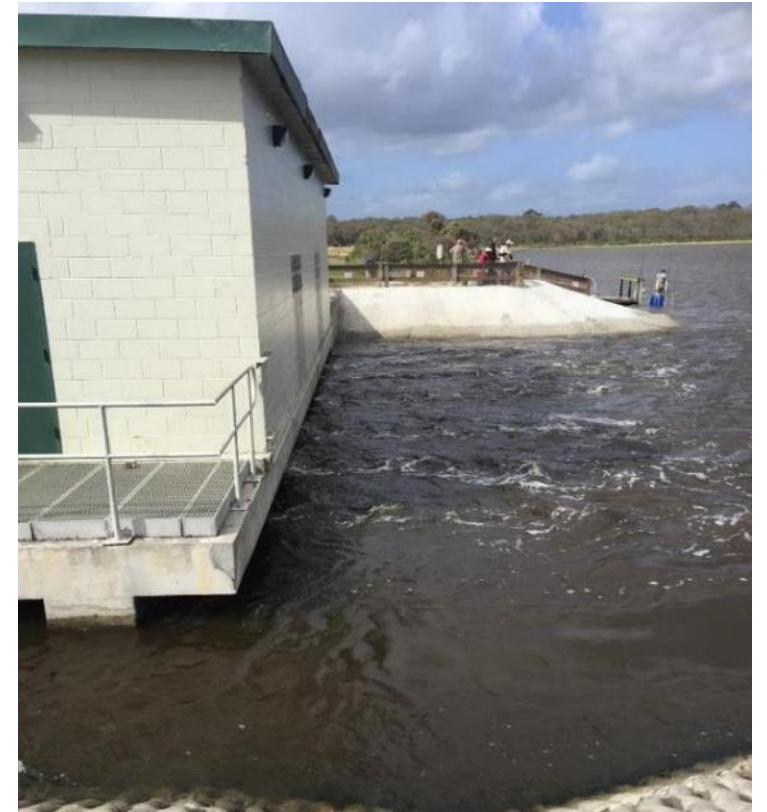
Guana Dam

2022





Guana Dam





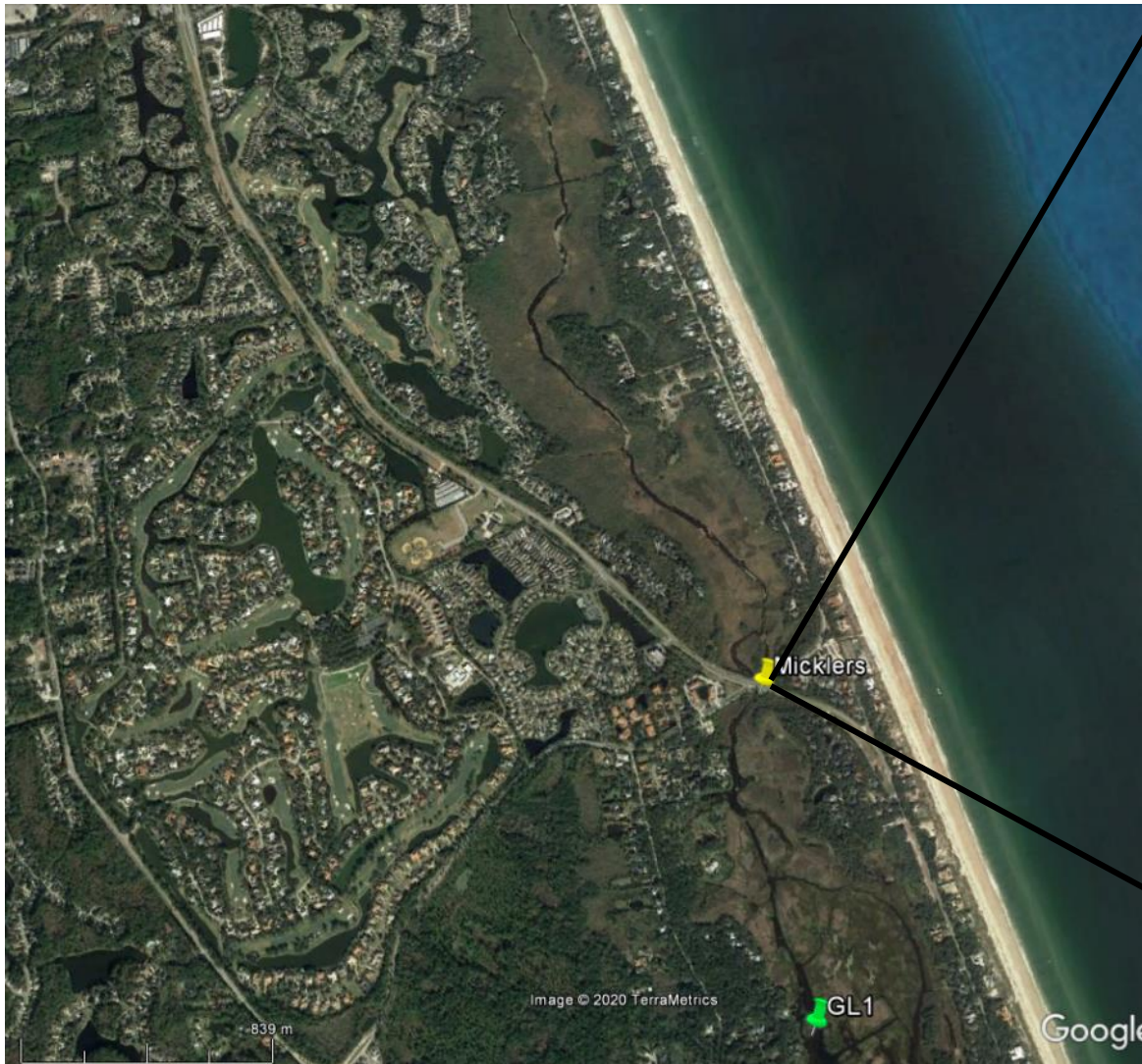
Guana Dam Water Level Management

- Winter - spring drawdown to mimic natural level and expose mud.
- Summer/fall high water.
- 2022 was different.





Micklers Weir



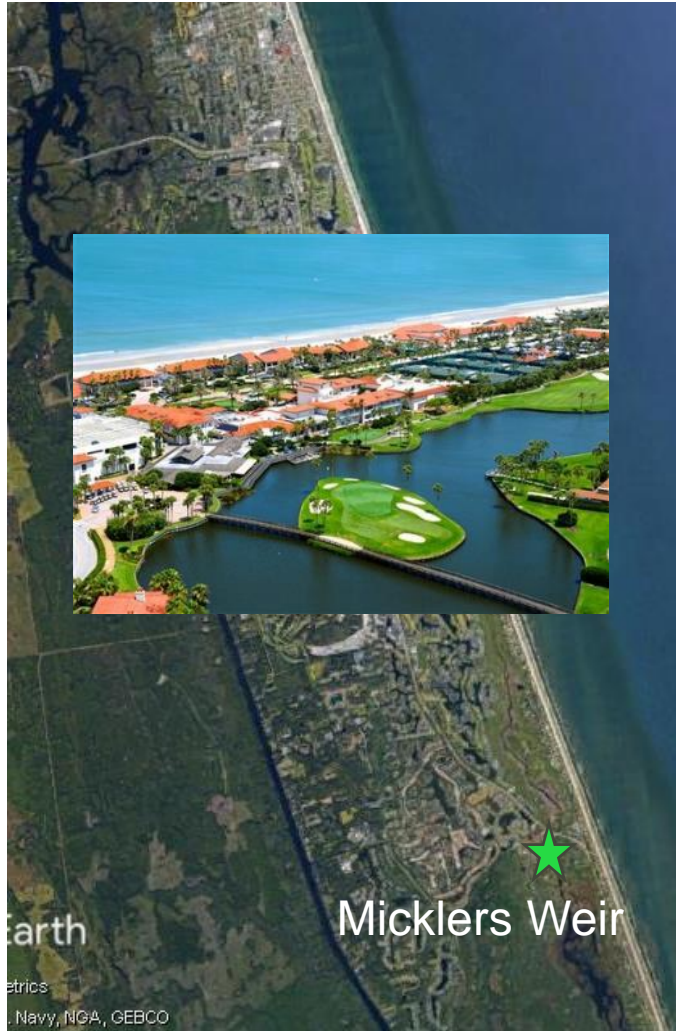


Guana Estuary

Headwaters ~7 miles

Lake ~10 miles

River ~3 miles





How's the Water?



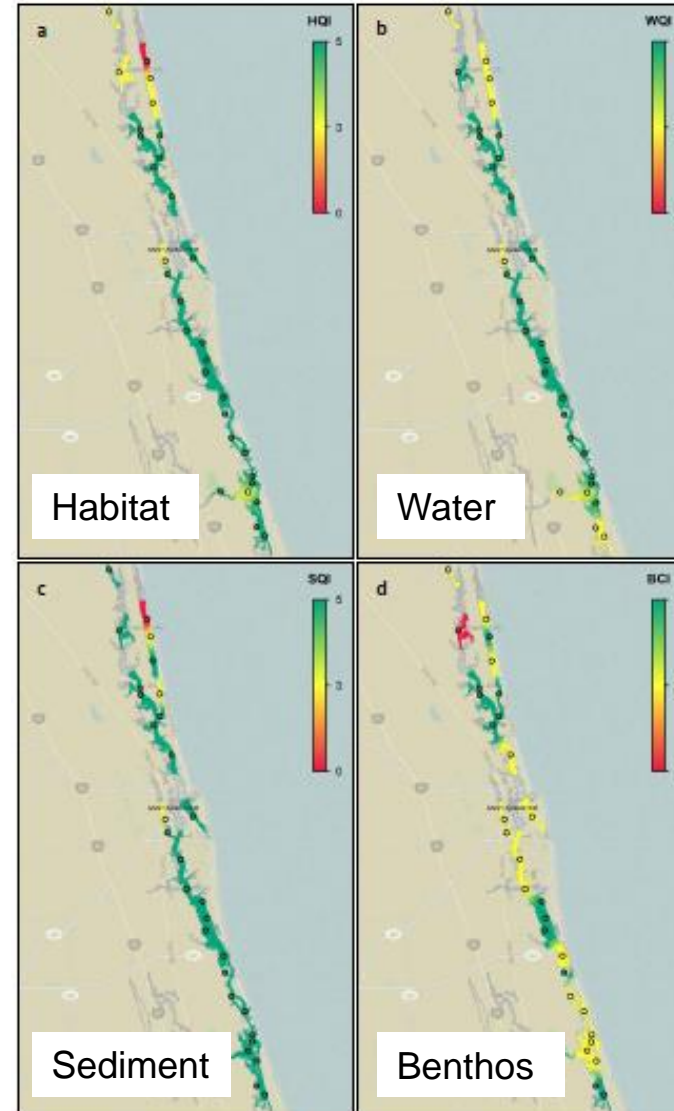


How's the Water?

Integrated Assessment of Ecosystem Condition and Stressor Impacts in Submerged Habitats of the Guana Tolomato Matanzas (GTM) National Estuarine Research Reserve (NERR)

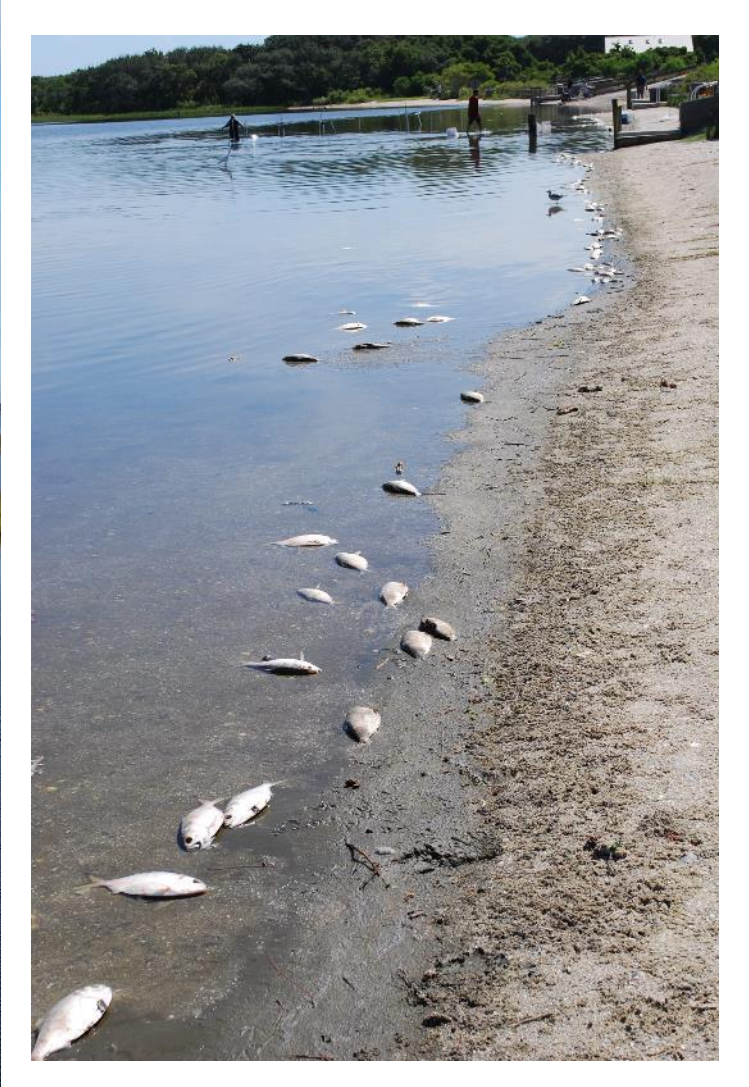


NOAA Technical Memorandum NOS NCCOS 231





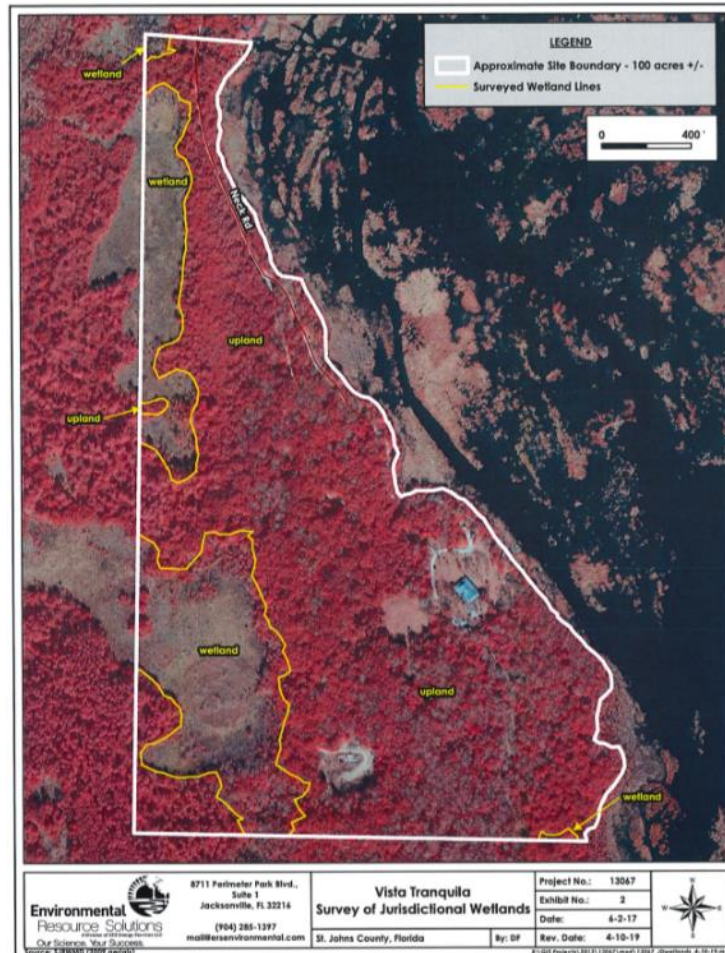
How's the Water?





How's the Water?

Proposed 77-home development Vista Tranquila sparks opposition from residents, conservation groups

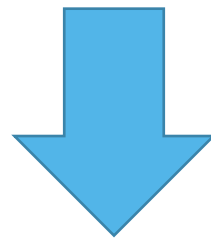




Water Quality Monitoring Approach



1. Establish a baseline.
2. Fill data gaps for state assessment.
3. Identify pollution sources and other influences on water quality.

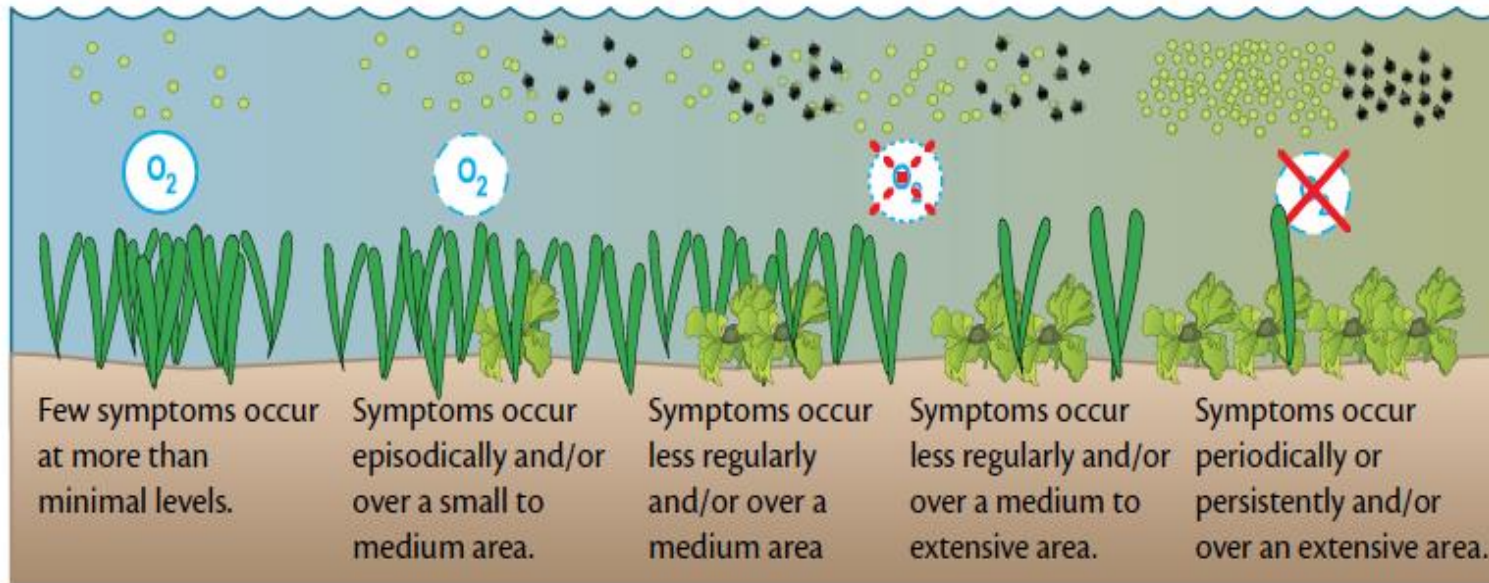


4. Science-based restoration.



Water Quality Monitoring Nutrient Indicators

Eutrophic symptoms



- Submerged aquatic vegetation
- Chlorophyll a
- Nuisance/toxic blooms
- Macroalgae
- Dissolved oxygen

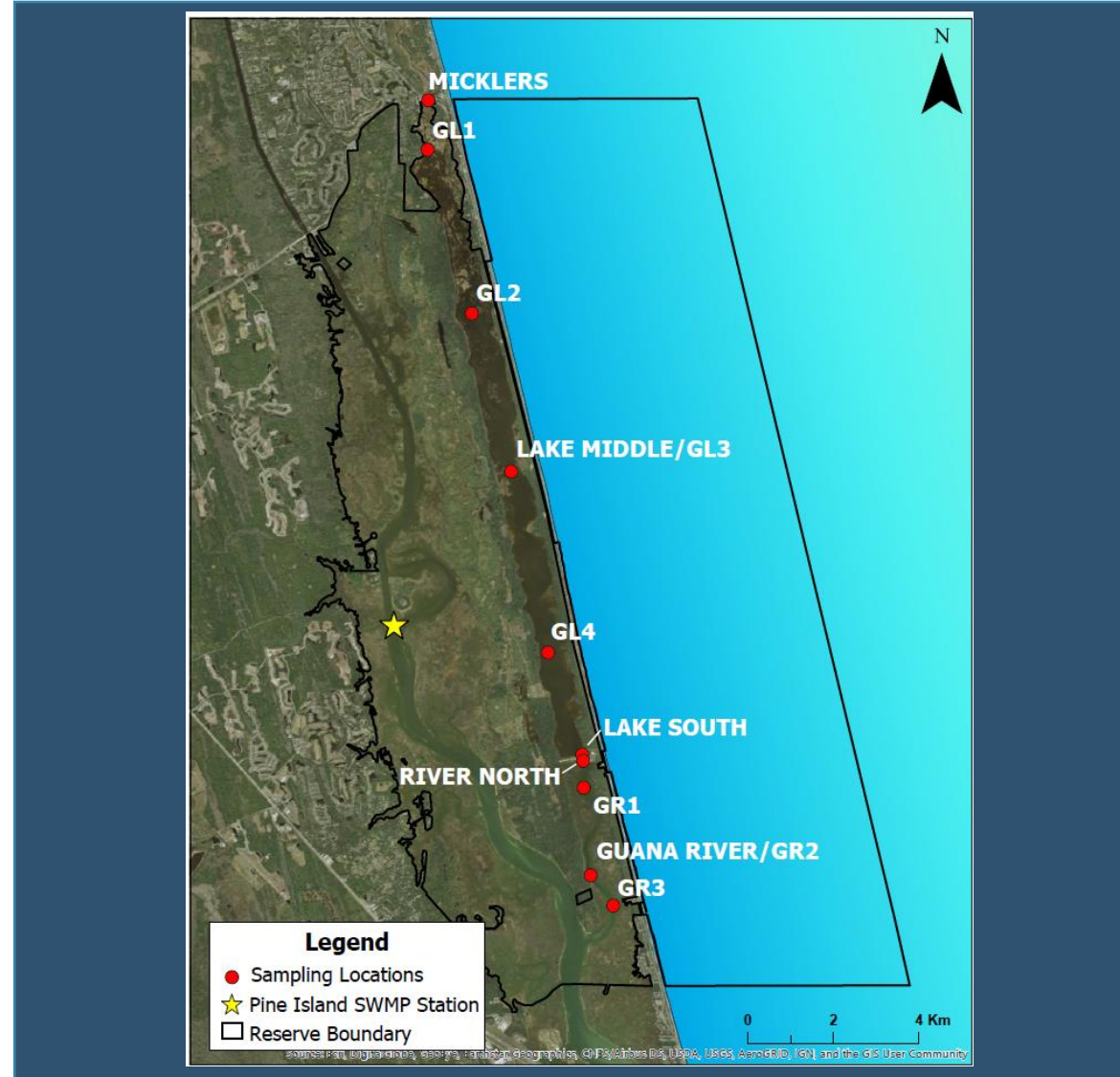


*Influencing factors
(loads and susceptibility)*



Water Quality Monitoring

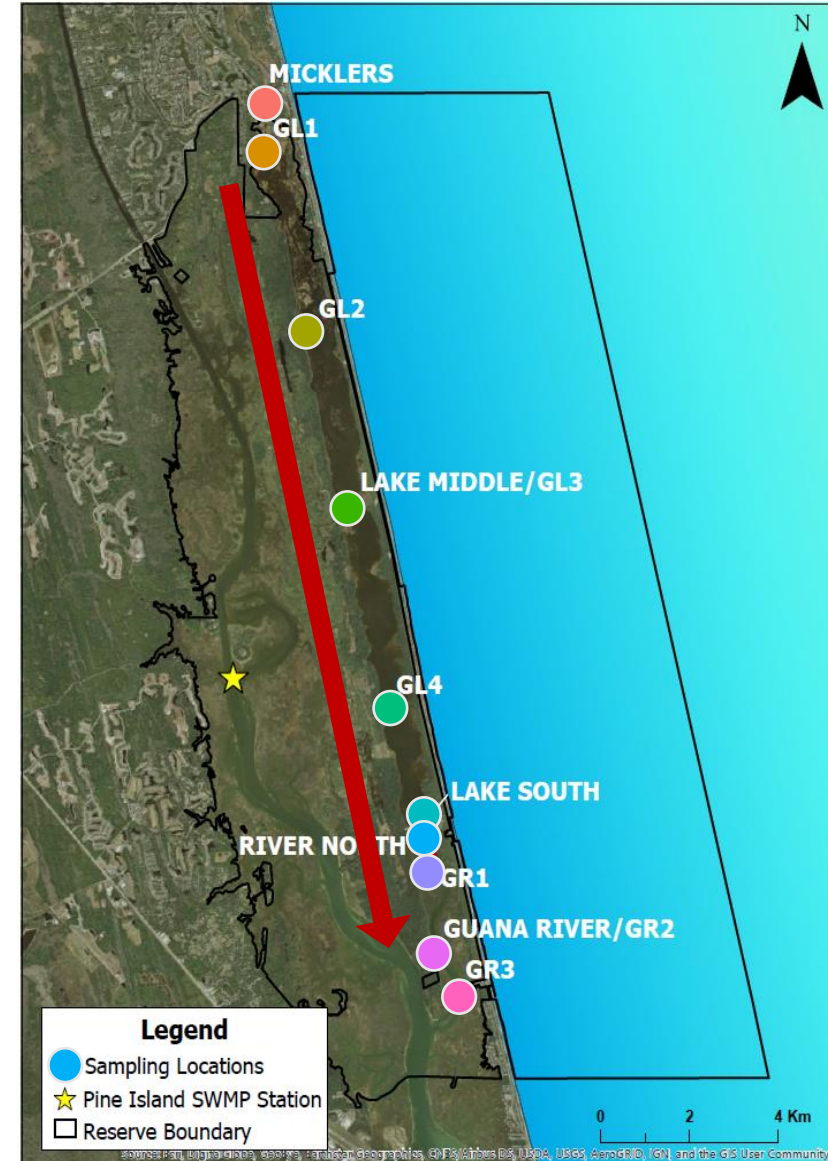
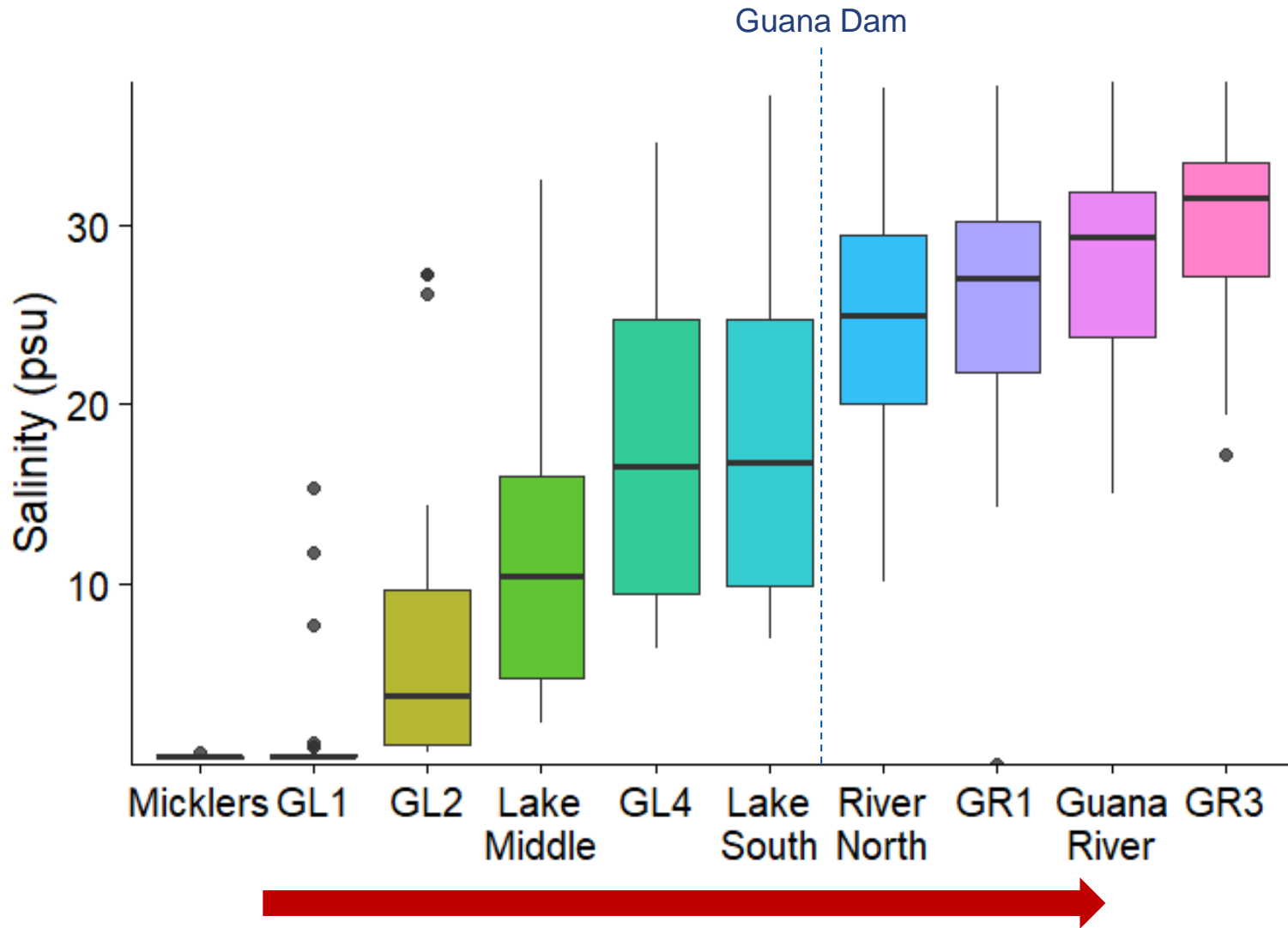
Monthly July 2017 – June 2023





Water Quality Monitoring Salinity Gradient

July 2017 – June 2022

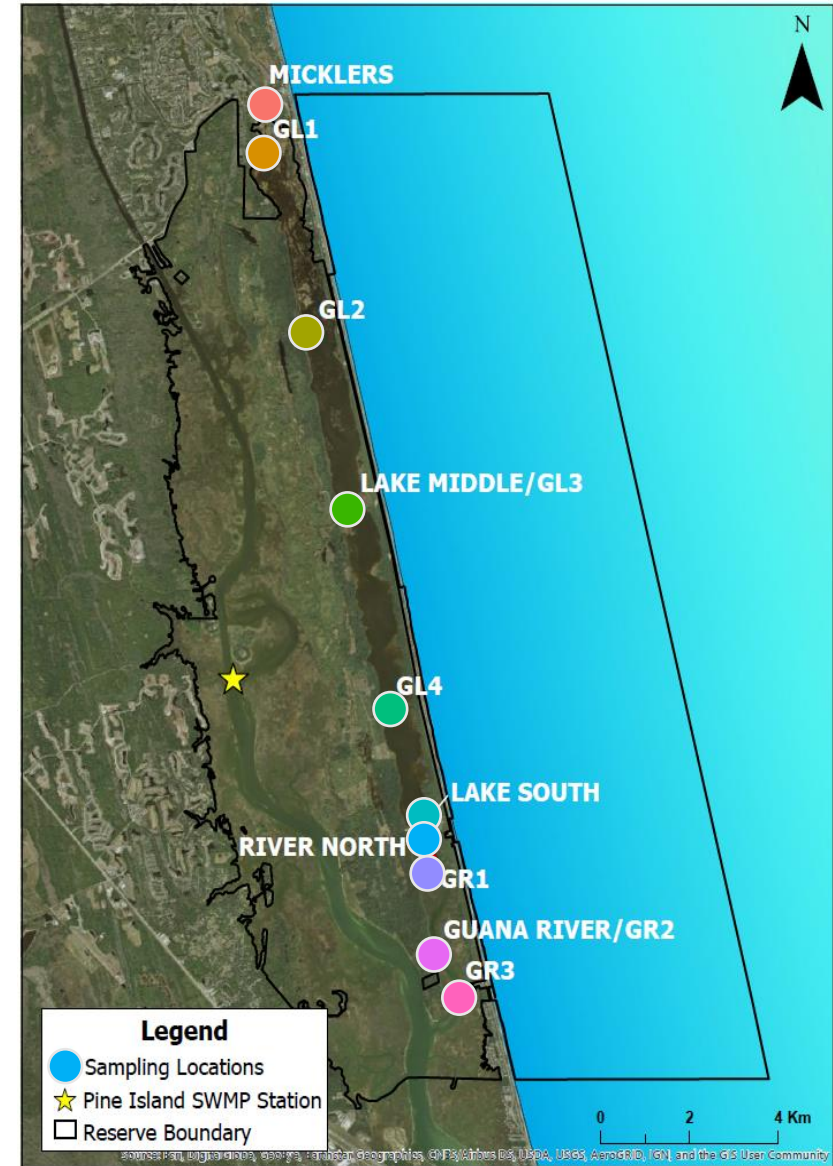
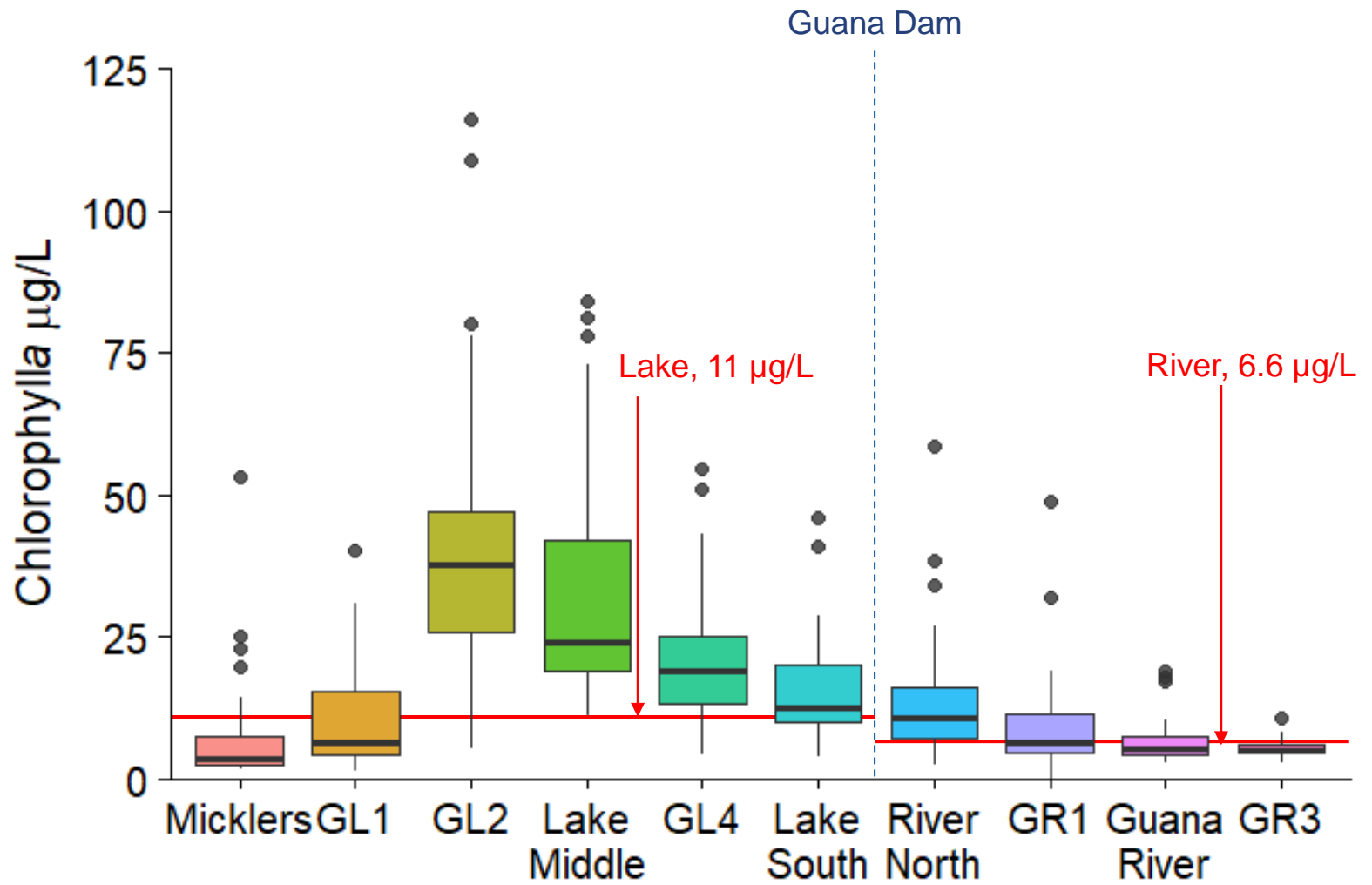




Water Quality Monitoring

Chlorophyll a (phytoplankton biomass)

July 2017 – June 2022





Water Quality Monitoring

Data Informing Conservation Action

Water quality assessment and restoration conducted by DEP

- EPA Clean Water Act
- Florida Impaired Waters Rule

Assessment
(every 2 years)

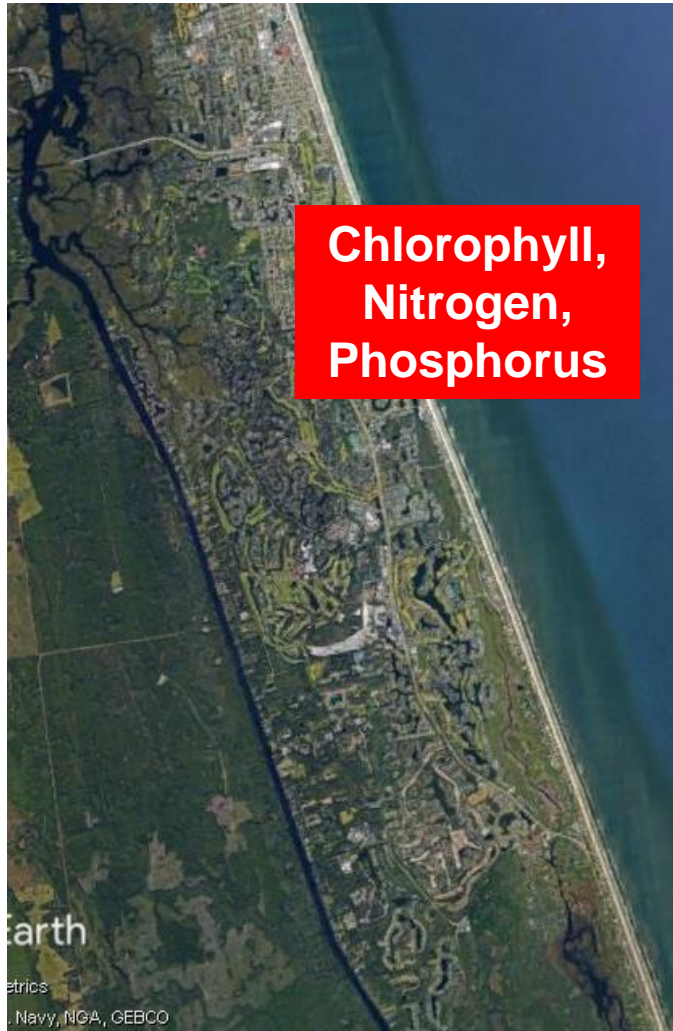
Total Maximum
Daily Load

Basin Management
Action Plan



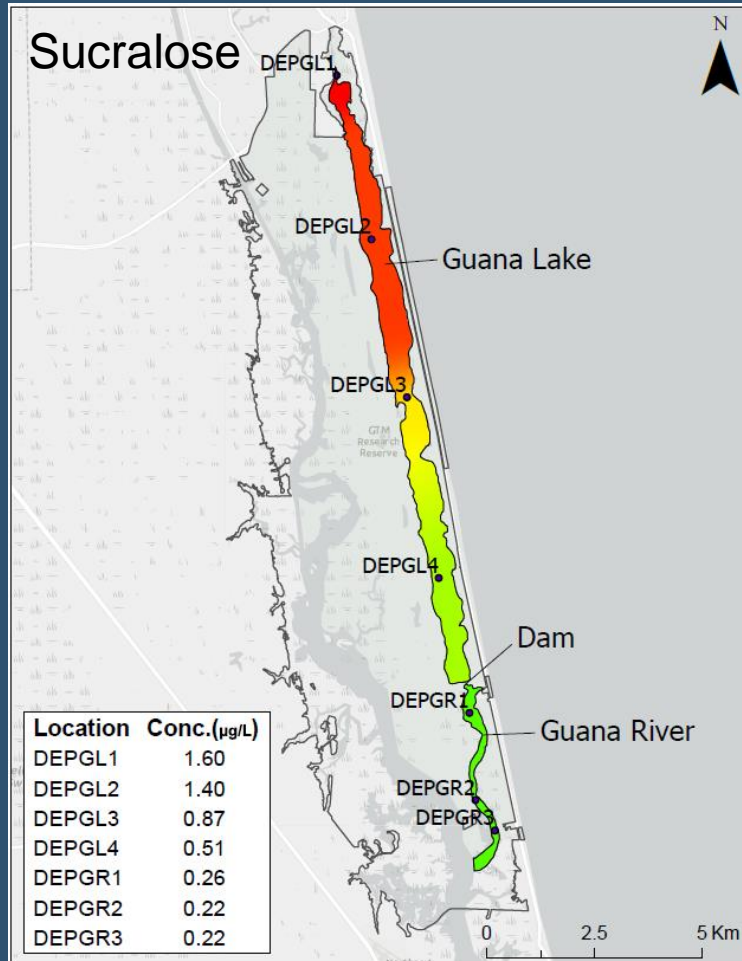
Water Quality Monitoring

Water Quality Impairments

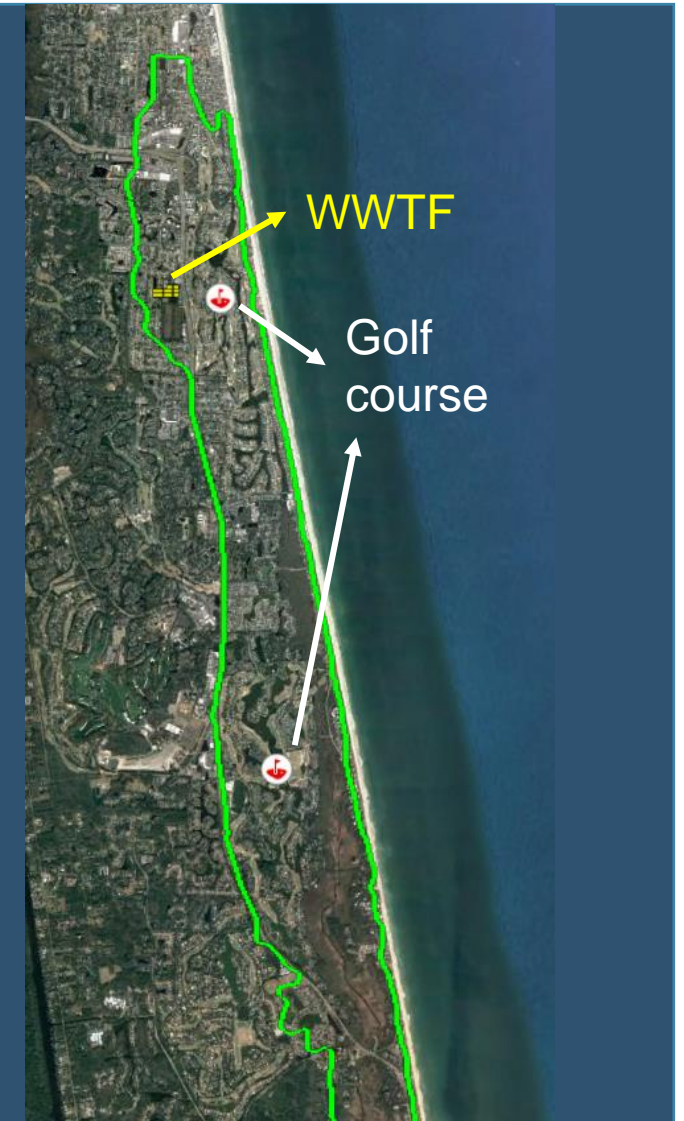




Nutrient Sources



- Wastewater
- Re-use water
- Septic systems
- Fertilizer run-off
- Sediment
- Vegetation

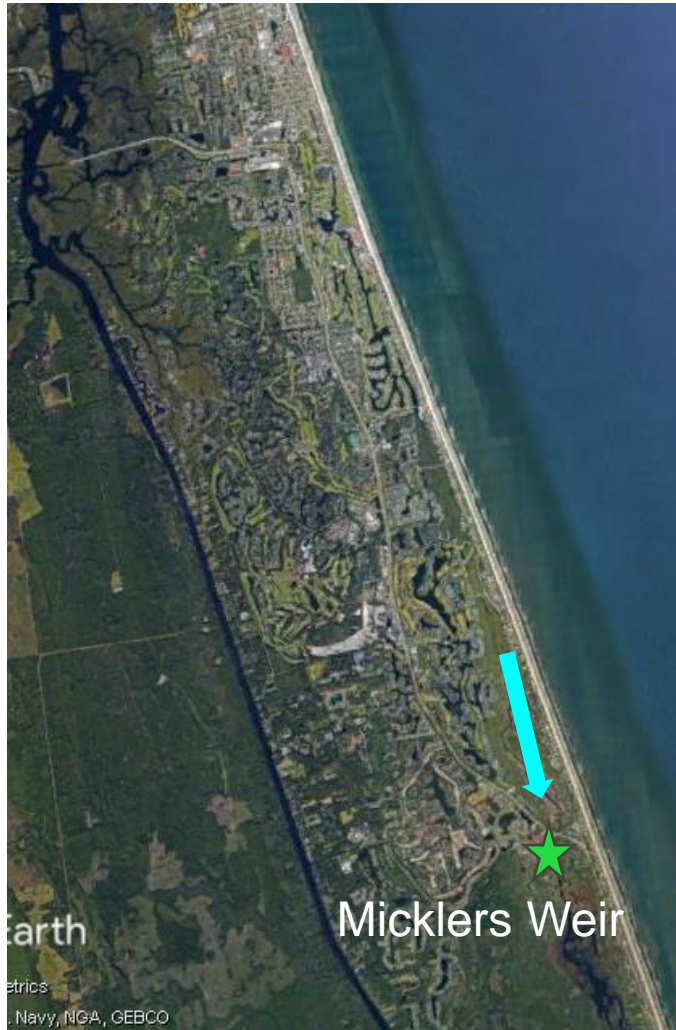




Nutrient Pathway

Headwaters

Lake



Micklers Weir



Decaying vegetation

Uptake and recycling by vegetation, algae, fish, crabs

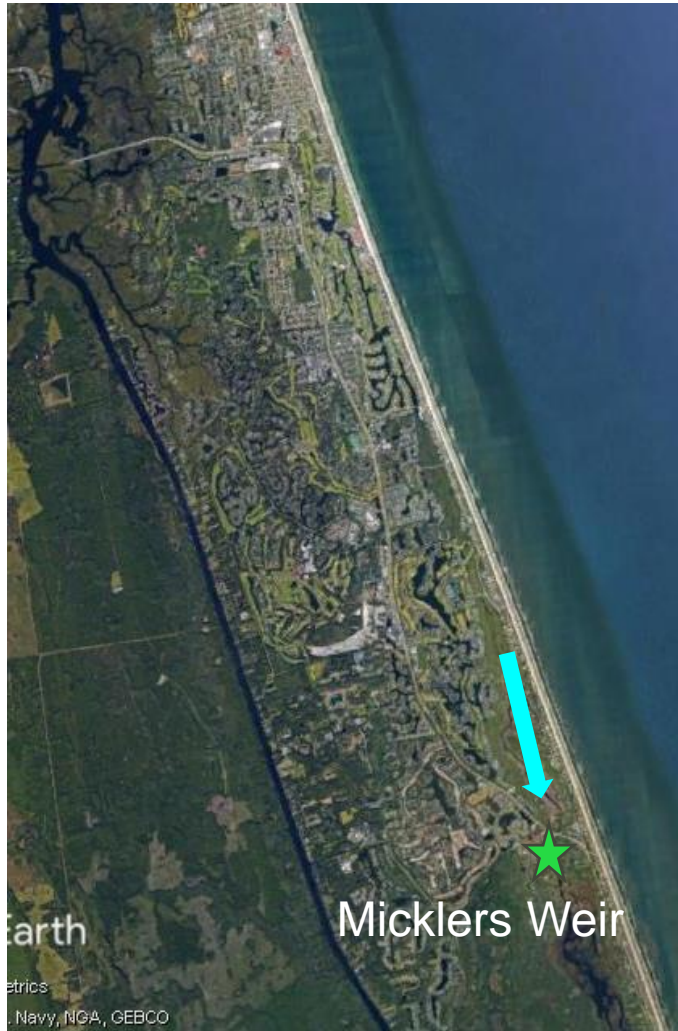
Guana Dam



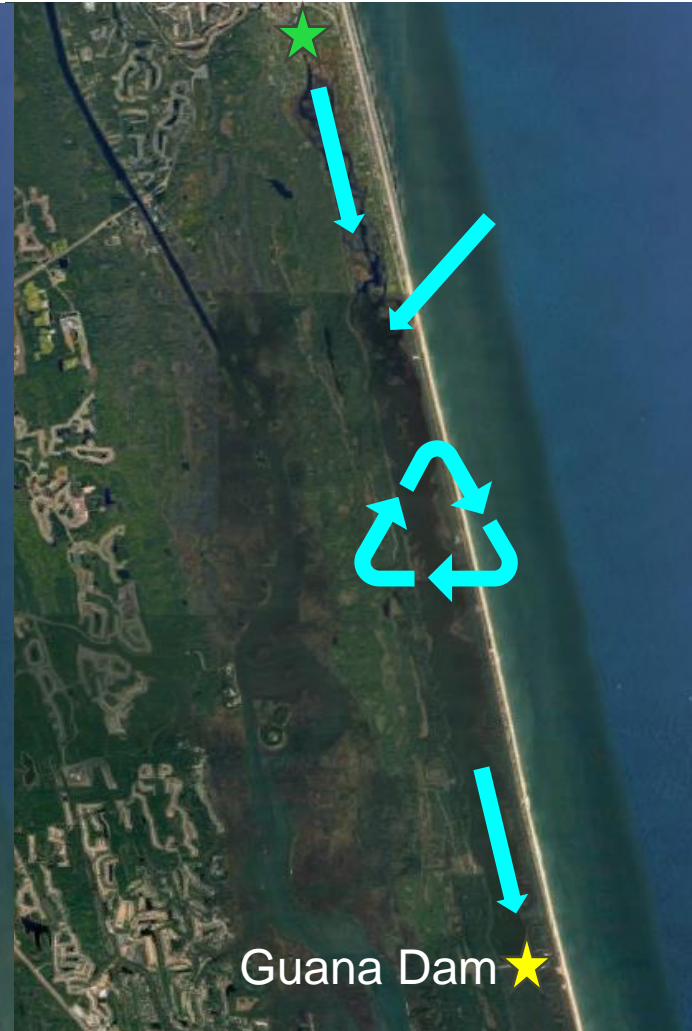


Nutrient Pathway

Headwaters



Lake



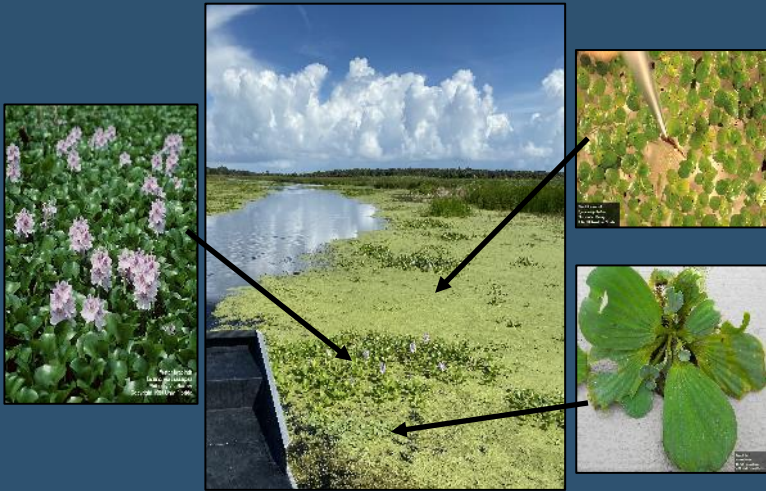
River





Other Factors Influencing Water Quality

Vegetation Control



Water Level Management

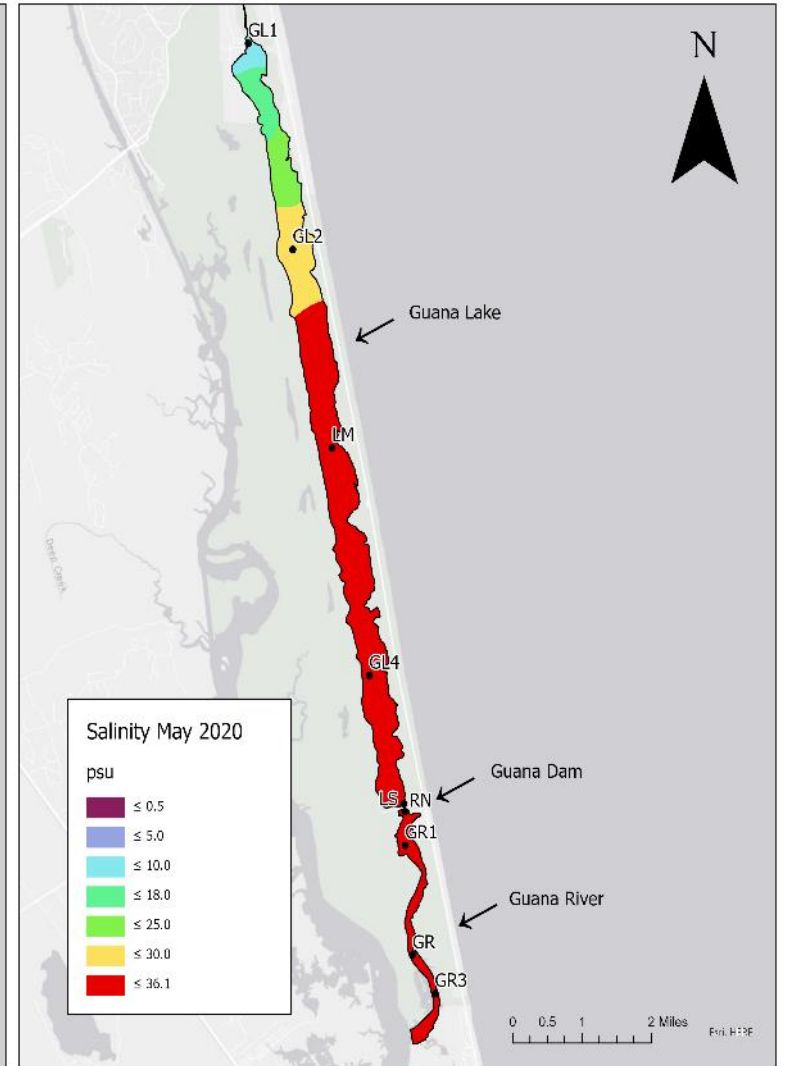
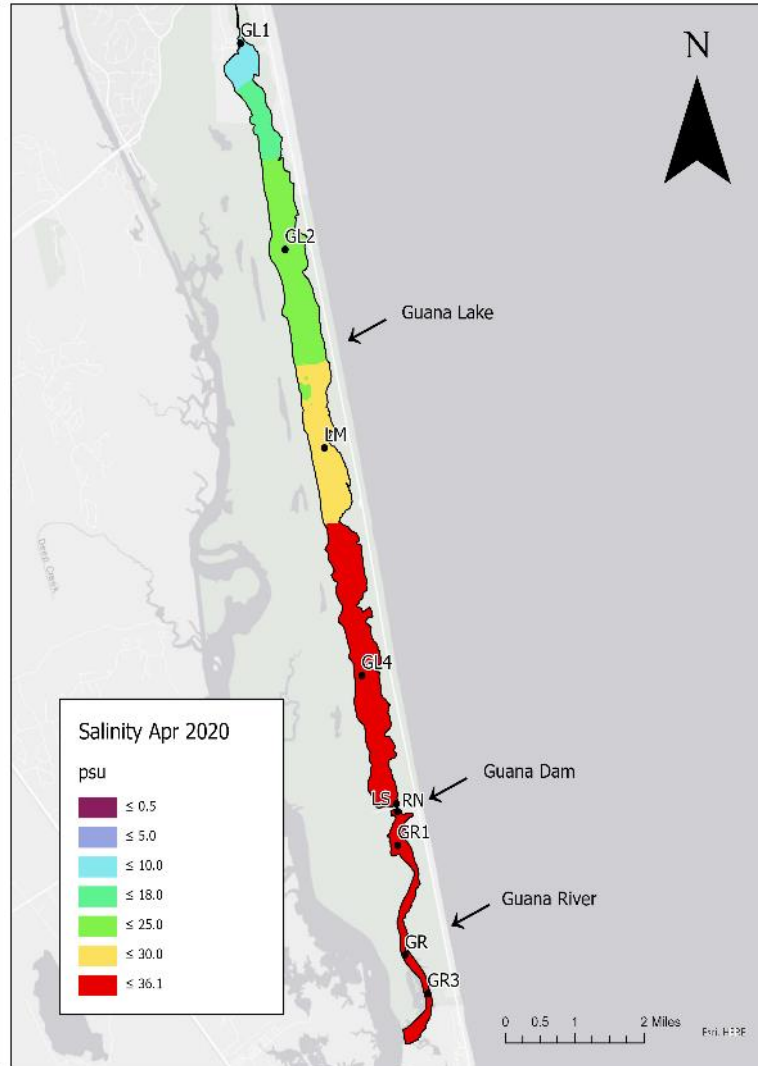


Drainage Improvements



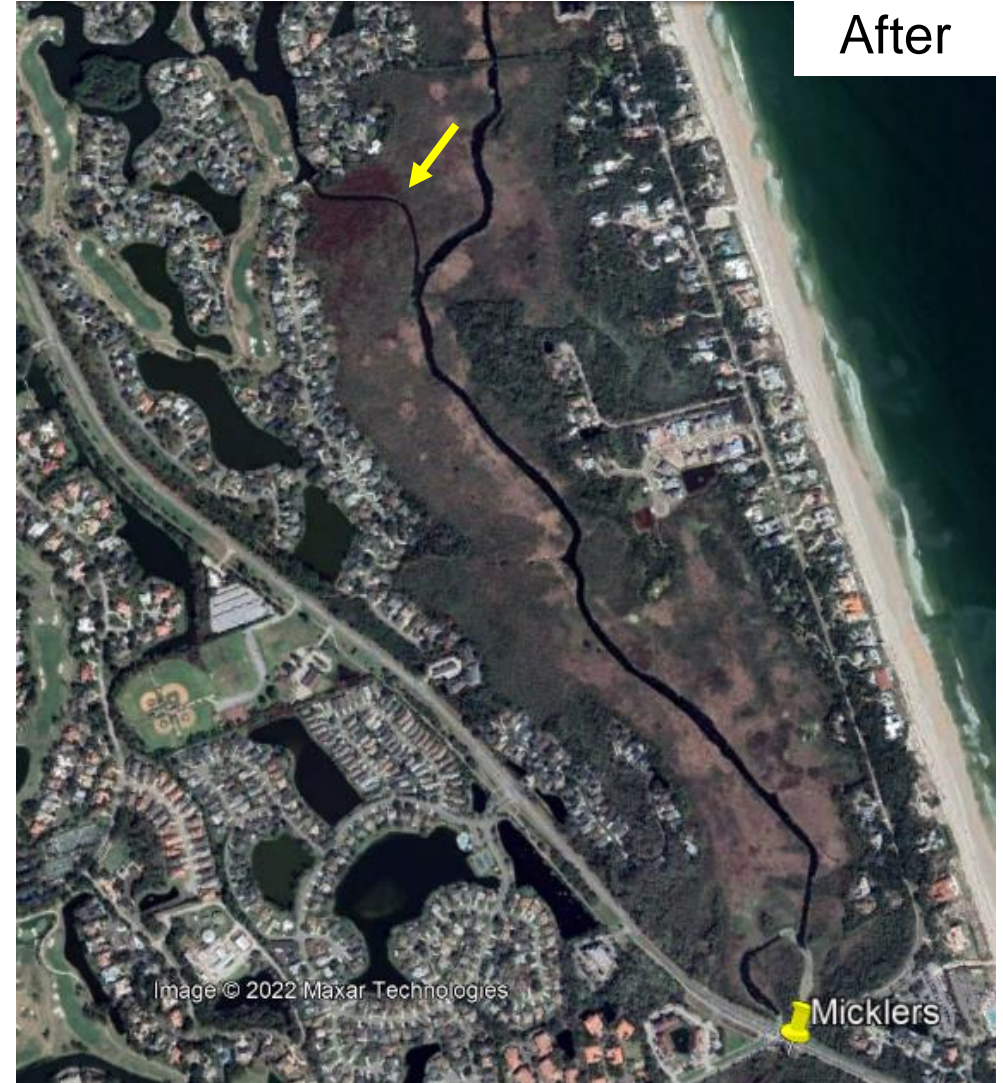
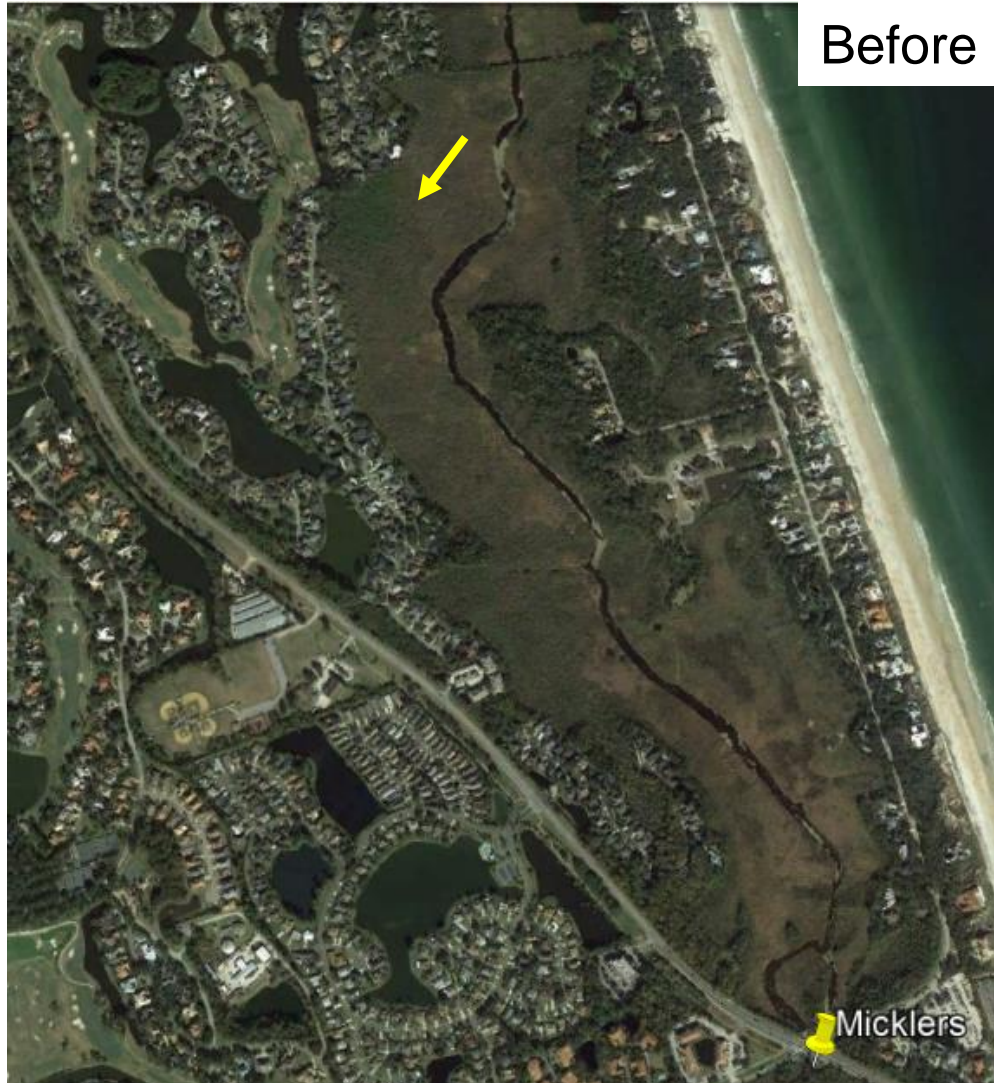


Guana Lake Recharge





Drainage Canal Clearing





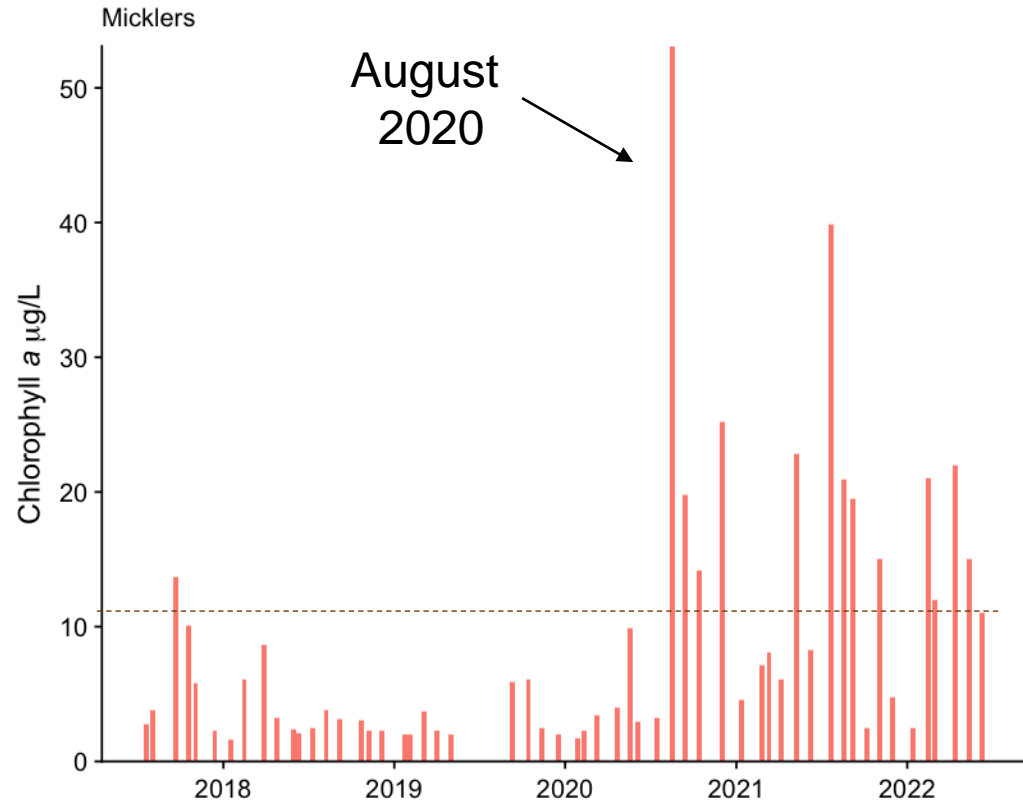
Drainage Canal Clearing

Aug. 17, 2020



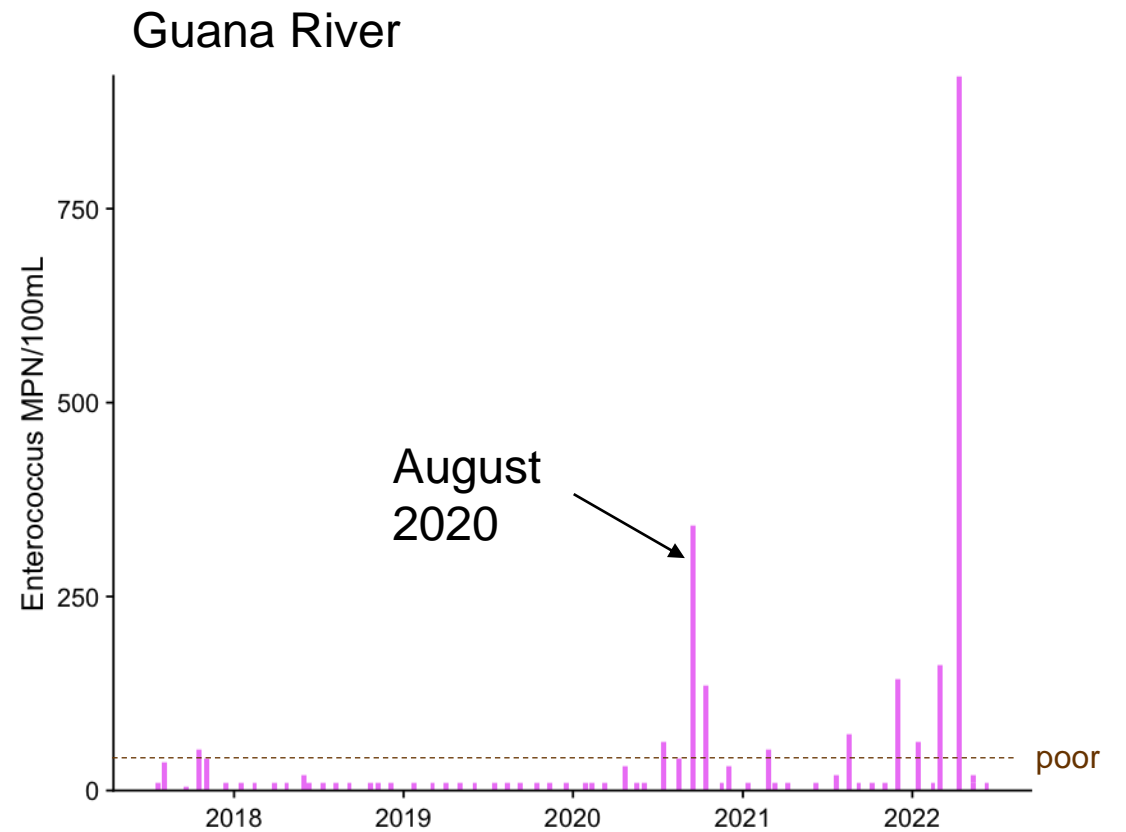
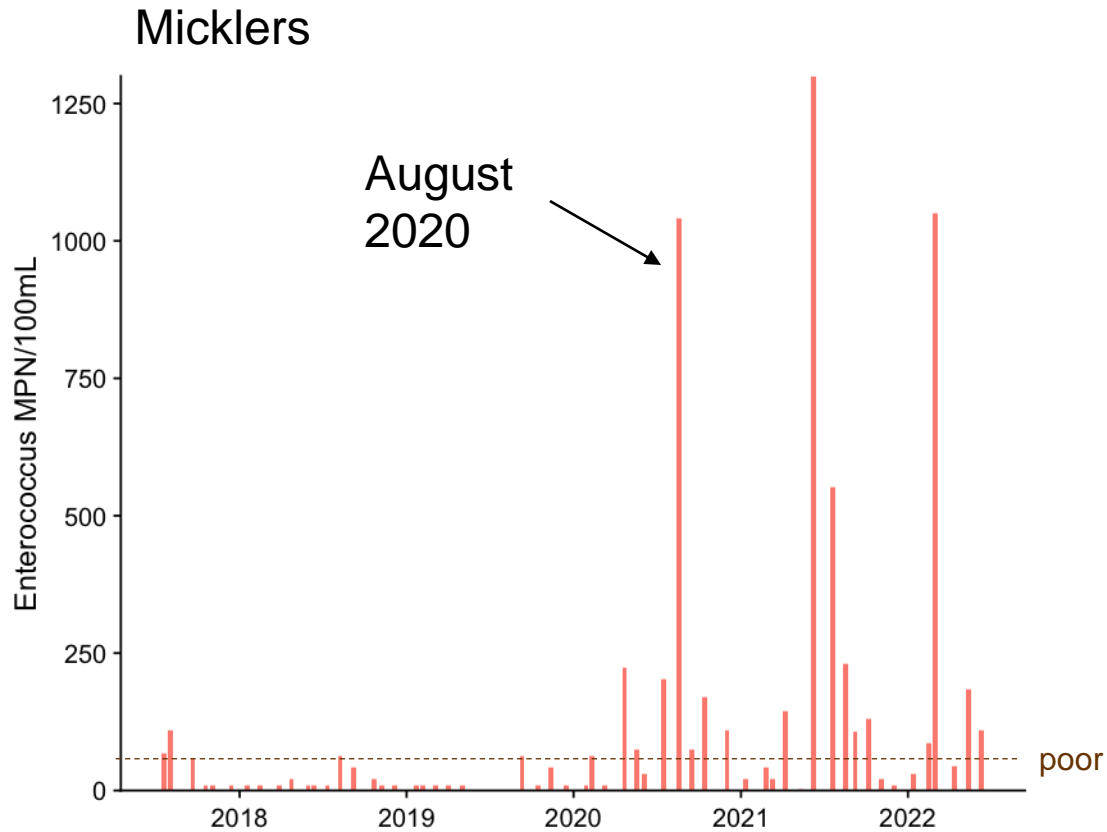


Drainage Canal Clearing





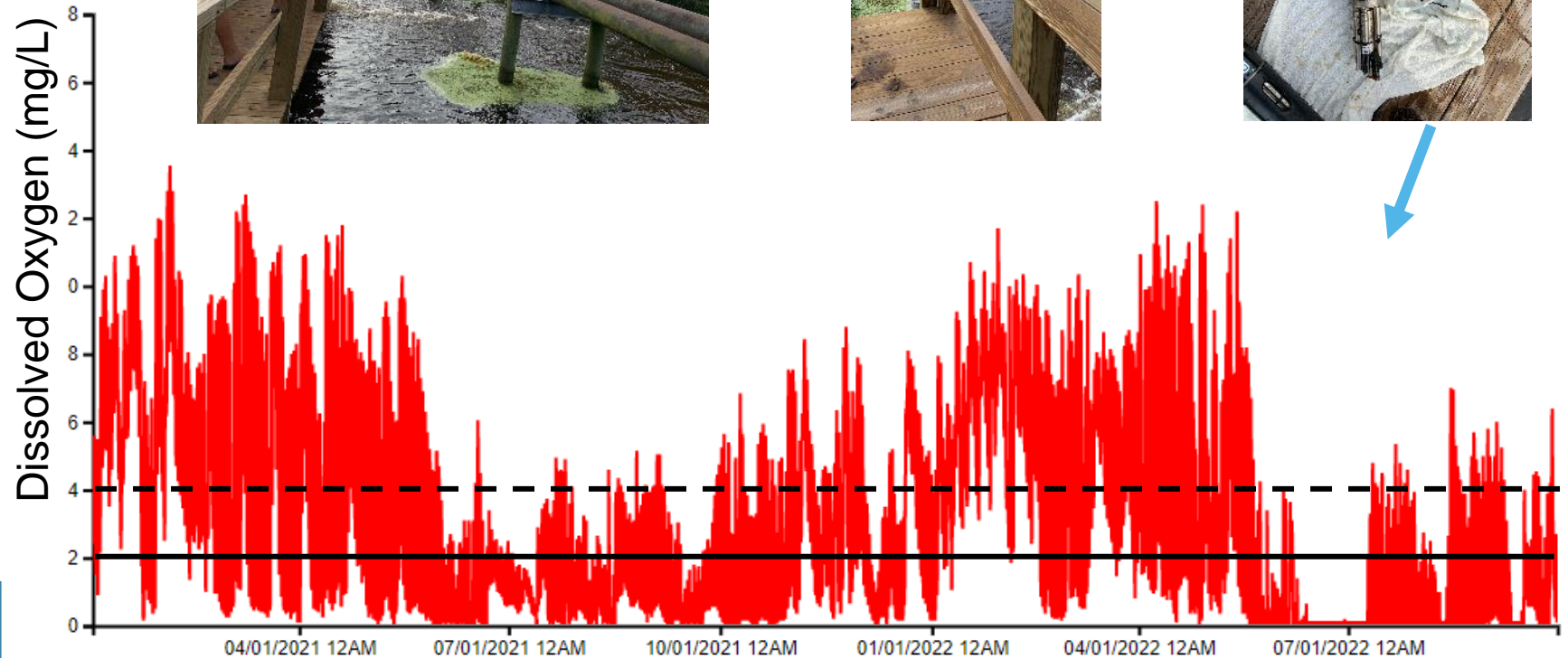
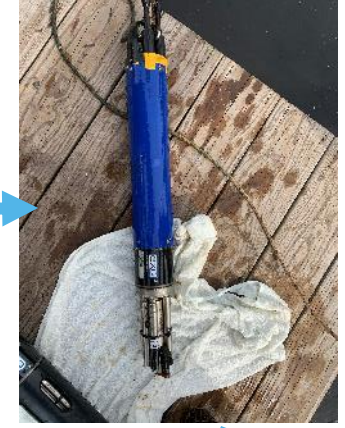
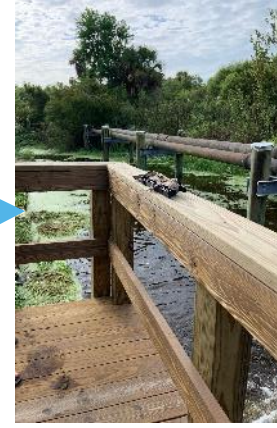
Drainage Canal Clearing



Florida Healthy Beaches Program Categories: Good = 0-35; Moderate = 36-70; Poor = 71



Continuous Water Quality Monitoring October 2020 to Present

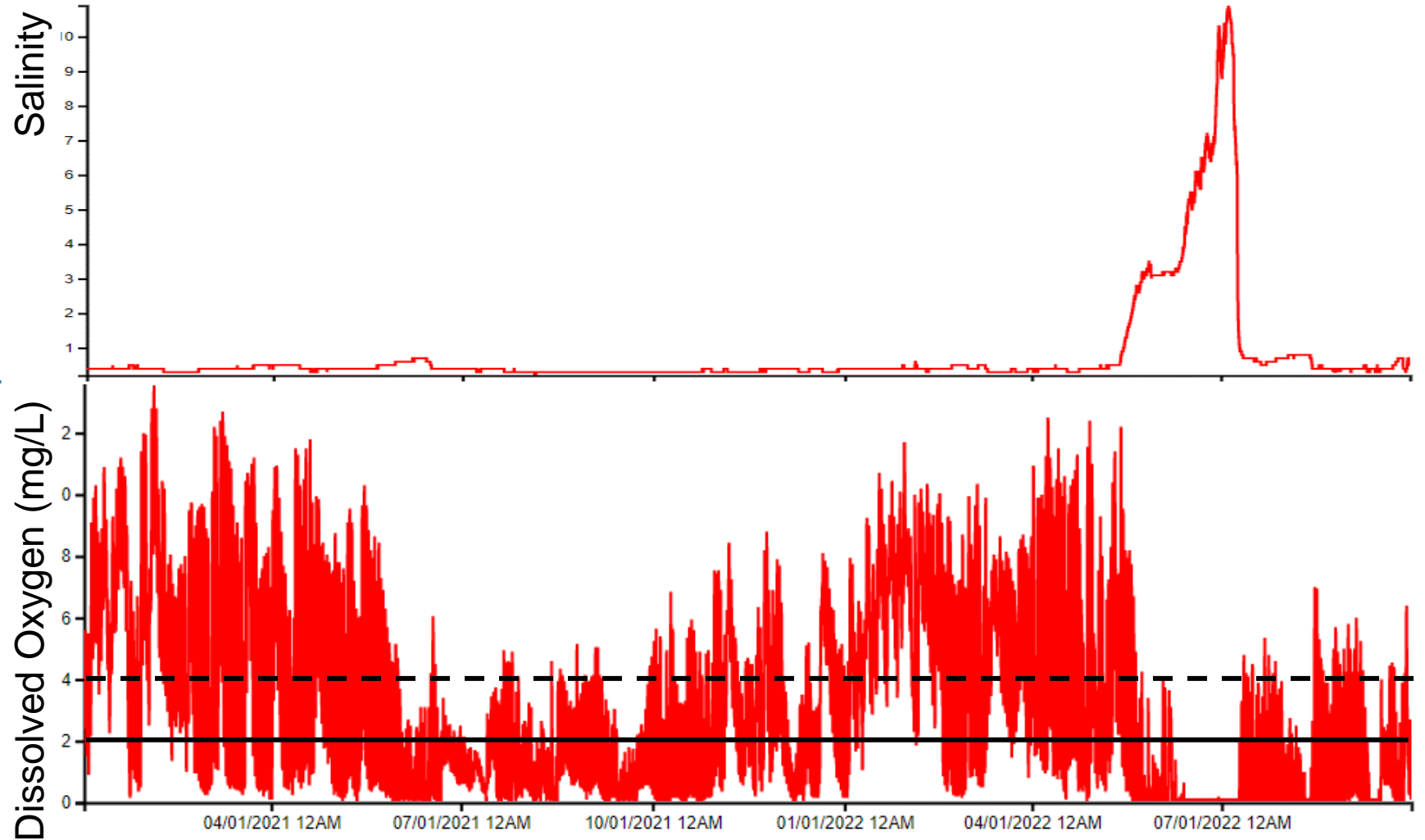


<https://floridaapdata.org/>



Continuous Water Quality Monitoring

October 2020 to Present

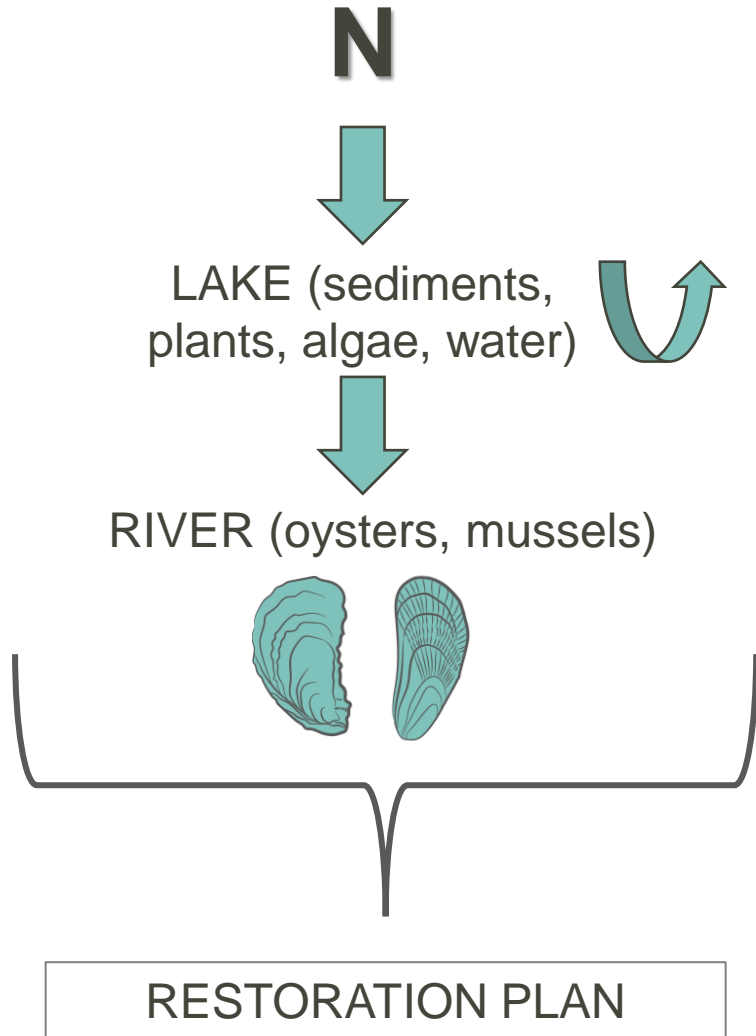
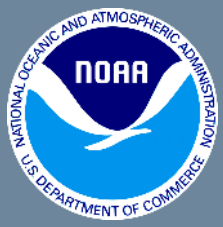


<https://floridaapdata.org/>



Collaborative Science

Developing Restoration Recommendations





THANK YOU

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