



Nikki Dix, Ph.D.

GTM Research Reserve





WATER QUALITY IN THE GTM RESEARCH RESERVE: FROM MONITORING TO MANAGEMENT

Nikki Dix², Shannon Dunnigan² and Katie Petrinec¹

Guana Tolomato Matanzas National Estuarine Research Reserve (GTMNERR)

¹Florida Department of Environmental Protection

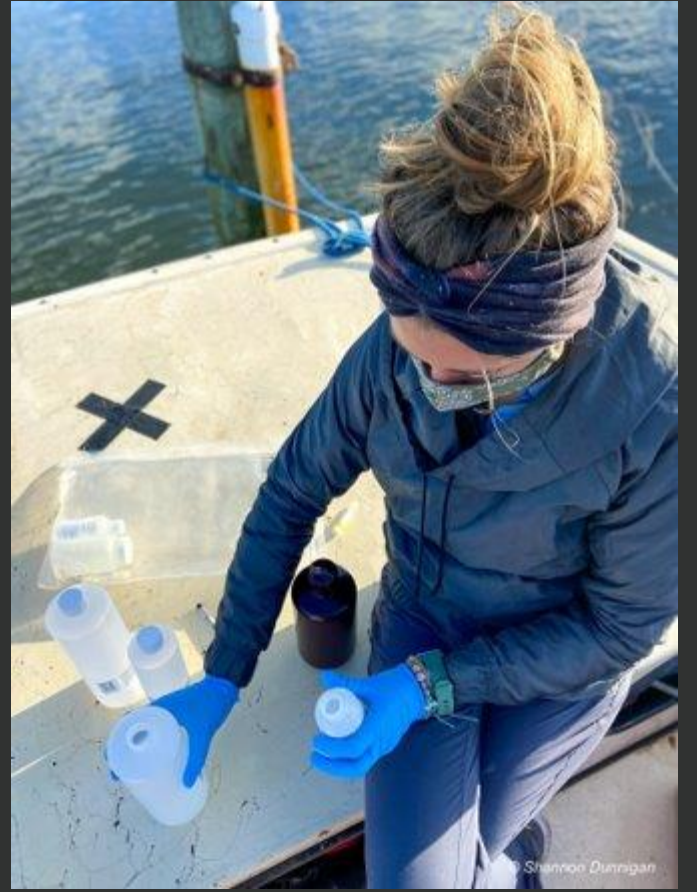
²University of North Florida

GTMNERR State of the Reserve | Feb. 15, 2024



SYSTEM-WIDE MONITORING PROGRAM

Water quality in the GTM Research Reserve:
From monitoring to management.



CENTRALIZED DATA MANAGEMENT OFFICE (CDMO)

www.nerrsdata.org

National Estuarine Research Reserve System
Centralized Data Management Office

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Real Time Monitoring Data

From the CDMO

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Suggested Citation Format

GTMPCMET
01/13/2022 15:45

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1.7 m/s (3.8 MPH)

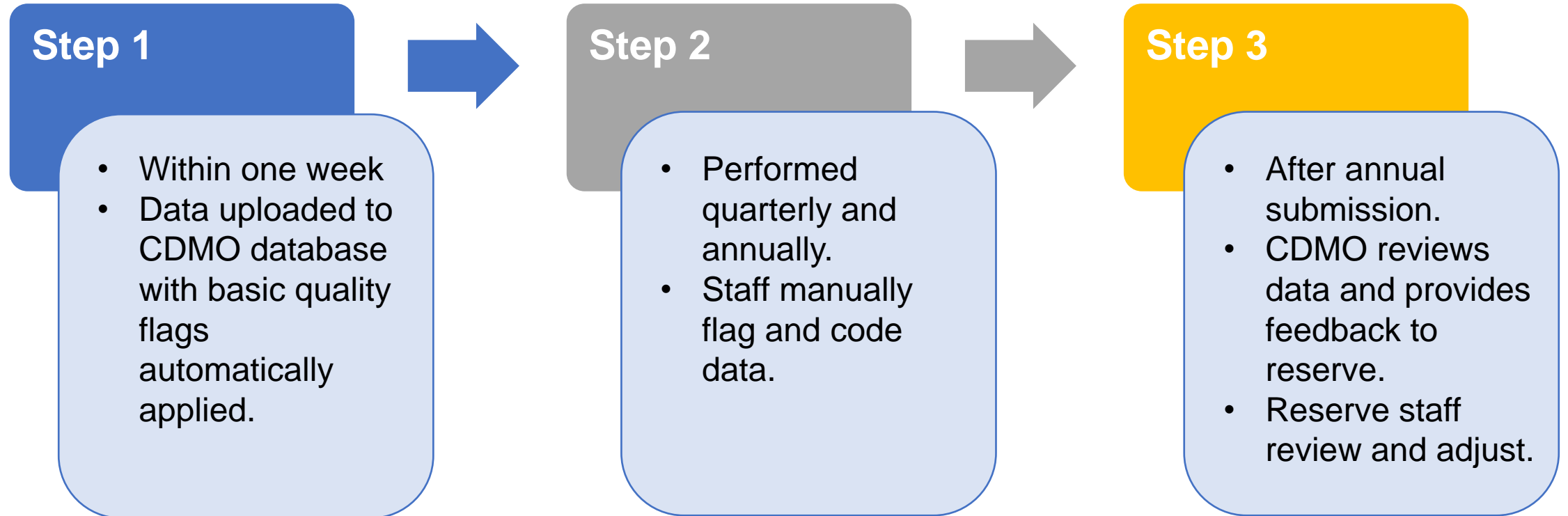
75%
0 mm (0 in.)

The CDMO is excited to announce the launch of our new **SWMP Mobile application**. Near real-time SWMP data is now available on your smartphone or tablet at: www.nerrsdata.org/mobile

Our **Data Graphing and Export System** has been updated and now has enhanced graphing capabilities! Want to easily export or graph data? If so, check out our **Data Graphing and Export System**!

Department of Commerce | NOAA | National Ocean Service | Office for Coastal Management | NERRS | Webmaster
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A THREE-STEP PROCESS












METADATA

Always check the metadata!

- Documentation associated with data.
- Included with every data download from CDMO.
- Explains *all aspects* of the data.
- Required from each NERR site.



Name	Type	Compressed size	Password ...	Size
 gtmfmwq2023	Microsoft Excel Comma S...	556 KB	No	
 gtmmet01-09.23m.prov	Microsoft Word Document	68 KB	No	
 gtmpecmet2023	Microsoft Excel Comma S...	570 KB	No	
 gtmpecwq2023	Microsoft Excel Comma S...	601 KB	No	
 gtmpeiwq2023	Microsoft Excel Comma S...	580 KB	No	
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 sampling_stations	Microsoft Excel Comma S...	15 KB	No	

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- Available Data
- CDMO Manual/SOPs
- Data Policy
- Data Citation
- SWMP Data QAQC
- SWMP Parameters
- SWMP Stations
- Metadata
- Teach with Data

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GTMPCMET
01/13/2022 15:45

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75%
0 mm (0 in.)

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CENTRALIZED DATA MANAGEMENT OFFICE (CDMO)

<https://cdmo.baruch.sc.edu/data/available-data>

Nutrient Parameters

Fort Matanzas

- o PO4F
- o NH4F
- o NO2F
- o NO3F
- o NO23F
- o CHLA_N
- o DIN
- o DOC
- o DON
- o DO_N
- o ENTERO_MPN
- o FECCOL_CFU
- o PHEA
- o PH_N
- o PON
- o SALT_N
- o SECCHI
- o TDN
- o TKN
- o TKNF
- o TN
- o TON
- o TP
- o TSS
- o TURB_N
- o UNCCHLA_N
- o ECOLI_MPN
- o COLOR
- o IRR0_N
- o IRR1_N
- o KD_N
- o SIO4F
- o PHOSP
- o POC
- o TDP

Pellicer Creek

- o PO4F
- o NH4F
- o NO2F
- o NO3F
- o NO23F
- o CHLA_N
- o DIN
- o DOC
- o DON
- o DO_N
- o ENTERO_MPN
- o FECCOL_CFU
- o PHEA
- o PH_N
- o PON
- o SALT_N
- o SECCHI
- o TDN
- o TKN
- o TKNF
- o TN
- o TON
- o TP
- o TSS
- o TURB_N
- o UNCCHLA_N
- o ECOLI_MPN
- o COLOR
- o IRR0_N
- o IRR1_N
- o KD_N
- o SIO4F
- o PHOSP
- o POC
- o TDP

Pine Island

- o PO4F
- o NH4F
- o NO2F
- o NO3F
- o NO23F
- o CHLA_N
- o DIN
- o DOC
- o DON
- o DO_N
- o ENTERO_MPN
- o FECCOL_CFU
- o PHEA
- o PH_N
- o PON
- o SALT_N
- o SECCHI
- o TDN
- o TKN
- o TKNF
- o TN
- o TON
- o TP
- o TSS
- o TURB_N
- o UNCCHLA_N
- o ECOLI_MPN
- o COLOR
- o IRR0_N
- o IRR1_N
- o KD_N
- o SIO4F
- o PHOSP
- o POC
- o TDP

San Sebastian

- o PO4F
- o NH4F
- o NO2F
- o NO3F
- o NO23F
- o CHLA_N
- o DIN
- o DOC
- o DON
- o DO_N
- o ENTERO_MPN
- o FECCOL_CFU
- o PHEA
- o PH_N
- o PON
- o SALT_N
- o SECCHI
- o TDN
- o TKN
- o TKNF
- o TN
- o TON
- o TP
- o TSS
- o TURB_N
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- o ECOLI_MPN
- o COLOR
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- o SIO4F
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- o POC
- o TDP

Pine Island



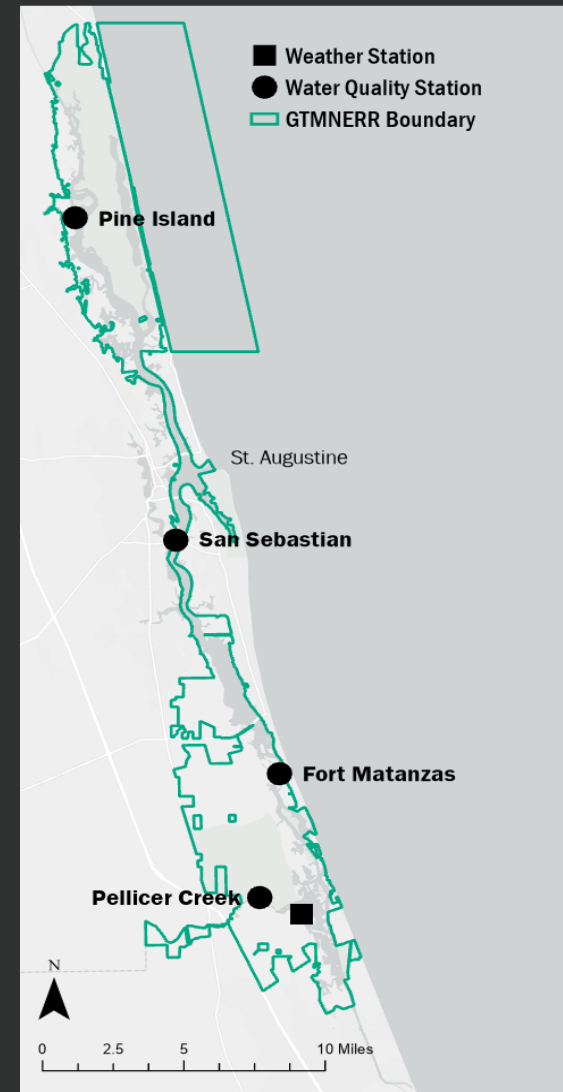
San Sebastian



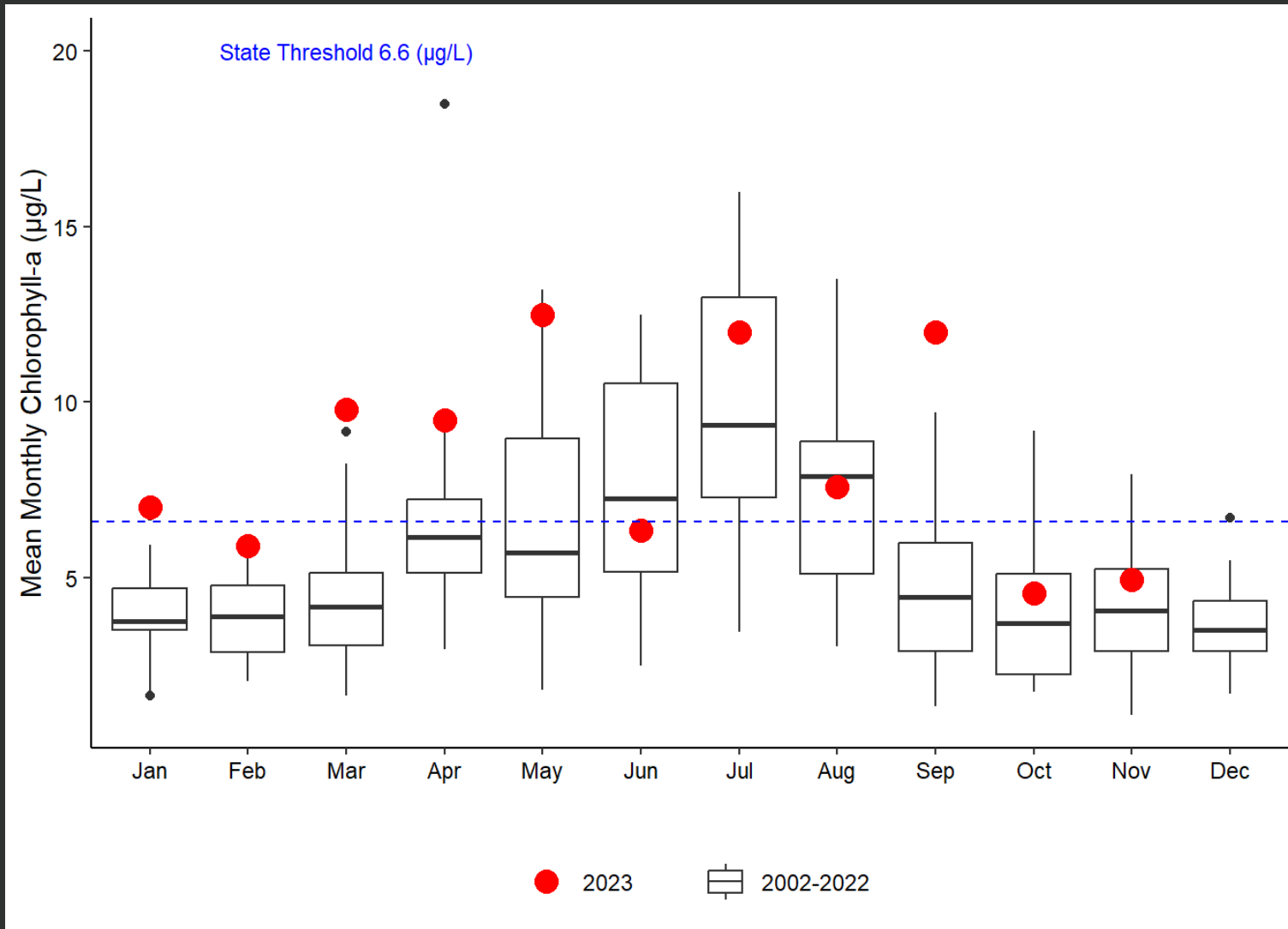
Fort Matanzas



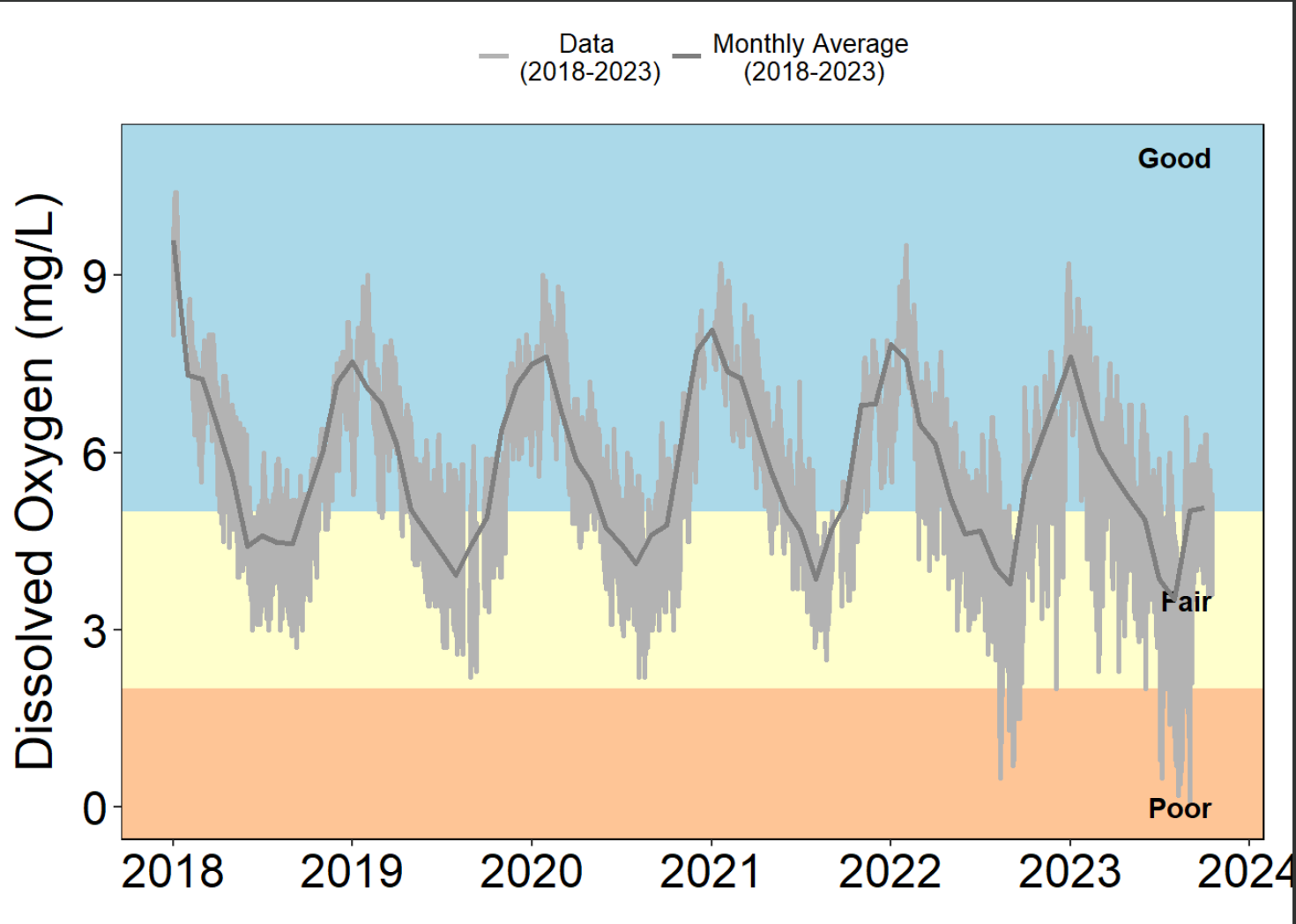
Pellicer Creek



CHLOROPHYLL *a* AT PINE ISLAND

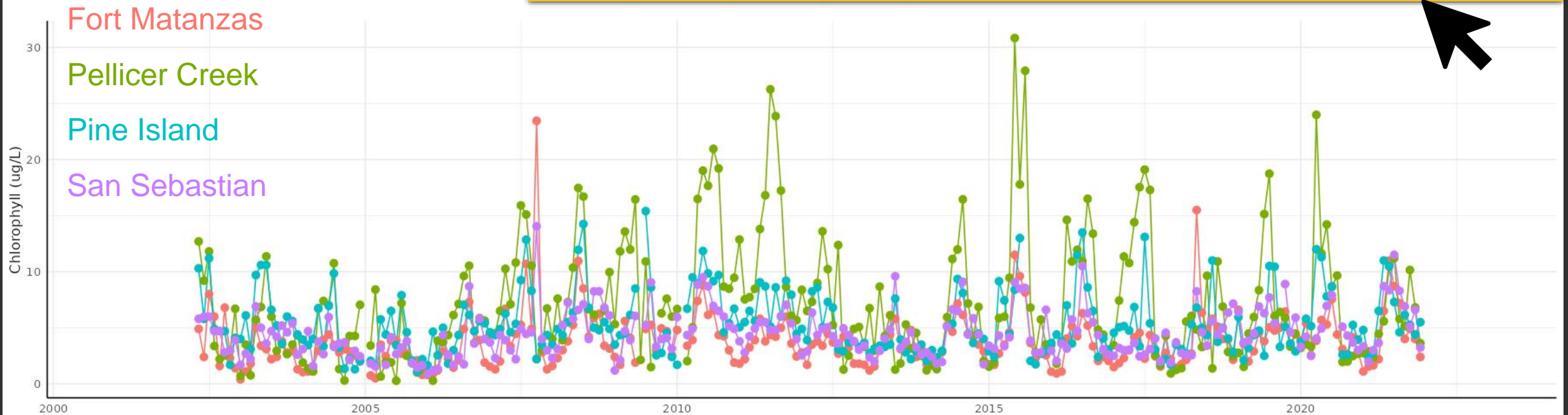


DISSOLVED OXYGEN AT PINE ISLAND



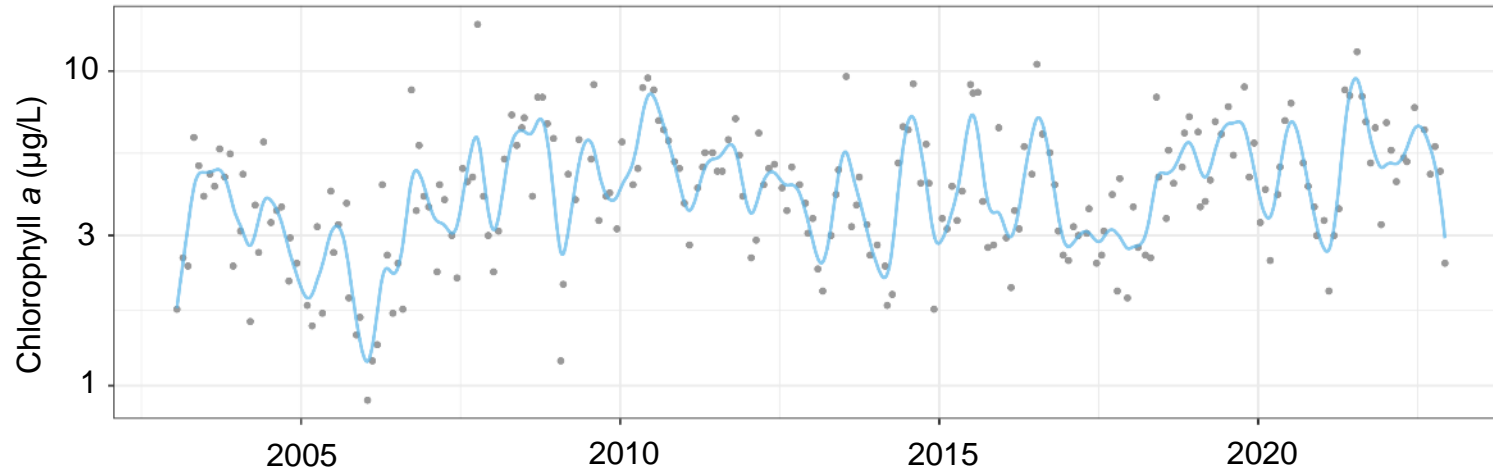
CHLOROPHYLL *a* AT ALL STATIONS

<https://cdmo.baruch.sc.edu/get/swmp-rats.cfm>

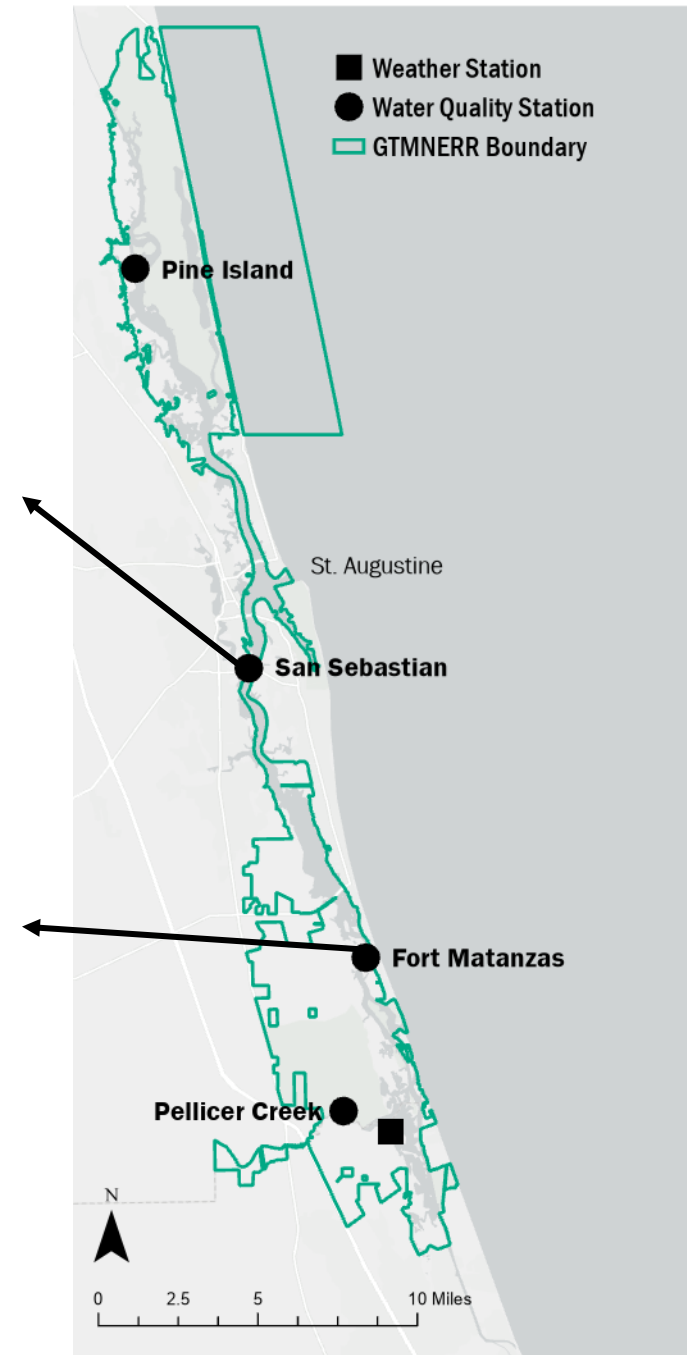
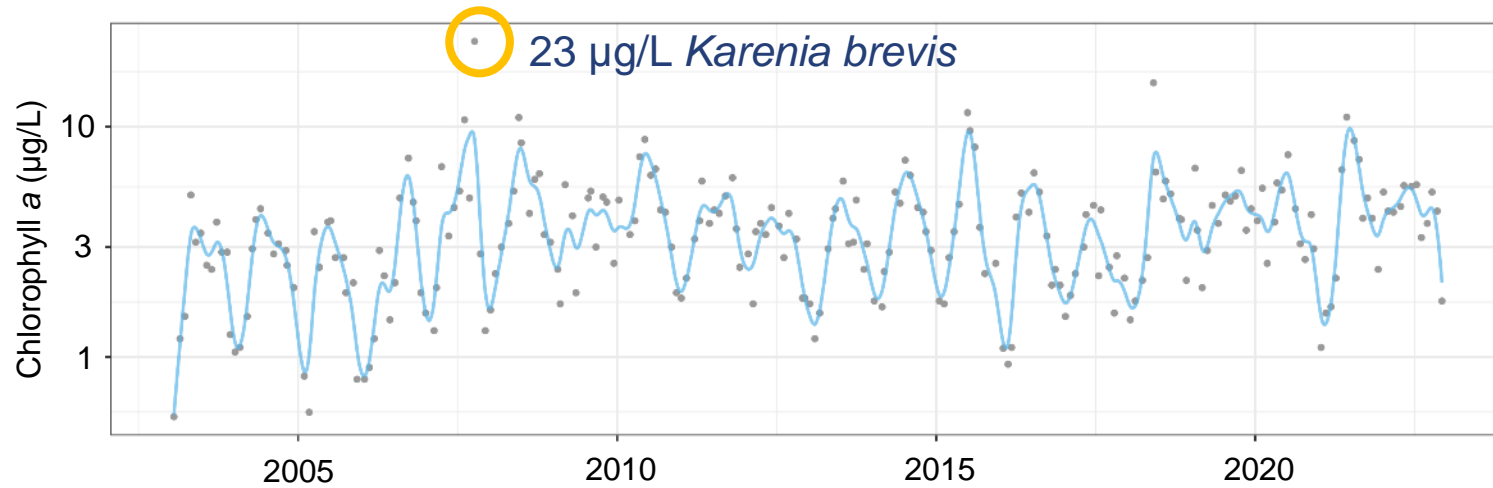




San Sebastian (SS)

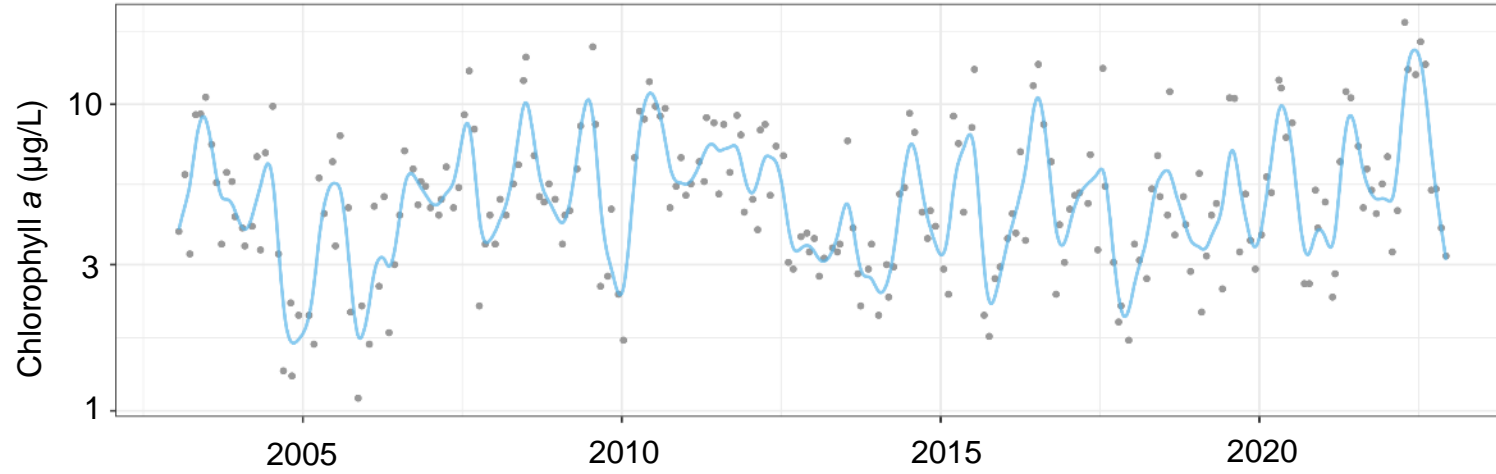


Fort Matanzas (FM)

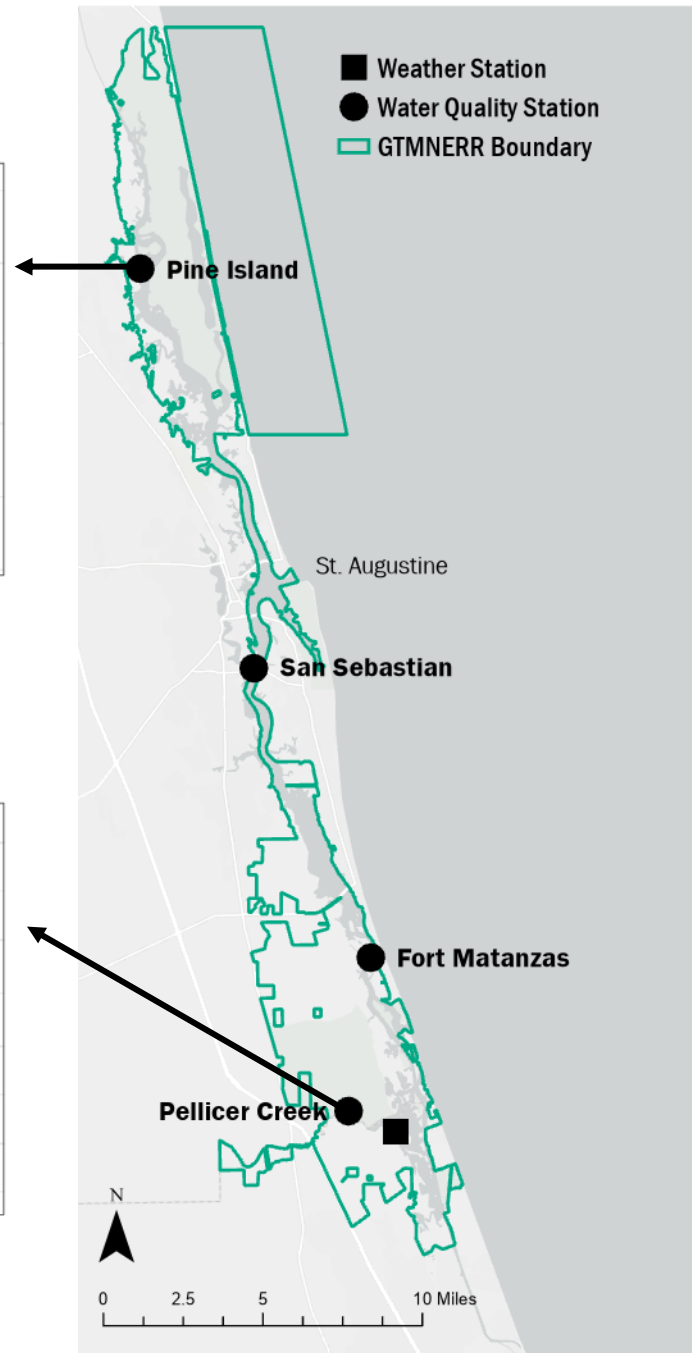
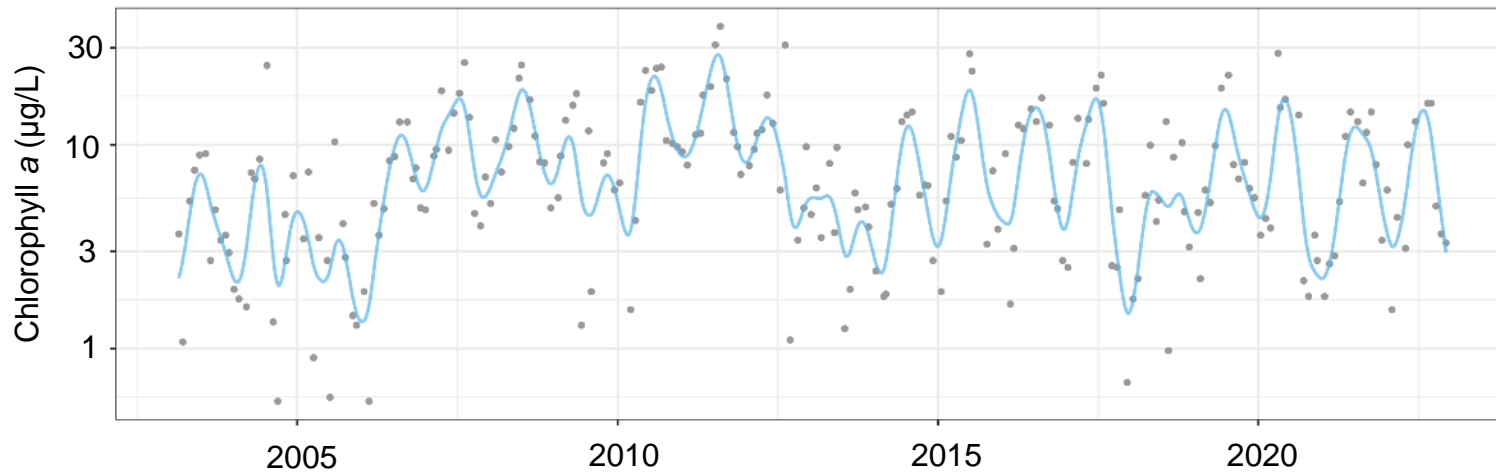




Pine Island (PI)



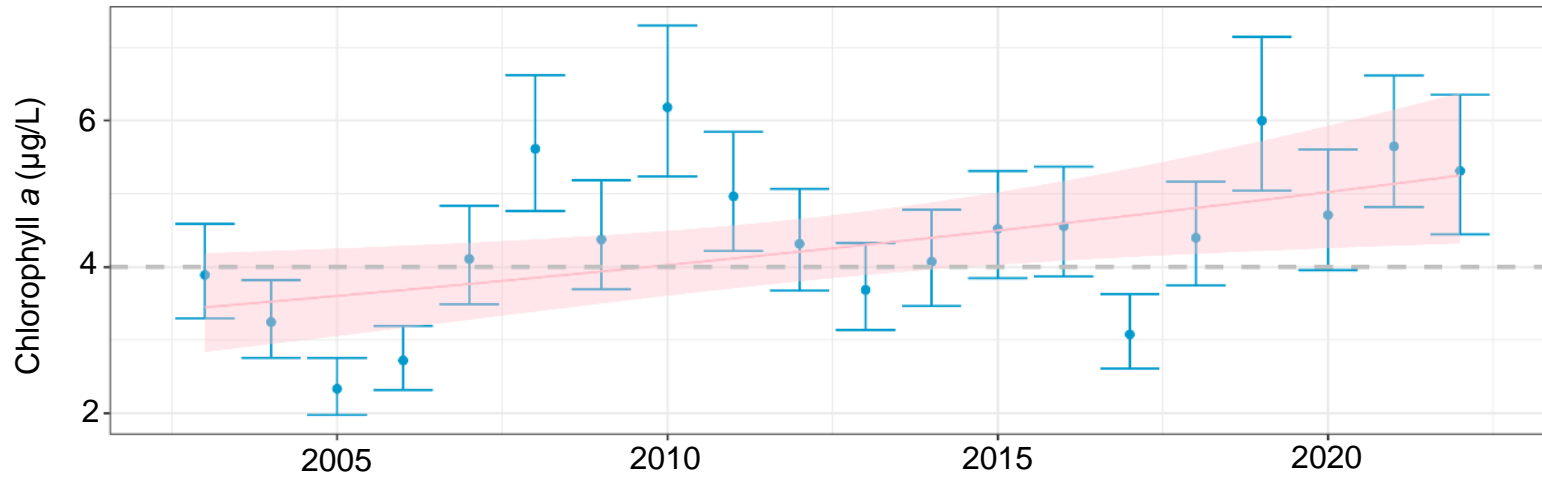
Pellicer Creek (PC)





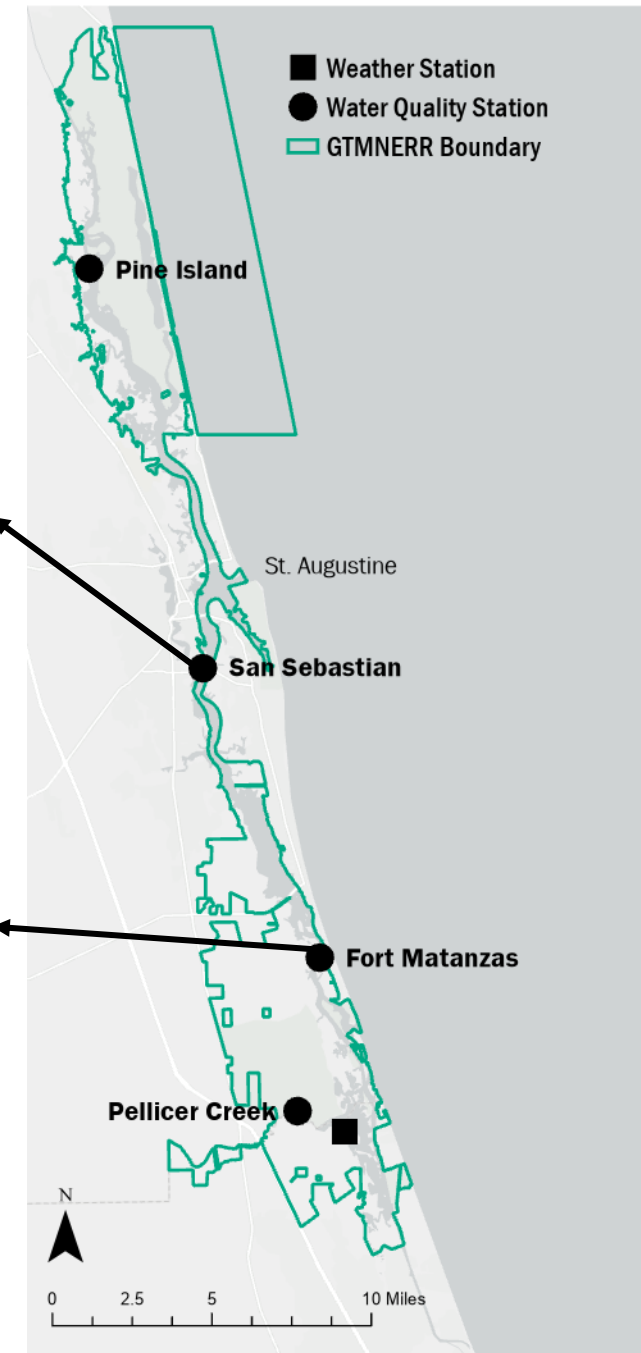
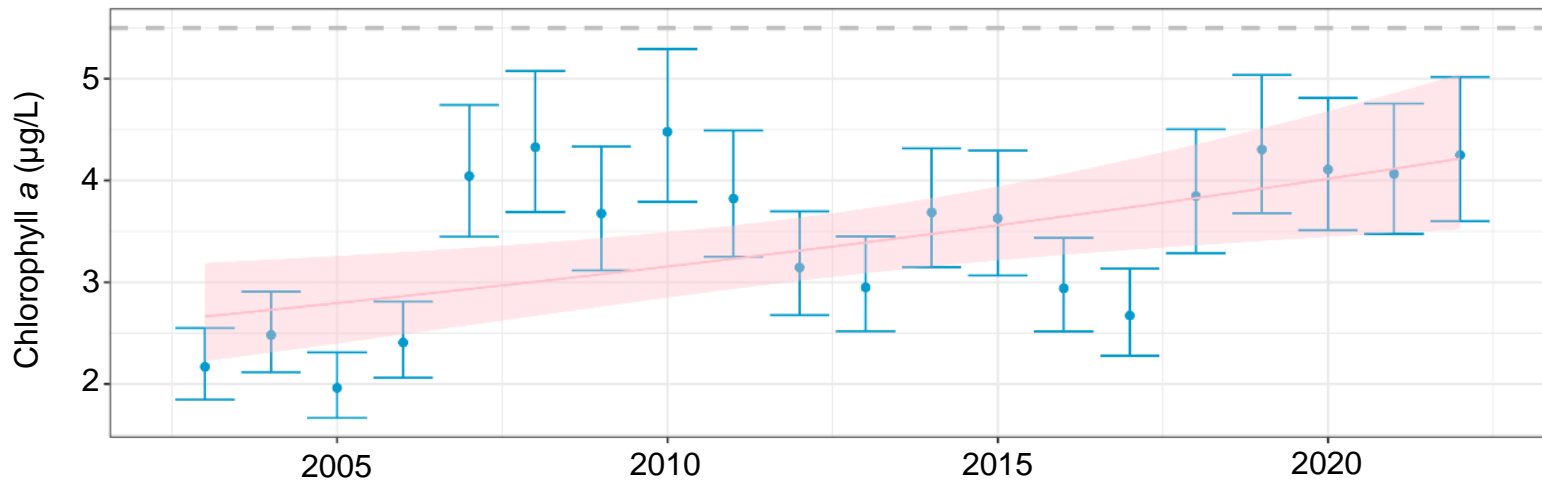
San Sebastian (SS)

Annual means with 95% confidence intervals.
Trend from 2003 to 2022: approximate slope 0.09, $p < 0.05$).



Fort Matanzas (FM)

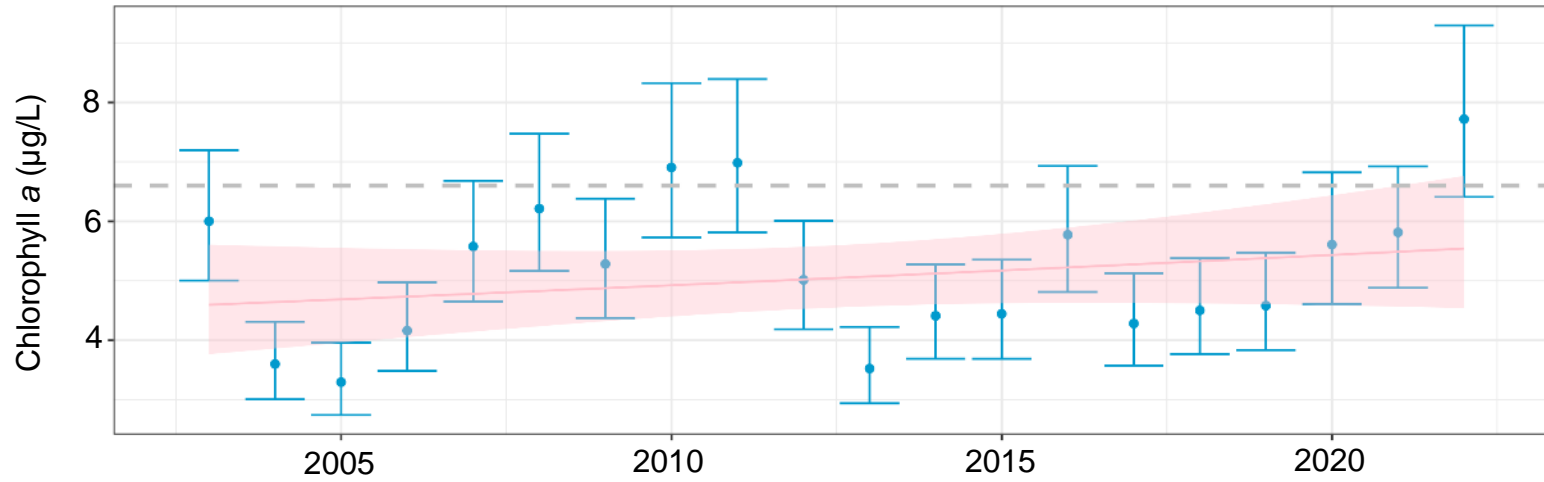
Annual means with 95% confidence intervals.
Trend from 2003 to 2022: approximate slope 0.08, $p < 0.01$).





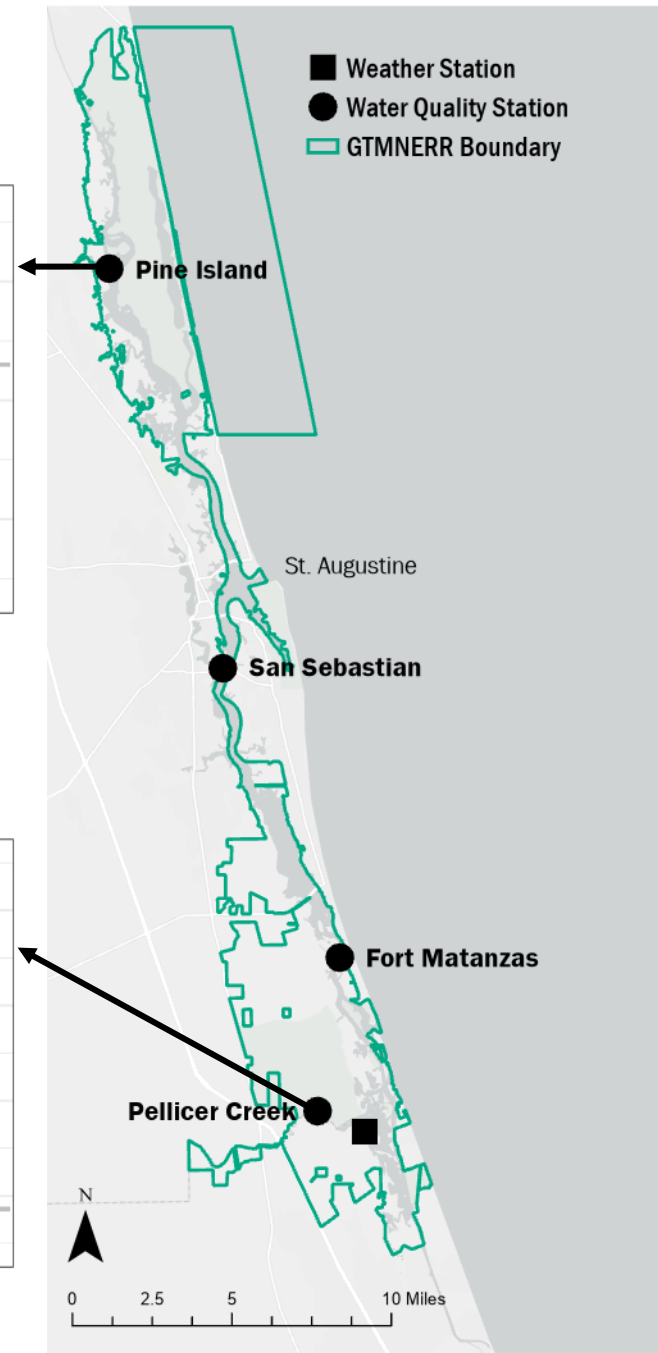
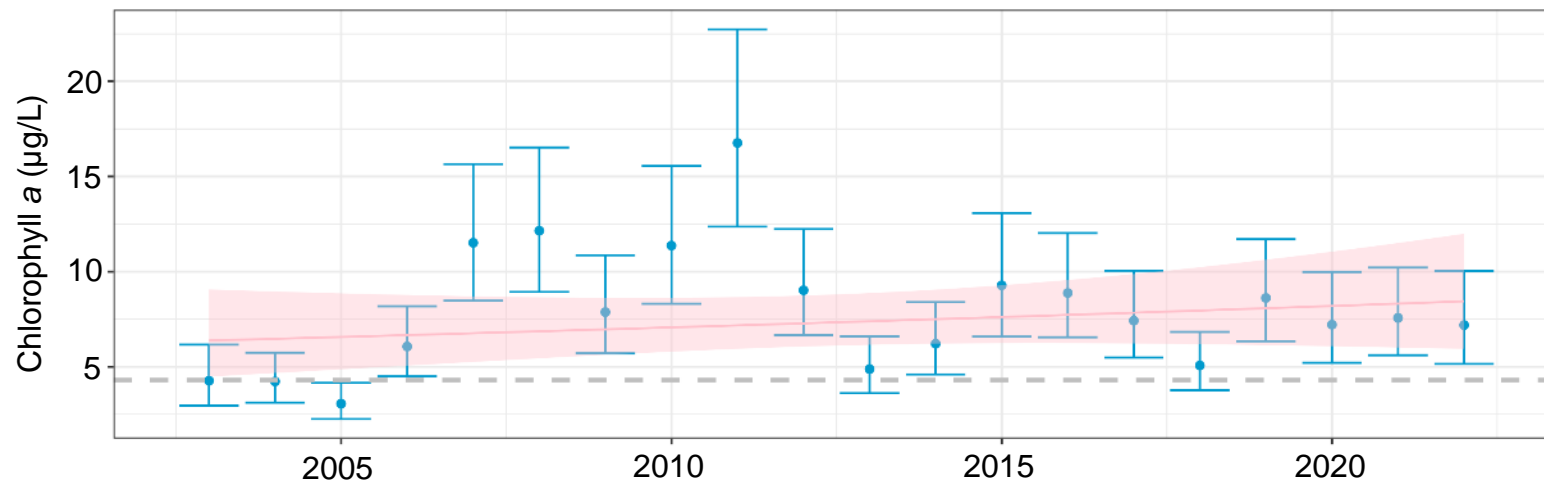
Pine Island (PI)

Annual means with 95% confidence intervals.
Trend from 2003 to 2022: nonsignificant



Pellicer Creek (PC)

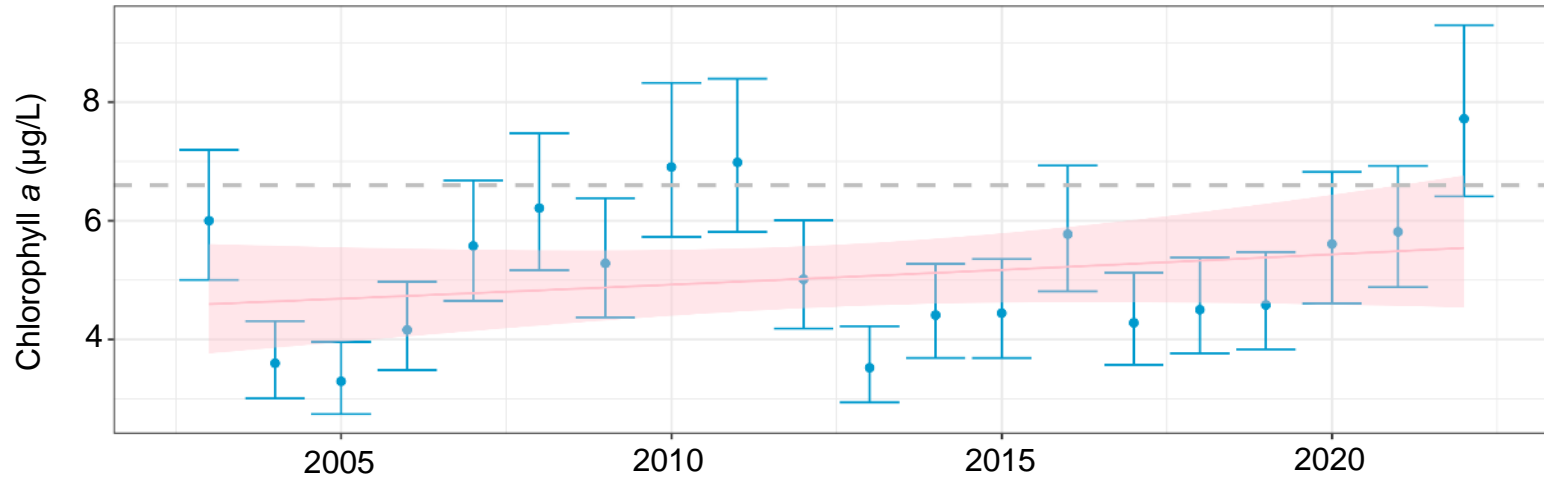
Annual means with 95% confidence intervals.
Trend from 2003 to 2022: nonsignificant



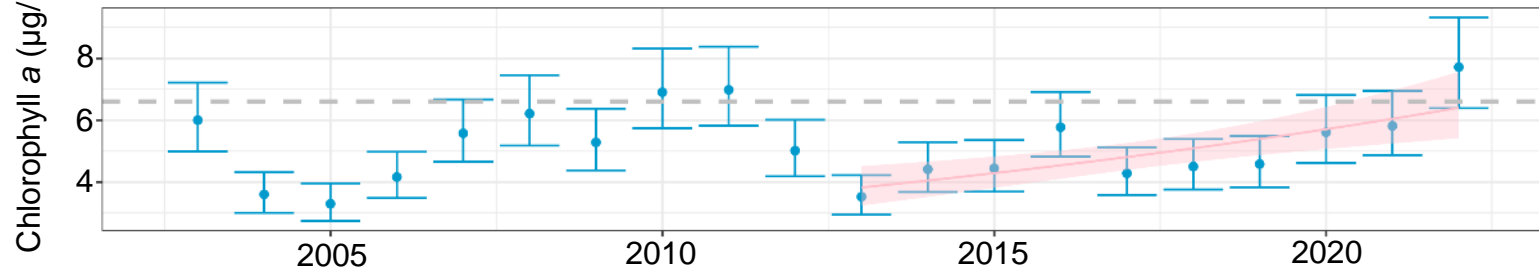


Pine Island (PI)

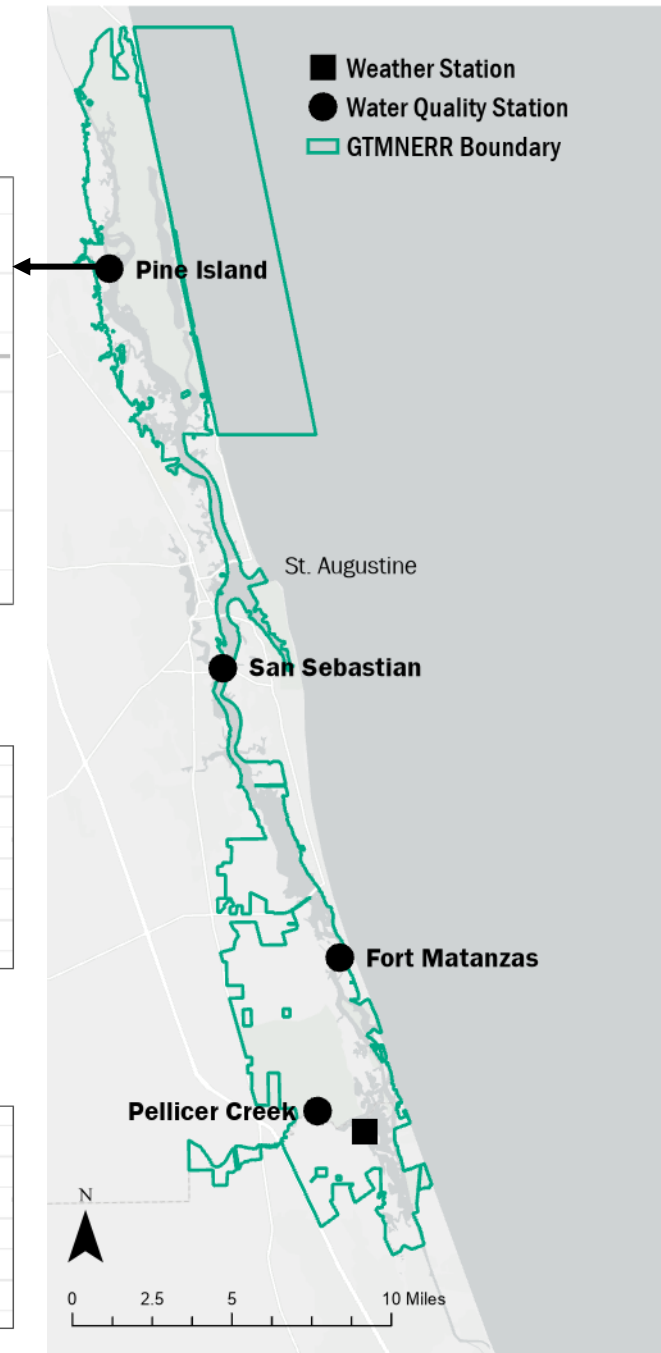
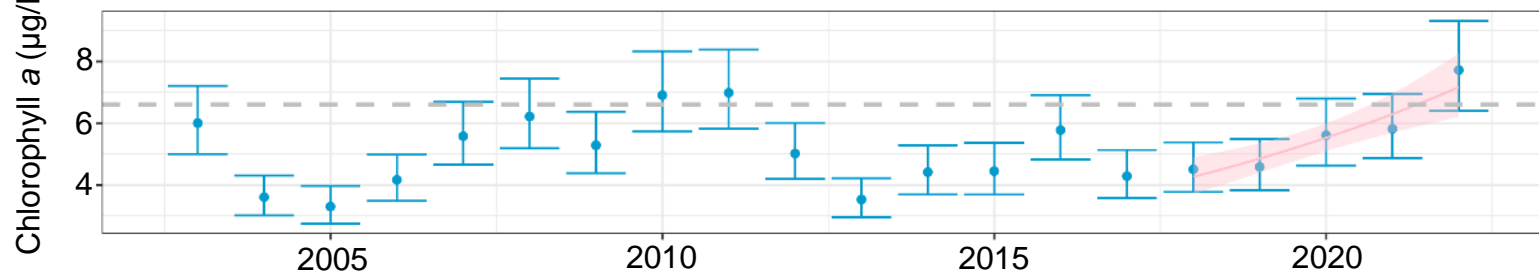
Annual means with 95% confidence intervals.
Trend from 2003 to 2022: nonsignificant



Trend from 2013 to 2022: approximate slope 0.29, log-slope 0.02 (0.01, 0.04), $p < 0.001$.



Trend from 2018 to 2022: approximate slope 0.72, log-slope 0.06 (0.03, 0.08), $p < 0.001$.



SUMMARY

- No chronic blooms detected.
- Consistently high at PC.
- Increasing trends.

	2003-2022 (20 years)	2003-2012 (1 st 10 years)	2013-2022 (2 nd 10 years)	2018-2022 (5 years)
PI	↑	↑	↑	↑
SS	↑	↑	↑	↑
FM	↑	↑	↑	↑
PC	↑	↑	↑	↑

p > 0.05

p < 0.05

p < 0.01

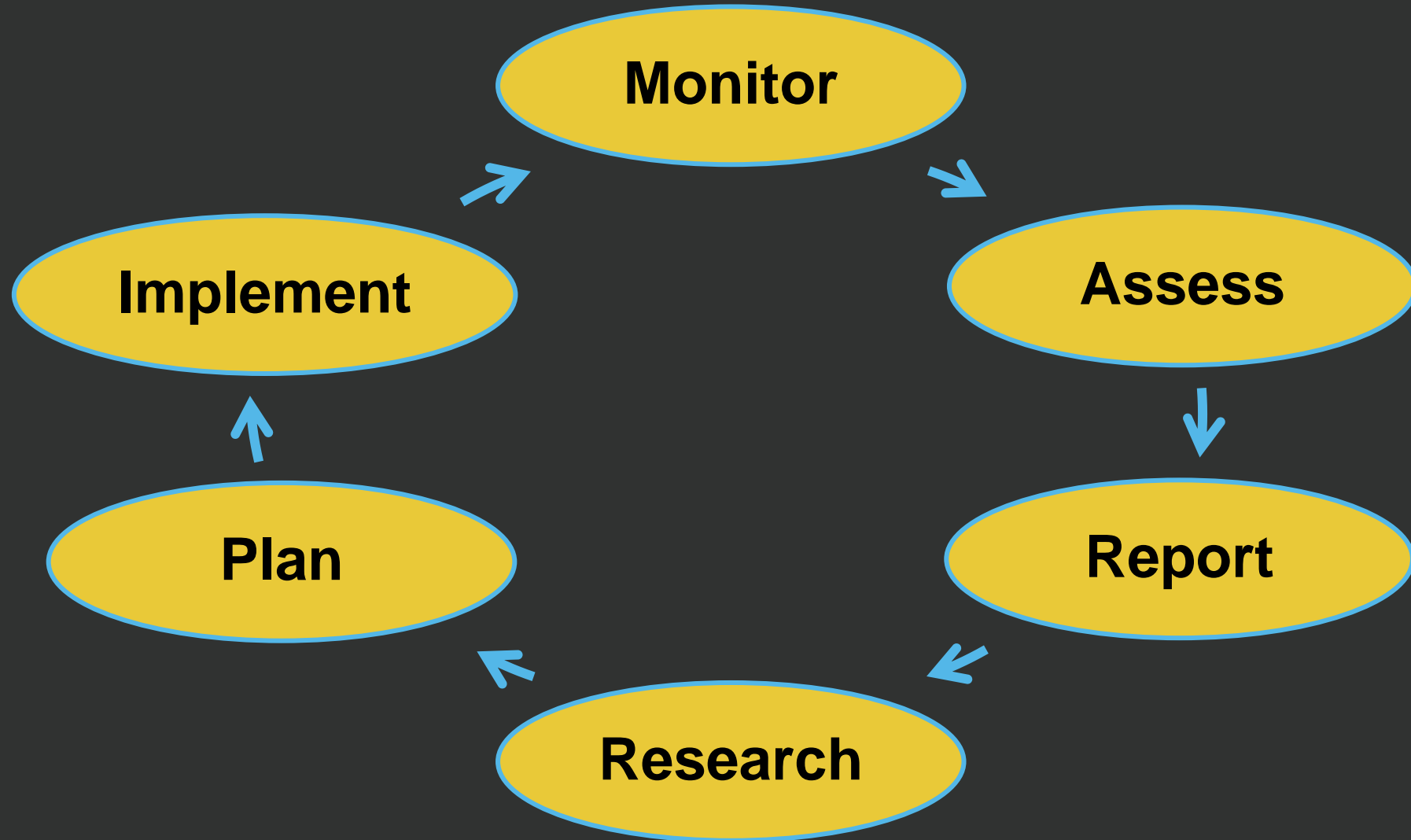




MONITORING TO MANAGEMENT

Water quality in the GTM Research Reserve:
From monitoring to management.

MONITORING TO MANAGEMENT

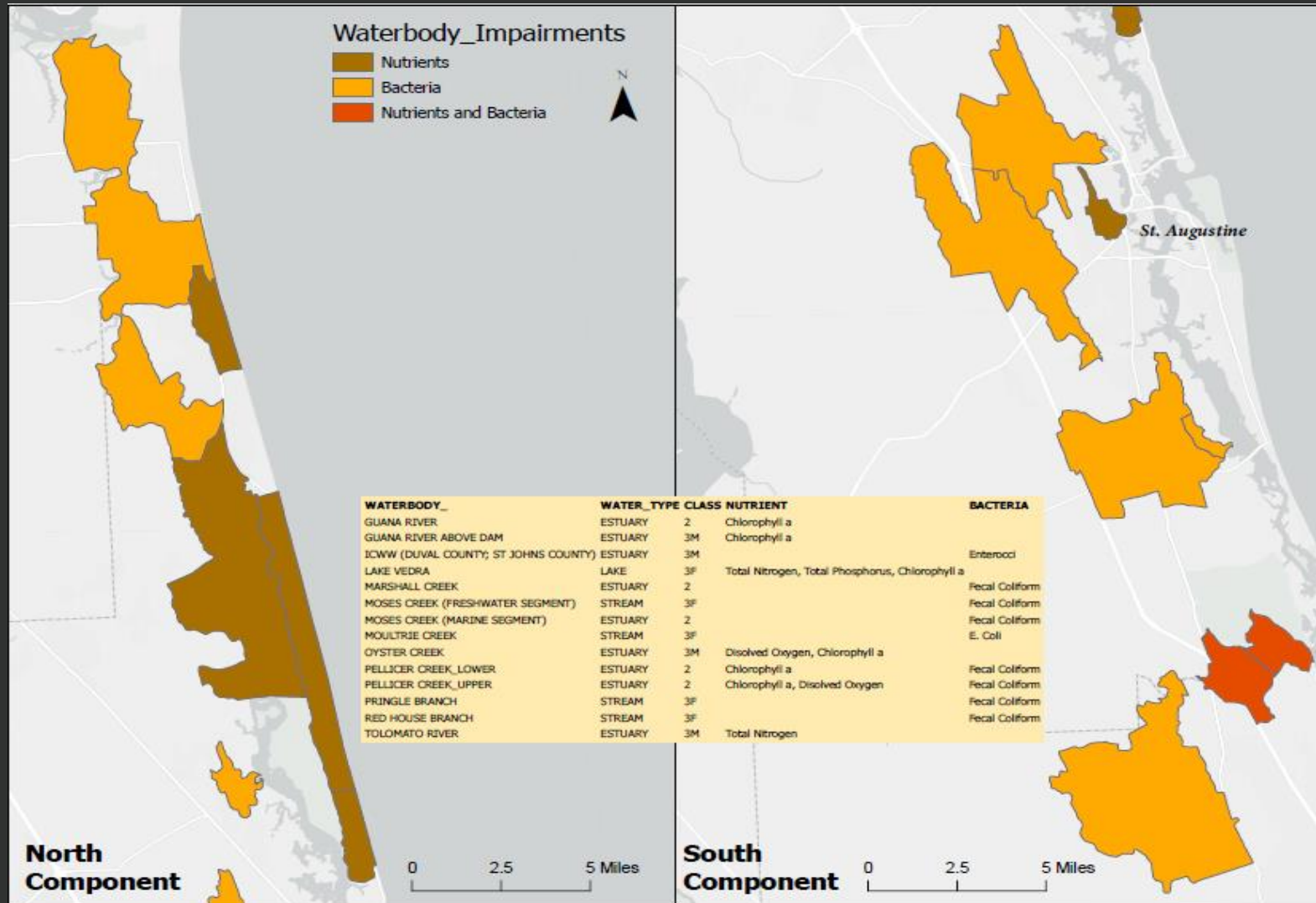


DIVISION OF ENVIRONMENTAL ASSESSMENT AND RESTORATION

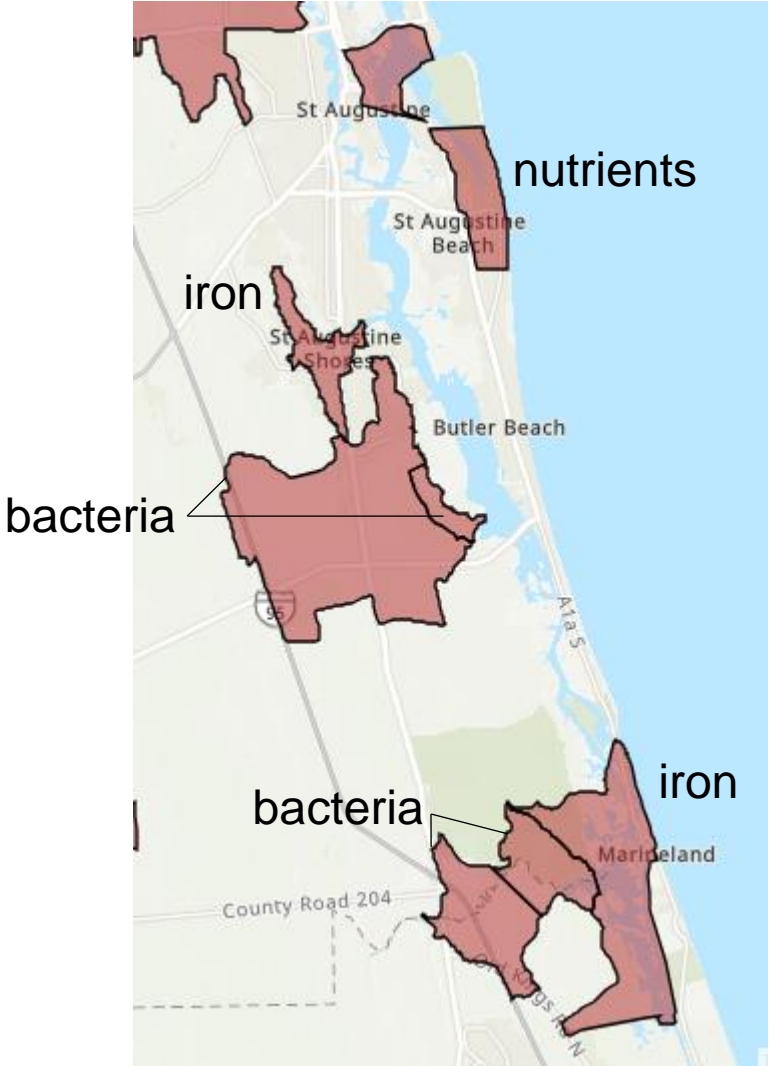
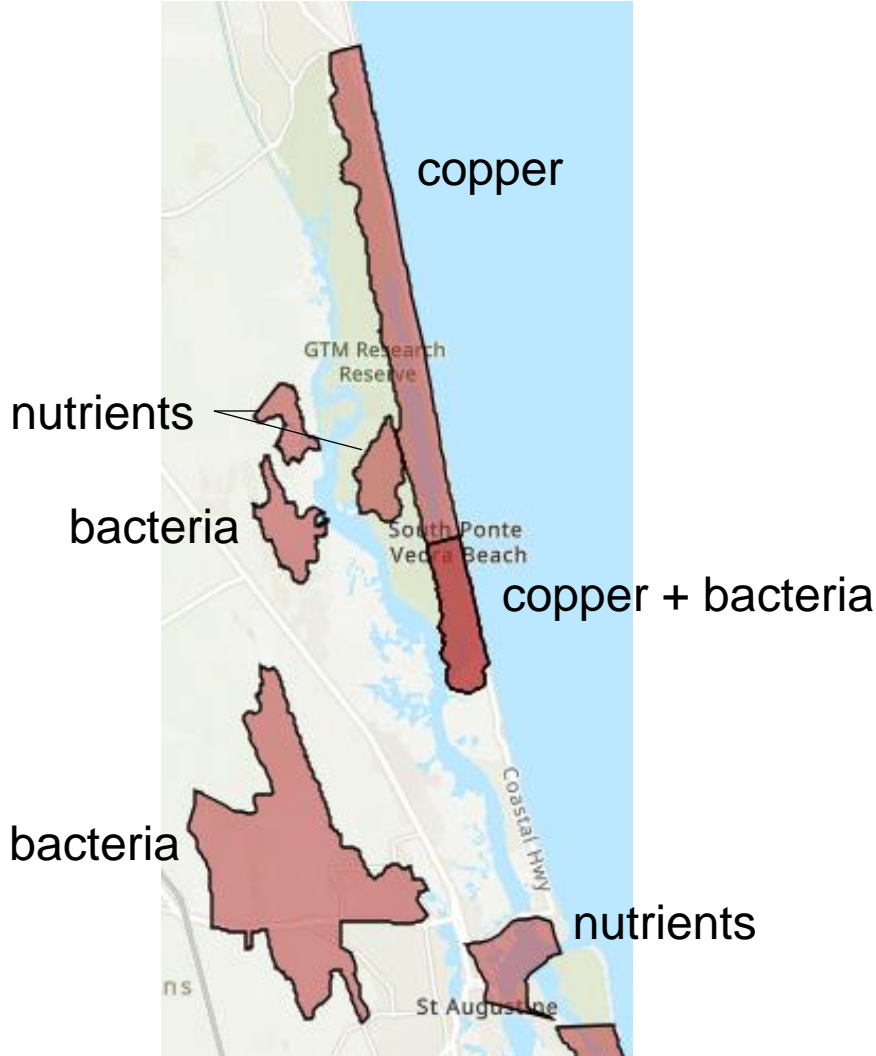
Waterbody Class	Designated Use	Description
Class II	Shellfish Propagation or Harvesting	Generally coastal waters where shellfish harvesting propagation occurs.
Class III	Fish Consumption; Recreation, Propagation and Maintenance of a Healthy, Well-Balanced Population of Fish and Wildlife	The surface waters of the state are Class III unless described in Rule 62-302.400, F.A.C.

<https://floridadep.gov/dear/watershed-assessment-section>

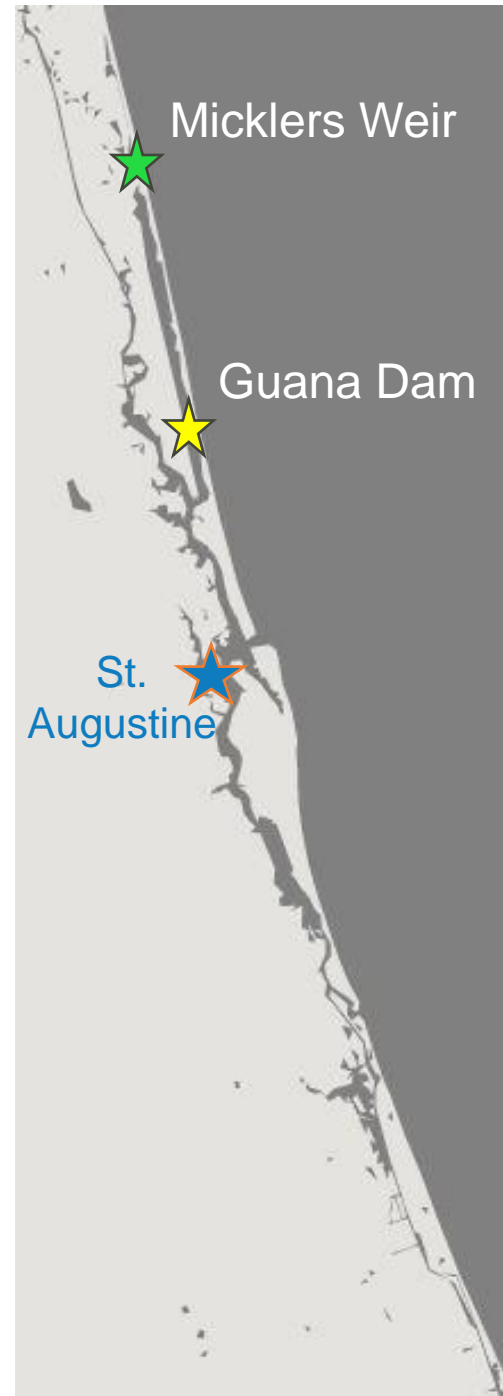
2022 FINAL LIST

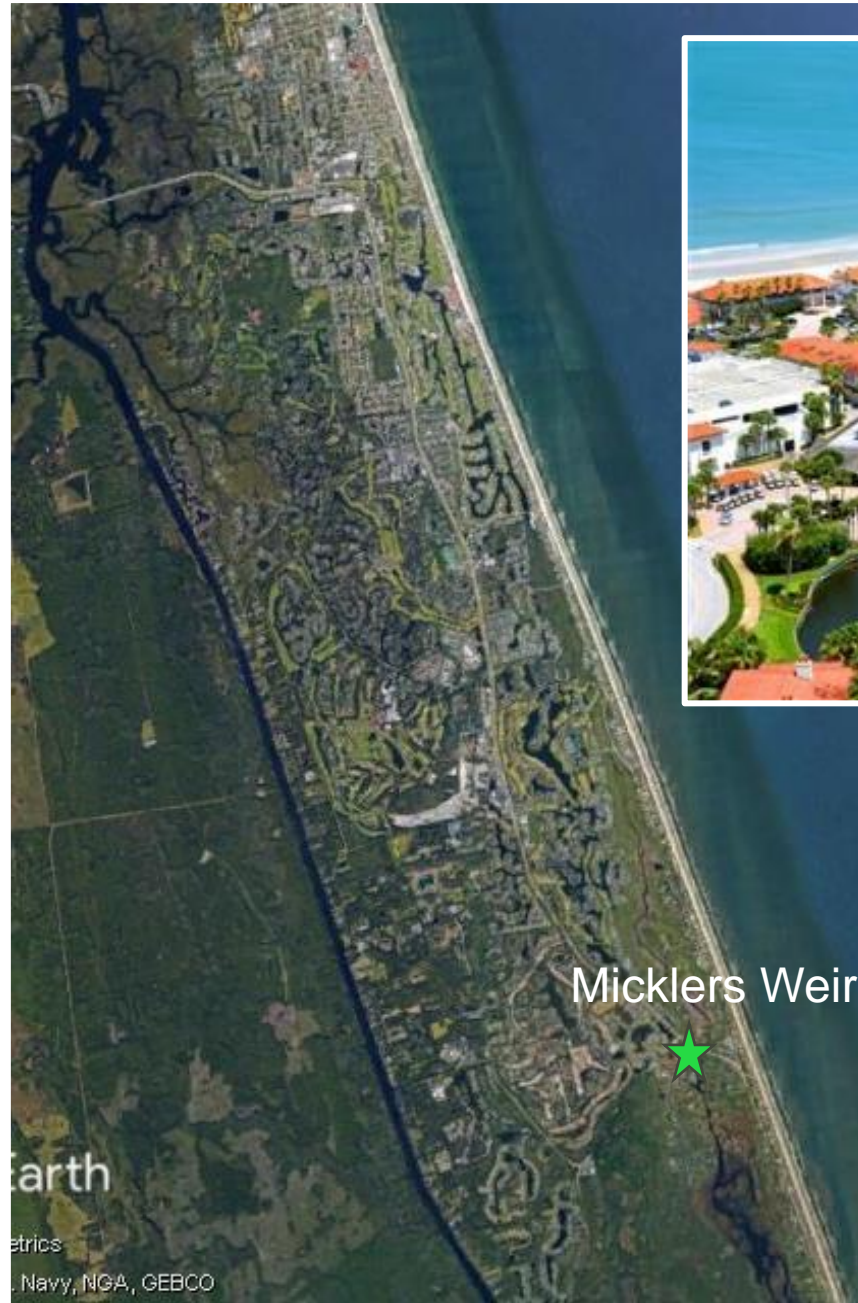
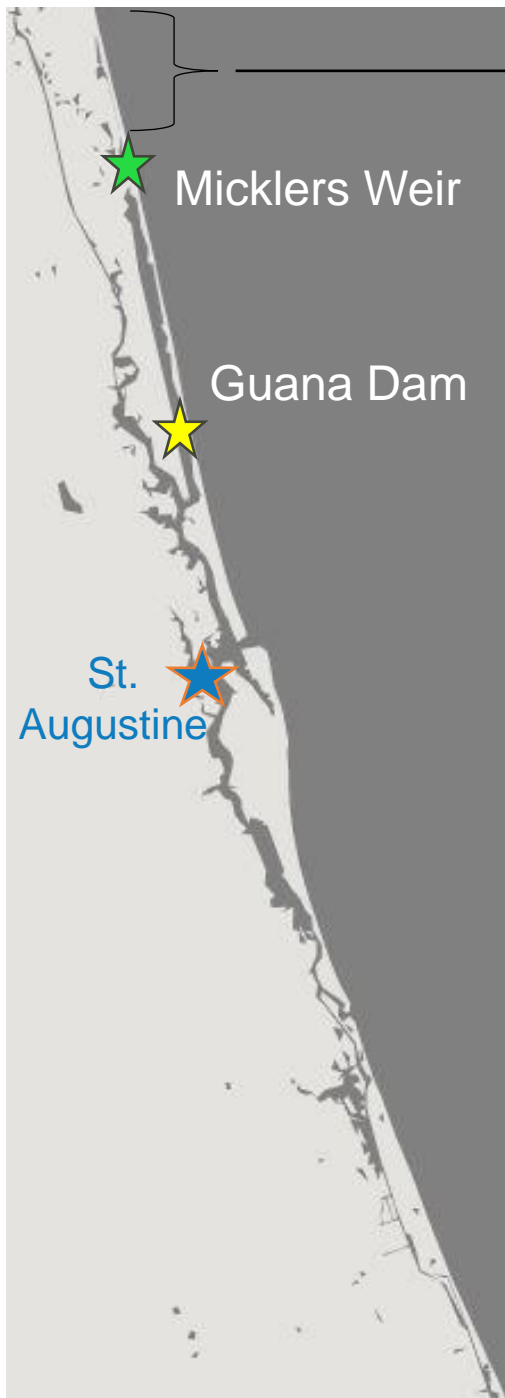


2024 DRAFT ADDITIONS

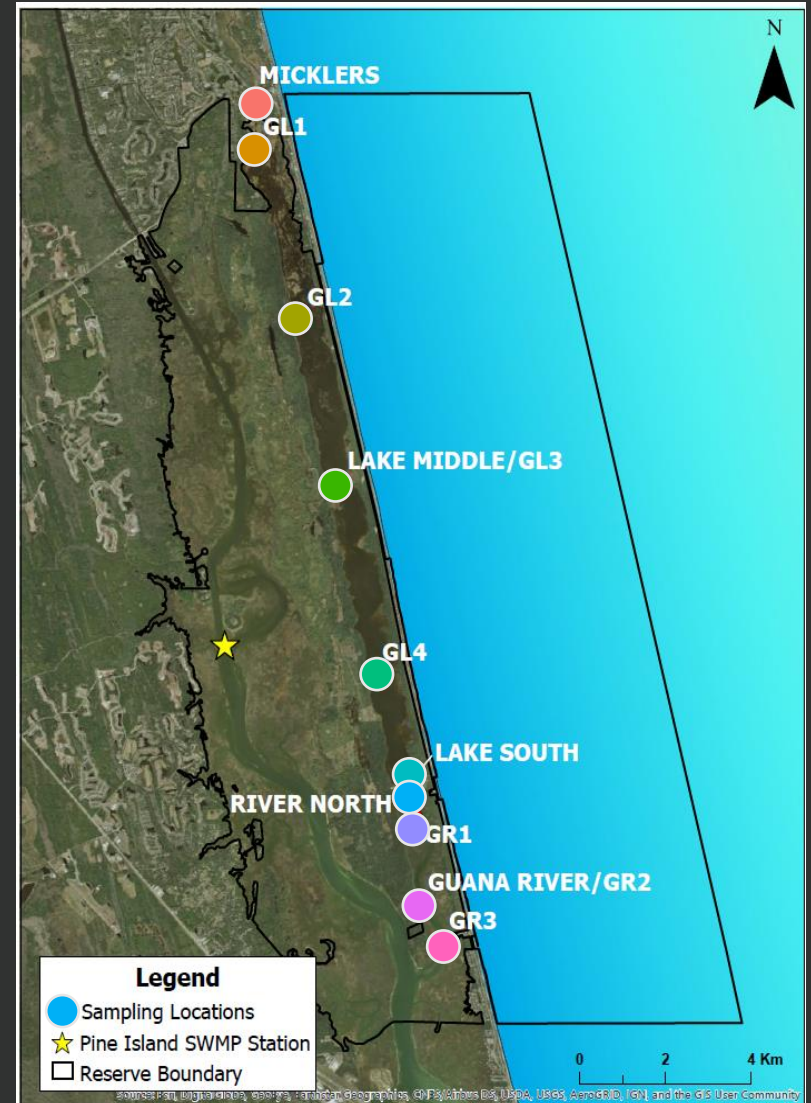






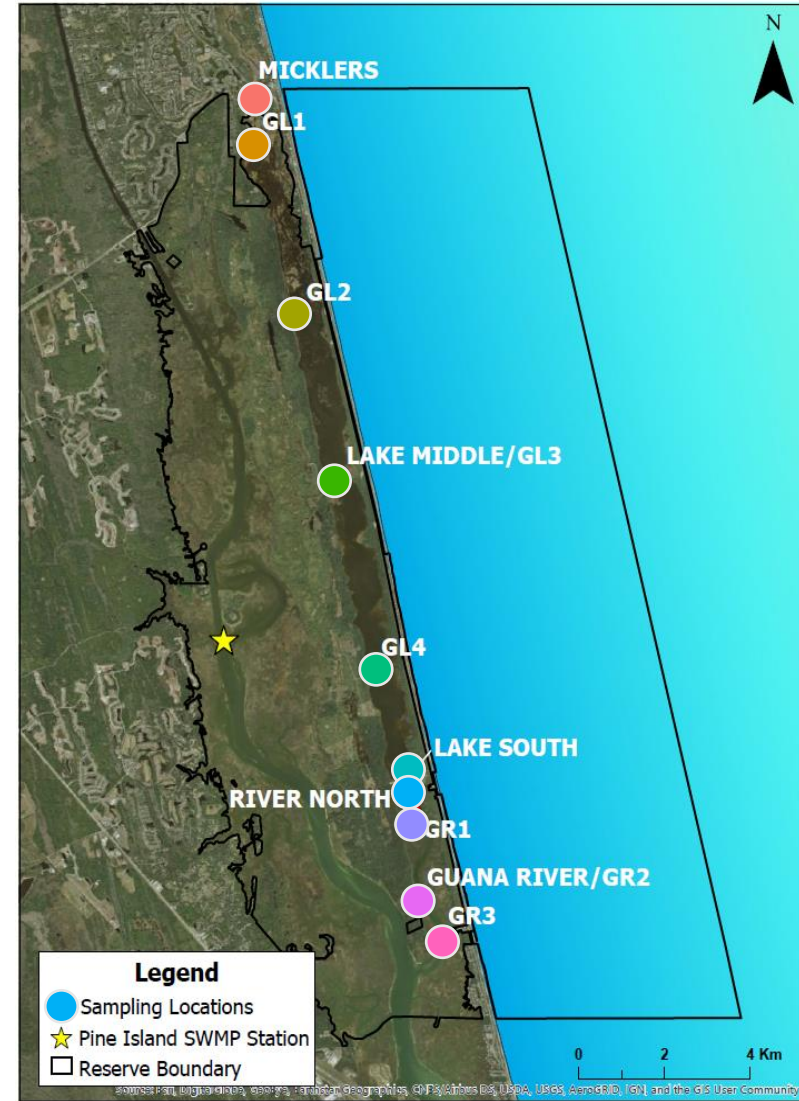
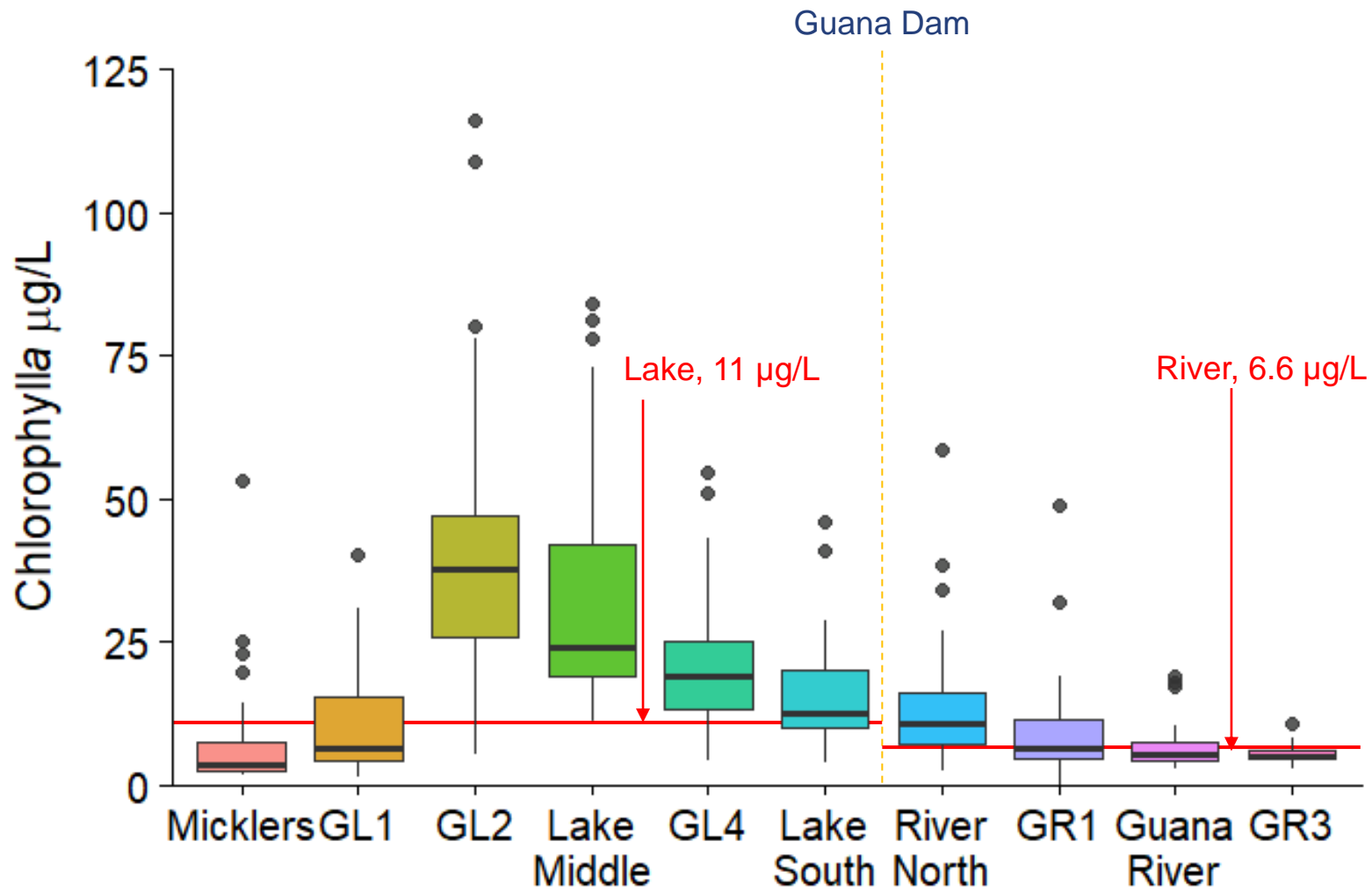


MONTHLY FROM JULY 2017 TO PRESENT

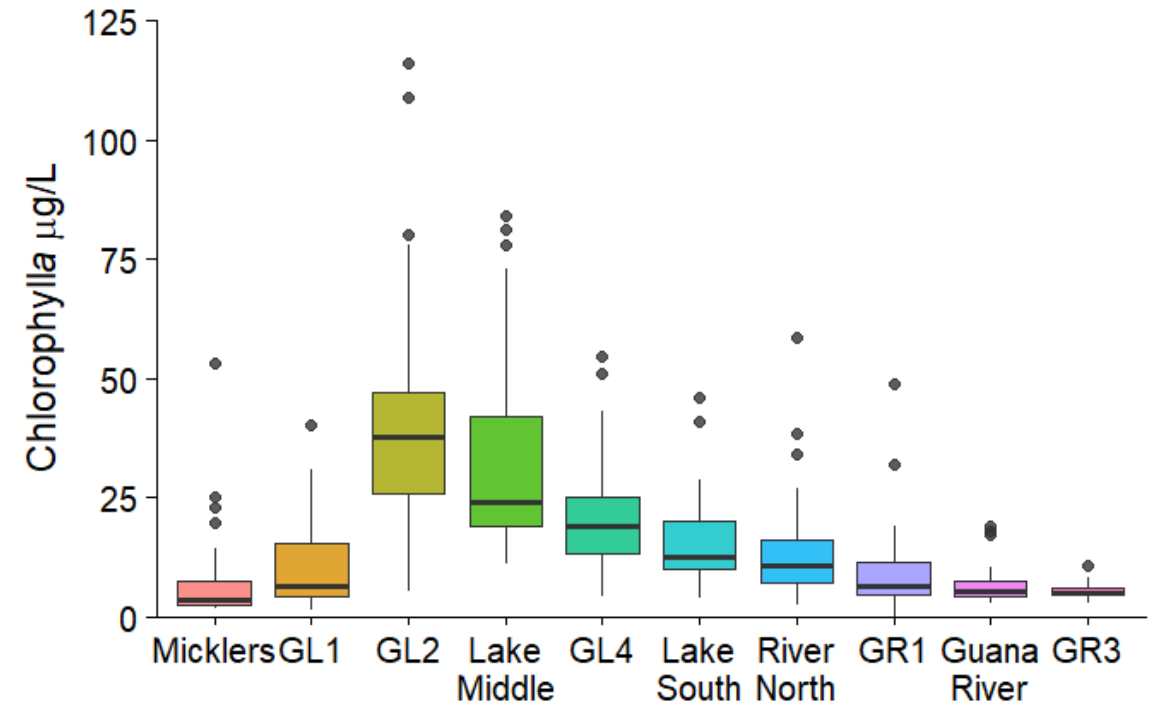
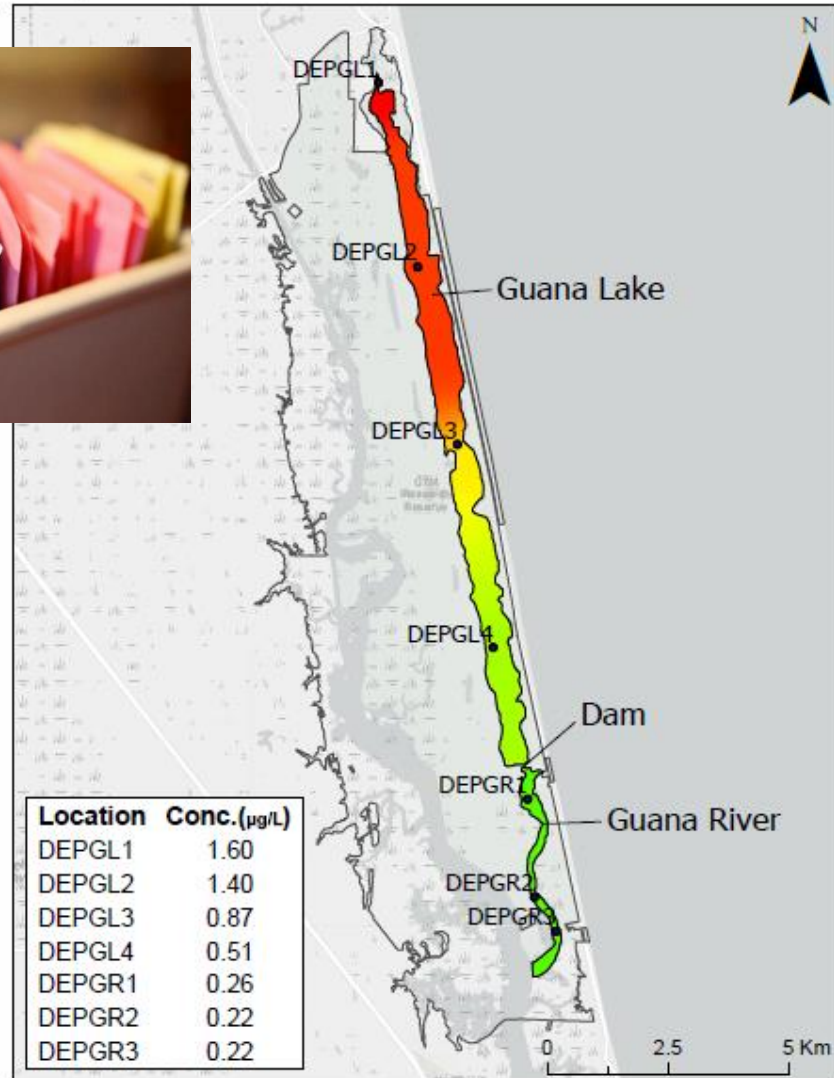


MONTHLY FROM JULY 2017 TO PRESENT

July 2017 – June 2022



SUCRALOSE = HUMAN WASTEWATER



TO INFORM MANAGEMENT



Guana Nutrients: Assessing the Current and Potential Role of Shellfish for Improving Water Quality, PI: Ashley Smyth, University of Florida.



High Resolution Surveys and Numerical Modeling to Optimize Guana Lake Levels, PIs: Daniele Pinton and Alberto Canestrelli, University of Florida.



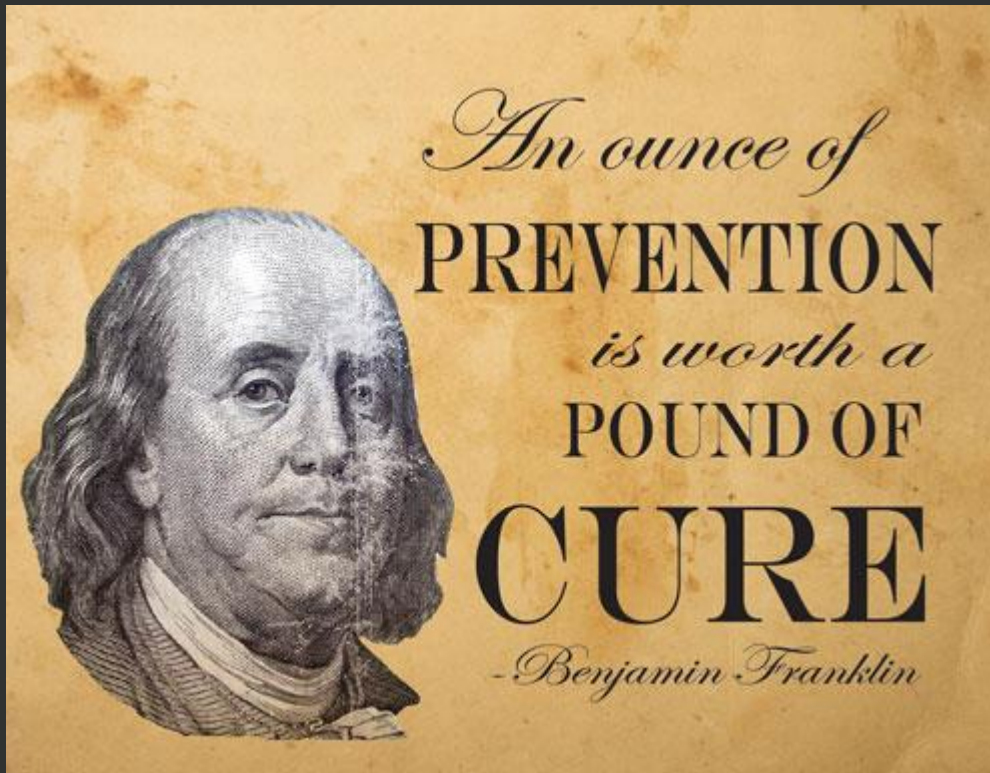
Using Collaborative Open Science Tools to Improve Engagement with the Ecology of the Guana River Estuary, PI: Geraldine Klarenberg, University of Florida.

TO PROTECT WATER QUALITY IN THE GTM ESTUARY



The GTM estuary is relatively resilient to algal blooms compared to neighboring estuaries to the north and south, but the warning signs presented here point to the need for protection against a tipping point.

TO PROTECT WATER QUALITY IN THE GTM ESTUARY





THANK YOU

Nikki Dix, Ph.D., Research Director
Office of Coastal Resilience and Protection/GTMNERR
Florida Department of Environmental Protection

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Nikki.Dix@FloridaDEP.gov