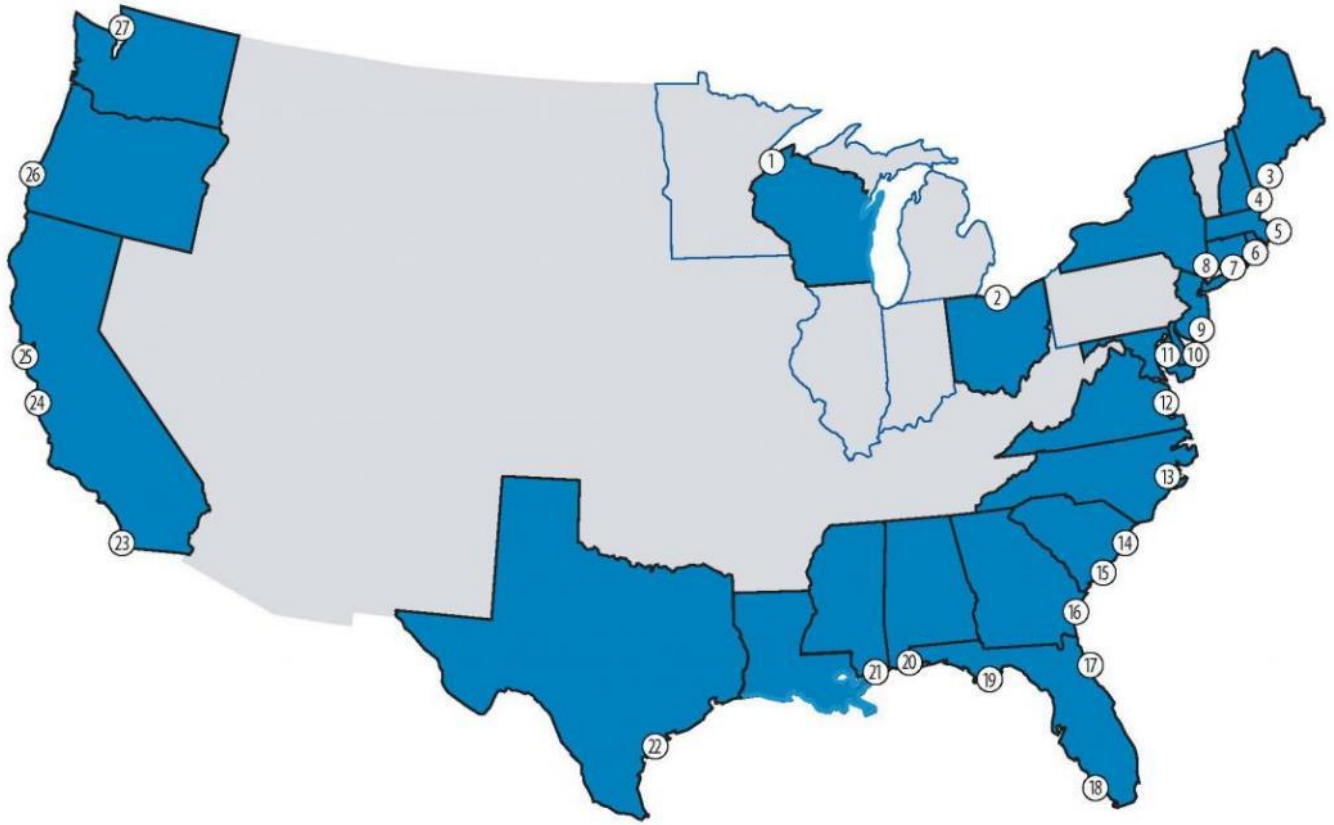
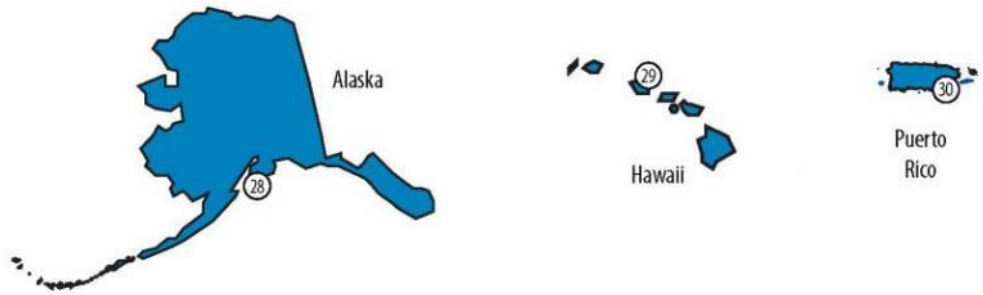
COASTAL WETLAND MONITORING IN THE GTMNERR MARSH-MANGROVE ECOTONE

Nikki Dix, PhD
Guana Tolomato Matanzas National Estuarine Research Reserve
Office of Resilience and Coastal Protection
Florida Department of Environmental Protection

Coastal Habitat Mapping & Monitoring Program Workshop | Jan. 16, 2024

NATIONAL ESTUARINE RESEARCH RESERVES





Great Lakes
1. Lake Superior, Wisconsin
2. Old Woman Creek, Ohio

Northeast
3. Wells, Maine
4. Great Bay, New Hampshire
5. Waquoit Bay, Massachusetts
6. Narragansett Bay, Rhode Island
7. Connecticut

Mid-Atlantic
8. Hudson River, New York
9. Jacques Cousteau, New Jersey
10. Delaware
11. Chesapeake Bay, Maryland
12. Chesapeake Bay, Virginia

Southeast
13. North Carolina
14. North Inlet-Winyah Bay, South Carolina
15. ACE Basin, South Carolina
16. Sapelo Island, Georgia
17. Guana Tolomato Matanzas, Florida

Gulf of Mexico
18. Rookery Bay, Florida
19. Apalachicola, Florida
20. Weeks Bay, Alabama
21. Grand Bay, Mississippi
22. Mission-Aransas, Texas

West
23. Tijuana River, California
24. Elkhorn Slough, California
25. San Francisco Bay, California
26. South Slough, Oregon
27. Padilla Bay, Washington
28. Kachemak Bay, Alaska

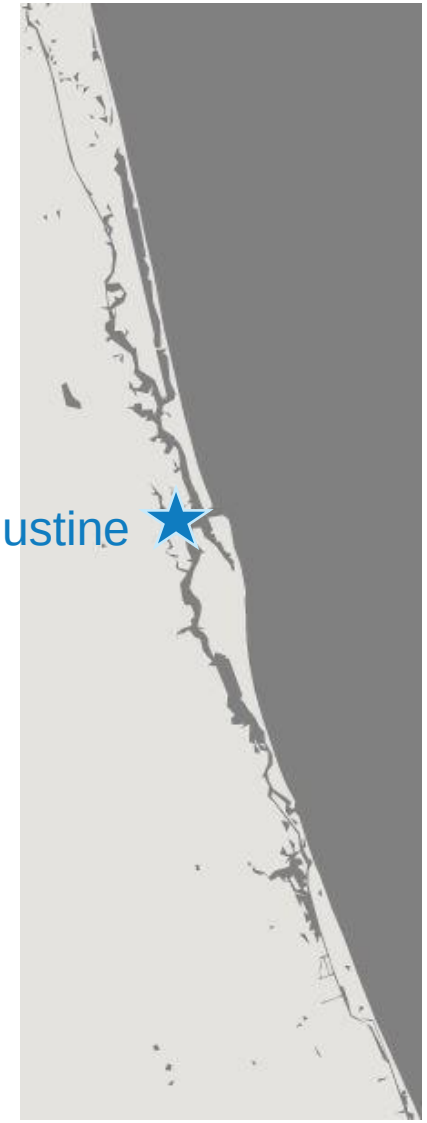
Pacific
29. He'eia, Hawai'i

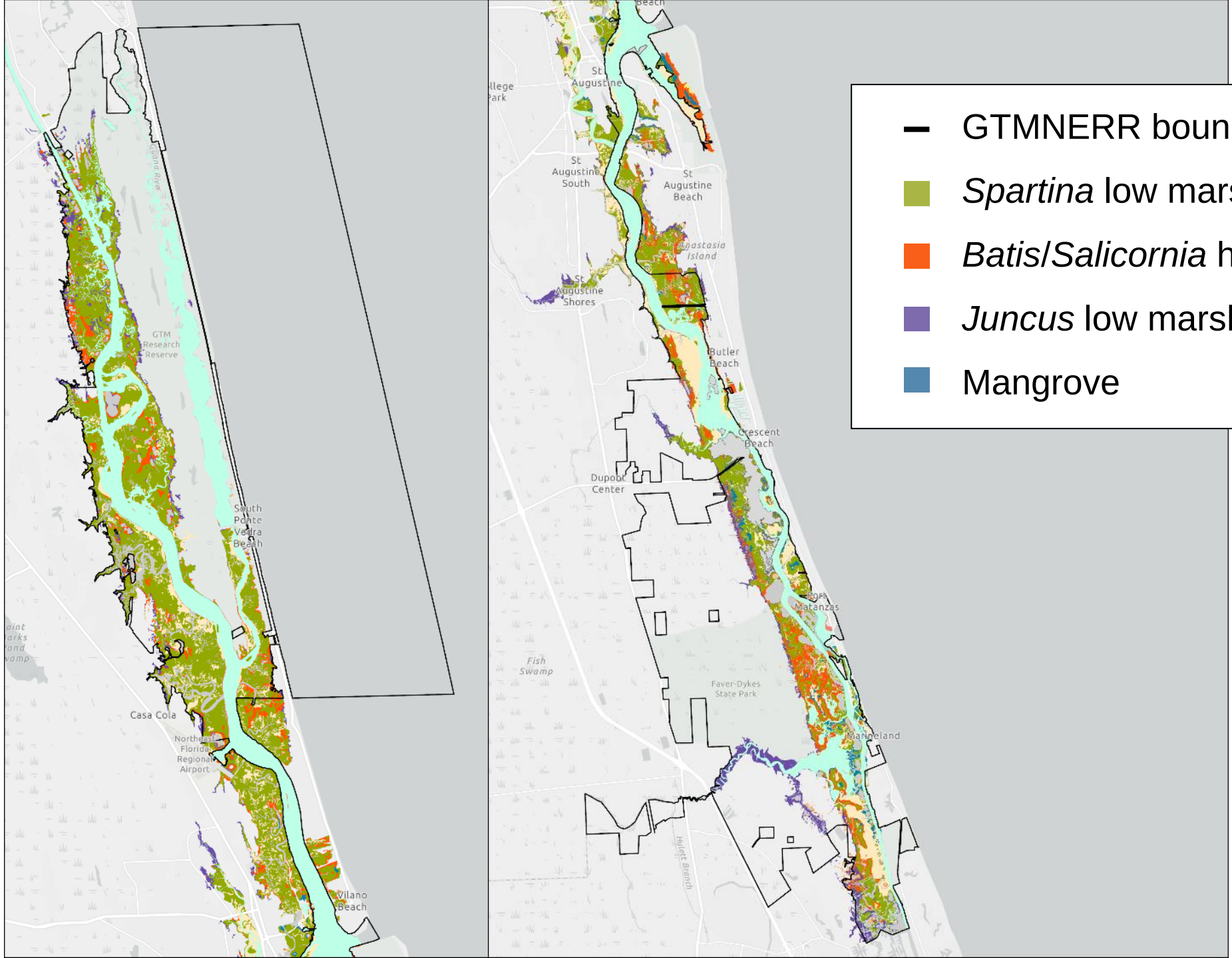
Caribbean
30. Jobos Bay, Puerto Rico

PROPOSED
Bay of Green Bay, Wisconsin
Louisiana

GUANA TOLOMATO MATANZAS (GTM) RESERVE

A BACK-BARRIER ISLAND ESTUARY




GTMNERR boundary
Spartina low marsh
Batis/*Salicornia* high marsh
Juncus low marsh
Mangrove
St Augustine
St Augustine South
St Augustine Beach
Anastasia Island
St Augustine Shores
Butler Beach
Crescent Beach
Dupont Center
Fish Swamp
Faver-Dykes State Park
Matanzas
Marineland
Hulett Branch
GTM Research Reserve
South Ponte Vedra Beach
Casa Cola
Northeast Florida Regional Airport
Vilano Beach

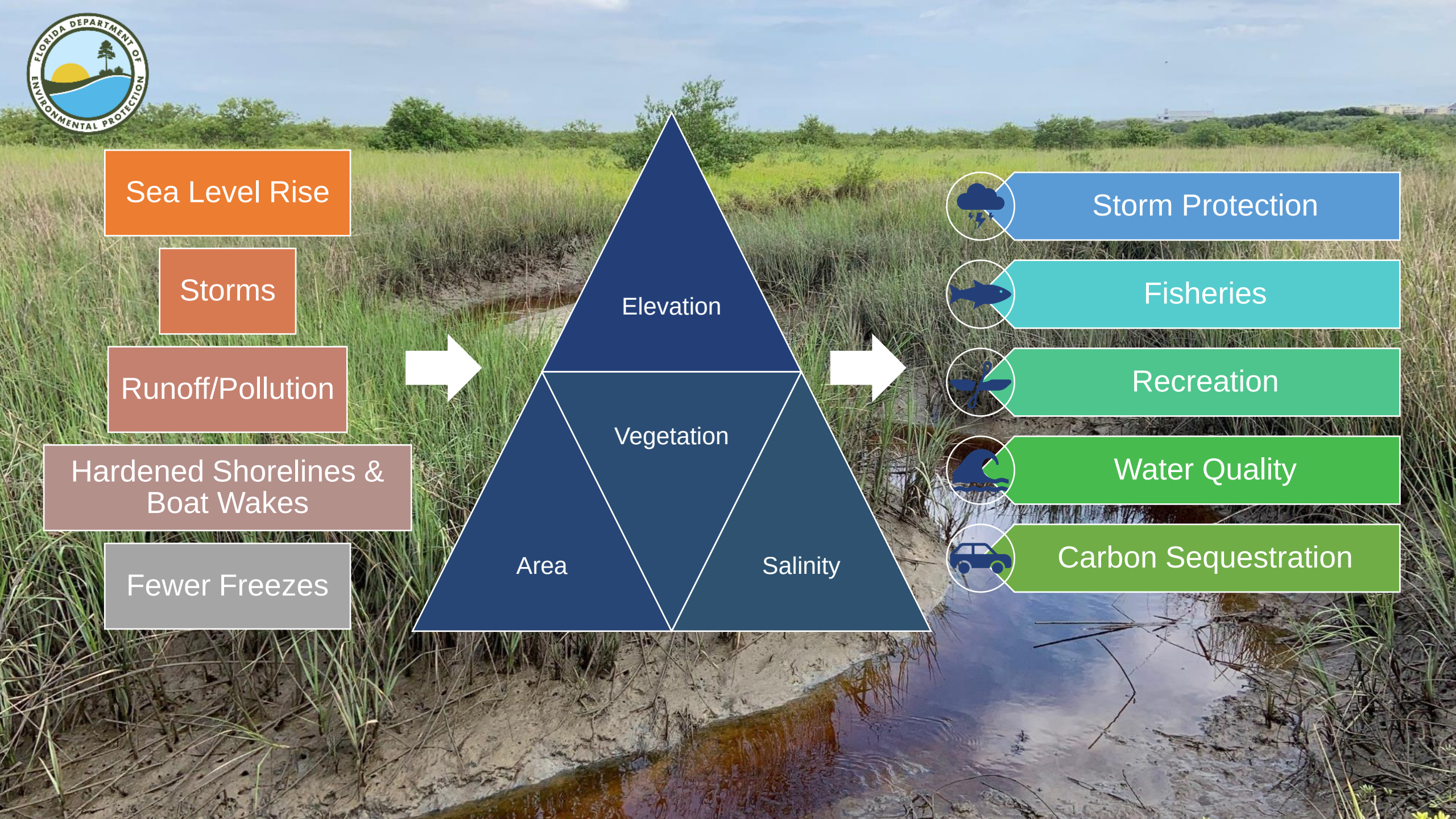
Spartina alterniflora

Juncus roemerianus

Batis maritima

Avicennia germinans

- GTMNERR boundary
- *Spartina* low marsh
- *Batis*/*Salicornia* high marsh
- *Juncus* low marsh
- Mangrove

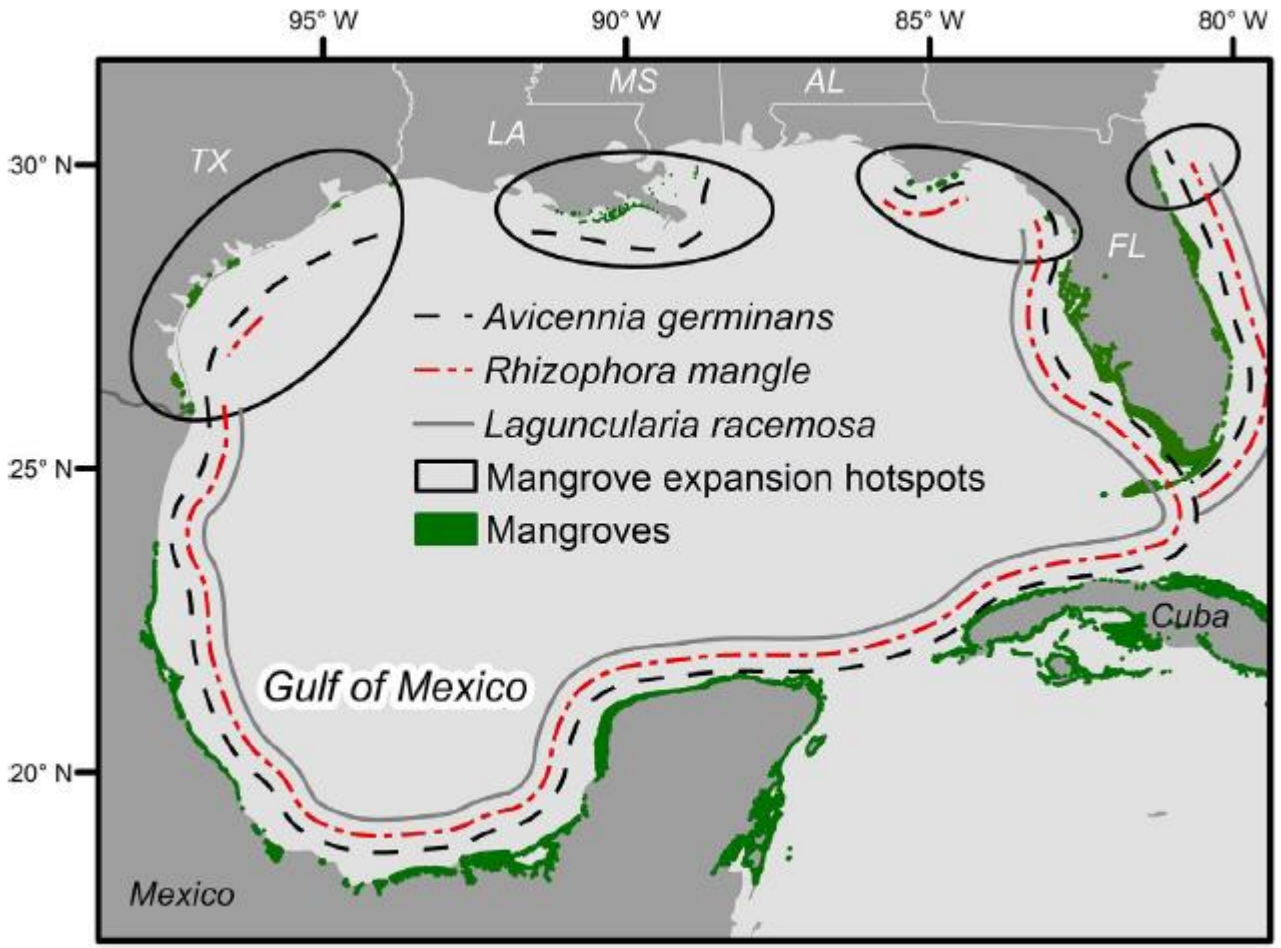

Sea Level Rise
Storms
Runoff/Pollution
Hardened Shorelines & Boat Wakes
Fewer Freezes
Elevation
Vegetation
Area
Salinity
Storm Protection
Fisheries
Recreation
Water Quality
Carbon Sequestration

DRIVERS OF CHANGE

Coastal wetland monitoring in the GTMNERR marsh-mangrove ecotone

STORMS & FEWER FREEZES

MANGROVE RANGE EXPANSION



Osland et al. 2022. The impacts of mangrove range expansion on wetland ecosystem services in the southeastern US… *Global Change Biology.*

STORMS & FEWER FREEZES

MANGROVE RANGE EXPANSION

HARDENED SHORELINES & BOAT WAKES

WETLAND EDGE EROSION

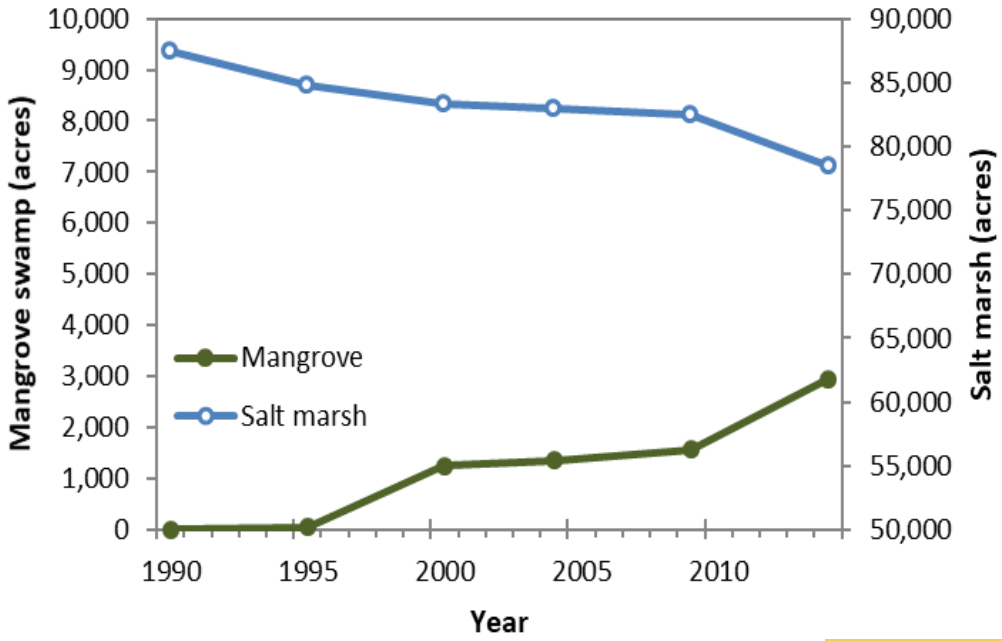
~1 m lateral marsh erosion per year.

OBSERVATIONS

Coastal wetland monitoring in the
GTMNERR marsh-mangrove ecotone

COASTAL WETLANDS MONITORING

REGIONAL MAPPING



- 9,000 ac salt marsh
+ 3,000 ac mangrove
= 6,000 ac wetland loss

Dix, N., R. Brockmeyer, S. Chapman, C. Angelini, S. Kidd, S. Eastman, & K. R. Radabaugh. 2021. Northeast Florida. In K. R. Radabaugh, C. E. Powell, and R. P. Moyer (Eds.). Coastal Habitat Integrated Mapping and Monitoring Program Report for the State of Florida. Florida Fish and Wildlife Conservation Commission. FWRI Technical Report No. 21, Version 2.

COASTAL WETLANDS MONITORING

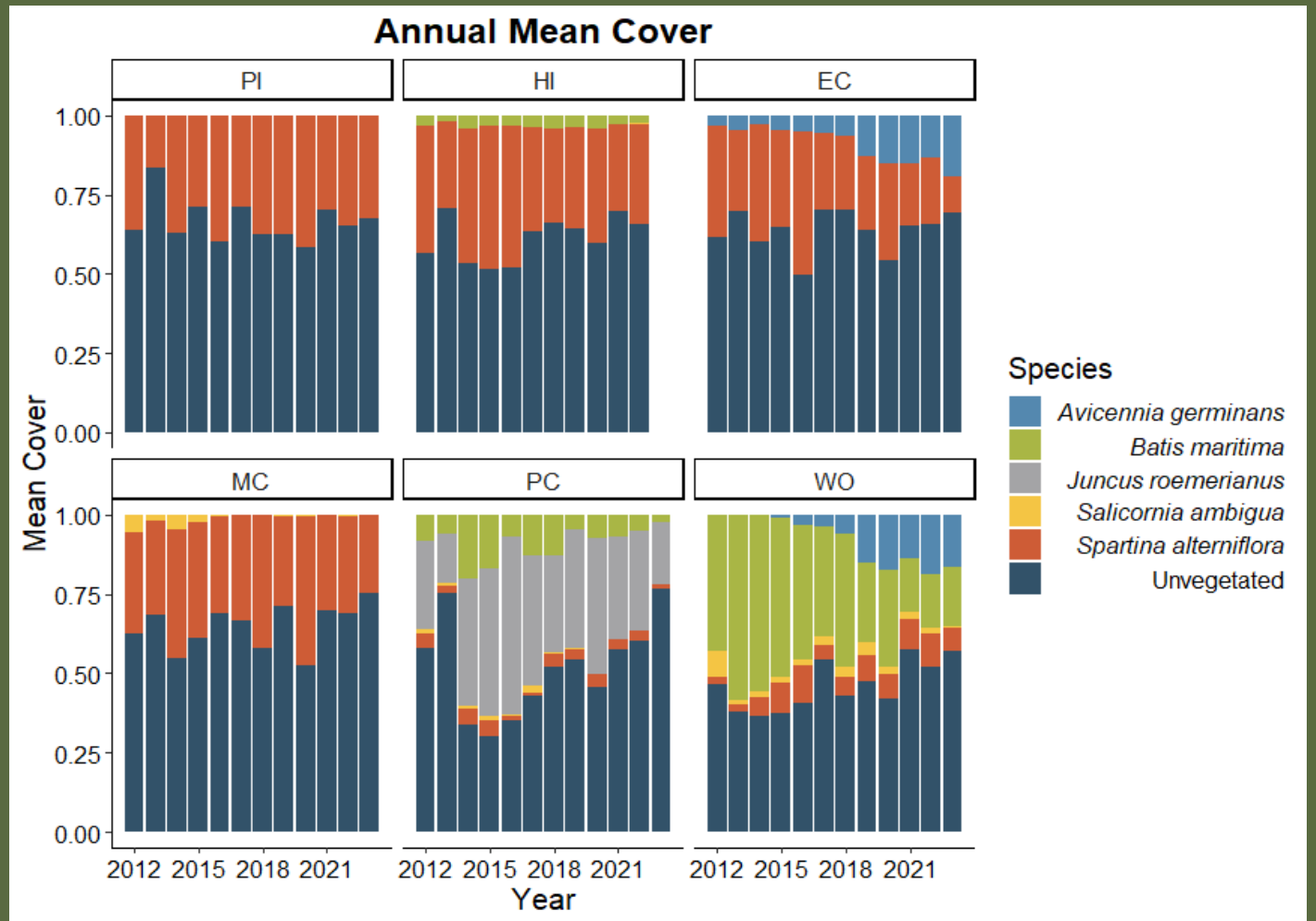
FIELD OBSERVATIONS

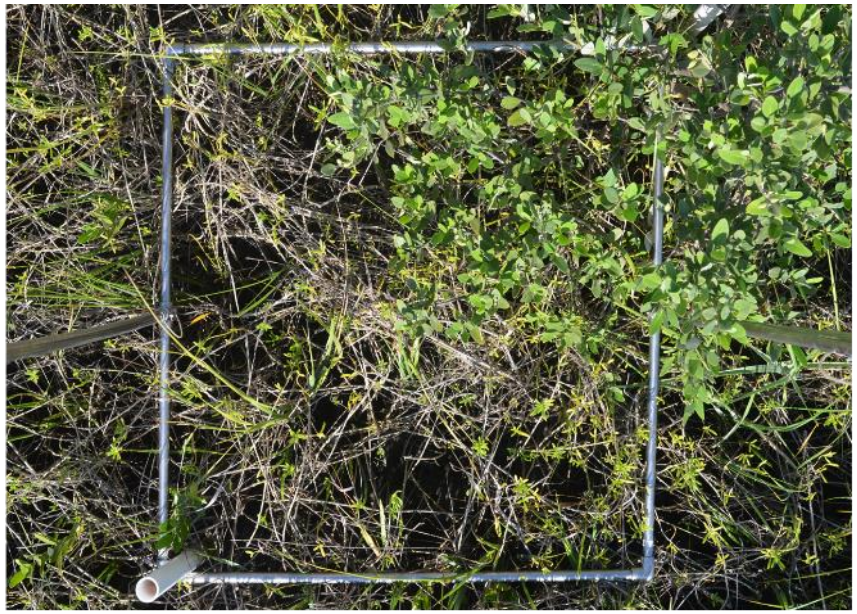
NERRS + NPS

Tracking long-term changes in our coastal wetlands using national and regional standardized protocols.

COASTAL WETLANDS MONITORING

PLANT COVER



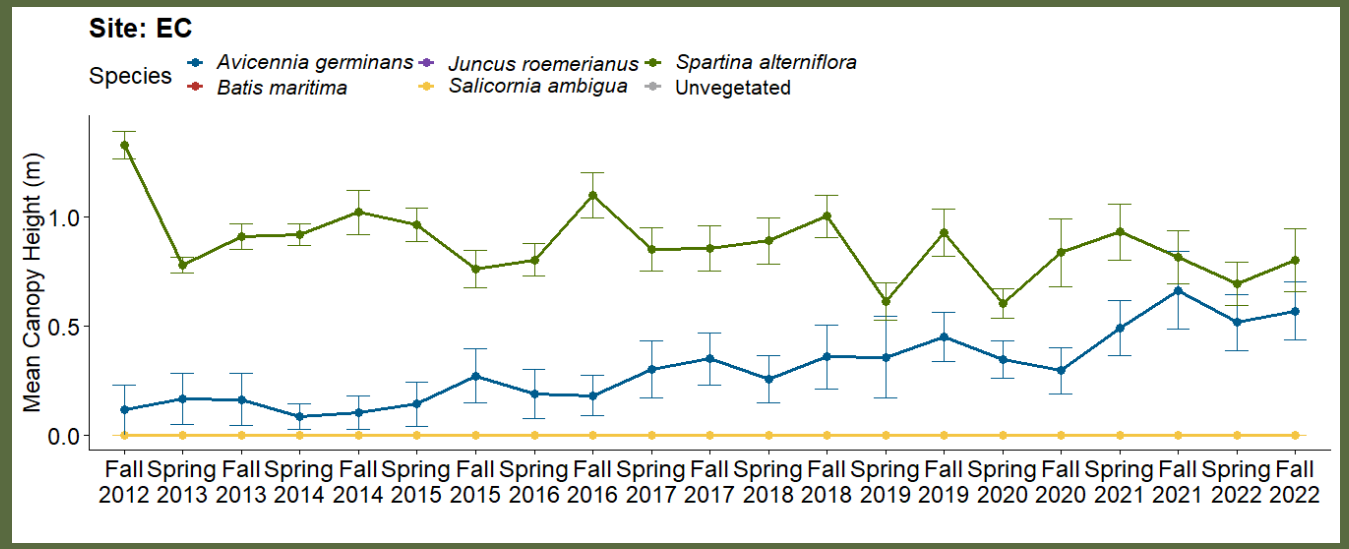


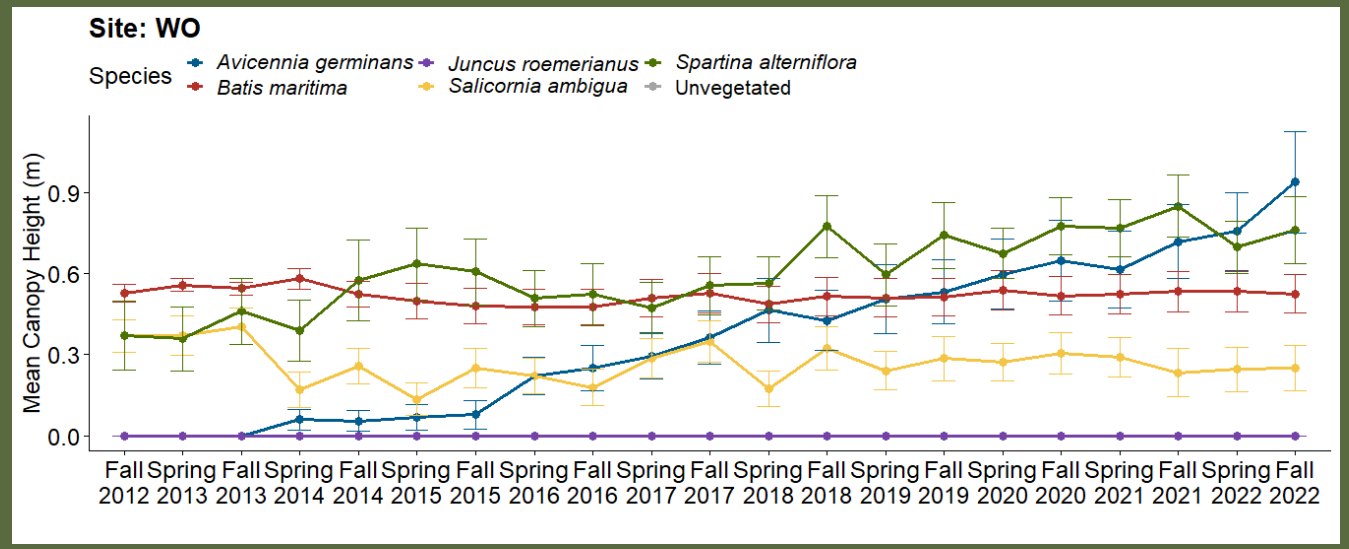
Vegetation plot from WO containing *A. germinans, S. alterniflora,* and *B. maritima.*

COASTAL WETLANDS MONITORING

PLANT HEIGHT

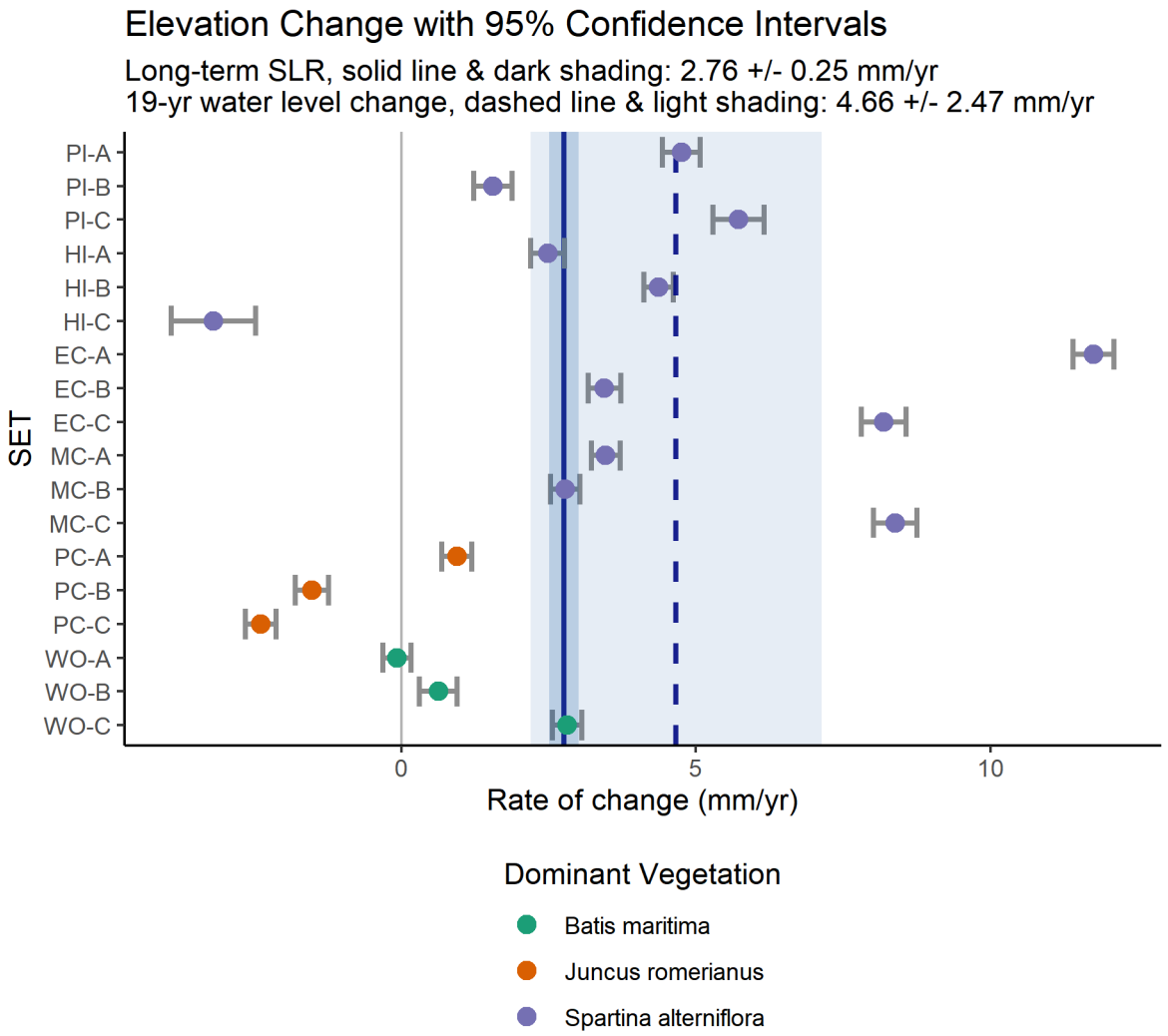
GTM Biologist, Jacob Berna, measuring canopy height.





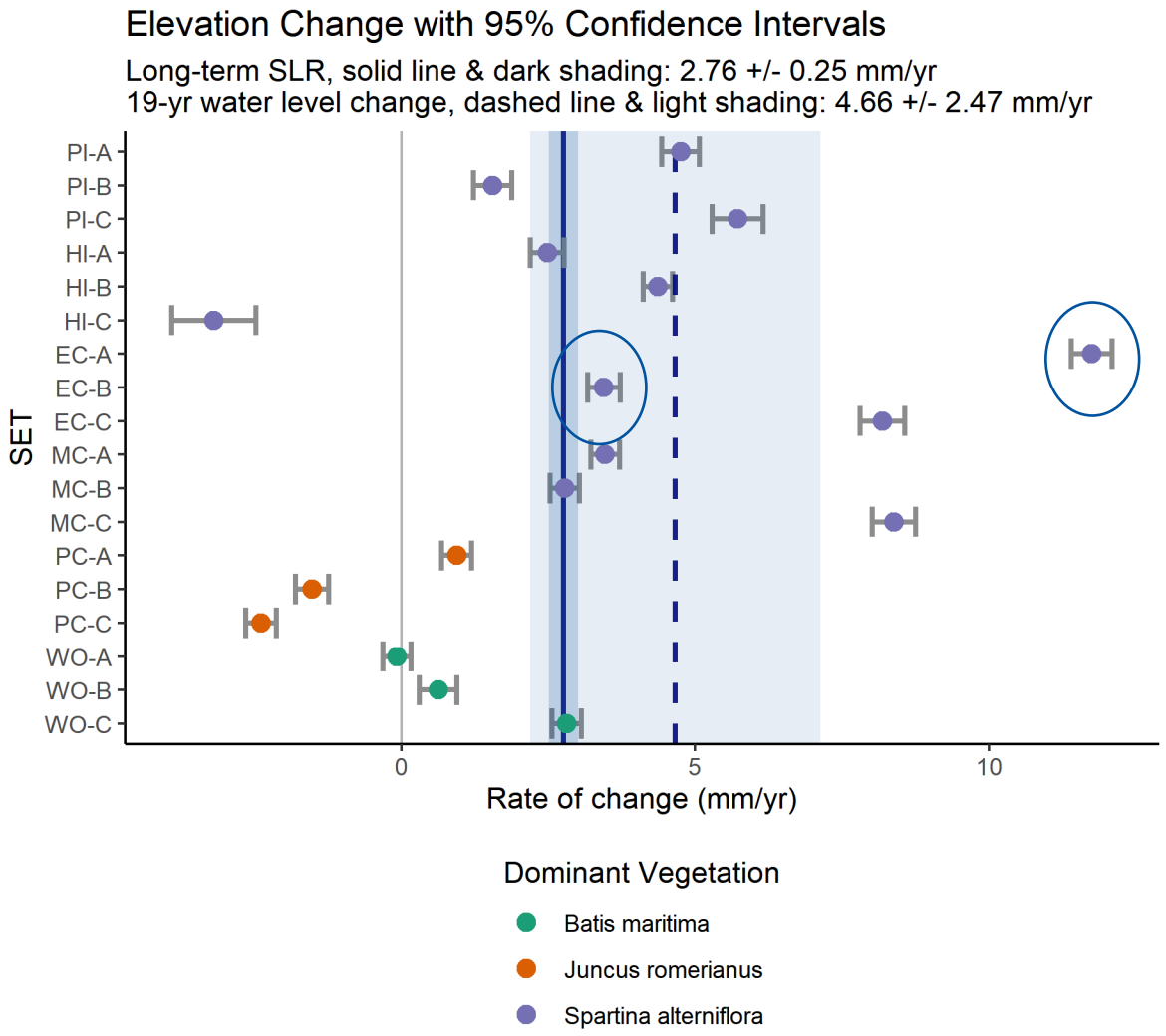
COASTAL WETLANDS MONITORING

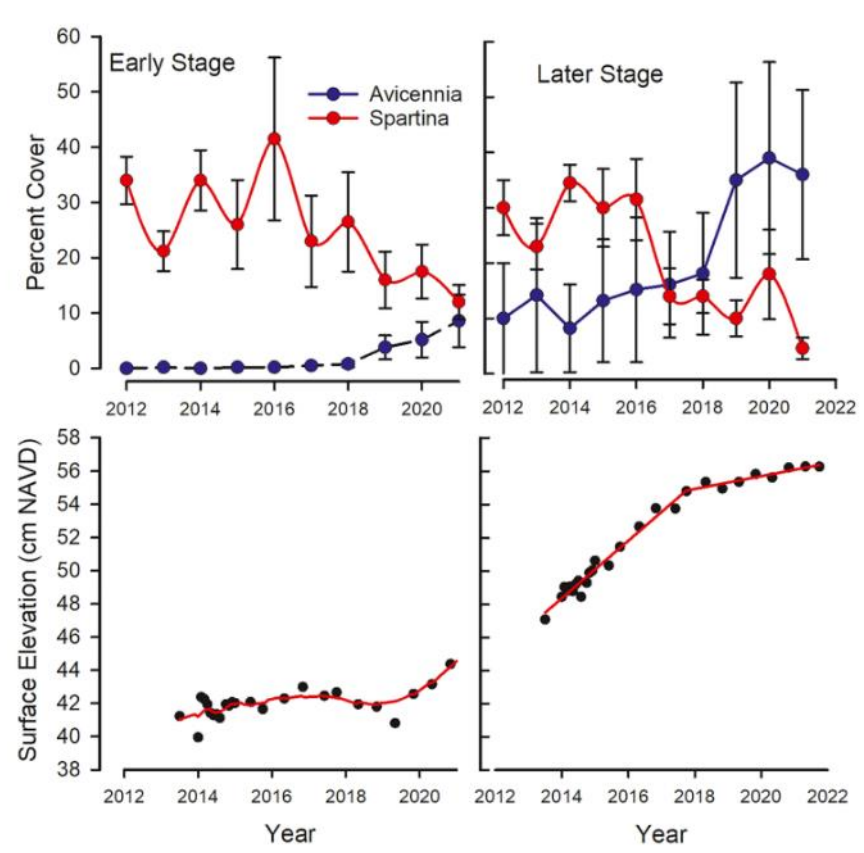
SURFACE ELEVATION



COASTAL WETLANDS MONITORING

SURFACE ELEVATION

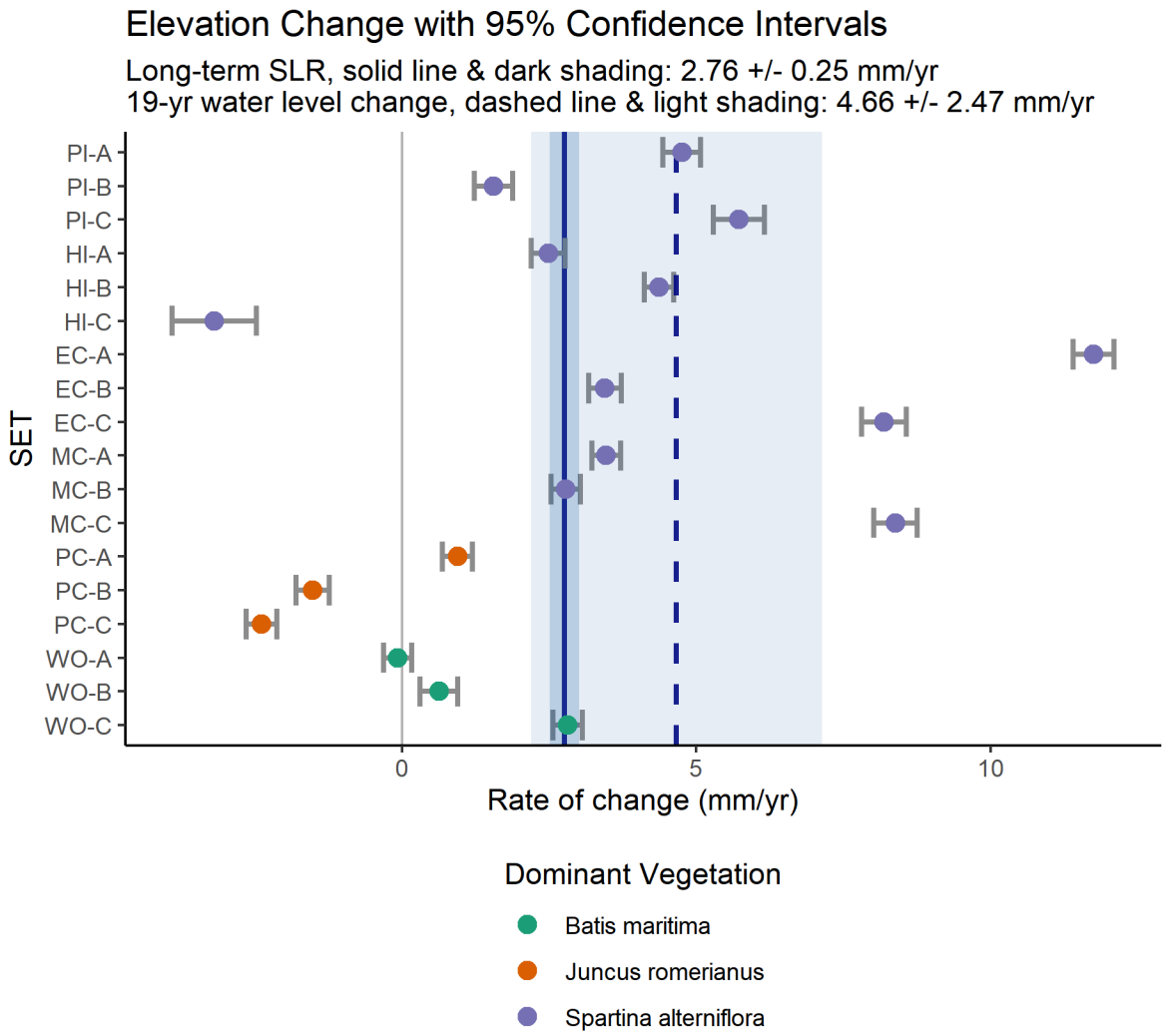


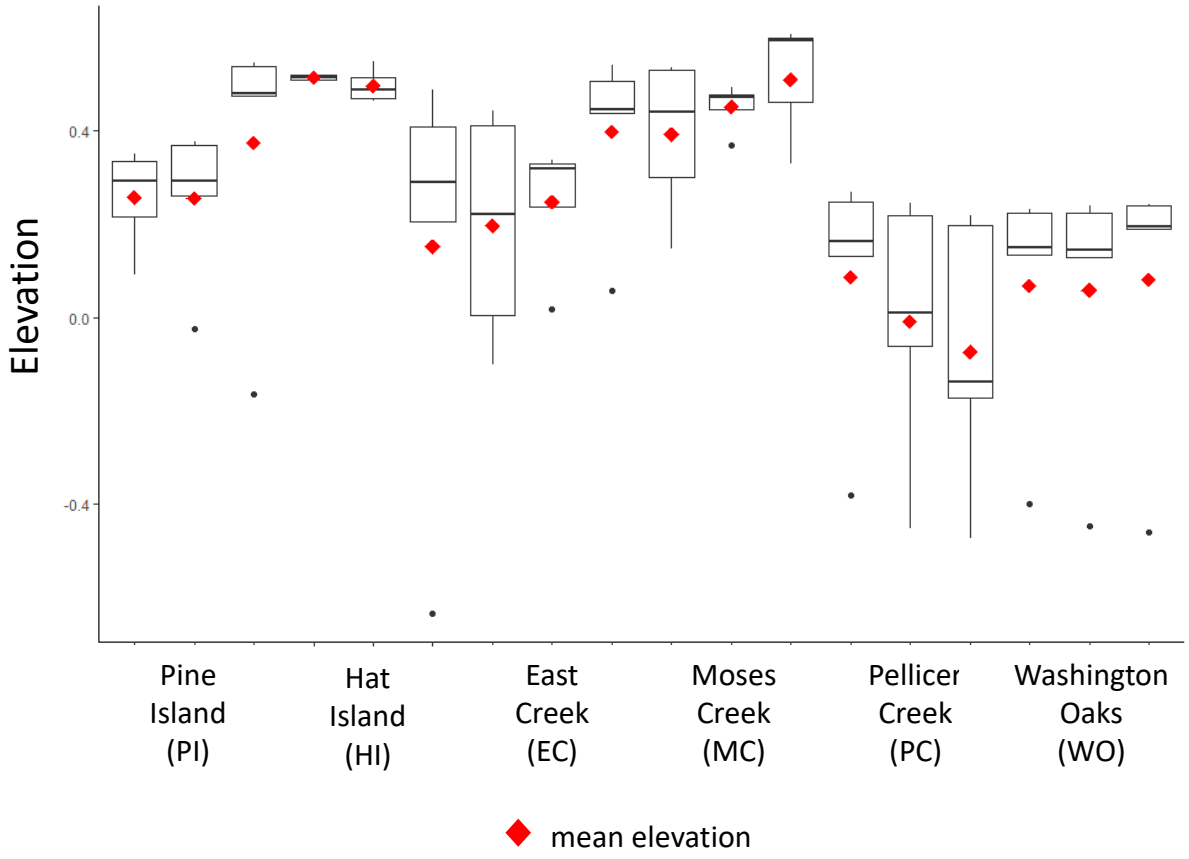


Morris, et al. 2023. Mangrove trees outperform saltmarsh grasses in building elevation but collapse rapidly under high rates of sea-level rise. *Earth's Future*, 11

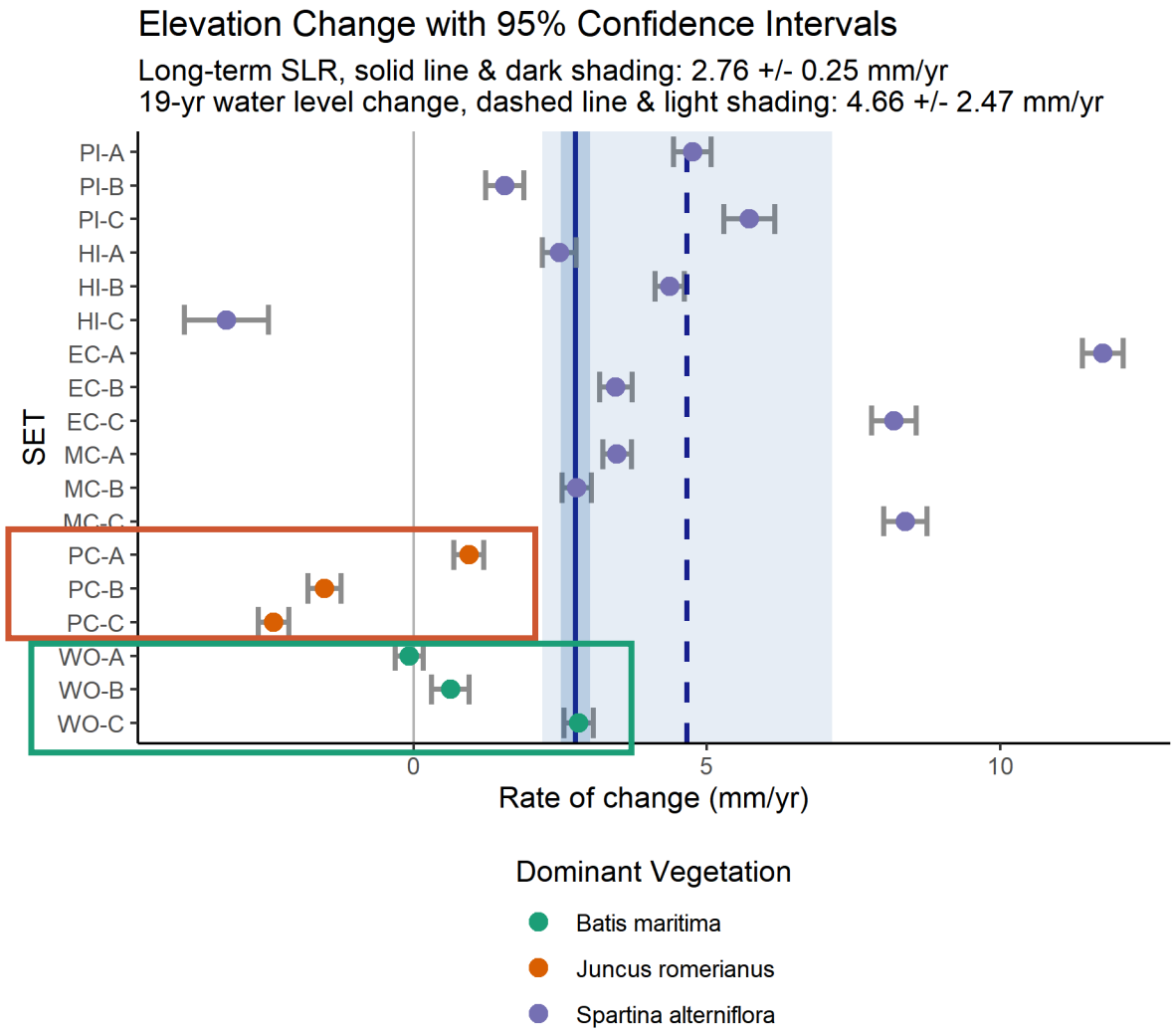
COASTAL WETLANDS MONITORING

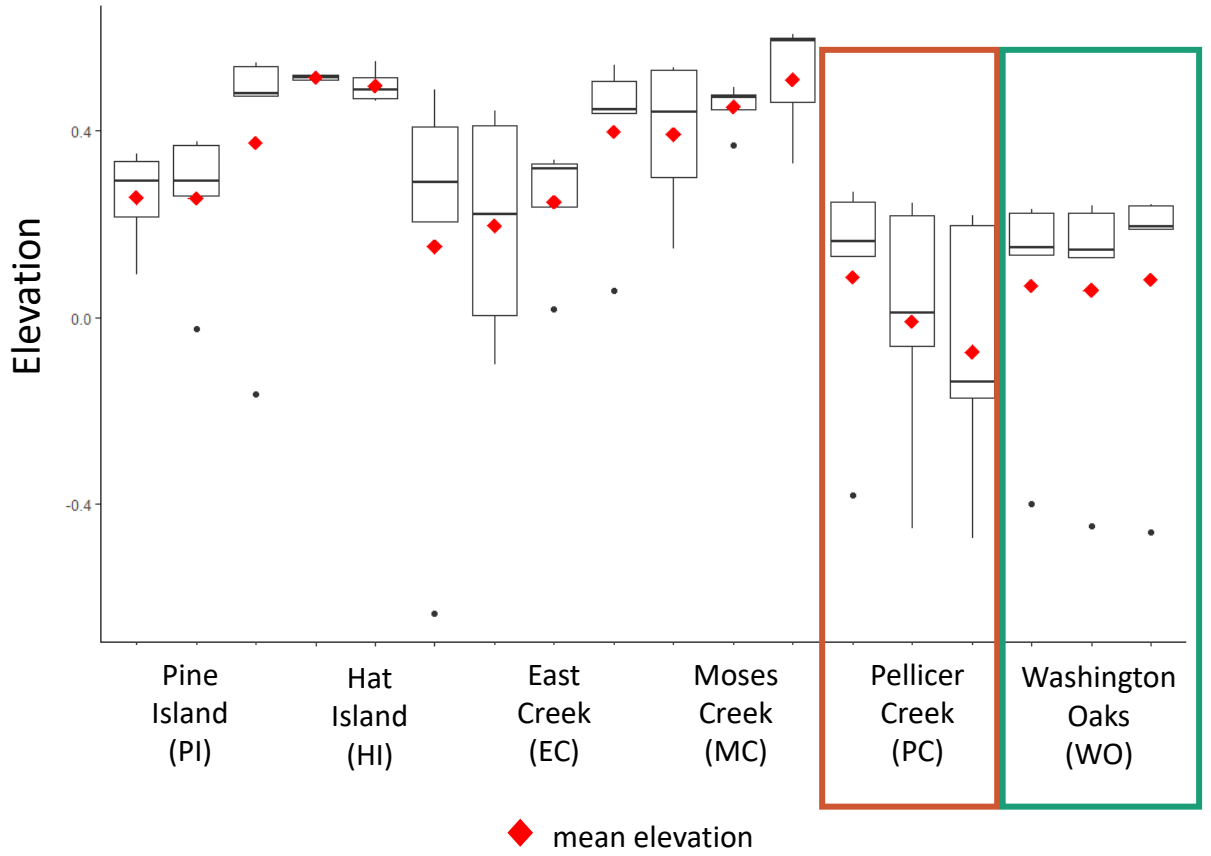
SURFACE ELEVATION





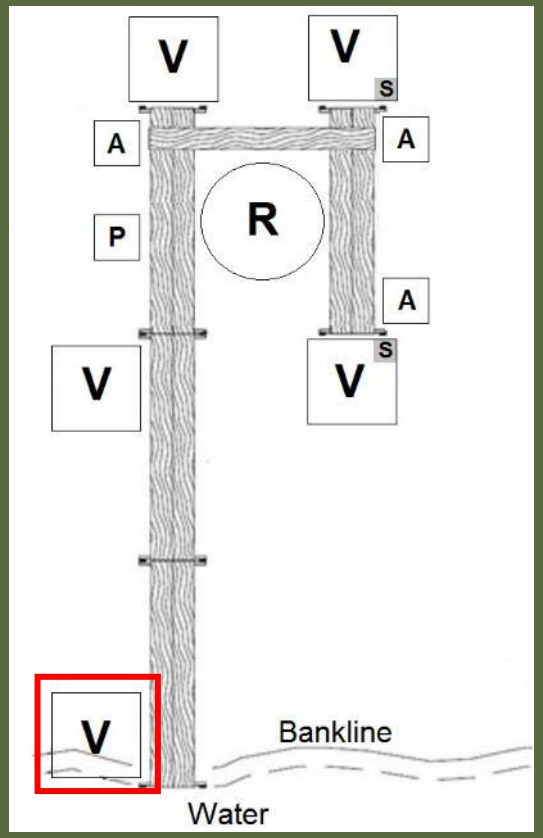
COASTAL WETLANDS MONITORING
SURFACE ELEVATION

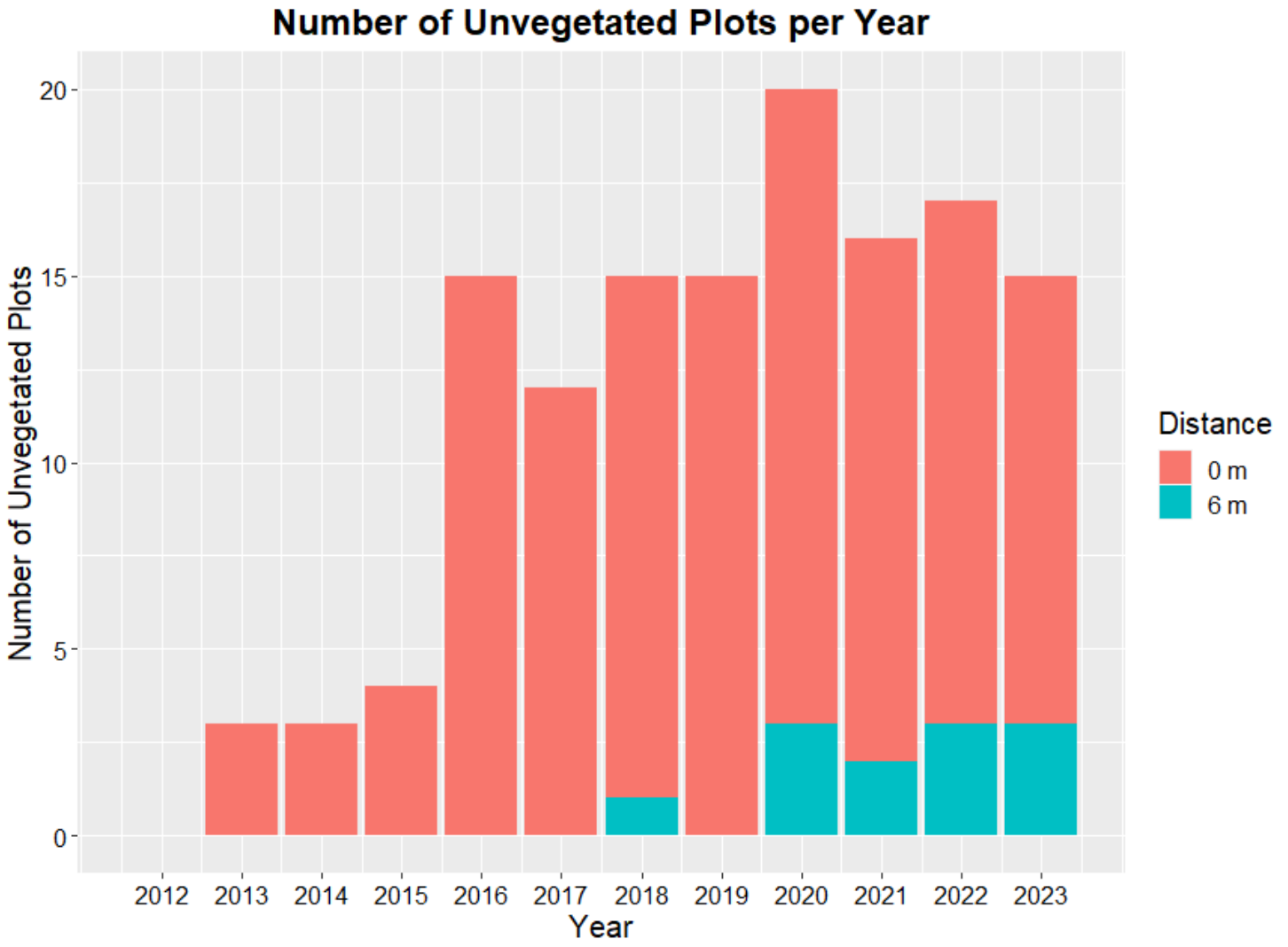




COASTAL WETLANDS MONITORING

EDGE LOSS





RESEARCH

Coastal wetland monitoring in the GTMNERR marsh-mangrove ecotone

CURRENT RESEARCH PRIORITIES

ECOSYSTEM IMPACTS OF MANGROVE RANGE EXPANSION

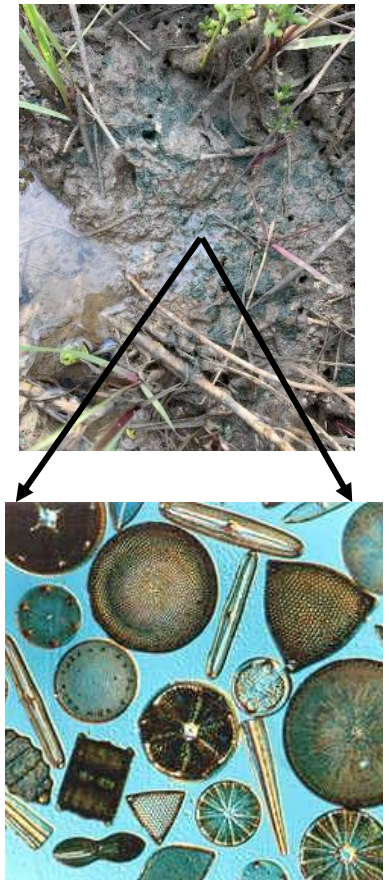
CURRENT RESEARCH PRIORITIES

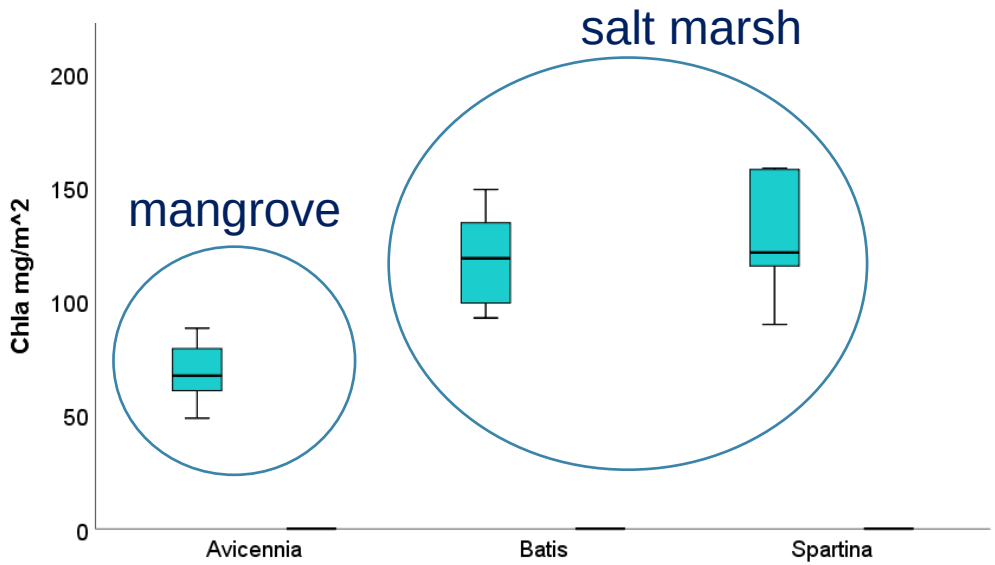
ECOSYSTEM IMPACTS OF MANGROVE RANGE EXPANSION

Gabby Canas, UNF Masters project supported by:

UNF UNIVERSITY of NORTH FLORIDA

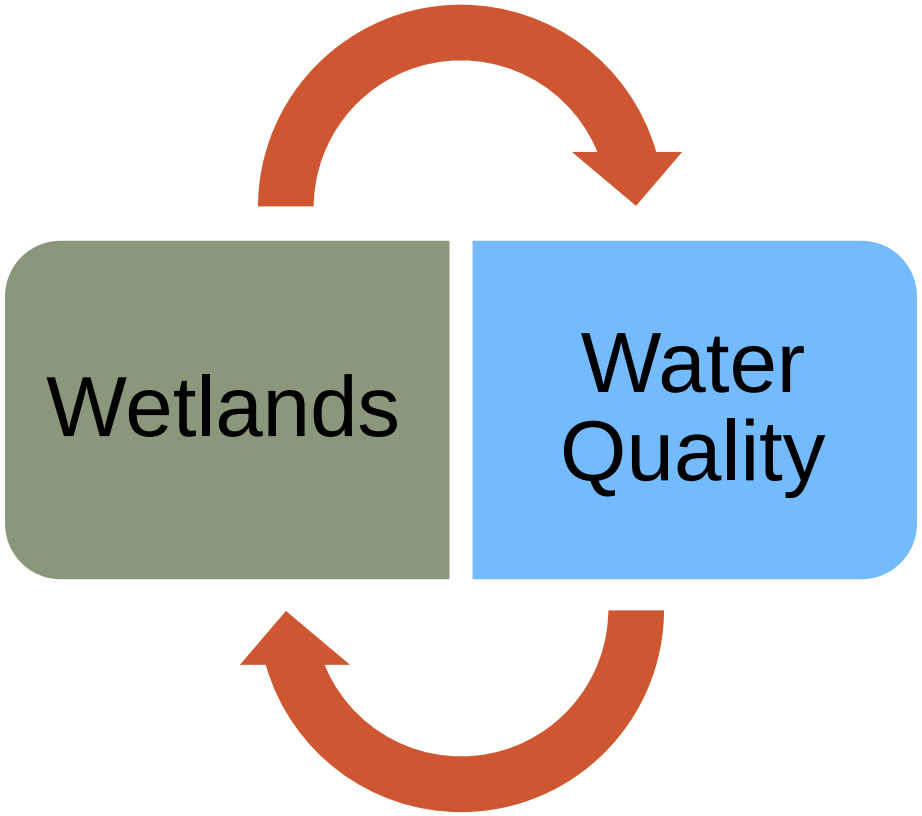
NSF





CURRENT RESEARCH PRIORITIES

NUTRIENTS & HYDROLOGY



THANK YOU

Nikki Dix, PhD
Guana Tolomato Matanzas National Estuarine Research Reserve
Office of Resilience and Coastal Protection
Florida Department of Environmental Protection

904-380-8600
Nikki.Dix@FloridaDEP.gov