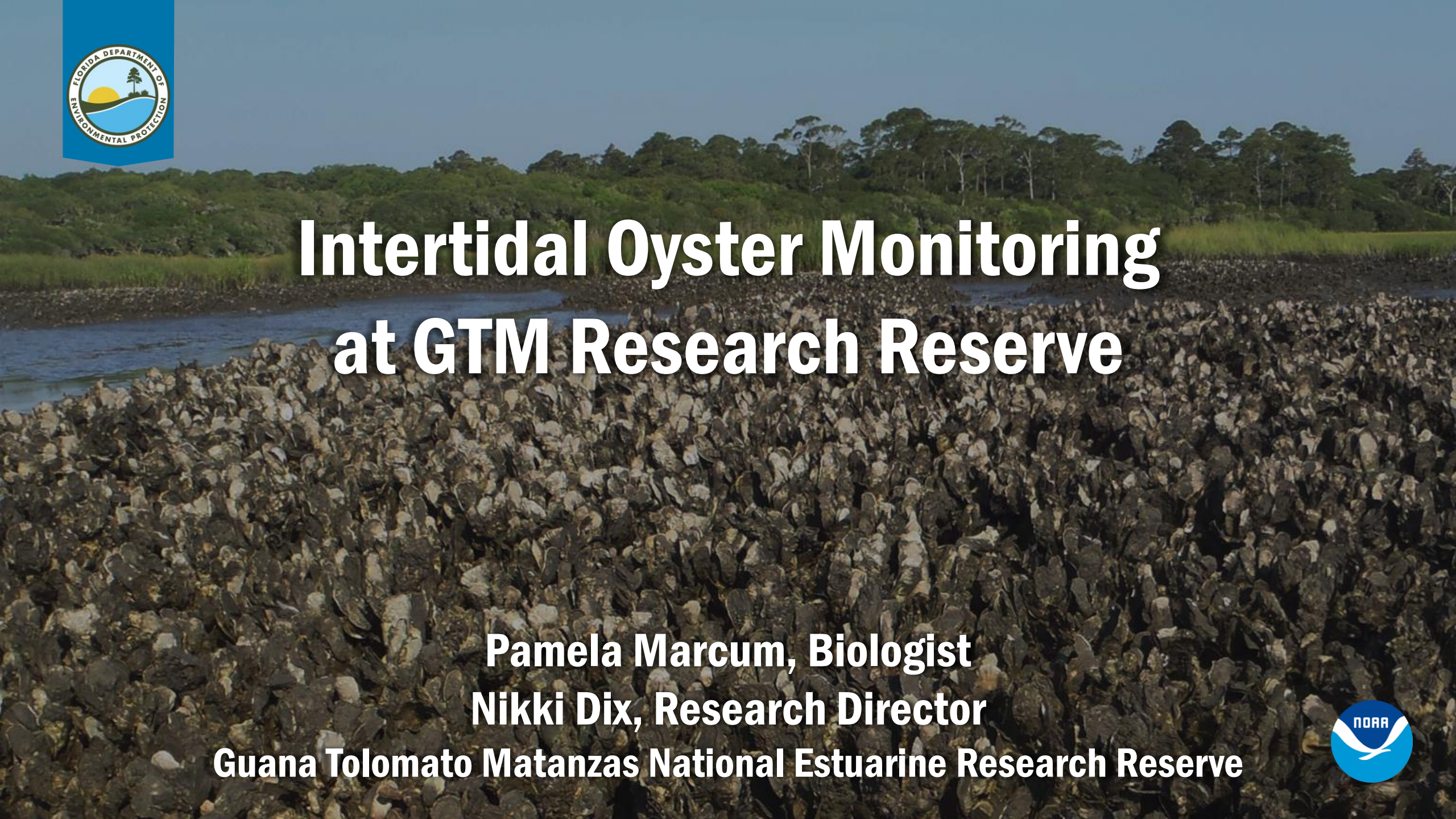
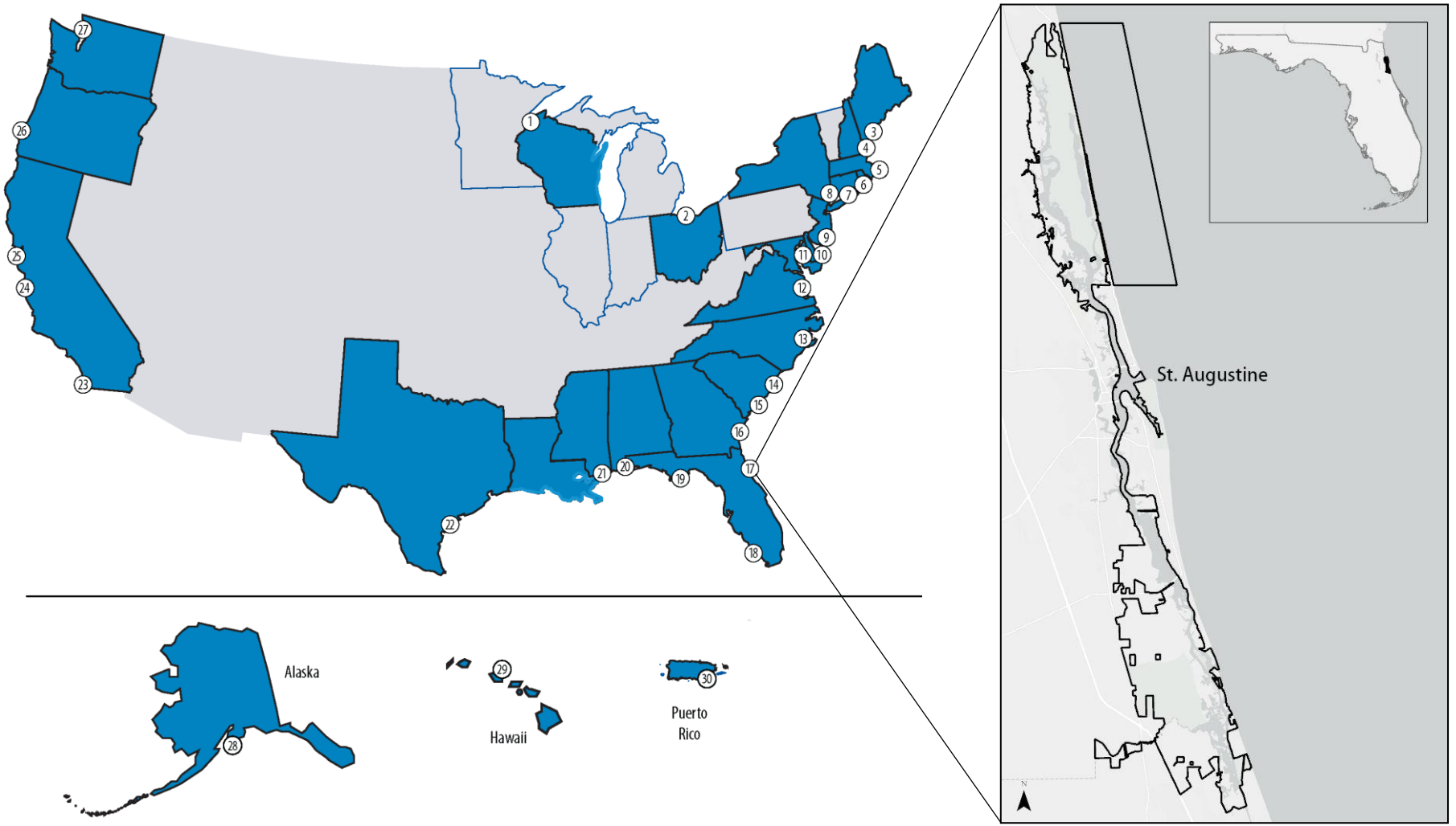


Intertidal Oyster Monitoring at GTM Research Reserve

Pamela Marcum, Biologist
Nikki Dix, Research Director
Guana Tolomato Matanzas National Estuarine Research Reserve

GTM Research Reserve



GTM Oyster Monitoring

Guiding Questions:

- How many oysters (areal coverage * density) are in the GTM/St. Augustine region?
- How do oyster abundances and size class frequencies change over space and time?
- What are the relative influences of temperature, food availability, salinity, disease, predation and harvesting on spatial and temporal patterns in oyster abundance and size?
- How do estimates of oyster abundance and size compare to past estimates and to oysters in other systems regionally and globally?
- Where are restoration efforts most needed and most likely to succeed?

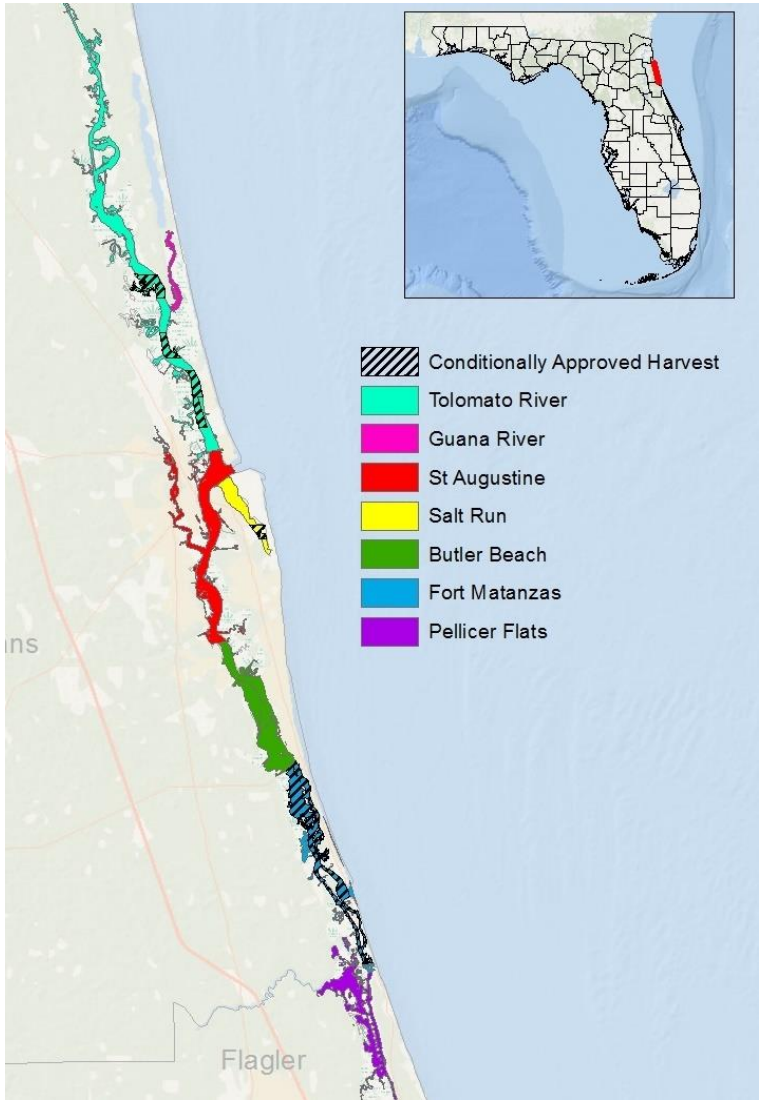
GTM Pilot Oyster Monitoring

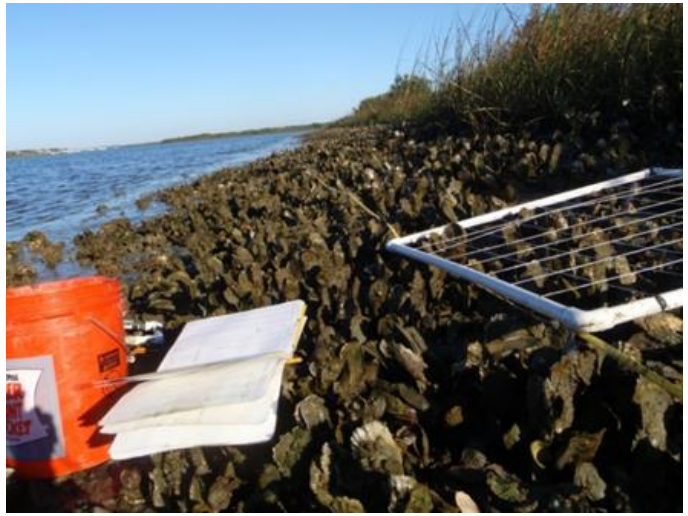
- Evaluate status of oyster populations
- Collect baseline data
- Evaluate monitoring metrics
- Evaluate sub-estuary differences
- Evaluate seasonal differences

GTM Pilot Oyster Monitoring

Strategy:

- 2014 - 2016
- Seasonal sampling
  - Summer: June – Aug.
  - Winter: Dec. – Feb.
- Sub-estuary sampling
  - Major waterways
  - Harvest areas
  - GTM boundaries
- Variety of metrics
- 210 reefs

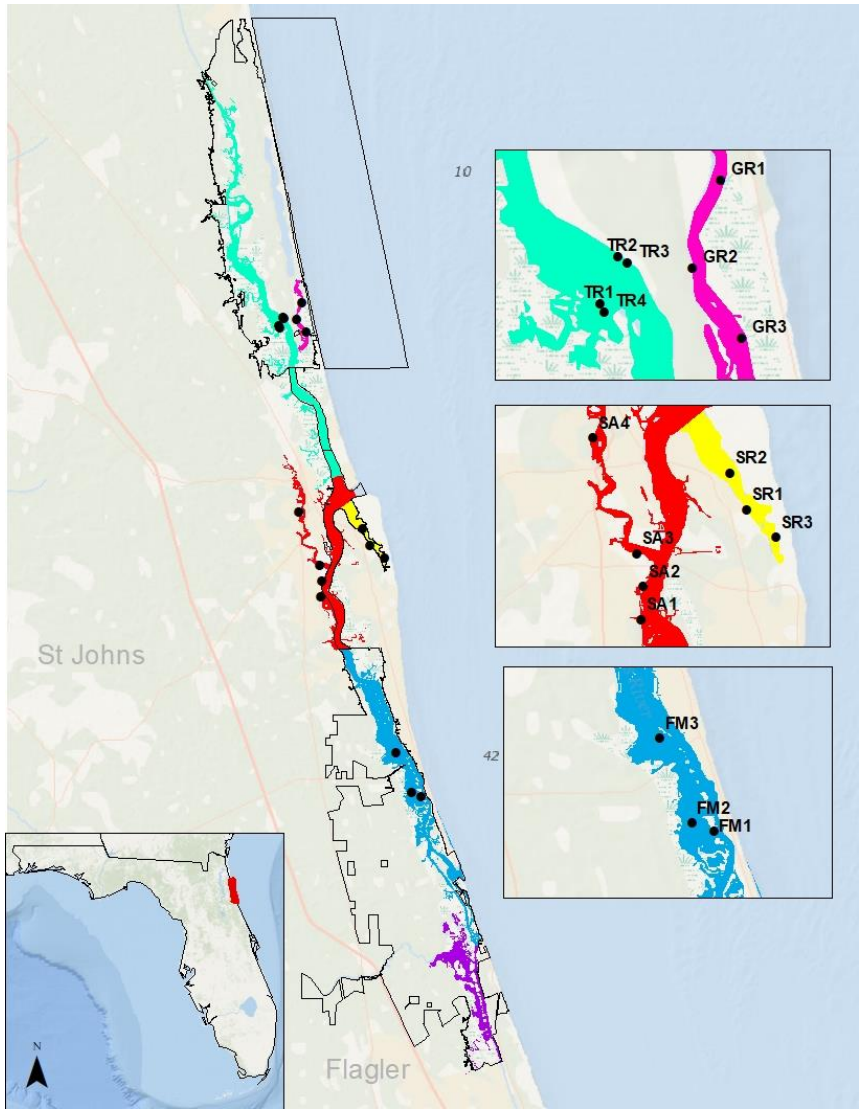




GTM Pilot Oyster Monitoring

Strategy:

- Oyster settlement (spat monitoring)
- Monthly 2015 – 2020
- 3 “trees” of shell strings in each sub-estuary



GTM Pilot Oyster Monitoring

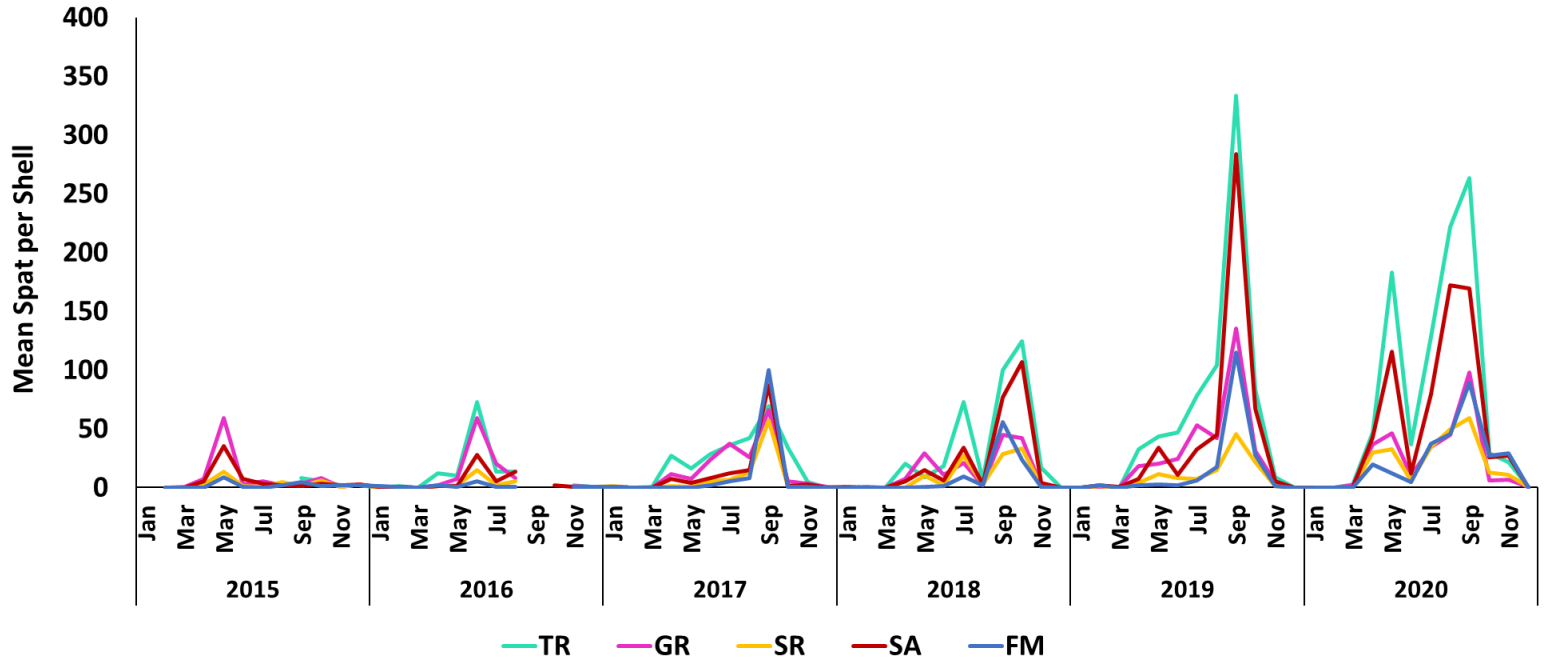
Conclusions:

- Seasonal differences in total oyster density, oysters <25mm, live cover, associated fauna
- Sub-estuary differences in most metrics
- Many reef condition metrics correlated with oyster density

GTM Pilot Oyster Monitoring

Conclusions:

- Settlement patterns varied by year
- Low settlement in Dec - Mar consistently



From Pilot to Long-term Monitoring

Guiding Future Monitoring:

- Oyster density may be an appropriate indicator of habitat function
  - Data used in oyster filtration model (Gray et al. 2021. Beyond Residence Time: Quantifying factor that drive the spatially explicit filtration services of an abundant native oyster population. *Estuaries and Coasts*)
- Omit oysters <25mm for large-scale population structure estimates
- Sub-estuary differences suggest stratified sampling
- Non-destructive cover metrics may be suitable indicators of relative oyster abundance and reef condition
  - Also useful for created reef comparisons (Safak et al. 2020. Coupling breakwalls with oyster restoration structures enhances living shoreline performance along energetic shorelines. *Ecological Engineering*, 15)

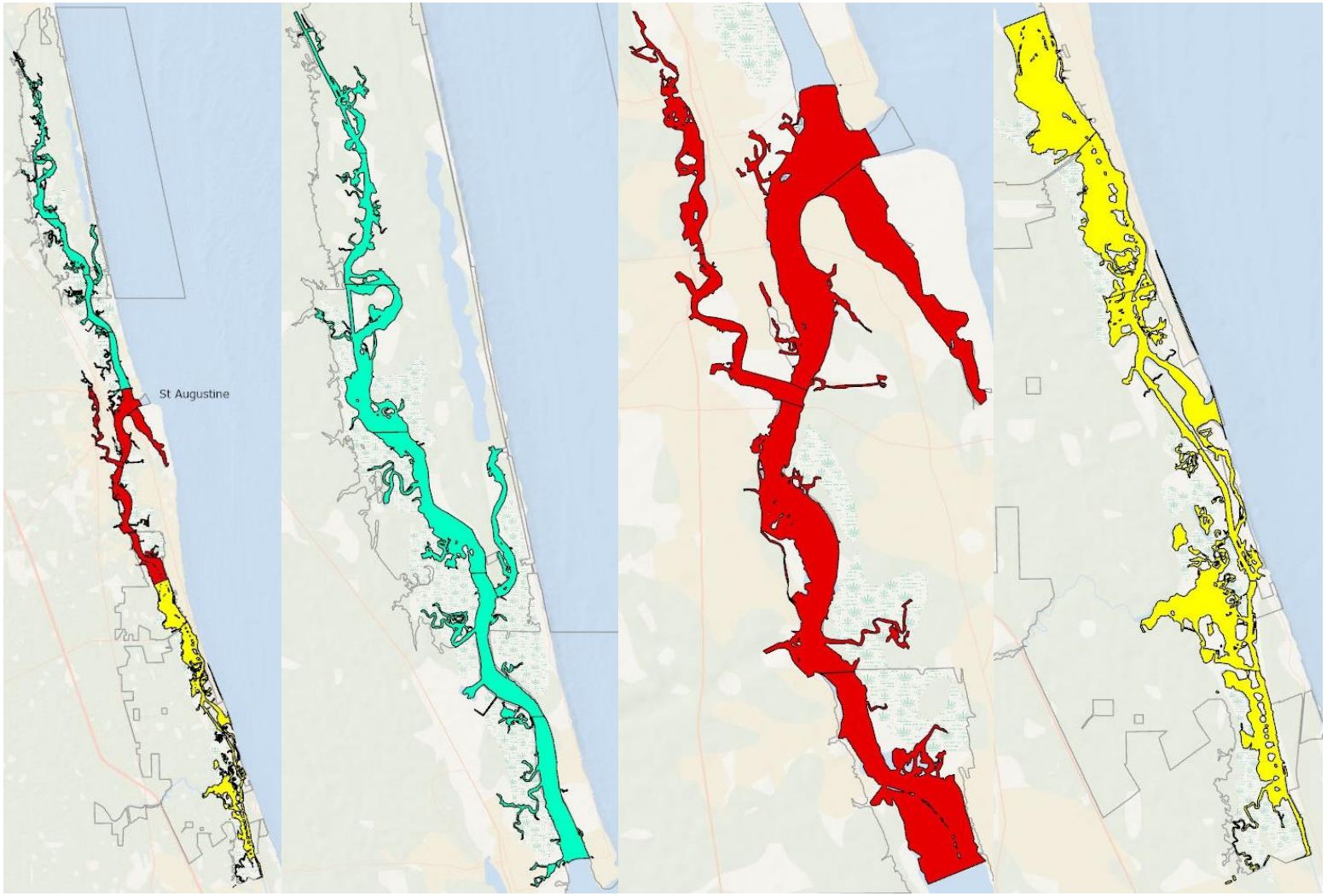
GTM Long-term Oyster Monitoring

- Evaluate reef condition
- Evaluate status and trends of oyster populations
- Estimate ecosystem services

GTM Long-term Oyster Monitoring

Strategy:

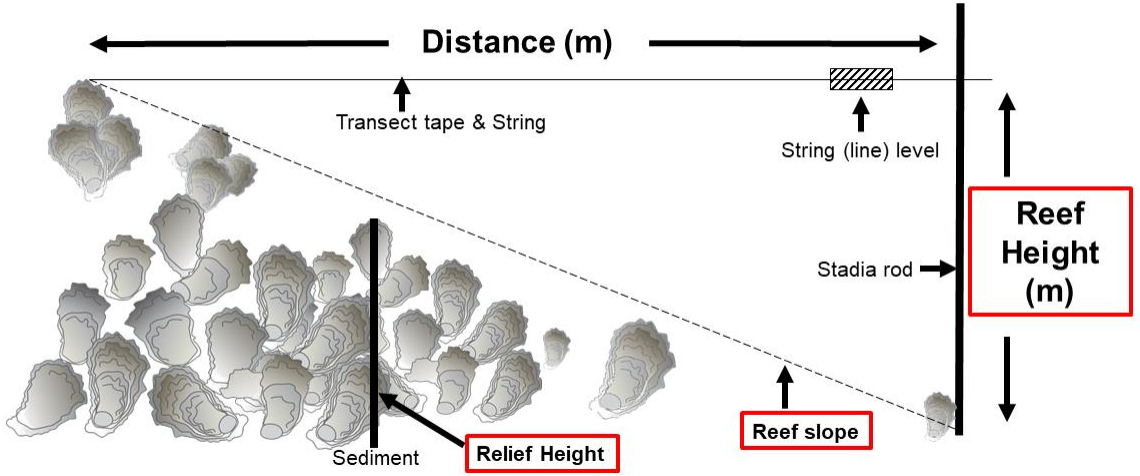
- Winter (Dec. - March)
- 3-year rotation
- Estuary scale
- Change over time



GTM Long-term Oyster Monitoring

Metrics: Reef Condition

- Reef height and slope
- # predatory snails
- # rooted mangroves
- # shell clusters
- Percent cover (live, shell, box, substrate, other)
- Relief height
- Mapping and elevation

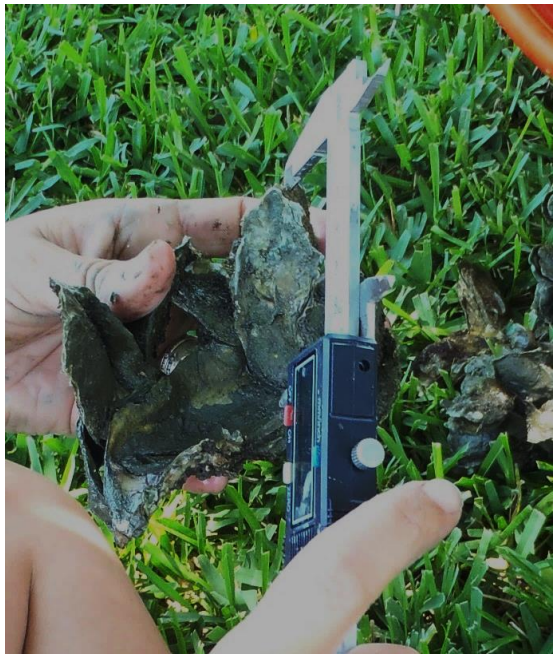


GTM Long-term Oyster Monitoring

Metrics:

Oyster Population (≥25 mm)

- Abundance of live oysters
- Shell height



GTM Long-term Oyster Monitoring

Metrics: Associated fauna

- Abundance of mussels, clams and barnacles
- Shell heights of mussels and clams
- Presence of other gastropods
- Presence of live *Cliona* or evidence of past presence

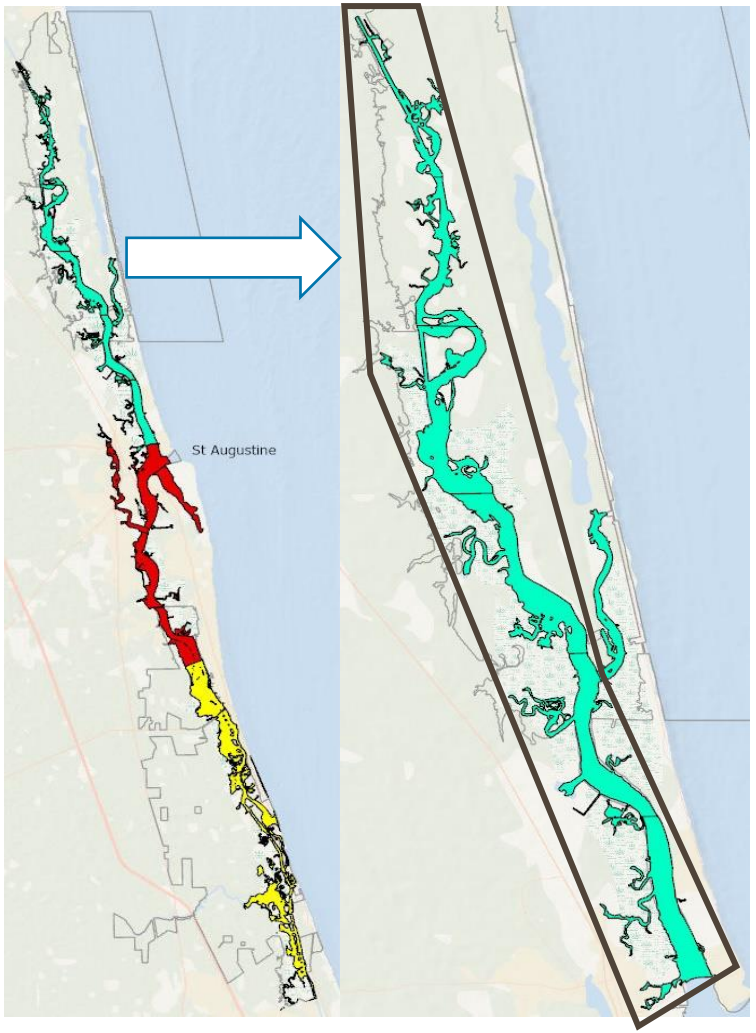
Winter 2022

- Start of GTM long-term intertidal oyster monitoring
- Sampling occurred January through March
- 2022 focused on the Northern sub-estuary

GTM Oyster Monitoring

Winter 2022:

- Tolomato River
  - Goal: 42 reefs



GTM Oyster Monitoring

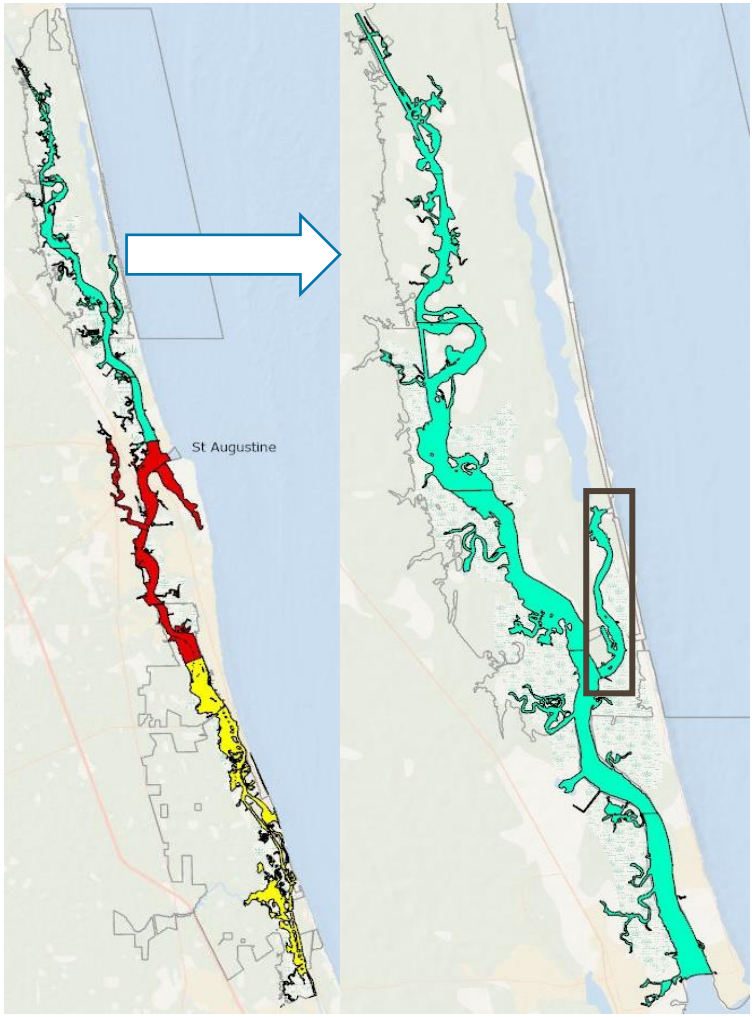
Winter 2022:

- Tolomato River
  - Goal: 42 reefs
  - Total sampled: 42 reefs

GTM Oyster Monitoring

Winter 2022:

- Guana River
  - Goal: 16 reefs



GTM Oyster Monitoring

Winter 2022:

- Guana River
  - Goal: 16 reefs
  - Total sampled: 18 reefs

GTM Oyster Monitoring

Winter 2022:

- Tolomato River
  - Goal: 42 reefs
  - Total sampled: 42 reefs
- Guana River
  - Goal: 16 reefs
  - Total sampled: 18 reefs
- TOTAL: 60 reefs

Thank you!

Contact Pamela.Marcum@FloridaDEP.gov
or Nikki.Dix@FloridaDEP.gov