Florida Trustee Implementation Group (FL-TIG)

Oyster Data Gaps
St Andrew Update

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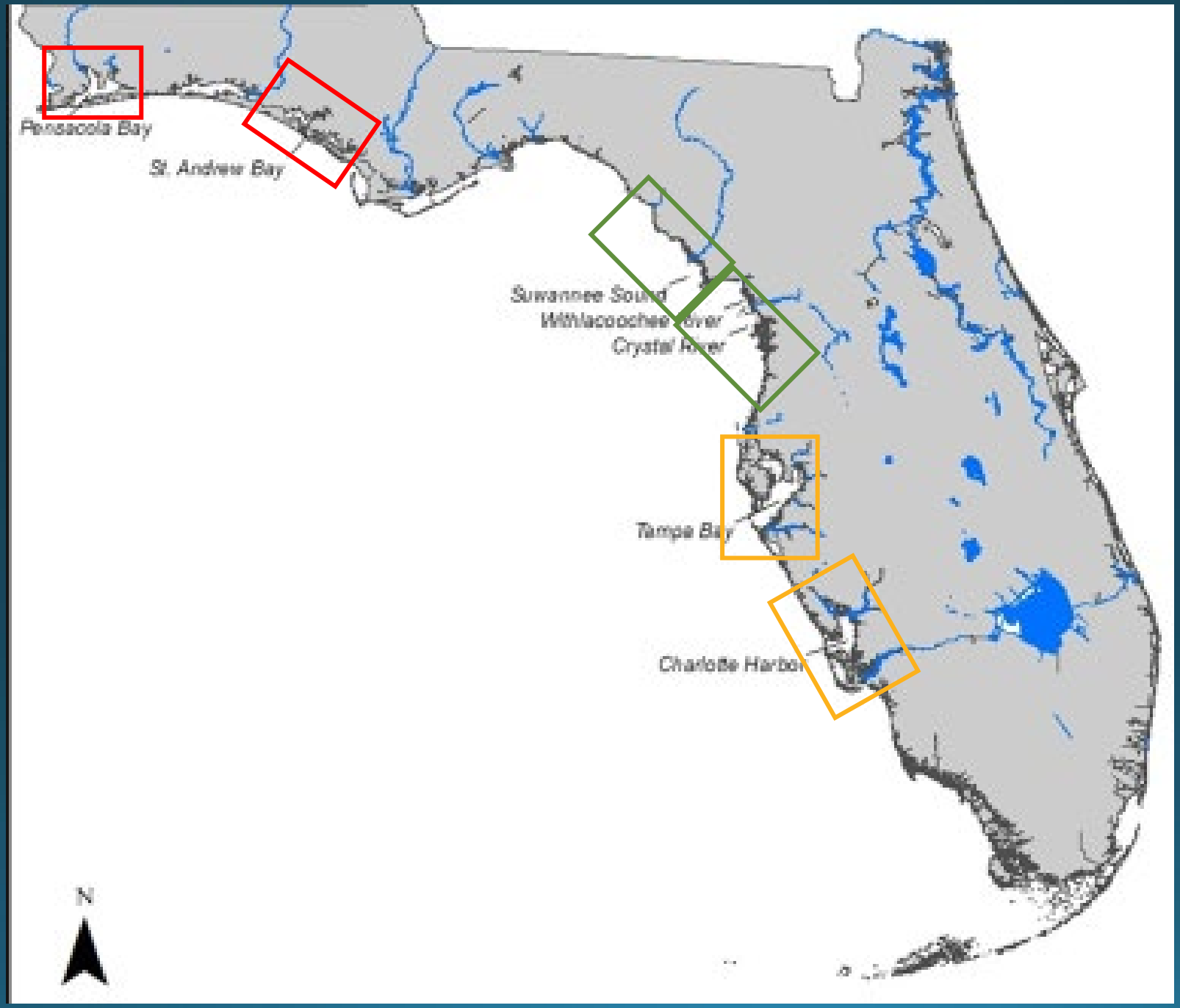
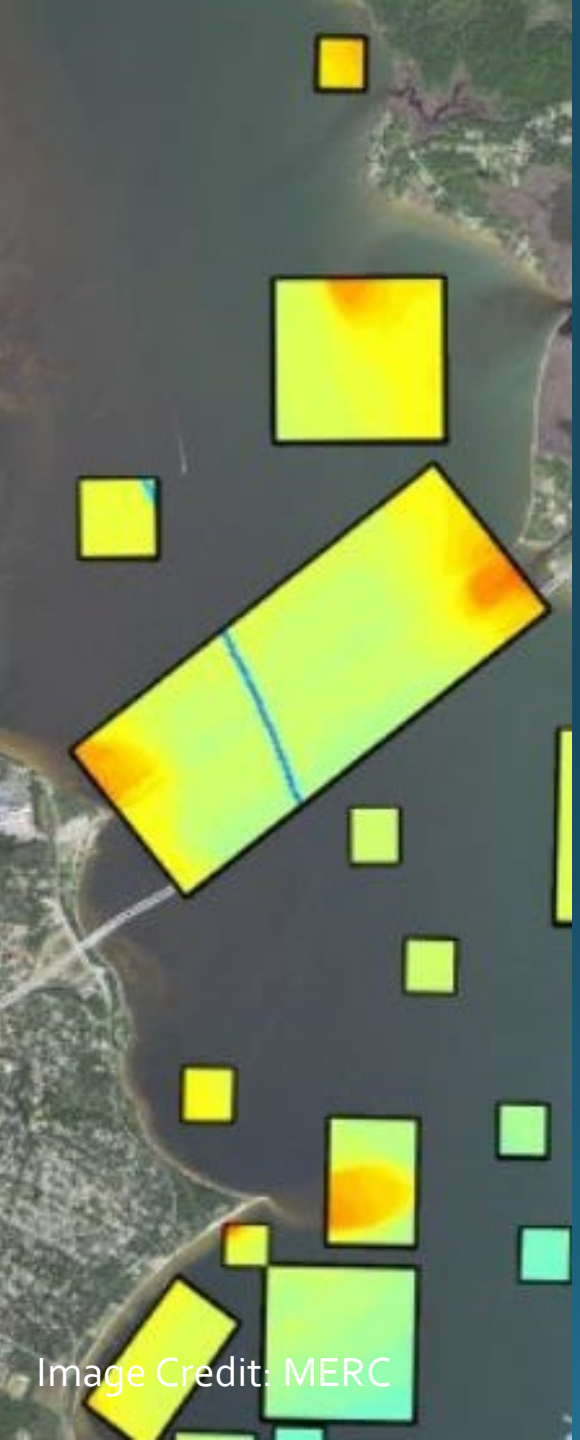
April 17, 2025

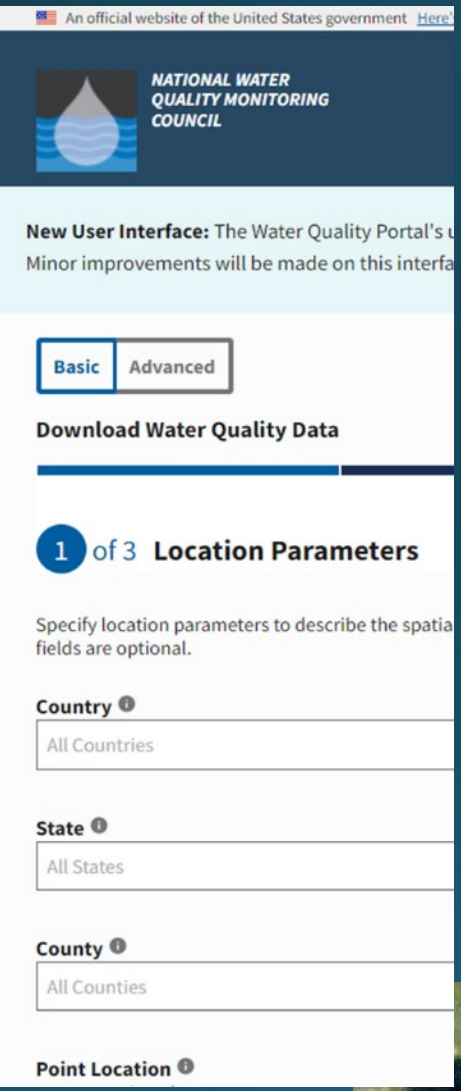

Pensacola Bay
St. Andrew Bay
Suwannee Sound
Withlacoochee River
Crystal River
Tampa Bay
Charlotte Harbor
N



Florida Trustee Implementation Group (FL-TIG)

1. Data compilation
   - Water quality and oyster data
   - Develop current status and trends
   - Report available
2. Benthic oyster habitat mapping
   - Mapping areas not recently mapped
3. Field assessments & monitoring
   - Initial Baywide survey
   - Monthly and Quarterly monitoring
4. GIS-based habitat suitability index (HSI) model
   - Aid for future restoration efforts

Task 1 - Oyster Data Compilation



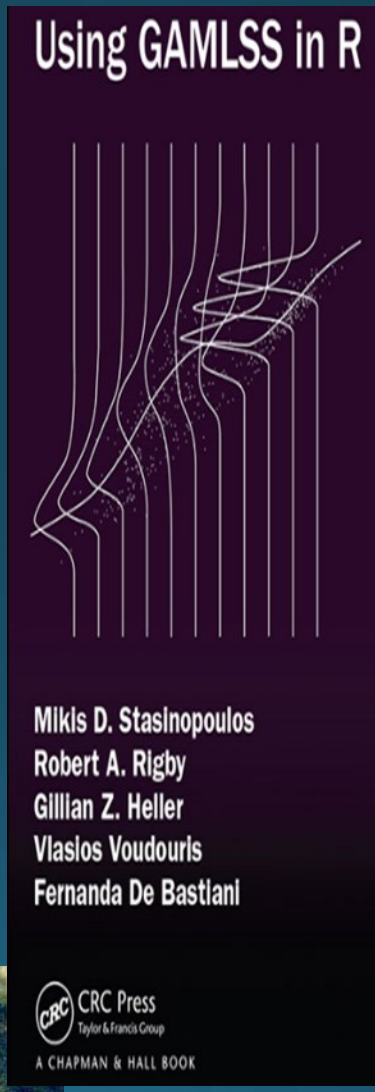
- Searched for oyster datasets for each location (SEACAR & other partners)
- Parameters of interest:
  - Oyster density, percent live, shell height, and reef height

Water Quality Data Compilation

- Matched to timeframe of oyster samples
- Parameters of interest:
  - Salinity, Temperature, Dissolved Oxygen, Chlorophyll a, and *K. brevis* counts

Data Modelling and Analysis

- Utilized Generalized Additive Models for Location, Scale and Shape (GAMLSS)
- Enables flexible regression and is well suited for dealing with multiple response variables and over-dispersed data distributions.

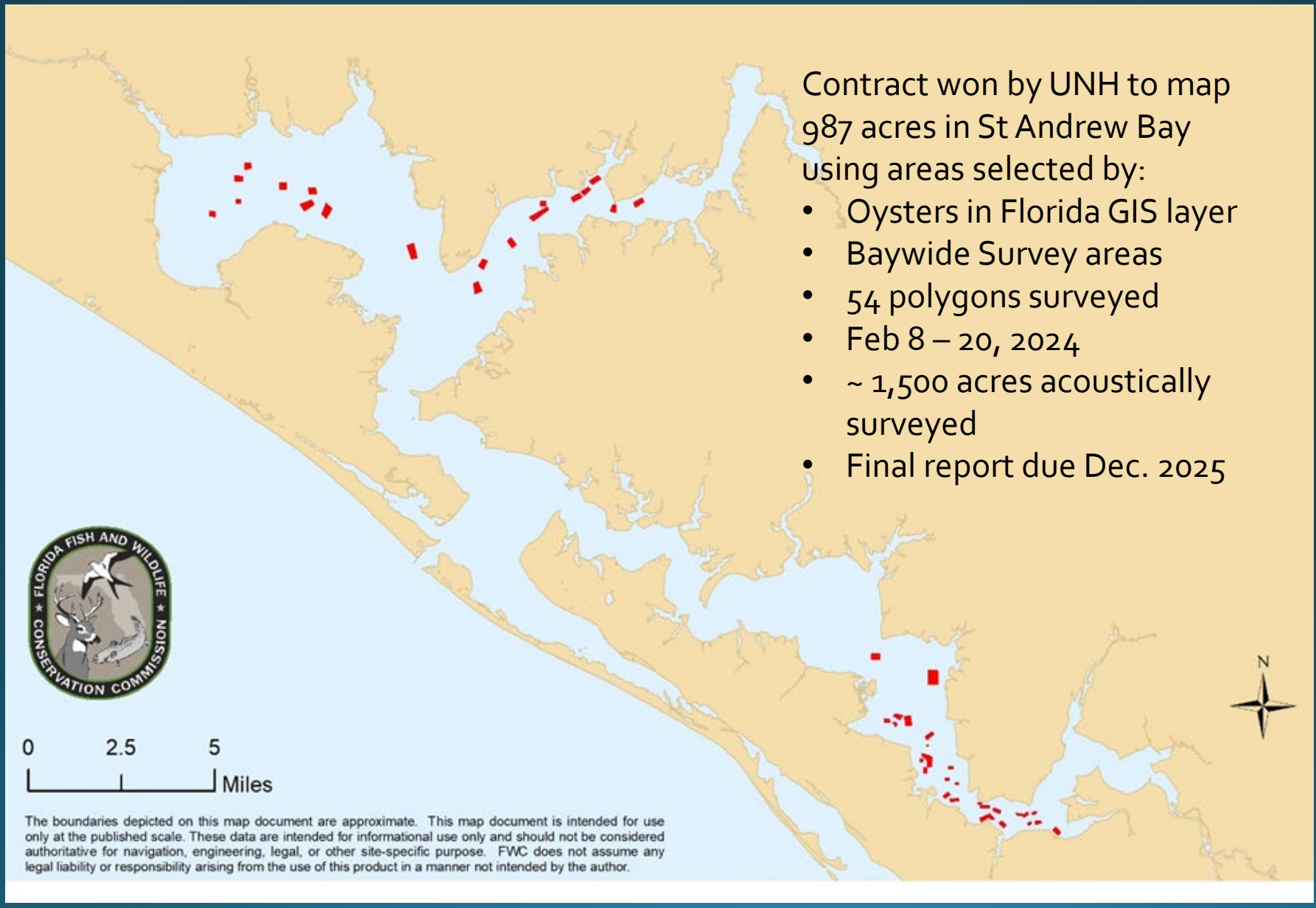


Trends Results
2010 - 2021

Estuary	Reef Type	Oyster Density	Percent Live	Shell height ≤ 25 mm	Shell height > 25 mm
Pensacola Bay	Restored	Decreasing*	Decreasing*	Decreasing*	Increasing*
	Natural	None	Decreasing*	None	None
St Andrew Bay	Restored	Decreasing*	None	Decreasing*	Decreasing*
	Natural	None	n/a	Decreasing*	None
Springs Coast	Natural	n/a	n/a	Increasing*	Decreasing*
Tampa Bay	Natural	Decreasing*	Increasing*	Decreasing*	Increasing*
Charlotte Harbor	Restored	Increasing*	n/a	Increasing*	Increasing*
	Natural	Decreasing*	None	None	Increasing*

Estuary	Temperature	Salinity	Dissolved oxygen	Chlorophyll a
Pensacola Bay	None	Decreasing	Increasing	None
St. Andrew Bay	Decreasing	Increasing	Decreasing	None
Springs Coast	None	None	Increasing	None
Tampa Bay	None	Increasing	None	Increasing
Charlotte Harbor	None	Decreasing	Decreasing	None

Task 2 - Mapping



Contract won by UNH to map 987 acres in St Andrew Bay using areas selected by:

- Oysters in Florida GIS layer
- Baywide Survey areas
- 54 polygons surveyed
- Feb 8 – 20, 2024
- ~ 1,500 acres acoustically surveyed
- Final report due Dec. 2025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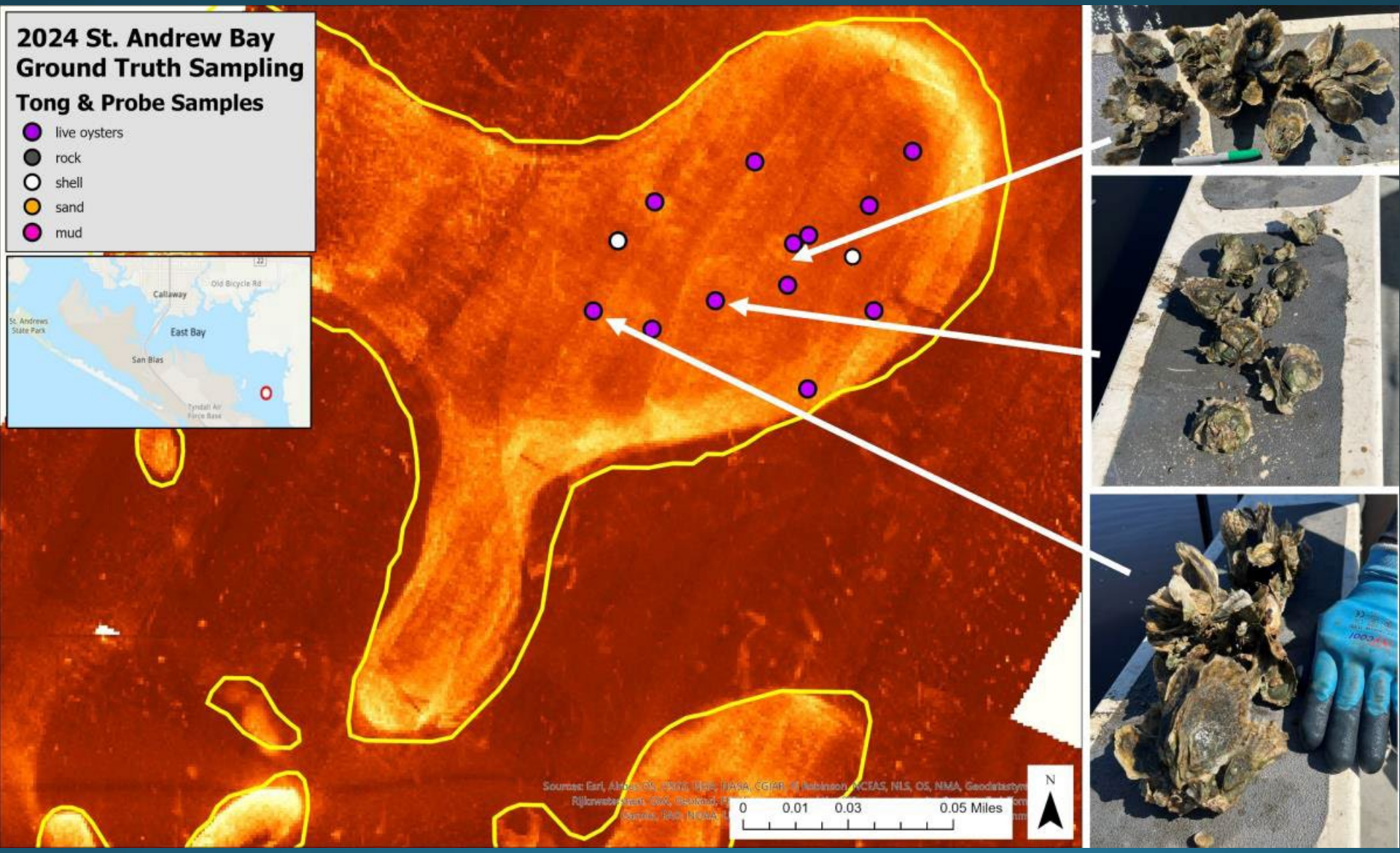
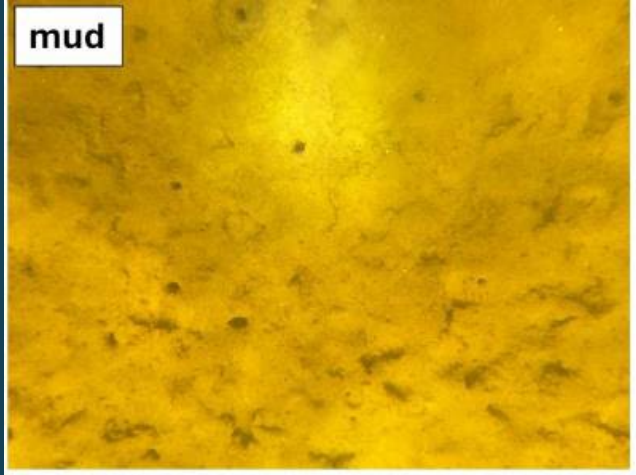
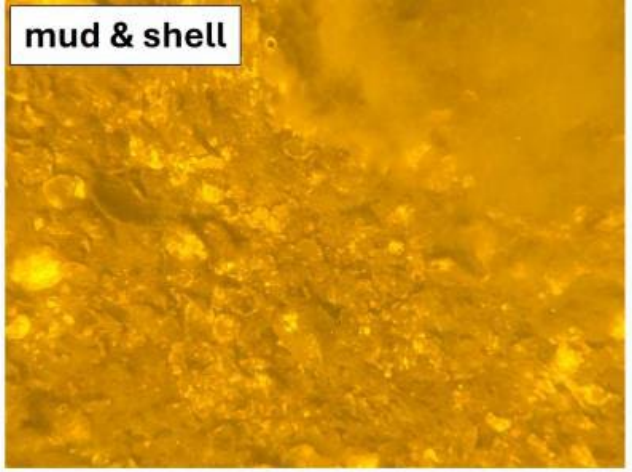
North Bay
Ground truthing at 355 locations
• 241 Probe
• 96 Tong
• 18 U/W video
BAYWOOD SHORE ESTATES
WILDRIDGE
GULF COAST VILLAGE
NORTHSHORE ISLANDS
CANDLEWICK ACRES
VENETIAN VILLAS
BELAIRE ESTATES
Lynn Haven
N
1 mi
Google Earth

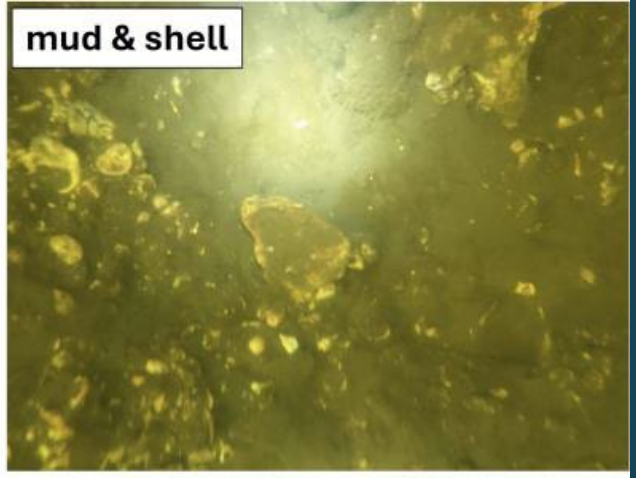
Overview of manually drawn polygons of “firm bottom” (yellow) based on sonar data for a portion of North Bay with the target polygons (red) overlaid.

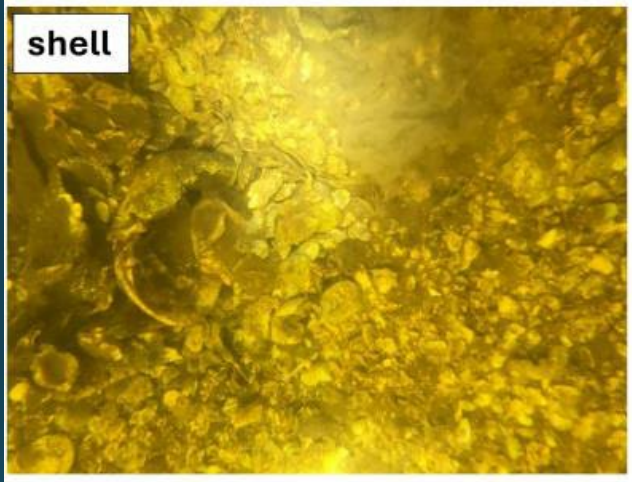
East Bay close up

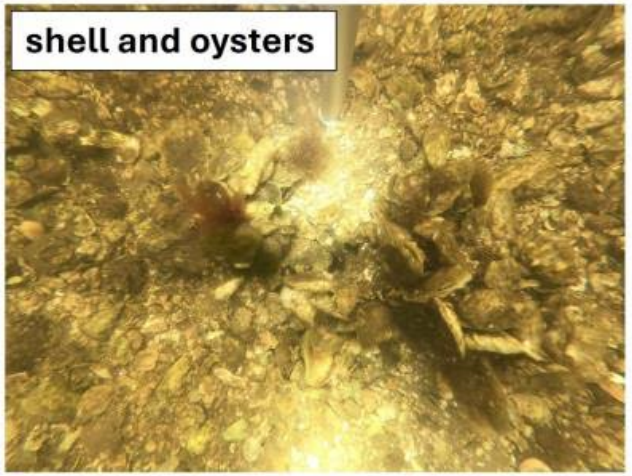


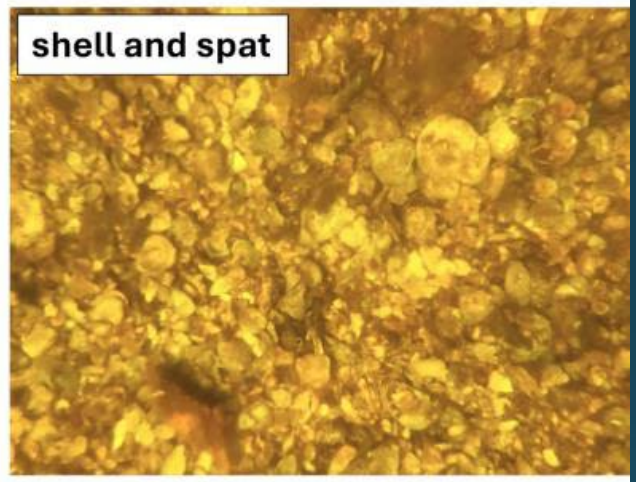

mud

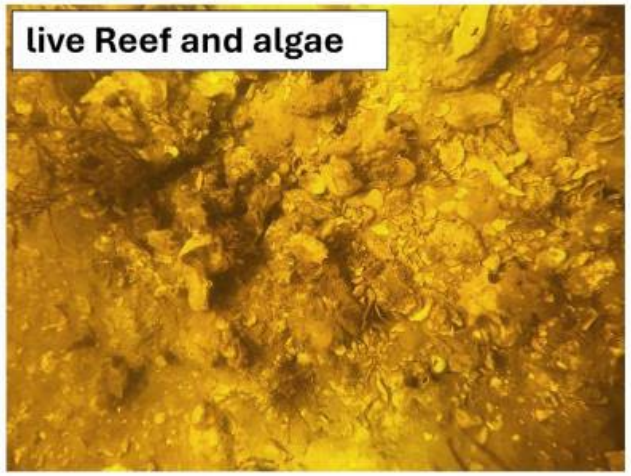

mud & shell

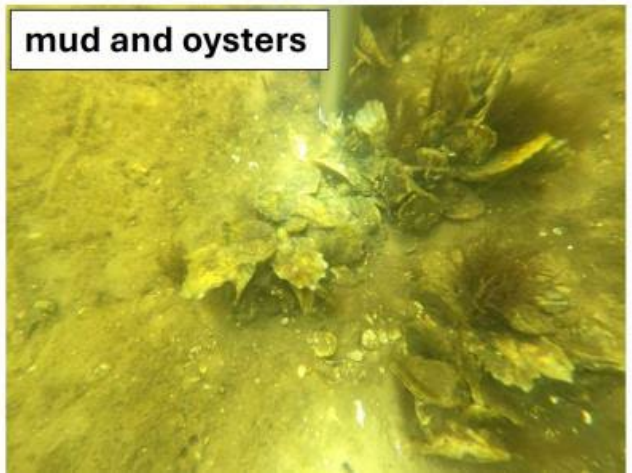

mud & shell

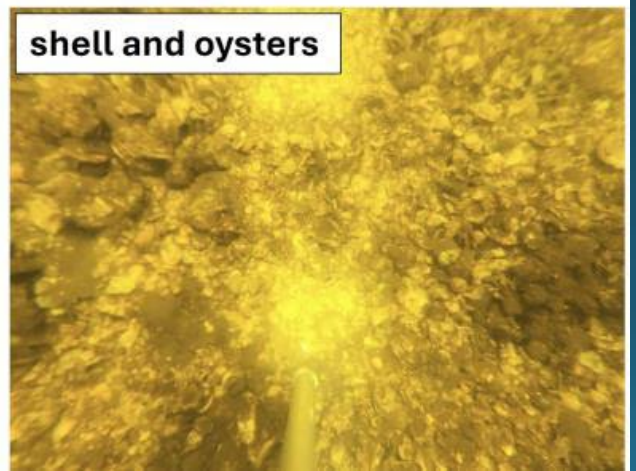

shell


shell and oysters

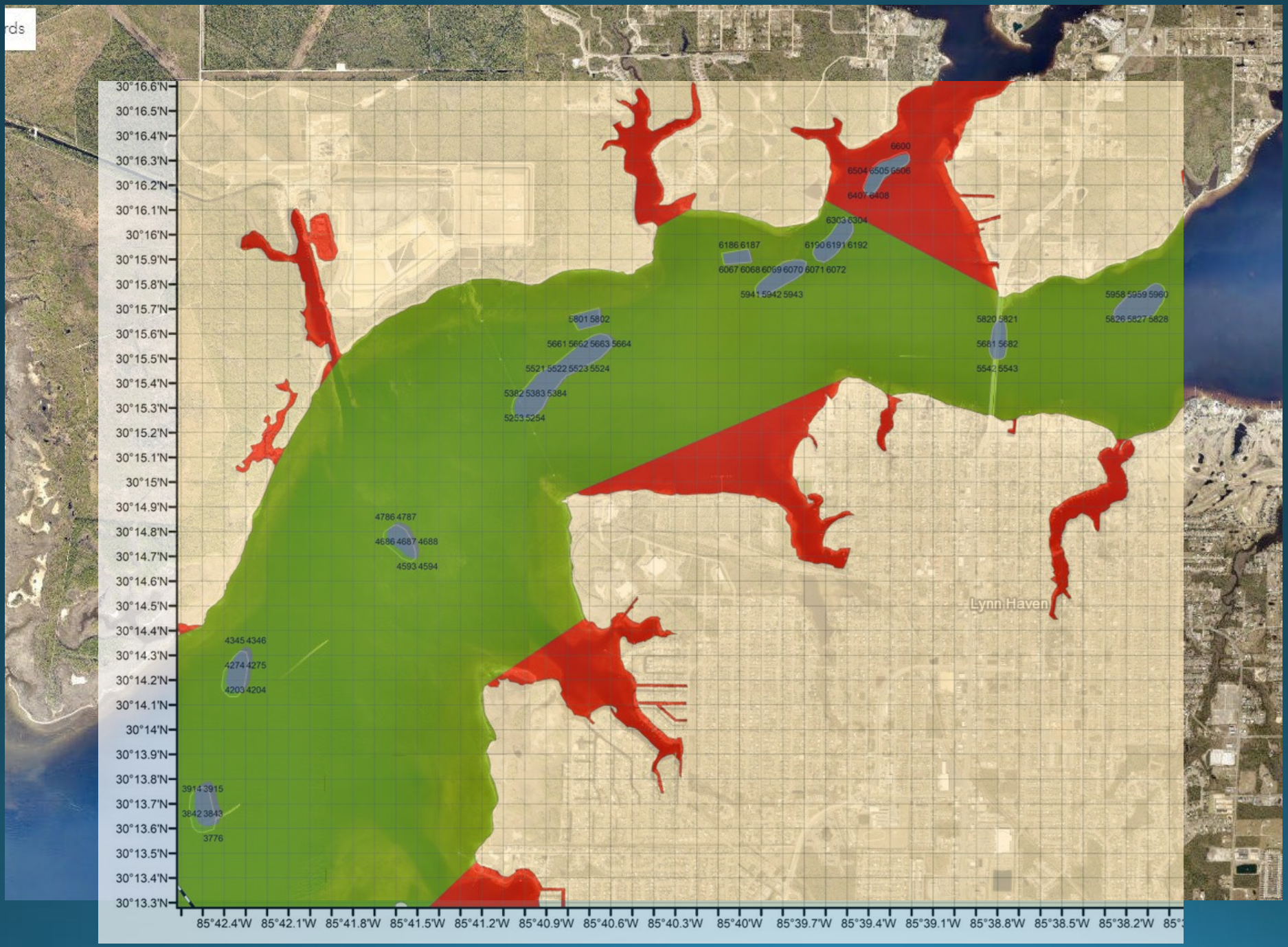

shell and spat


live Reef and algae


mud and oysters


shell and oysters


Task 3 – Assessment & Monitoring
Baywide Survey
Lynn Haven
Panama City Beach
Cedar Grove
Panama City
Springfield
Callaway
Lower Grand Lagoon
Parker


30°16.6'N
30°16.5'N
30°16.4'N
30°16.3'N
30°16.2'N
30°16.1'N
30°16'N
30°15.9'N
30°15.8'N
30°15.7'N
30°15.6'N
30°15.5'N
30°15.4'N
30°15.3'N
30°15.2'N
30°15.1'N
30°15'N
30°14.9'N
30°14.8'N
30°14.7'N
30°14.6'N
30°14.5'N
30°14.4'N
30°14.3'N
30°14.2'N
30°14.1'N
30°14'N
30°13.9'N
30°13.8'N
30°13.7'N
30°13.6'N
30°13.5'N
30°13.4'N
30°13.3'N
85°42.4'W
85°42.1'W
85°41.8'W
85°41.5'W
85°41.2'W
85°40.9'W
85°40.6'W
85°40.3'W
85°40'W
85°39.7'W
85°39.4'W
85°39.1'W
85°38.8'W
85°38.5'W
85°38.2'W
6600
6504 6505 6506
6407 6408
6303 6304
6186 6187
6190 6191 6192
6067 6068 6069 6070 6071 6072
5941 5942 5943
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5826 5827 5828
5801 5802
5820 5821
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5681 5682
5521 5522 5523 5524
5542 5543
5382 5383 5384
5253 5254
4786 4787
4686 4687 4688
4593 4594
Lynn Haven
4345 4346
4274 4275
4203 4204
3914 3915
3842 3843
3776

Baywide Oyster Surveys

- Poling or diver to assess substrate
  - Oyster, mud, sand, or seagrass
- SCUBA divers use ¼ meter² quadrat
- Collect 5 quadrats per station
- Collect data on:
  - Sample weight
  - Number and size of live oysters
  - Number of recently dead oysters
  - Number of oyster drills

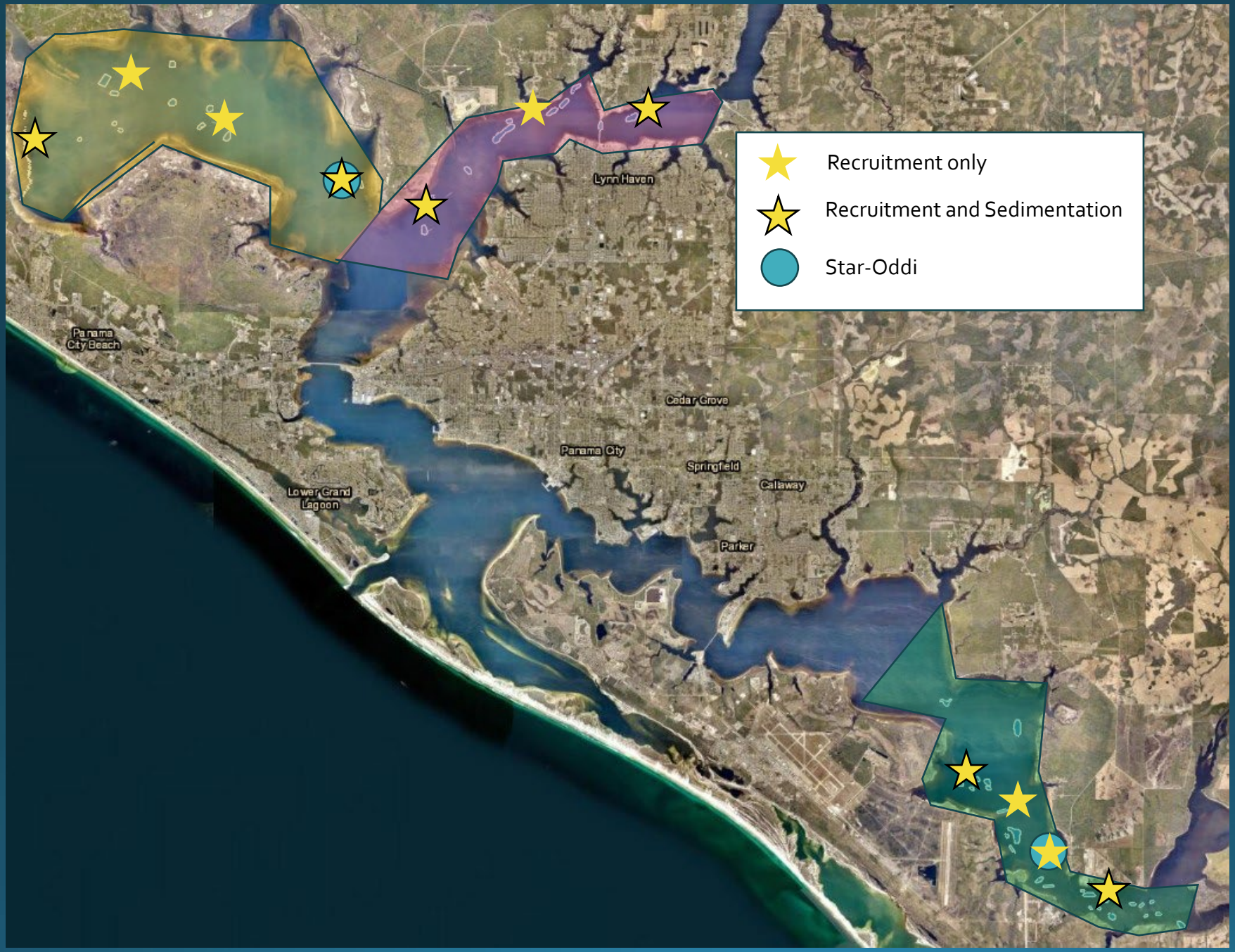
umbo

ventral shell margin

Shell Height = maximum linear distance from umbo to ventral shell margin

Summary Stats

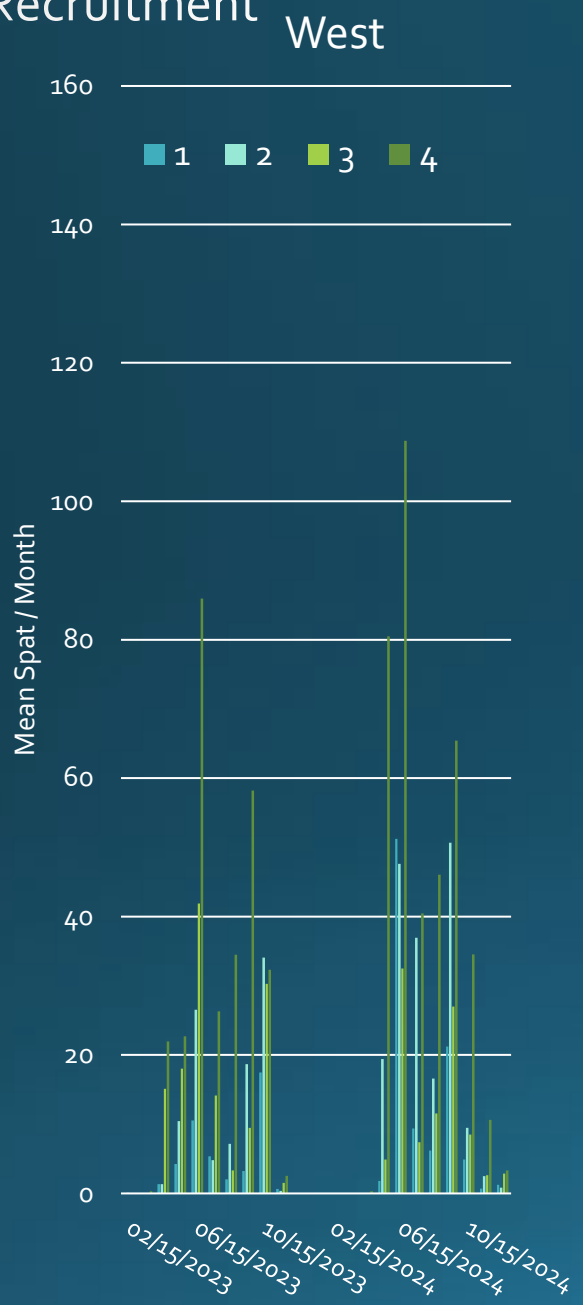
- Stations visited: 45
  - East Bay (24), North Bay (12), West Bay (9)
- Strata found: 3
  - Oyster/hard bottom: 21 stations (47%)
  - Mud: 18 stations (40%)
  - Sand: 6 stations (13%)
- Quadrats collected: 100
  - East Bay (35), North Bay (25), West Bay (40)
- Oysters found: 3,792
  - East Bay (447), North Bay (1,192), West Bay (2,153)
- Oysters over 30 mm SH found: 60
  - East Bay (8), North Bay (1), West Bay (51)
- Oysters over 75 mm SH found: None

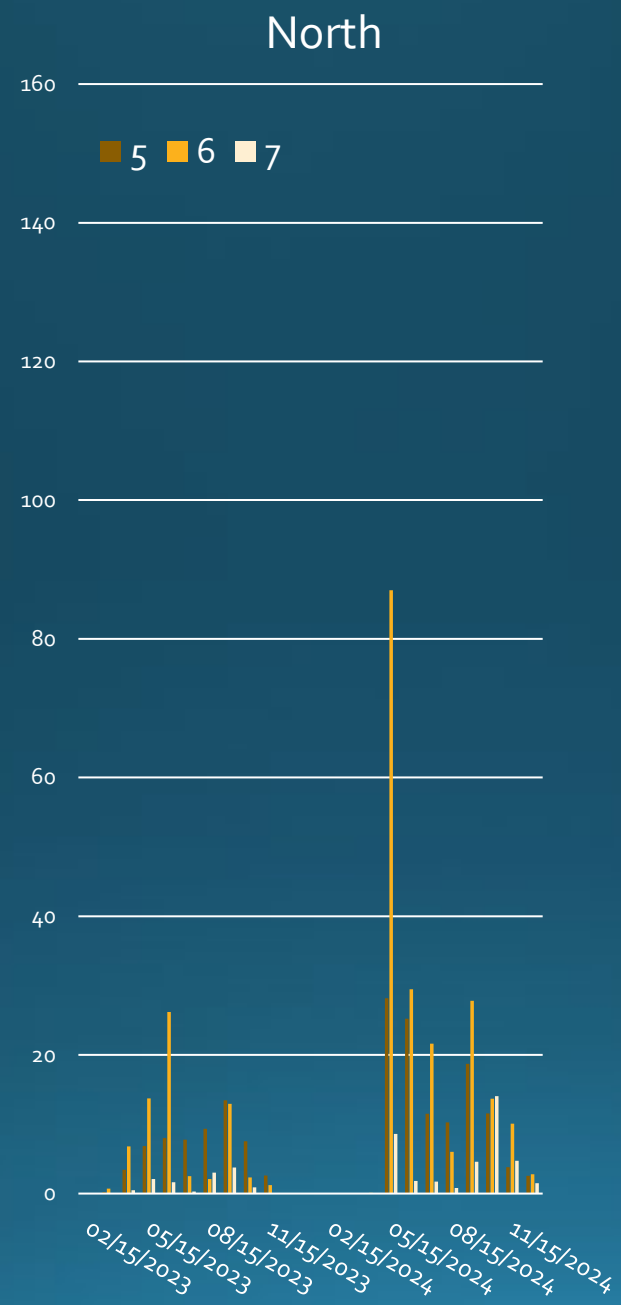

Recruitment only
Recruitment and Sedimentation
Star-Oddi
Lynn Haven
Panama City Beach
Cedar Grove
Panama City
Springfield
Callaway
Lower Grand Lagoon
Parker

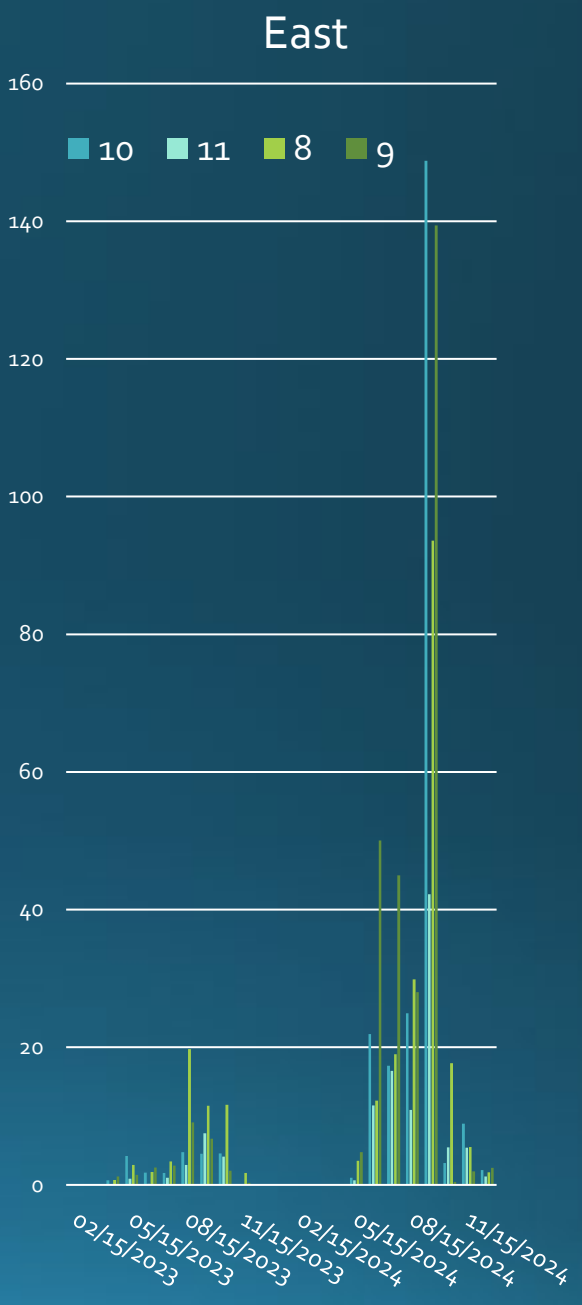
Recruitment Monitoring

- Spat (young oysters) settle on oyster shells / hard substrate
- Shell strings deployed at fixed stations
- Oyster spat settle on shell strings
- Shell strings deployed for one month then collected
- **Initial Deployment January 2023**

Recruitment



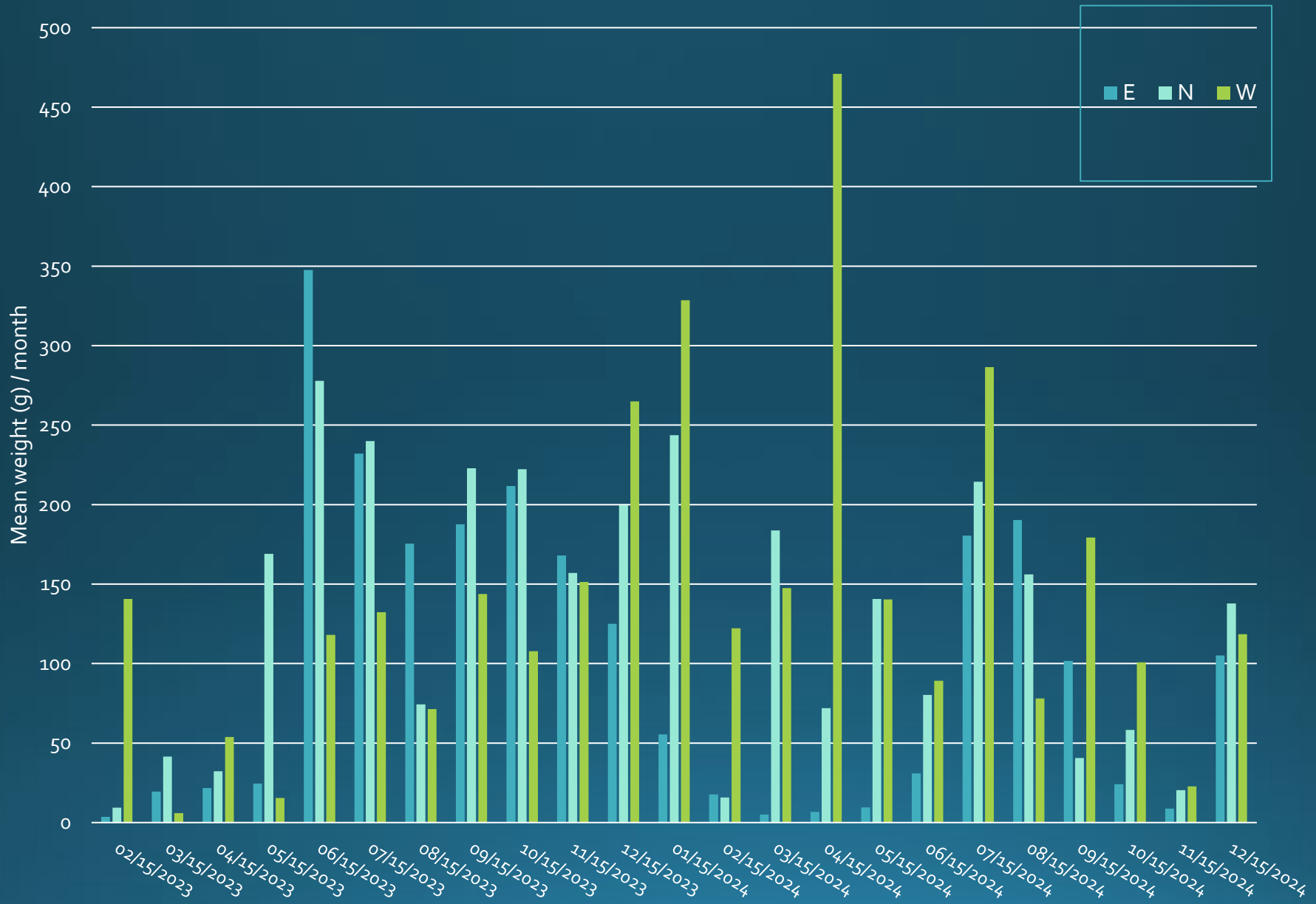




Sedimentation Monitoring

- Sediment traps deployed/retrieved monthly
- Each trap has four replicates
- Contents brought to lab:
  - Sample is filtered, dried, then weighed
- **Initial Deployment January 2023**

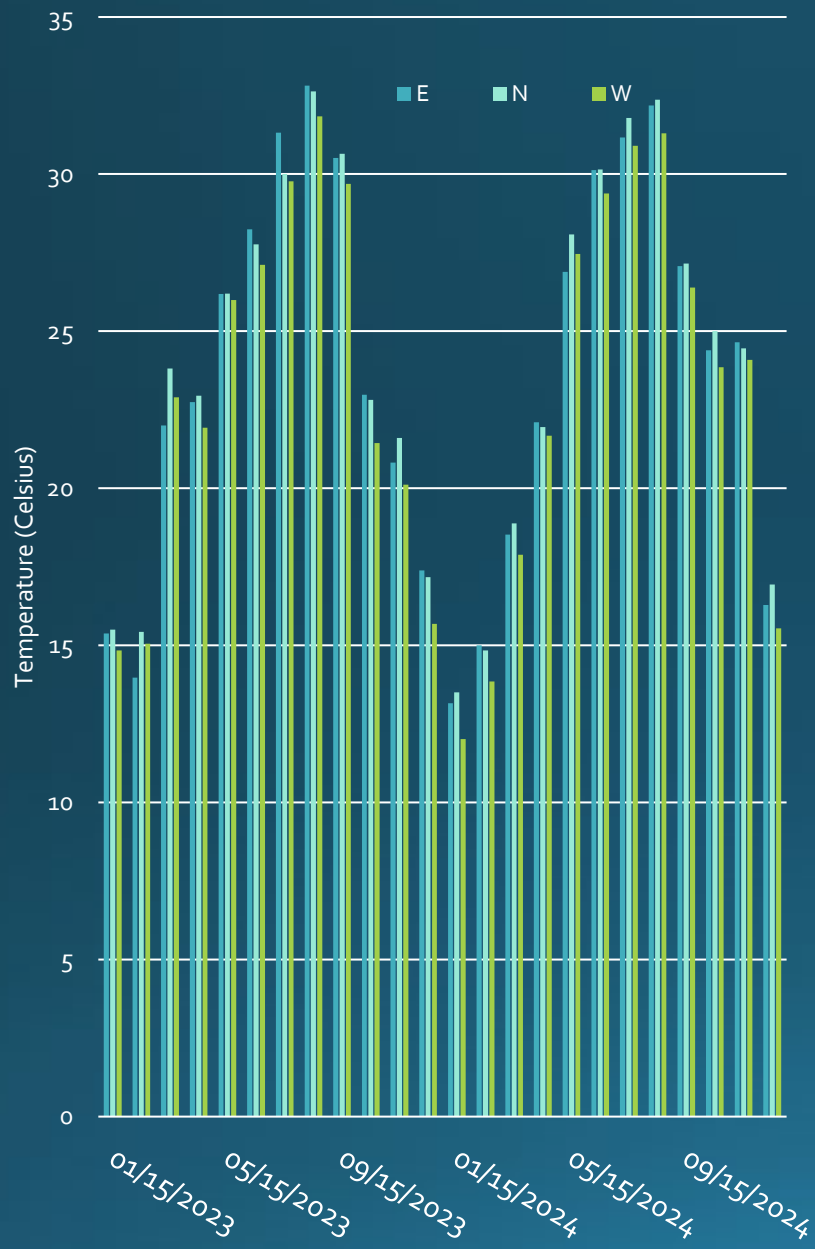
Sedimentation



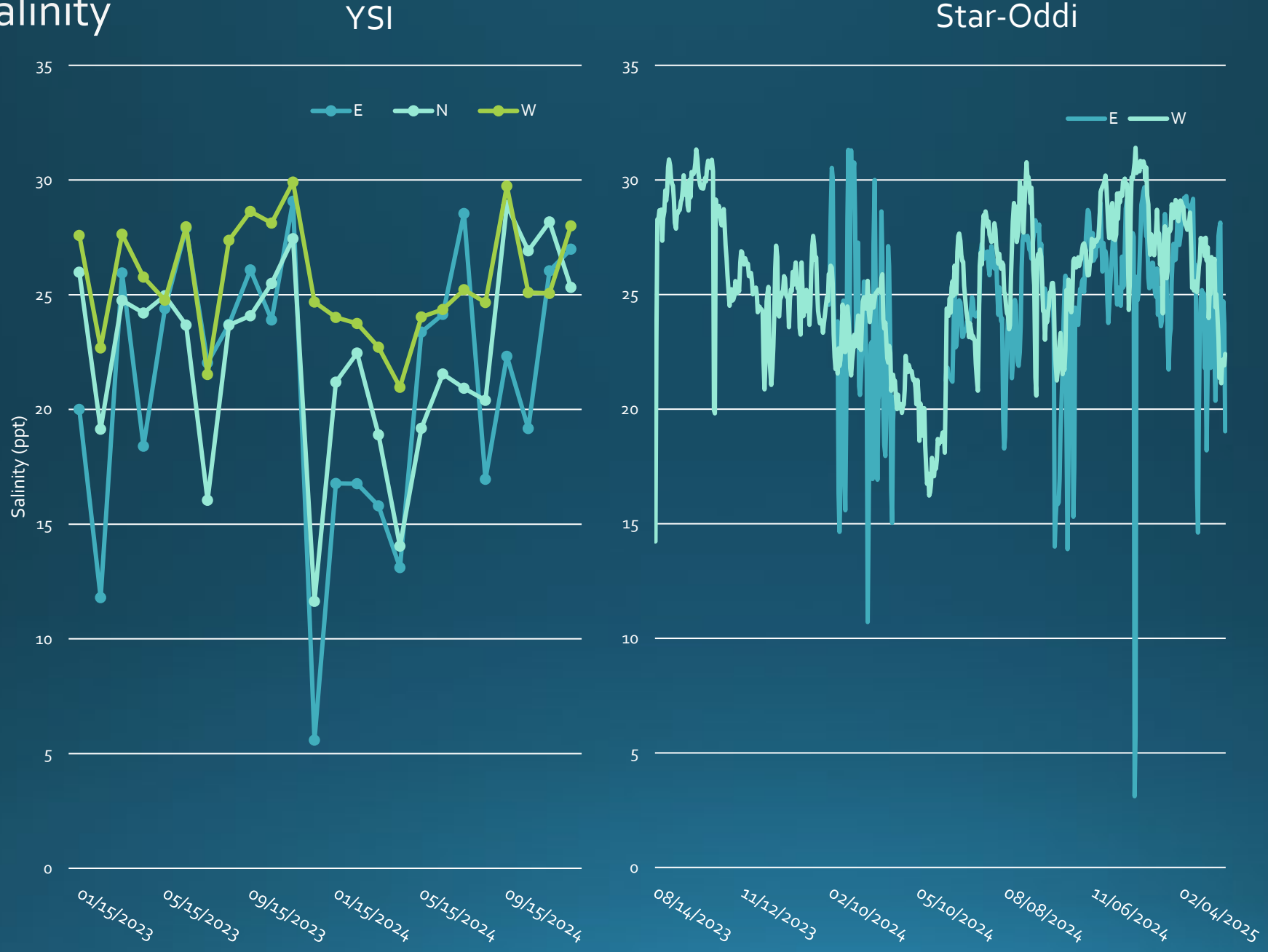
Water Quality

- **YSI**
  - Point sample, taken during monthly sampling
  - Surface and bottom measurements
    - **Temperature**
    - **Salinity**
    - **Dissolved oxygen**
- **Star-Oddi**
  - Continuous sample, takes readings at selected stations every 30 minutes
  - Bottom only
    - **Temperature**
    - **Salinity**

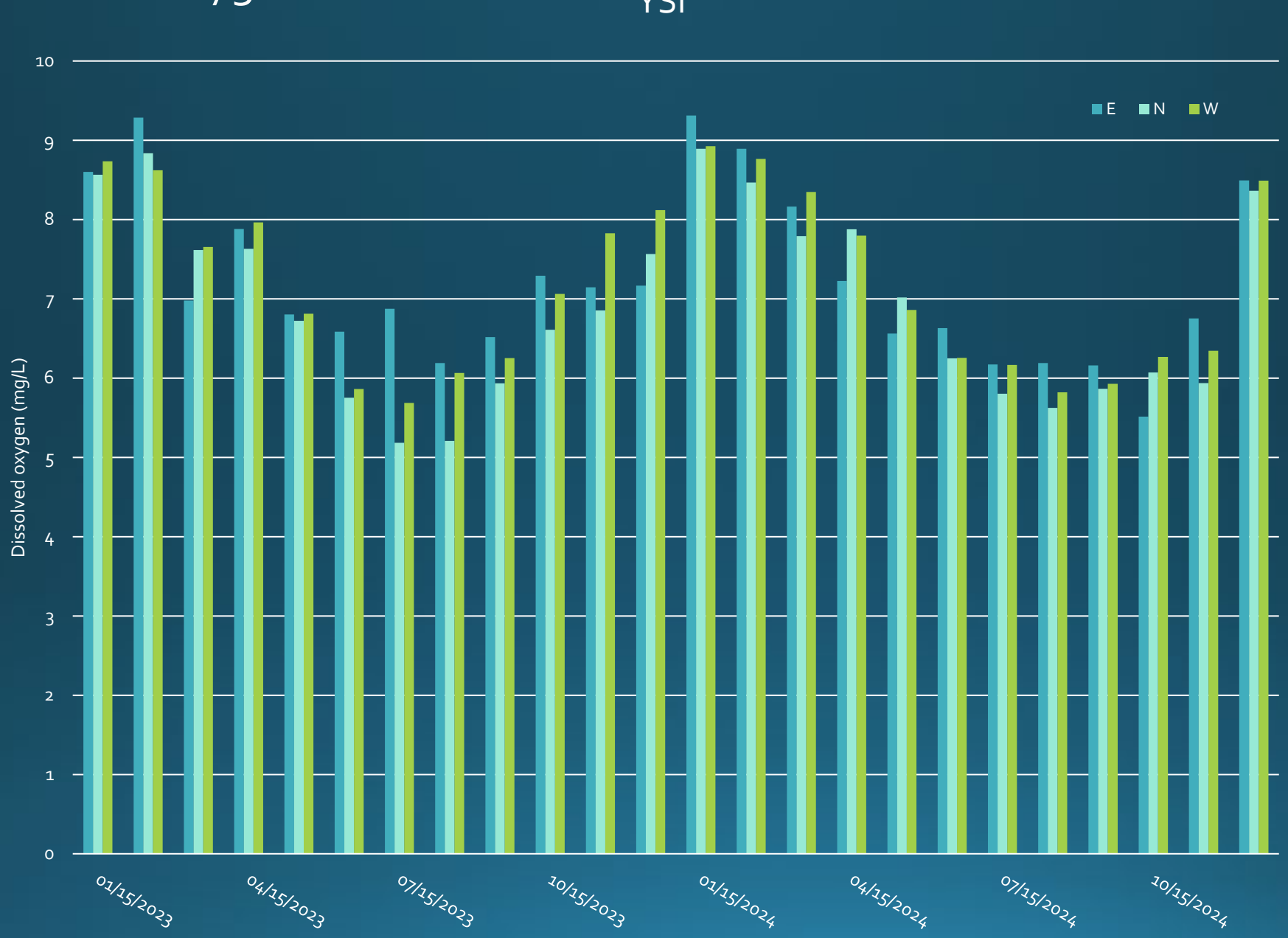
Temperature



Salinity

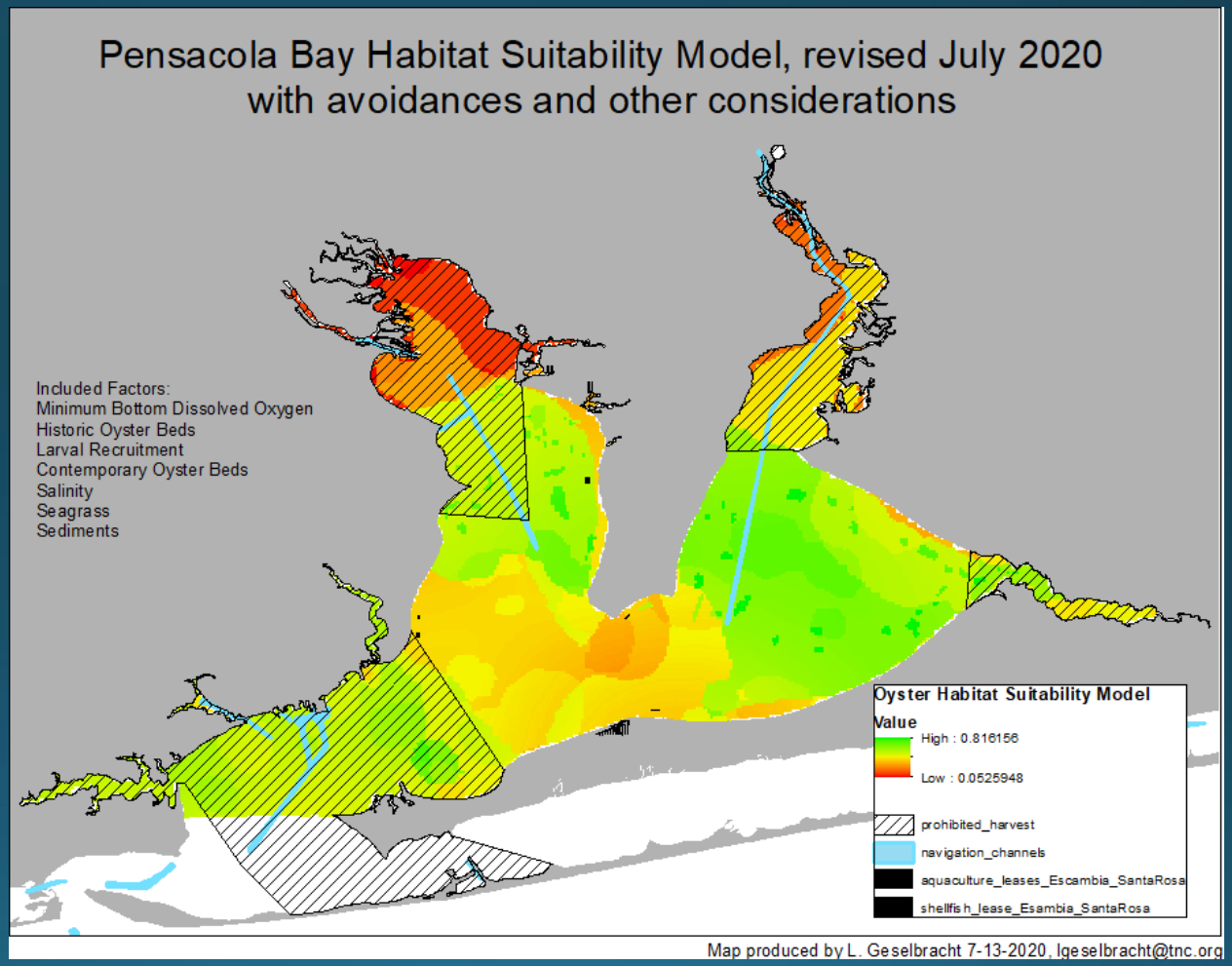

YSI
Star-Oddi
Salinity (ppt)
35
30
25
20
15
10
5
0
E
N
W
01/15/2023
05/15/2023
09/15/2023
01/15/2024
05/15/2024
09/15/2024
08/14/2023
11/12/2023
02/10/2024
05/10/2024
08/08/2024
11/06/2024
02/04/2025

Dissolved oxygen



Task 4 – Habitat Suitability Index

- Aid for future restoration
- Provide new data to areas with existing HSIs (Pensacola & Tampa Bays)
- Develop new HSIs for areas without existing HSIs
- Prioritizing regions with upcoming restoration efforts
- All will be available by the end of 2026.



Summary

- Oyster status and trends data analysis
  - Decreasing oyster densities locally and statewide
  - No strong water quality trends
- Oyster habitat mapping
  - UNH mapped ~1,500 acres of potential habitat in St. Andrew Bay
  - Maps available by the end of 2025
- Monitoring
  - Baywide Survey
    - Completed August – September 2022
    - Few oysters, mostly spat
  - Monthly (January 2023 – present)
    - Recruitment Monitoring
      - Encouraging recruitment rates
    - Sedimentation Monitoring
      - Variable sedimentation rates
    - Water quality
      - Temperature and salinity as expected, no indications of anoxic areas
- Habitat Suitability Indices
  - Aid for future restoration
  - Available by the end of 2026


Thank you to my hardworking field crew!
Questions?