

Megan Sytsma; Barry Walton M.Sc  
 Florida State University College of Arts and Sciences

## Introduction

- 85% of global oyster reefs have been lost.<sup>2</sup>
- Environmental stress, overfishing, predation, and urban development have been identified as possible contributing factors to oyster loss.<sup>1</sup>
- Apalachicola Bay, historically known for its oyster fisheries, followed this global trend of decline and was declared a “Federal Fishery Disaster” in 2013.<sup>2</sup>
- The Florida Fish and Wildlife Conservation Commission has voted to halt wild oyster harvesting in the bay from 2020 until 2025.
- More research is still needed to identify the root causes behind local oyster decline and their respective levels of influence.
- Our research will provide information that will help develop a plan that leads to oyster recovery in Apalachicola Bay.

## Methods

### Sites

- 117 predetermined sites.

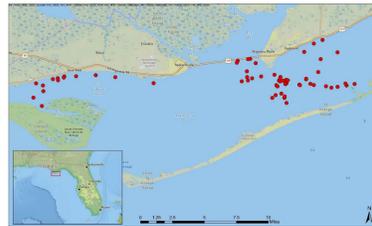


Figure 1. Map of sites sampled.

### Predators

- Predators sampled for: oyster drill and eggs, crown conch and eggs, lightning whelk and eggs, mud crab, stone crab, Porcelain crab, and boring sponge.
- Identified through literature review.
- Species numerically counted: oyster drill, crown conch, lightning whelk, mud crab, stone crab, and porcelain crab.
- Species categorized as present or absent: oyster drill eggs, crown conch eggs, lightning whelk eggs, and boring sponge.

### Sampling

- Samples were collected with oyster tongs.
- Six samples were taken concurrently at each site.
- Each sample was processed to identify and count oyster predators present and record the presence or absence of predators.

### Analysis

- Predator abundance was visualized with the use of ArcGIS Pro.
- ANCOVA models were created with RStudio to examine the relationships between predator abundance and abiotic factors.

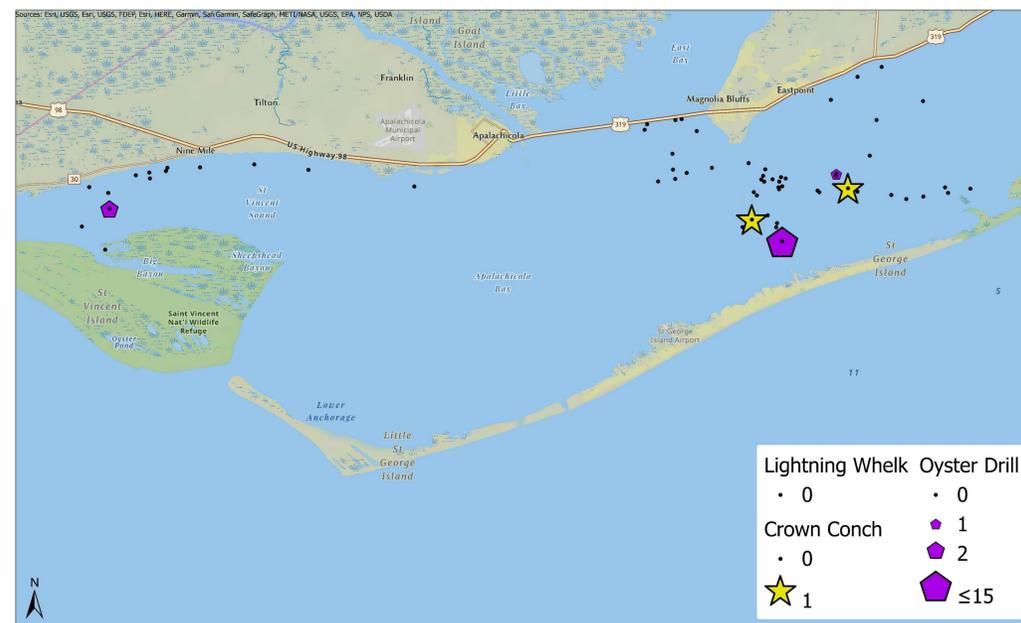


Figure 2. Graduated symbol map of other invertebrate predator abundance.



Figure 3. Graduated symbol map of crab predator abundance.

## Results

### Abundance of Predators

- 340 total predators found.
  - Stone crab most abundant (n = 145).
  - Crown conch least abundant (n = 2).
- No lightning whelk found.

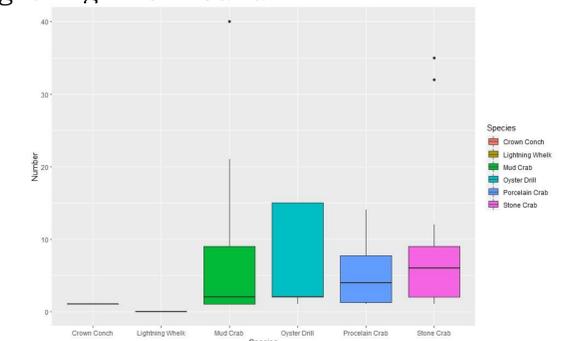


Figure 4. Boxplot of all predators' abundance.

### Presence and Abiotic Factors

- Predators more abundant during low salinity, low temperature conditions.
  - Stone and porcelain crabs were more abundant during periods of low salinity and temperature.
  - Mud crabs were more abundant during periods of high salinity and temperature.
  - Oyster drill and crown conch were more abundant during periods of low salinity and temperature.

### Presence and Location

- Predators more abundant in St. George Sound compared to other locations.

## What this means for the bay

- Expected results for some species, but good to understand that this occurs locally.
- Low presence expected due to the season, but interesting that lower temps were favored for some species.
- Small number of presence events probably due to seasonal conditions.
  - Limits the amount and accuracy of information and possible correlations perceived.

## Future Directions

- Lengthen the time frame to include different seasons, possibly over several years.
- Select a more accurate and repeatable sampling method.

## References

- <sup>1</sup>Kennedy, V. S., Shaw, K. S., & Newell, R. I. . (2009) 'Discriminatory predation by three invertebrates on eastern oysters (*Crassostrea virginica*) compared with non-native Suminoe oysters (*C. ariakensis*)', *Invertebrate Biology*, 128(1), 16-25 [online]. Available at: <https://doi.org/10.1111/j.1744-7410.2008.00151.x> (Accessed: 12 November 2021)
- <sup>2</sup>Pine III, W. E., Walters, C. J., Camp, E. v., Bouchillon, R., Ahrens, R., Sturmer, L., Berrigan, M. E. (2015). 'The curious case of eastern oyster *Crassostrea virginica* stock status in Apalachicola Bay, Florida', *Ecology and Society*, 20(3), 46 [online]. Available at: <https://doi.org/10.5751/ES-07827-200346> (Accessed: 25 February 2022)

## Acknowledgements

I would like to thank Stasia Pietraszun and the ABSI staff for having me and for sharing their time and knowledge.