Reef surface structure and sediment biogeochemistry across Franklin County, FL:

Assessing intertidal oyster reef condition using live oysters, shell clusters, and sediments characteristics

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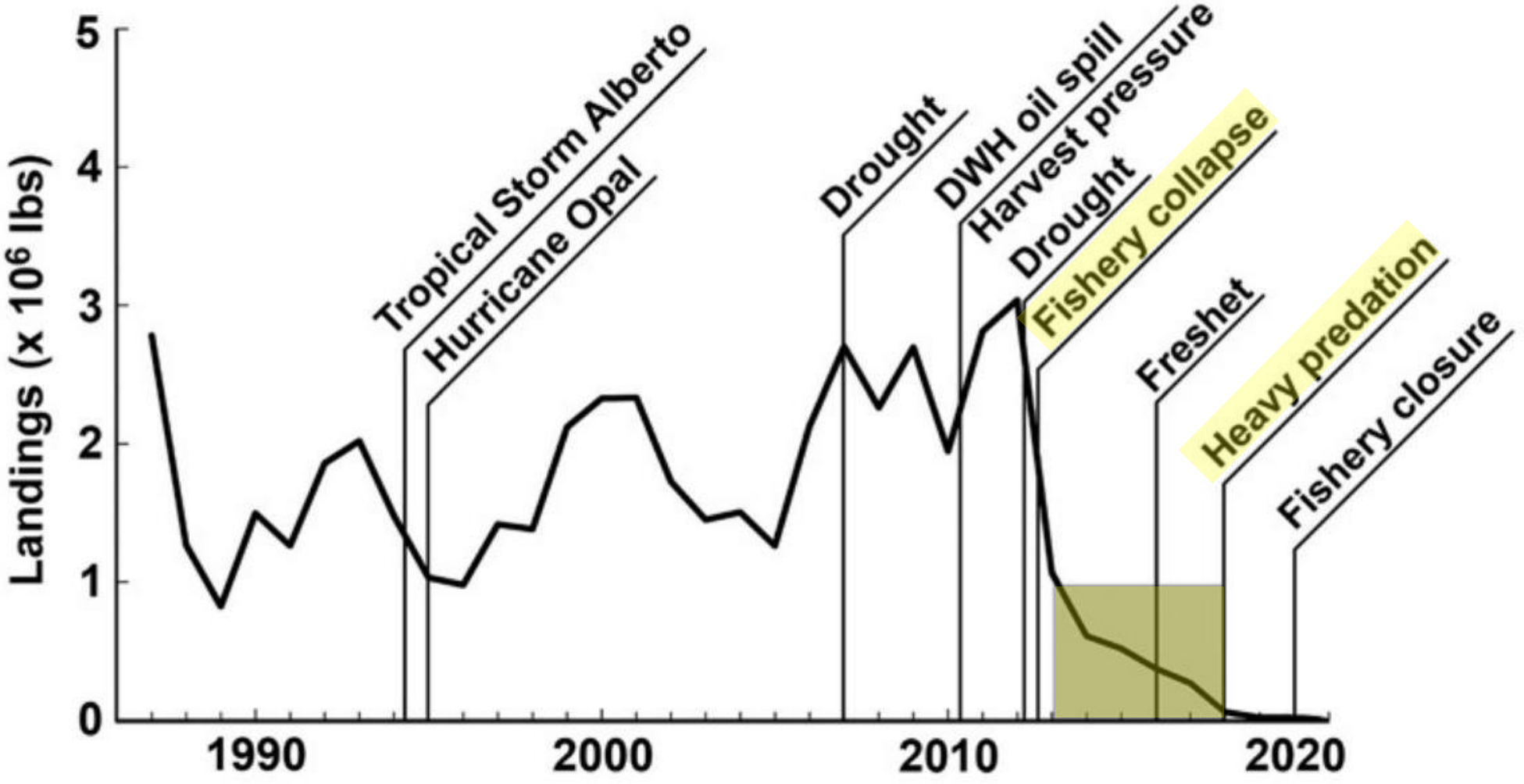
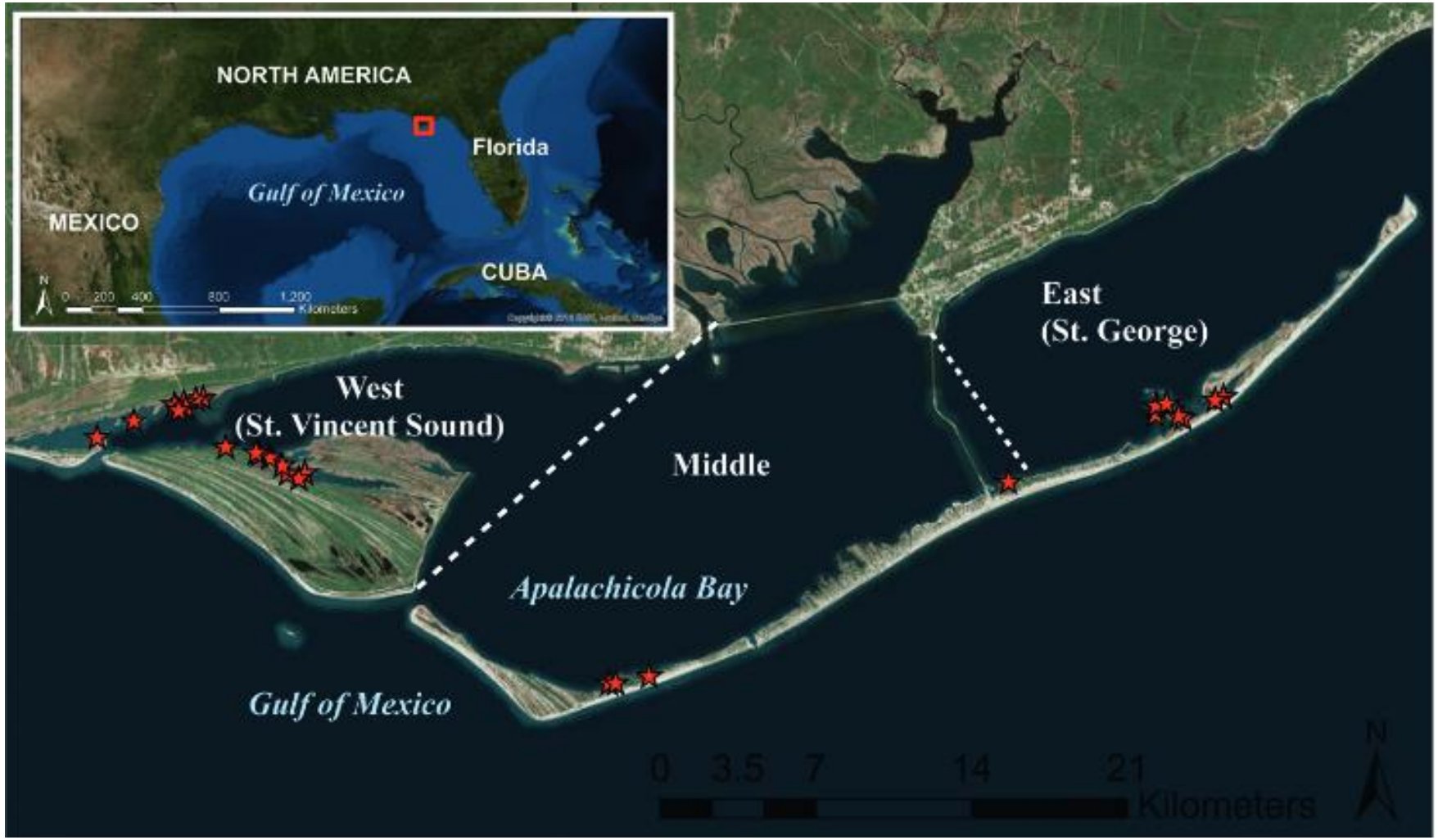
Franklin County once produced 90% of Florida's oysters, but **subtidal** population decline resulted in a five-year harvest moratorium.



Sourced from Hintenlang, L., Brooks, R. C., & Kane, A. S. (2024). Assessing cumulative stressors, state shift, and the current outlook for oyster habitat in Apalachicola Bay, Florida. *Journal of Shellfish Research*, *42*(3). https://doi.org/10.2983/035.042.0311

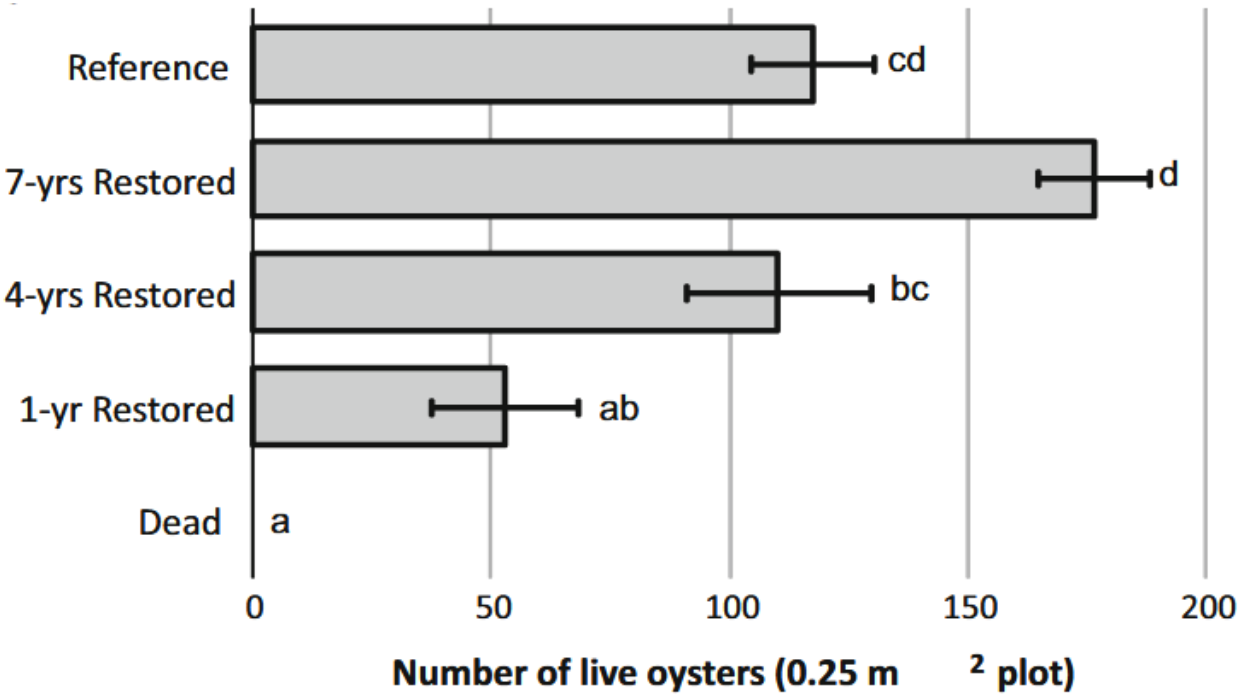
Intertidal reefs across the region were last assessed in 2018, describing a gradient of oyster density increasing from west to east.

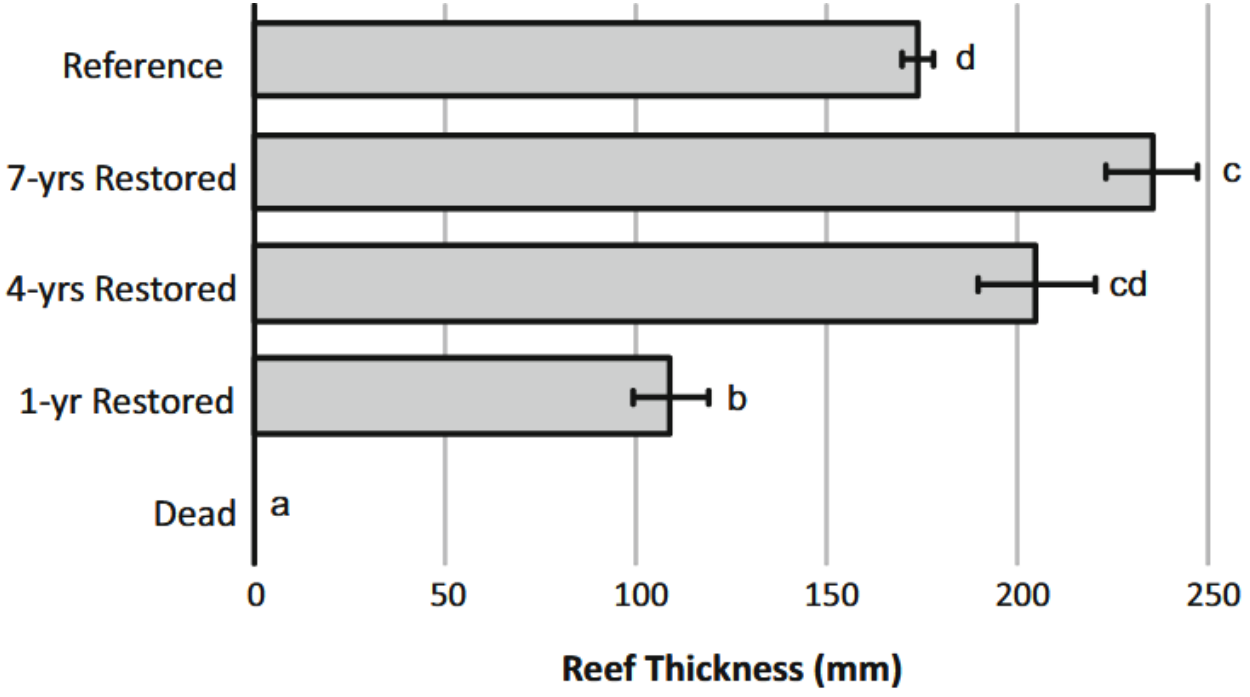


Region	Adult Oyster m^{-2} (mean $\pm$ SE)
West	34 ± 75.5
Central	429 ± 256
East	993 ± 724

Sourced from Grizzle, R., Ward, K., Geselbracht, L., & Birch, A. (2018). Distribution and Condition of Intertidal Eastern Oyster (Crassostrea virginica) Reefs in Apalachicola Bay Florida Based on High-Resolution Satellite Imagery. *Journal of Shellfish Research*, *37*(5), 1027. https://doi.org/10.2983/035.037.0514

Restoration studies have measured shell cluster and sediment parameters to assess changes in reef condition within one site.

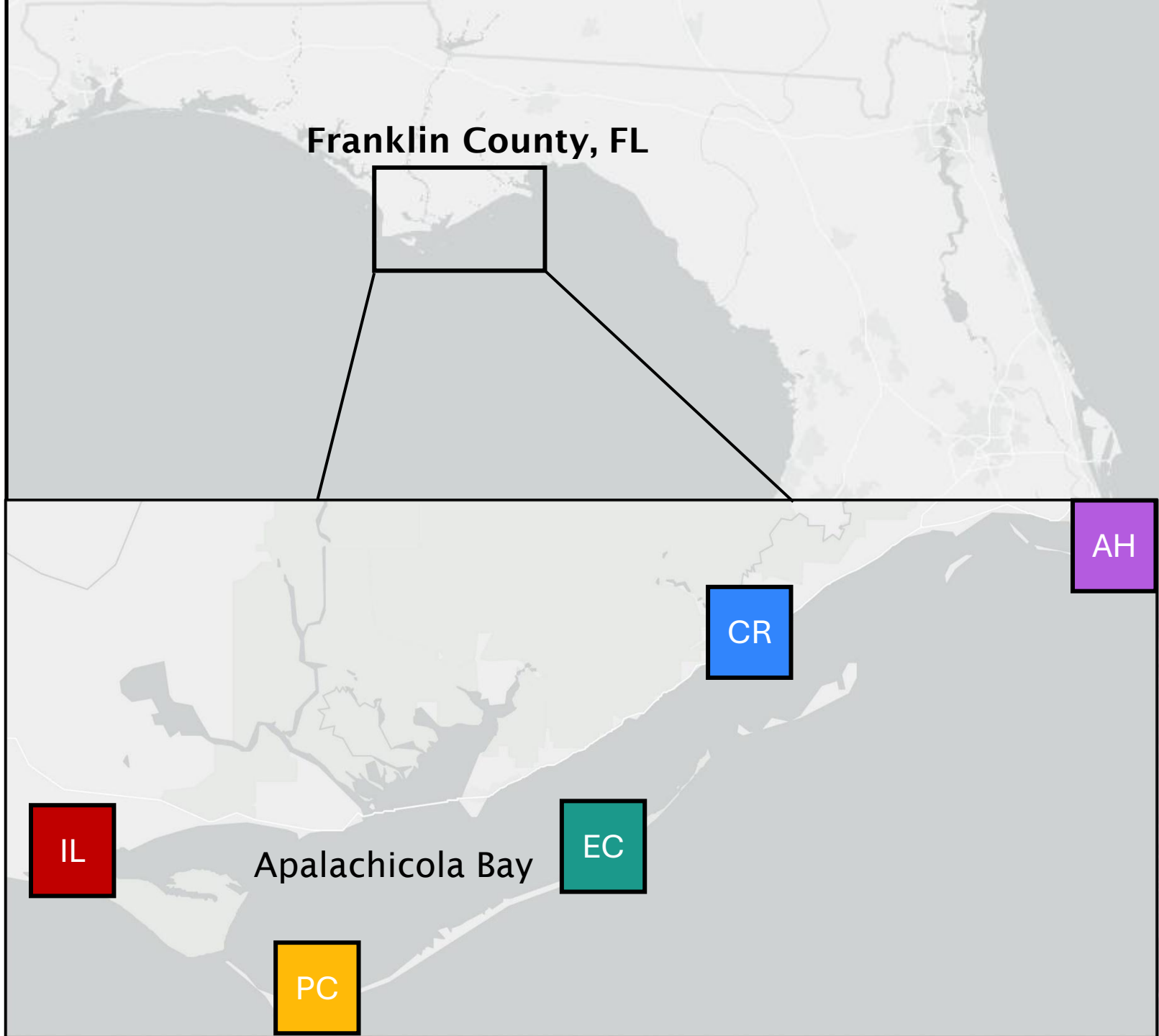




Sourced from Chambers, L. G., Gaspar, S. A., Pilato, C. J., Steinmuller, H. E., McCarthy, K. J., Sacks, P. E., & Walters, L. J. (2018). How Well Do Restored Intertidal Oyster Reefs Support Key Biogeochemical Properties in a Coastal Lagoon? *Estuaries and Coasts*, *41*(3), 784–799. https://doi.org/10.1007/s12237-017-0311-5

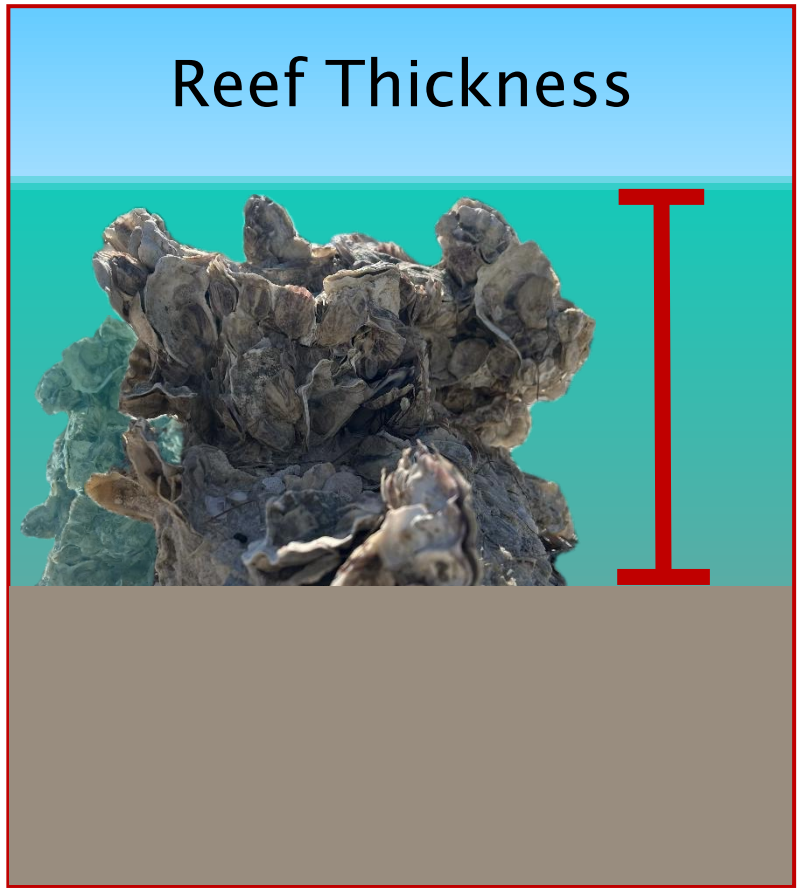
We aim to:

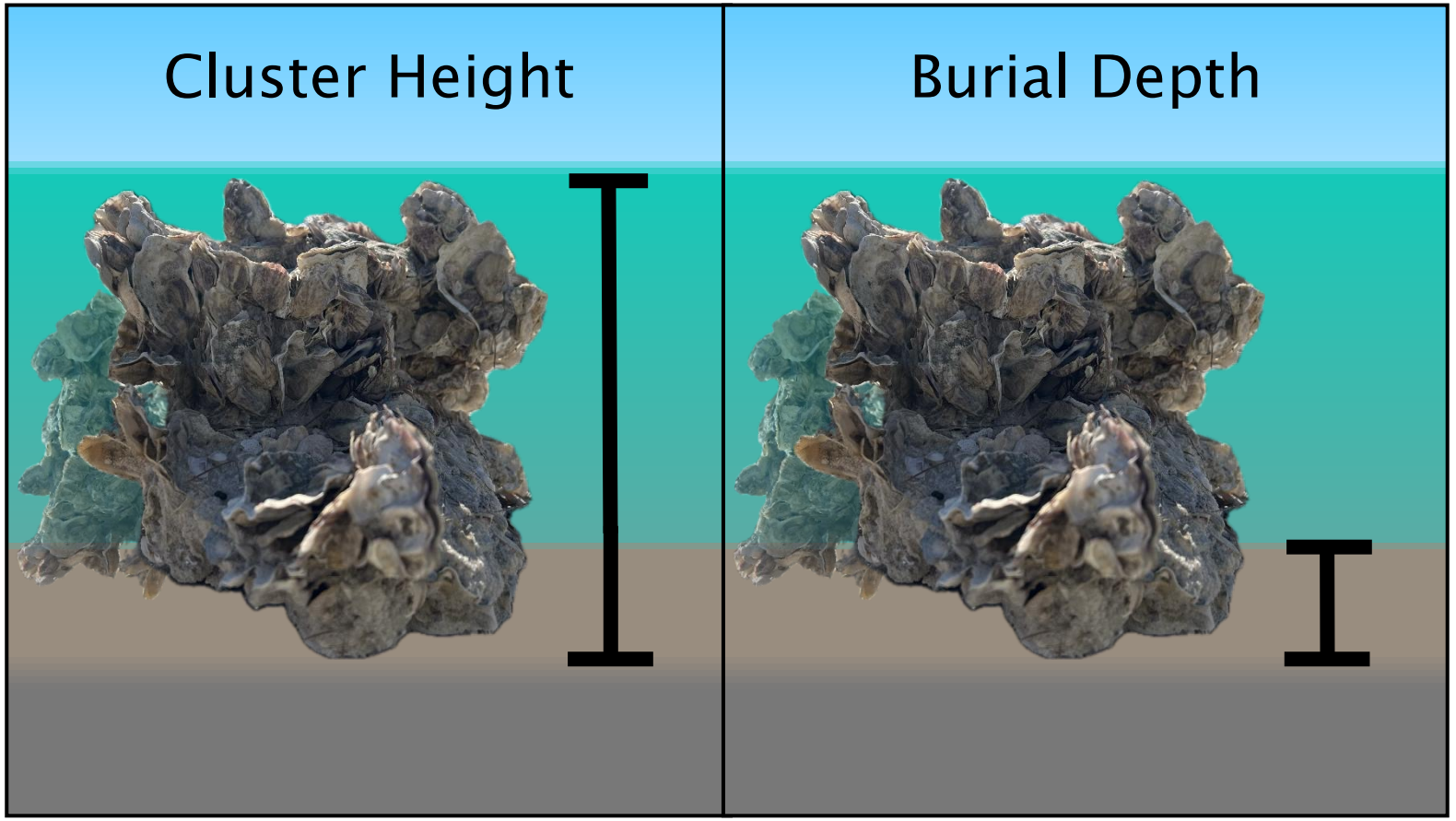
- Update intertidal oyster population surveys in the region



Cluster vary significantly throughout the region, so multiple parameters were used to quantify them.

Reef thickness is divided into cluster height and burial depth, measuring sediment accretion / erosion.





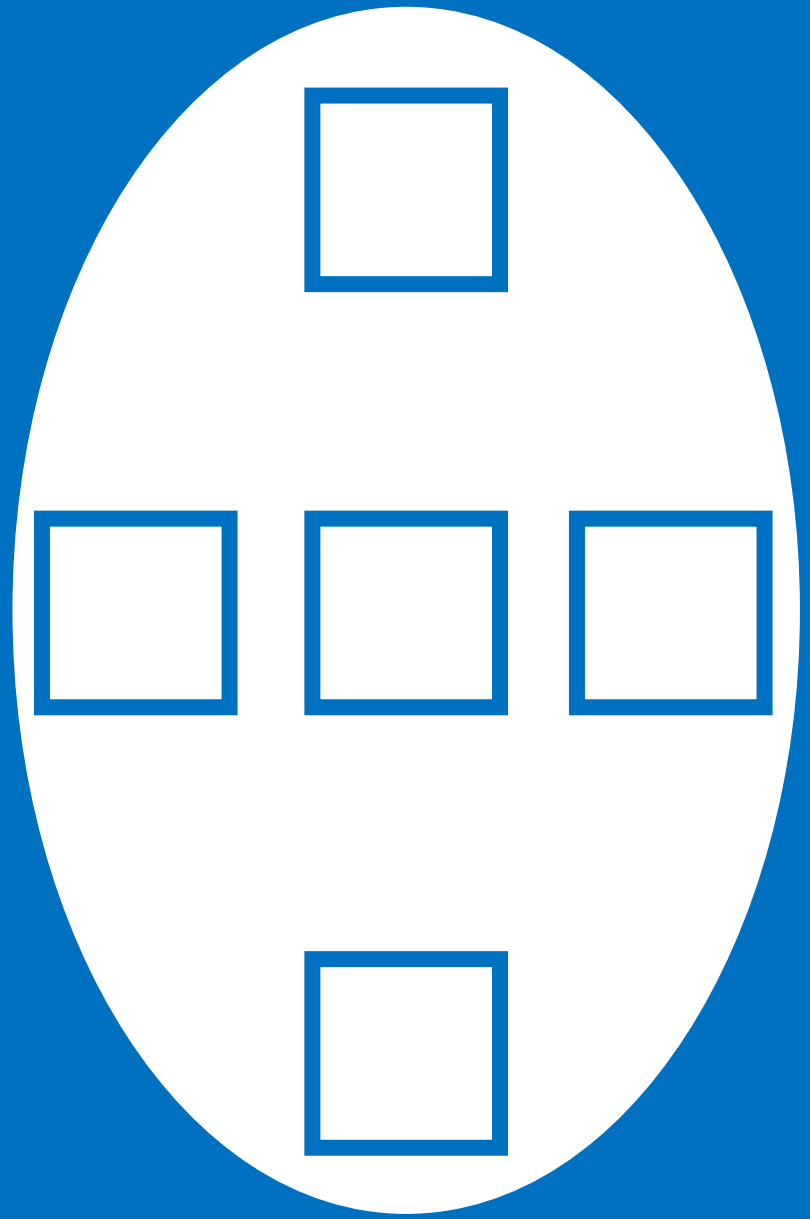
Oyster Monitoring:

For 4/5 sites (PC excluded):

5 reefs visited per site

Measured and counted **individual oysters** in 5 quadrats

Sampling repeated biannually for each site



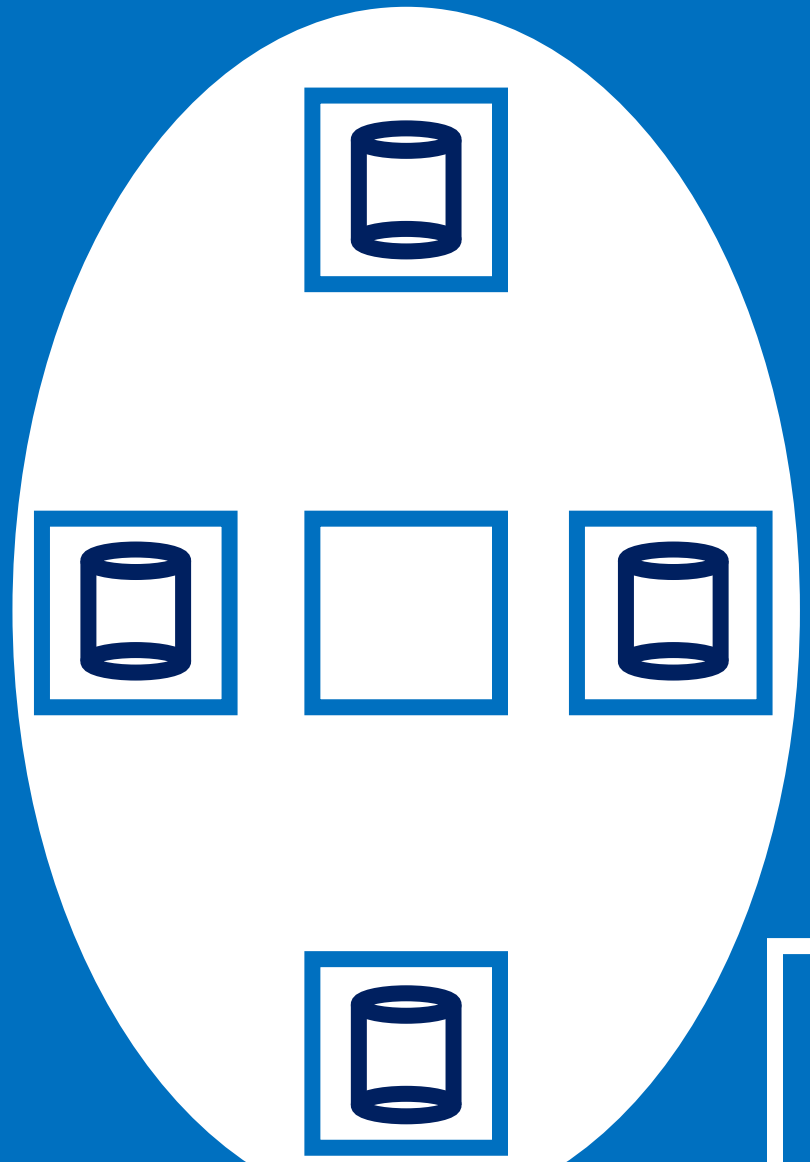
Cluster Sampling:

For all 5 sites:

6 reefs visited per site

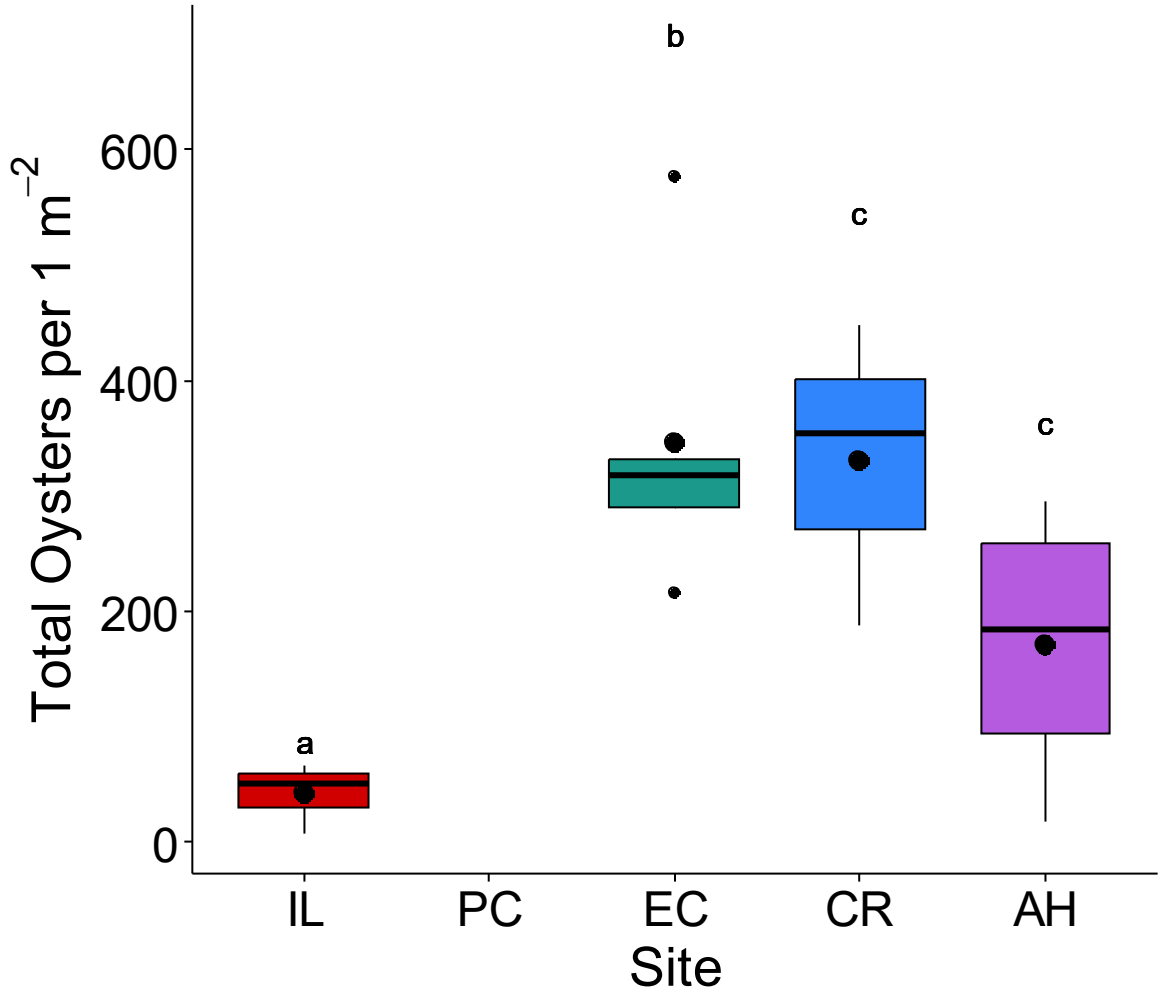
Measured and counted **shell clusters** in 6 quadrats

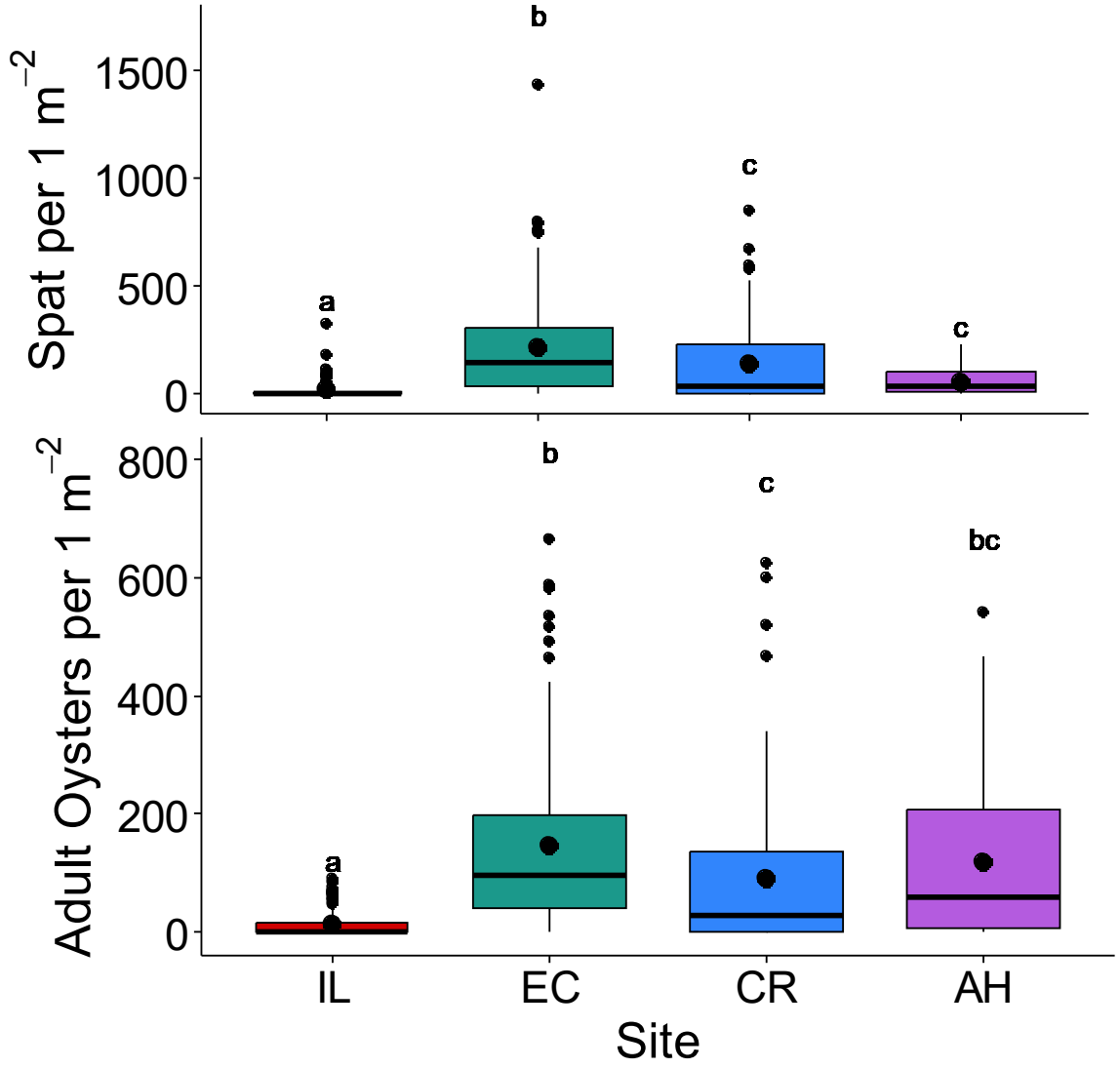
Sediment cores collected from 4/6 quadrats



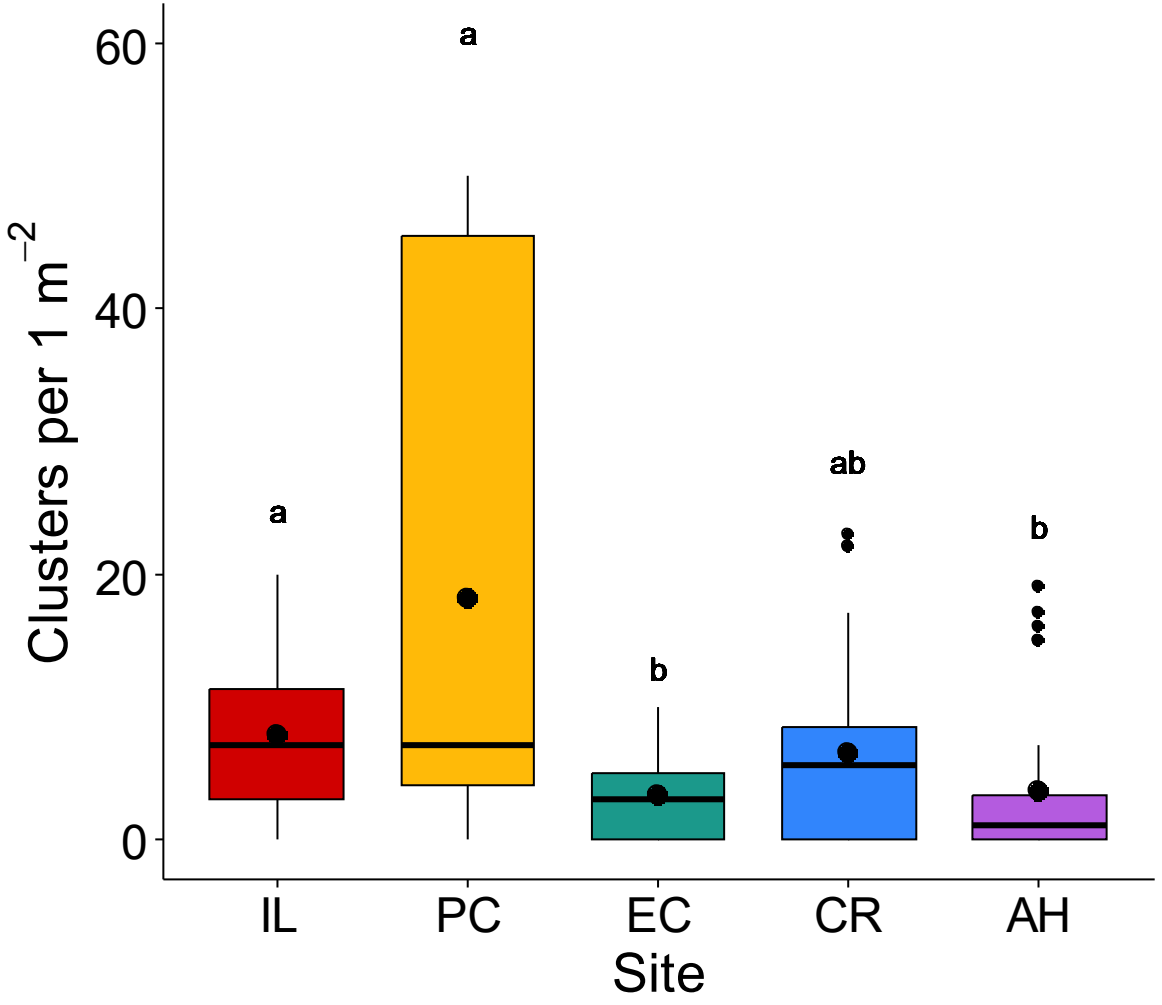
Haphazard

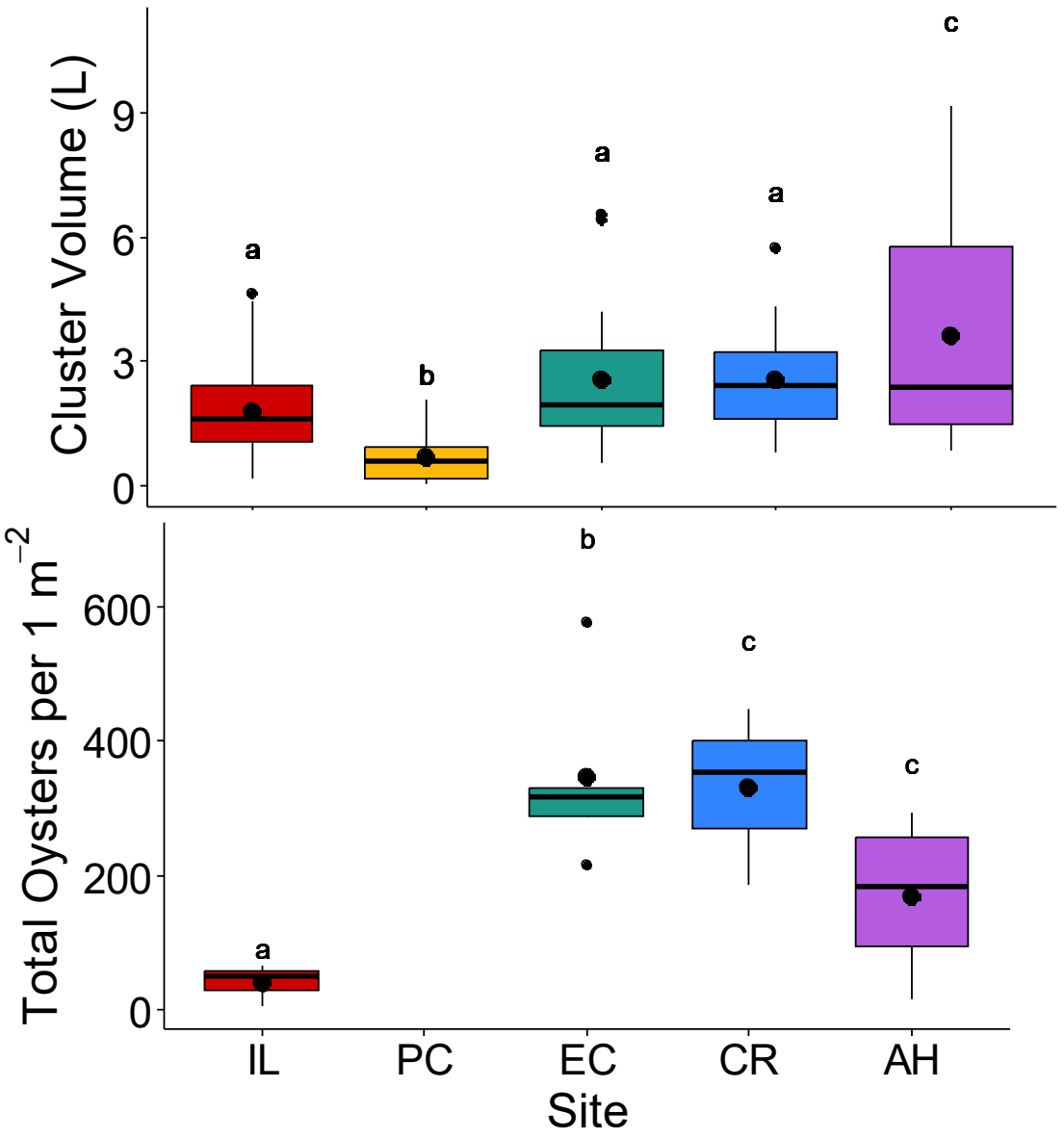
Live oysters are present on intertidal reefs at lower densities but the same distribution as prior studies.



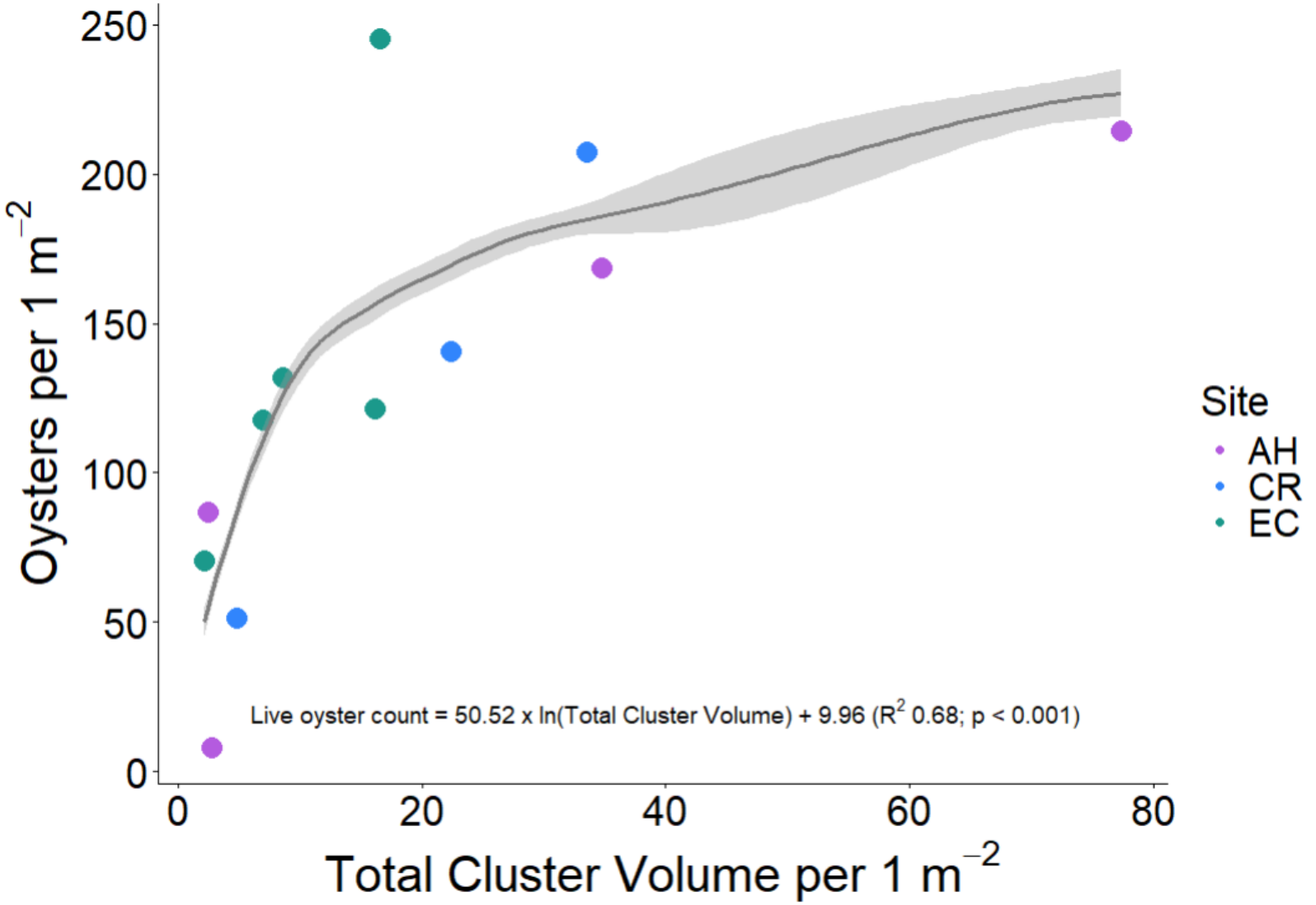


Low cluster density may indicate degradation, but high densities can be misleading.

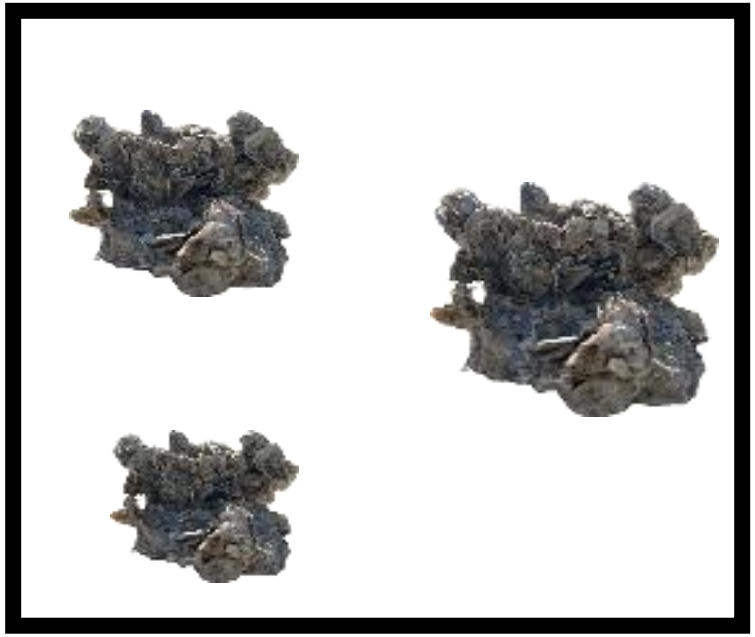




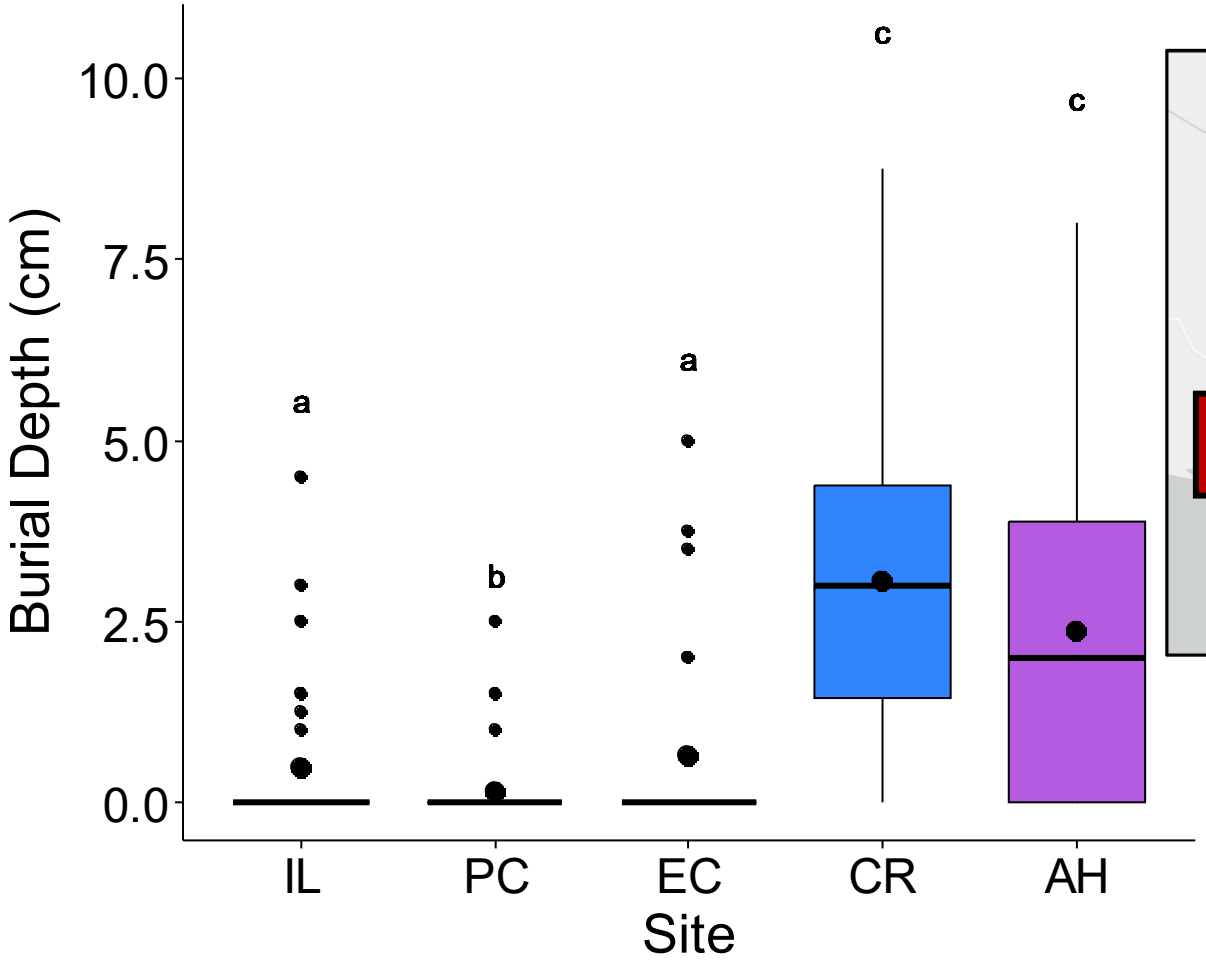
Combining all sites but IL, we found a significant logarithmic relationship between live adult oysters and total cluster volume .

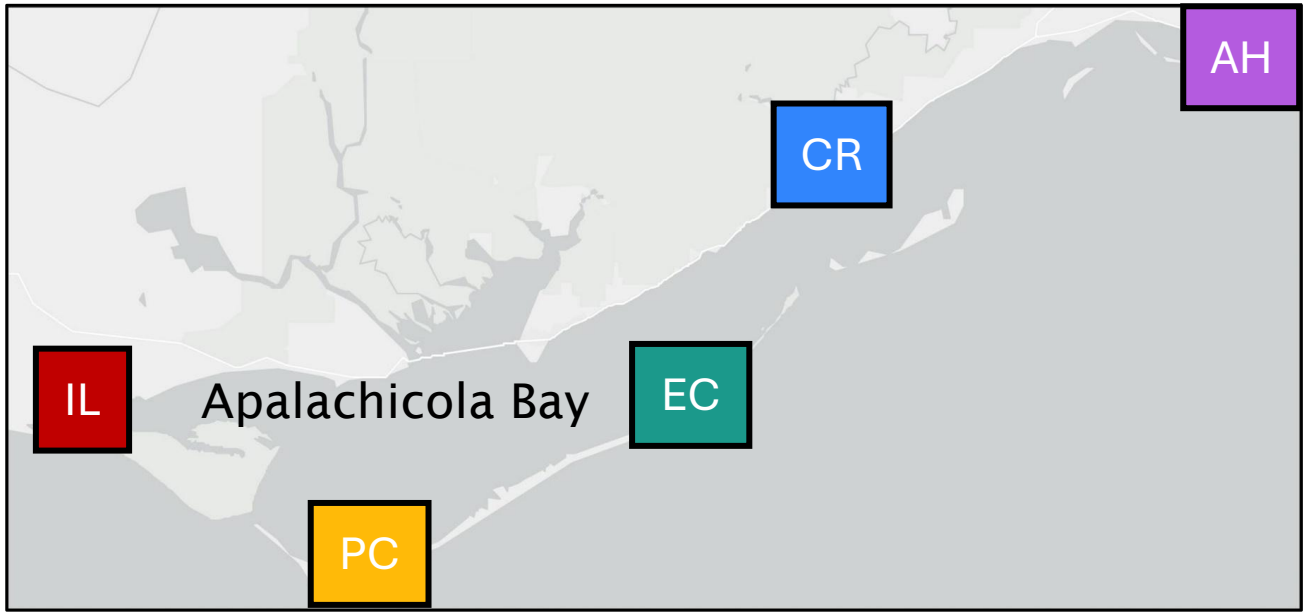


Total cluster volume is calculated using the mean cluster size multiplied by the total cluster count (up to 100)

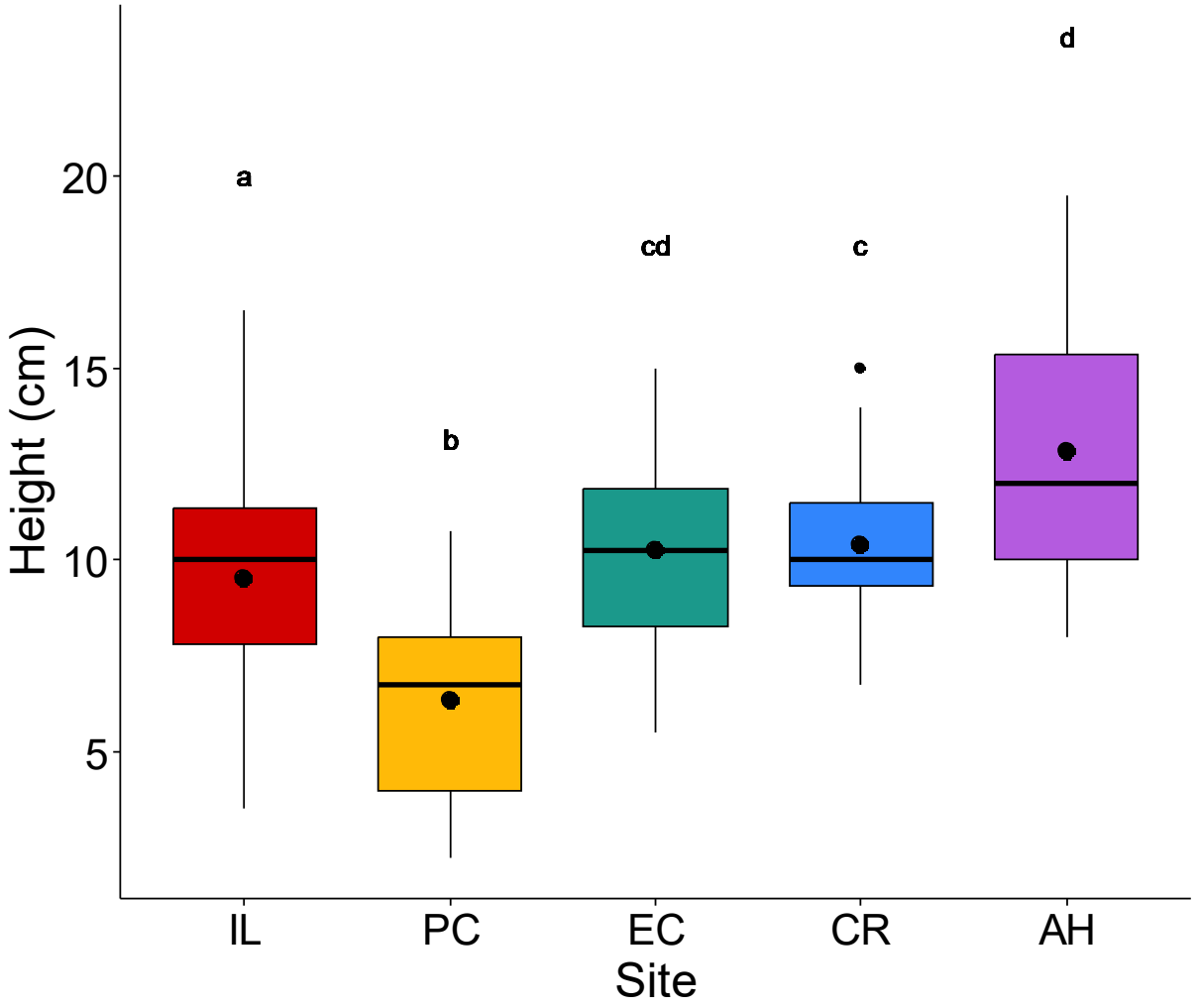


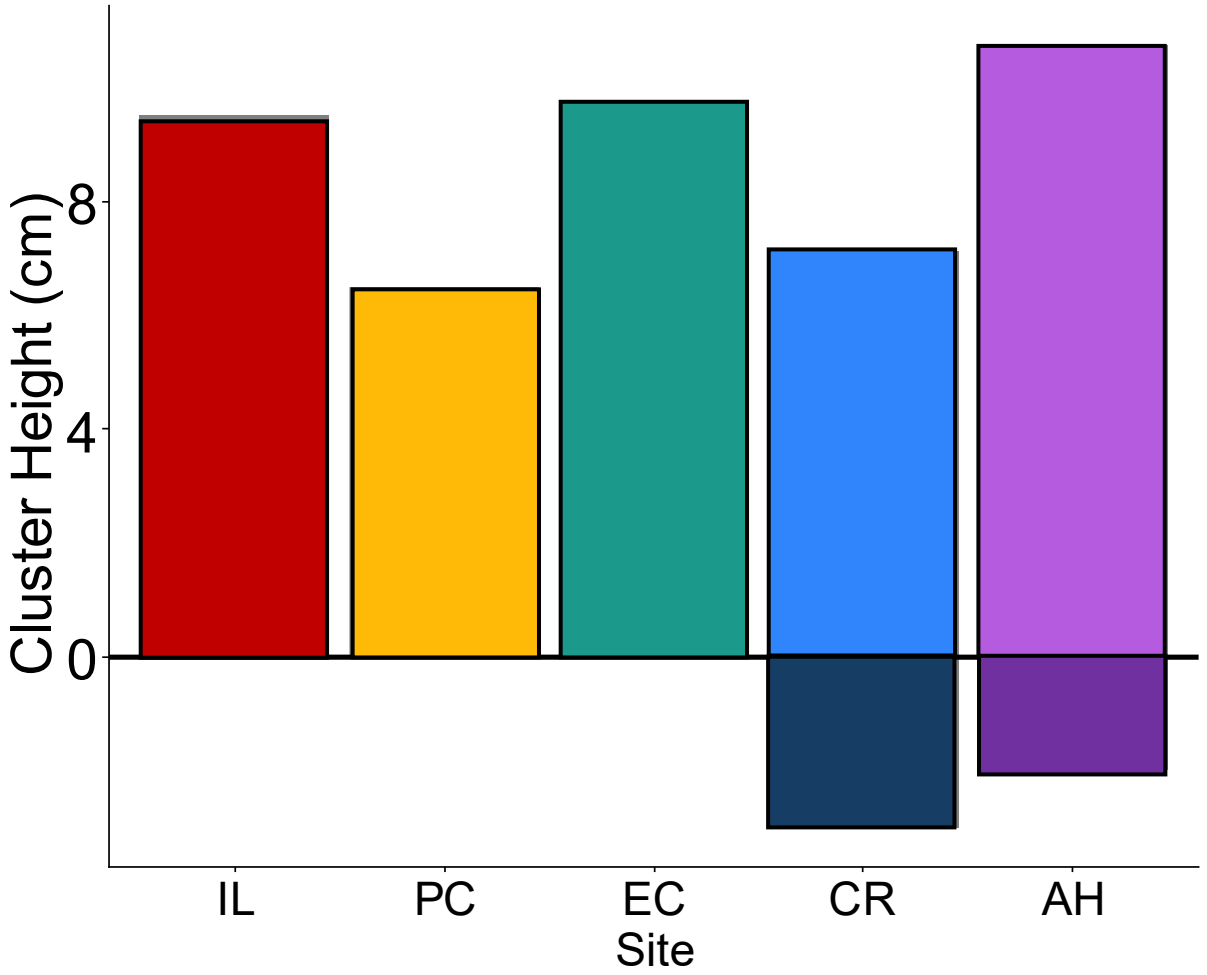
Cluster position varied between regions: resting at the surface within the bay, and slightly buried to the east.





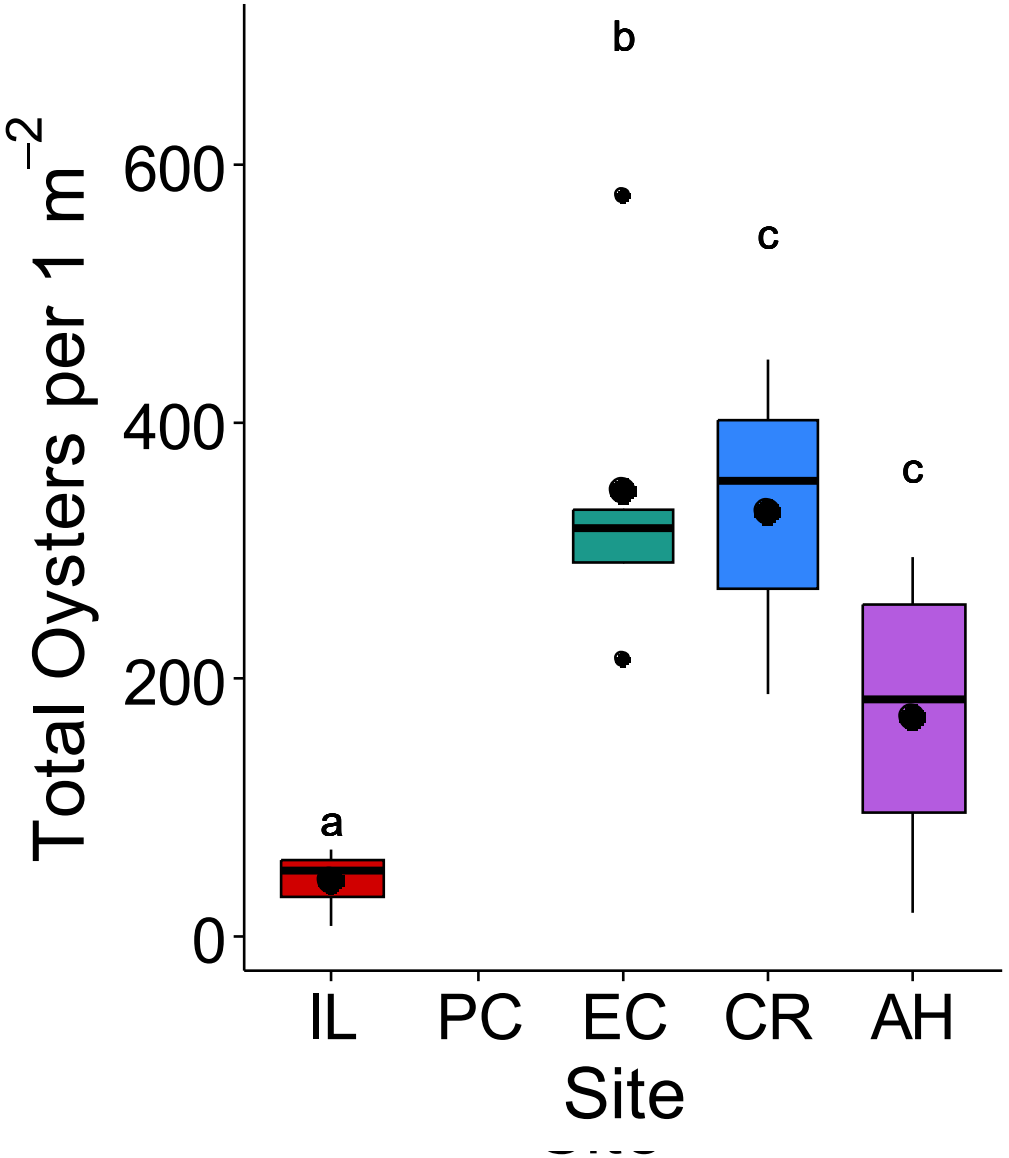
Combining total height and burial depth allows us to understand effective reef thickness and sediment dynamics.





Key Takeaways:

- Intertidal oyster populations have declined following the same pattern noted by Grizzle et al.



Thank you!

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