

Oysters and Mussels in the Guana River

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Ecosystem Services Provided by Shellfish

Nutrient Mitigation

Water filtration

Habitat

Coastal Protection

Commercial and recreational fisheries

Ecosystem Services Provided by Shellfish

Nutrient Mitigation

Water

Habitat

Coastal

Community

Fisheries



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Interplay of shellfish and water quality



Interplay of shellfish and water quality



Understanding the interplay of shellfish and water quality is critical for incorporating shellfish into future water quality solutions

The Guana River





Increasing
Nutrients

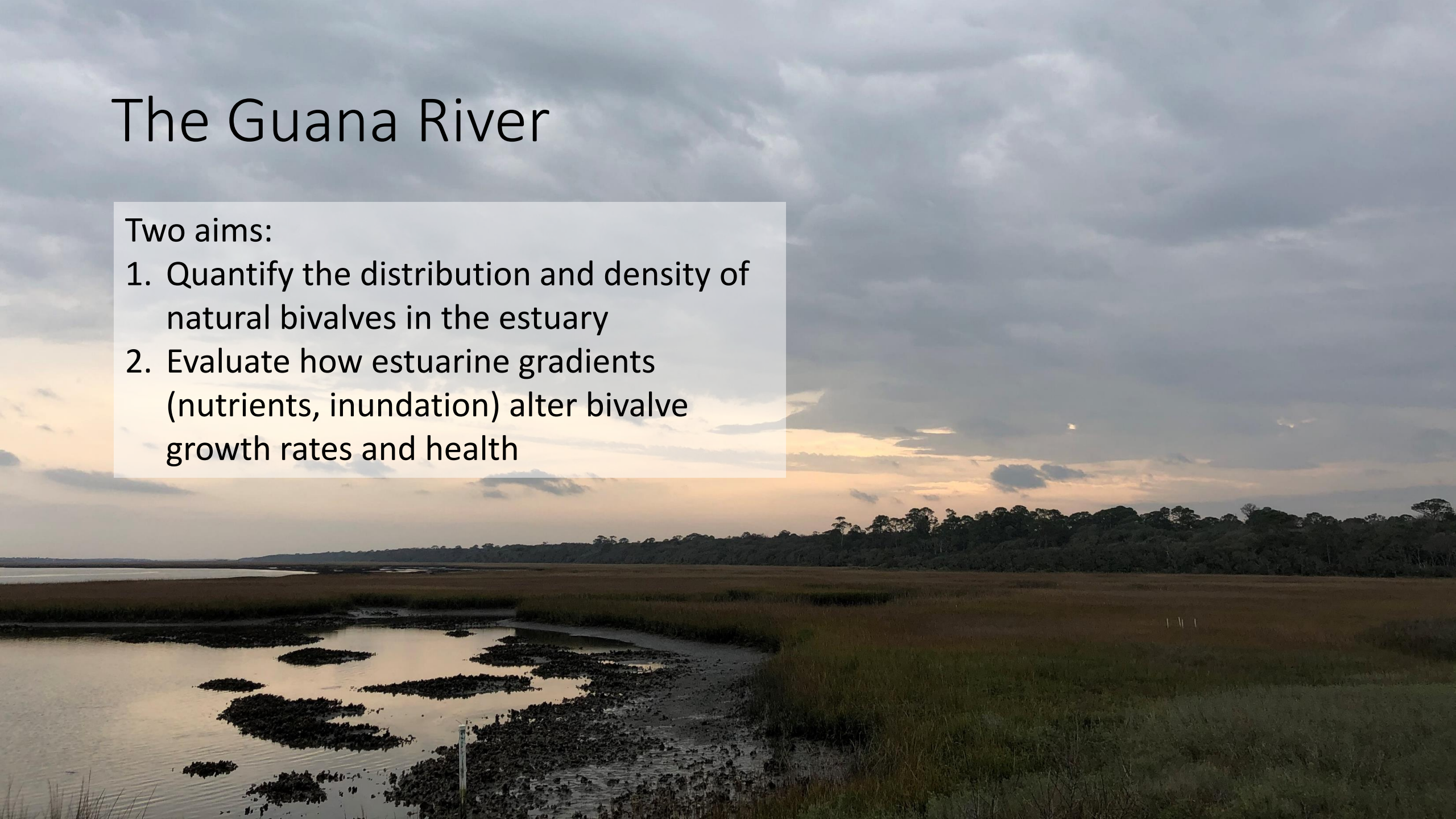




The Guana River

Two aims:

1. Quantify the distribution and density of natural bivalves in the estuary
2. Evaluate how estuarine gradients (nutrients, inundation) alter bivalve growth rates and health



Bivalve mapping

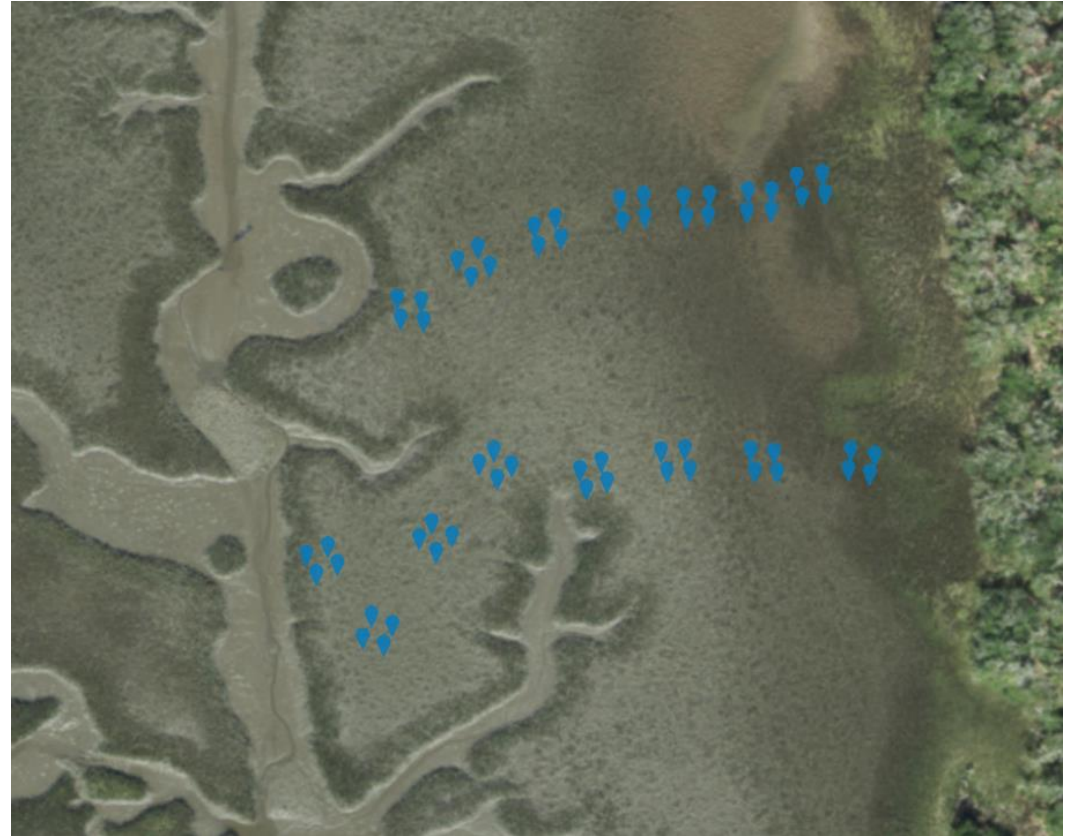
- Two methods to estimate distribution and density:
 - Drone based for oysters
 - Field surveys for mussels



Oyster mapping



Mussel Mapping



Bivalve Transplant Experiment

- Nutrient Gradient: Transplanted oysters and mussels from one site at four sites
- Inundation Gradient: Transplanted mussels and oysters at 3 elevation per species at one site
 - Bivalves were tagged and measured before deployment
- Measured growth and condition index after 6 months
 - $CI = \text{tissue weight} / \text{shell weight} \times 100$



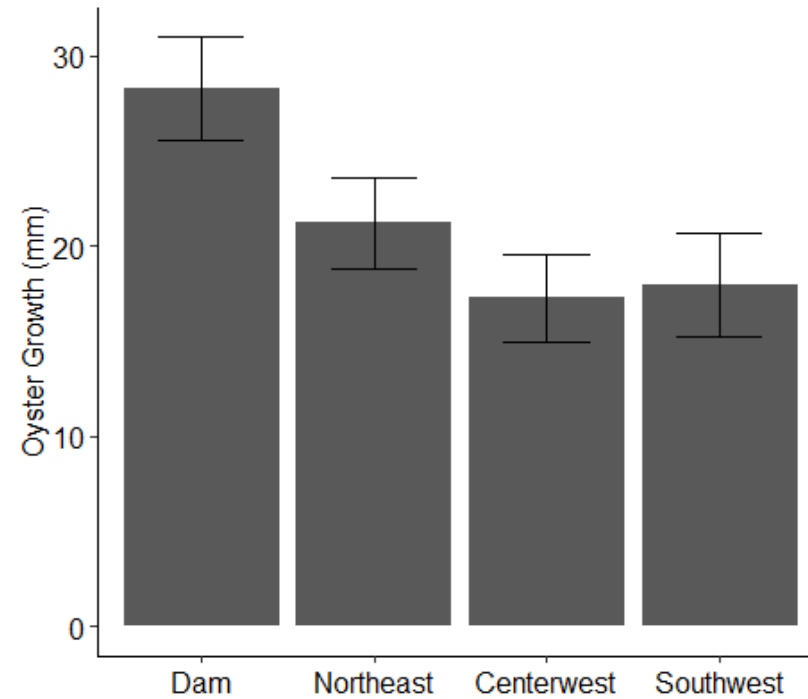
Nutrient Gradient Transplant



Nutrient Gradient Transplant



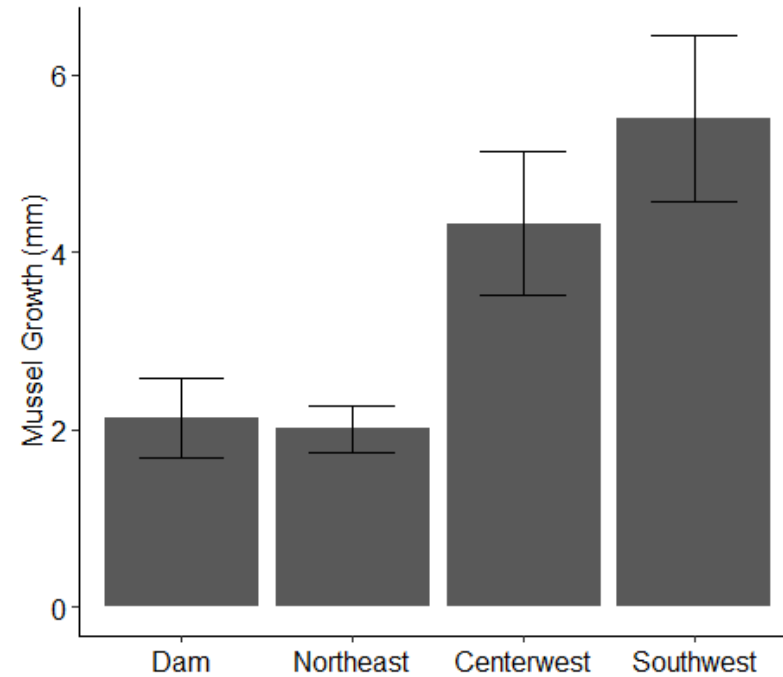
Oyster Growth



Nutrient Gradient Transplant

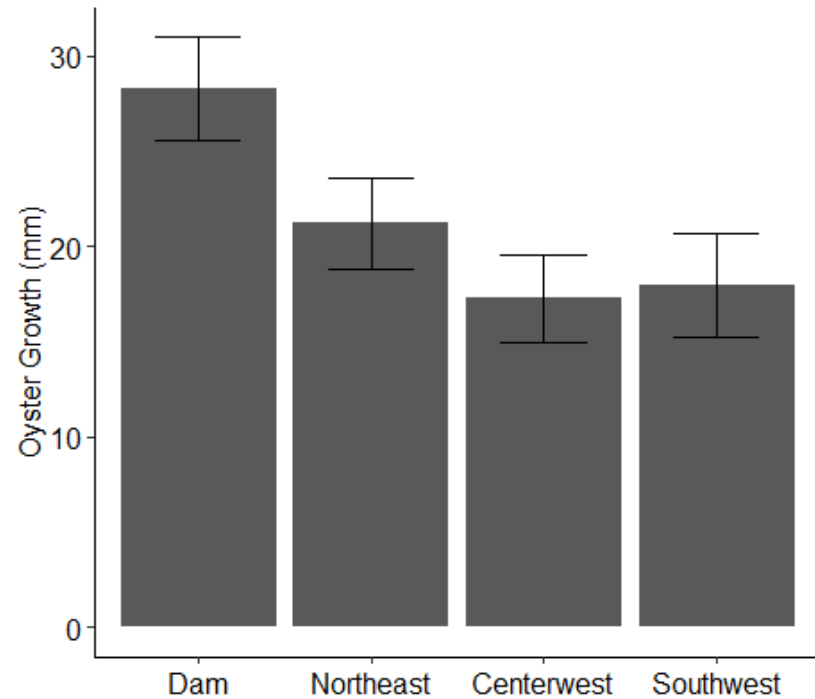


Mussel Growth

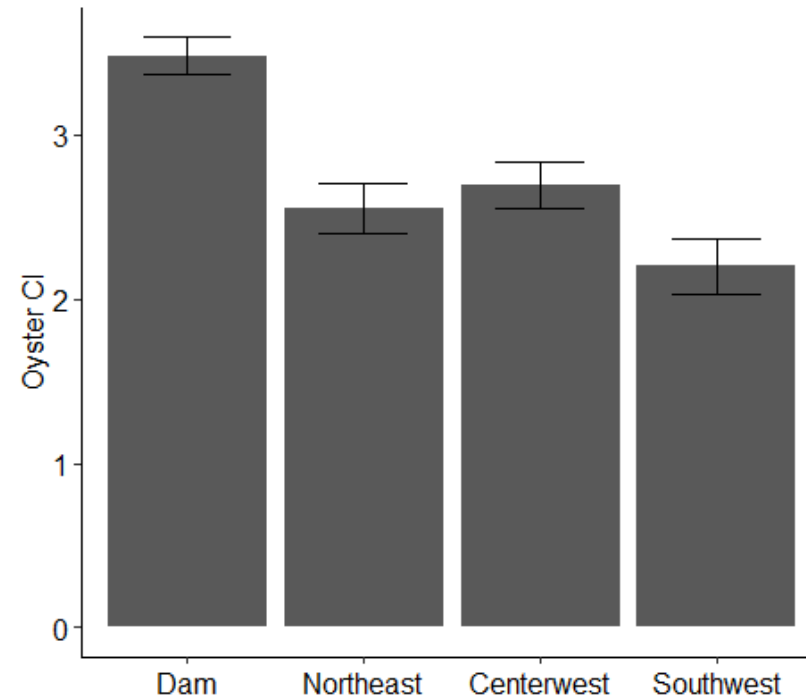


Nutrient Gradient Transplant

Oyster Growth

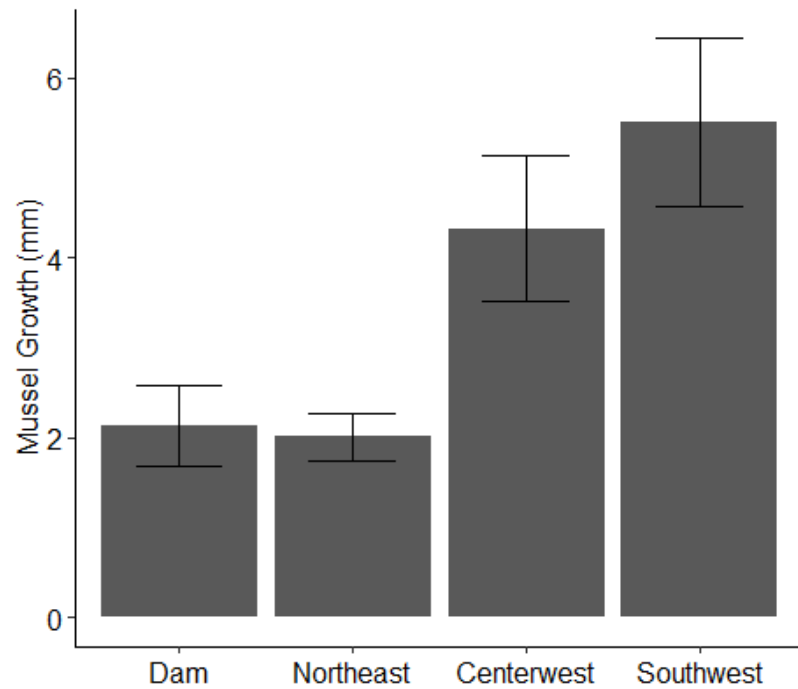


Oyster Condition Index

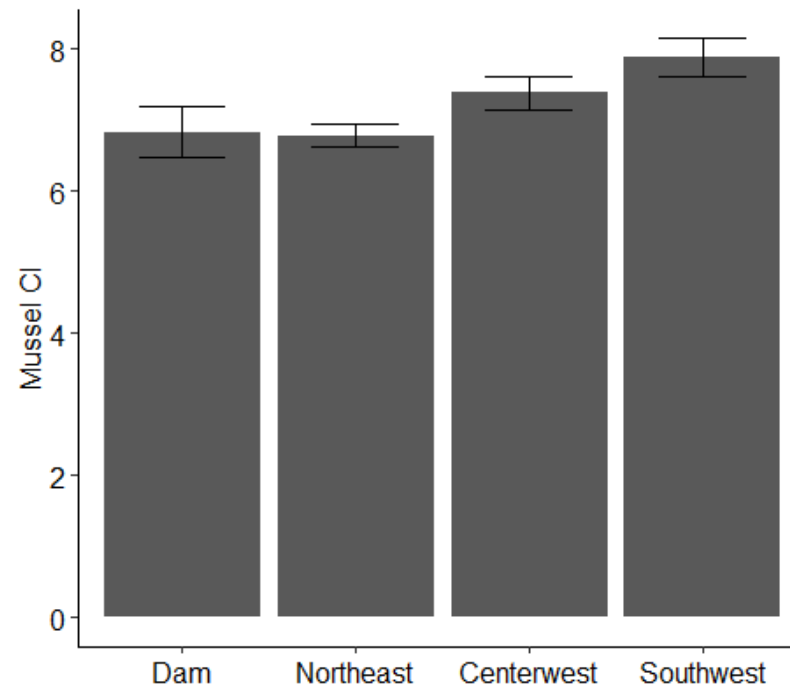


Nutrient Gradient Transplant

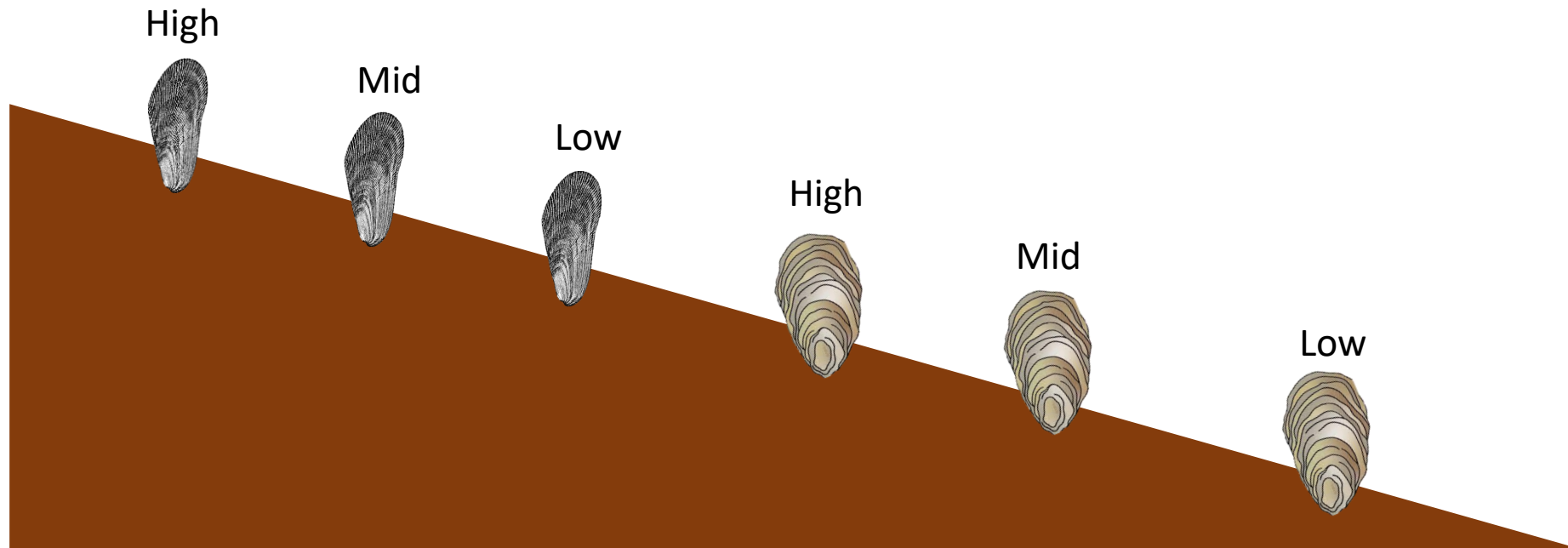
Mussel Growth



Mussel Condition Index

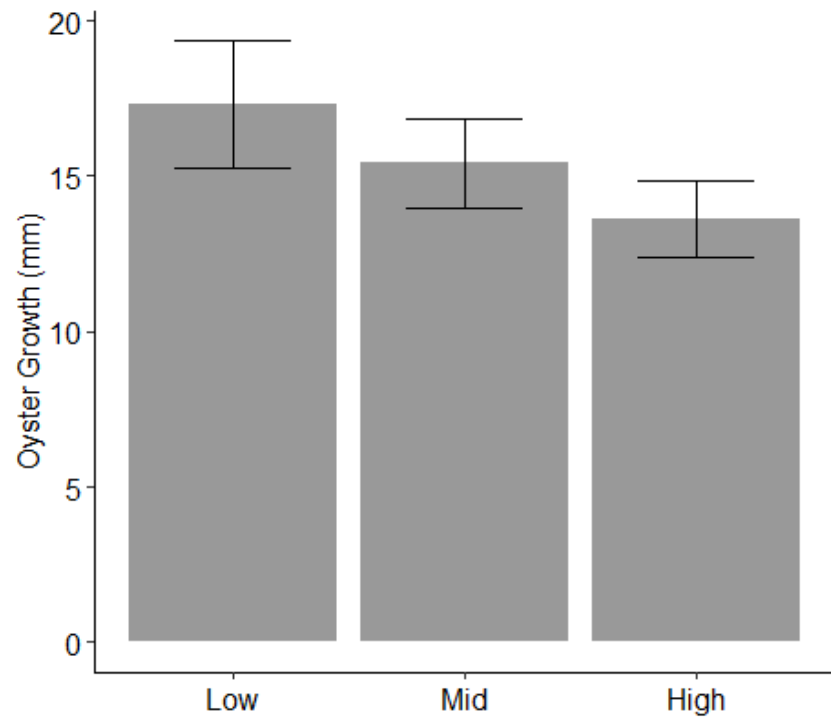


Elevation Gradient Transplant

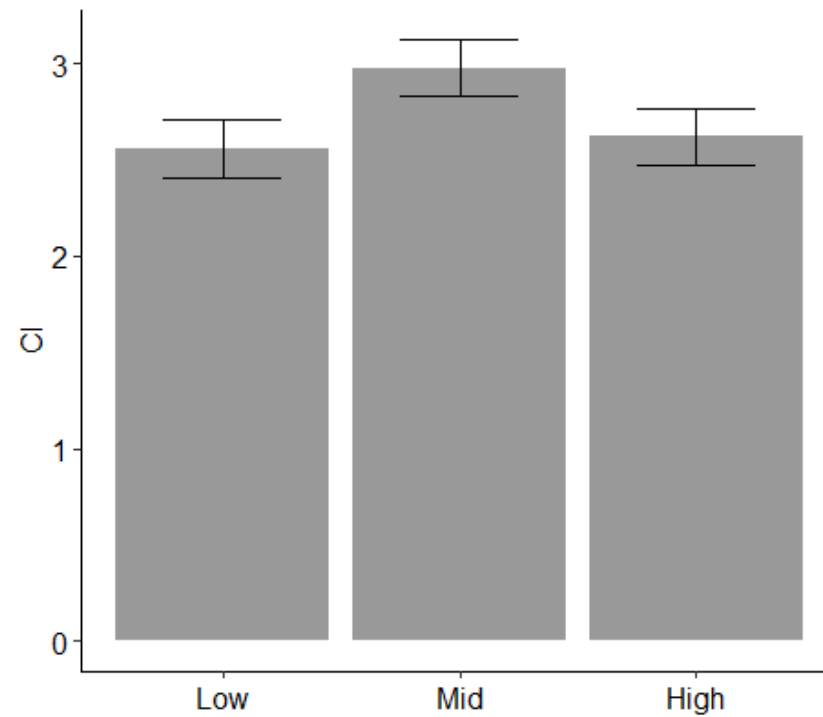


Elevation Gradient Transplant

Oyster Growth

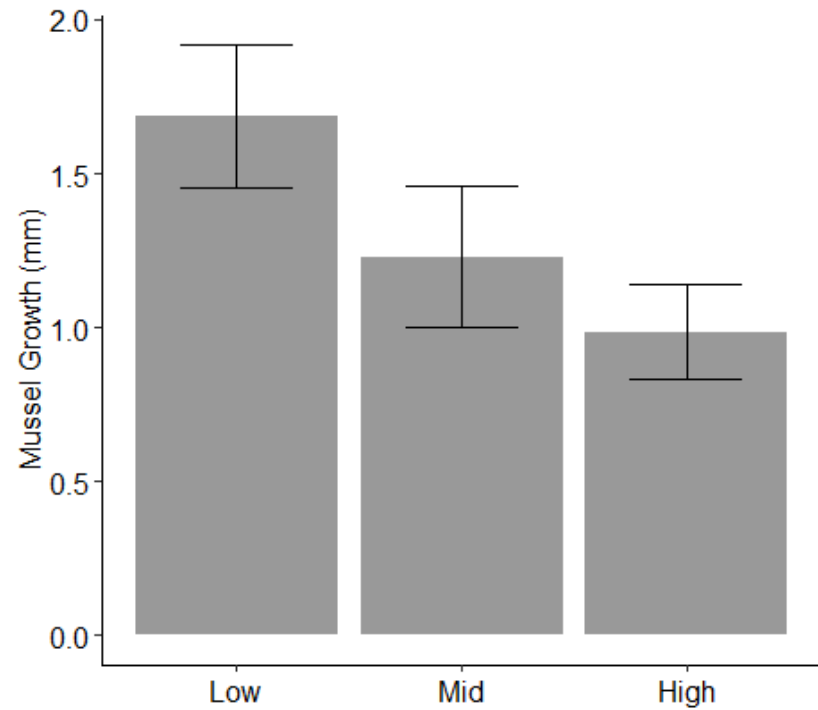


Oyster Condition Index

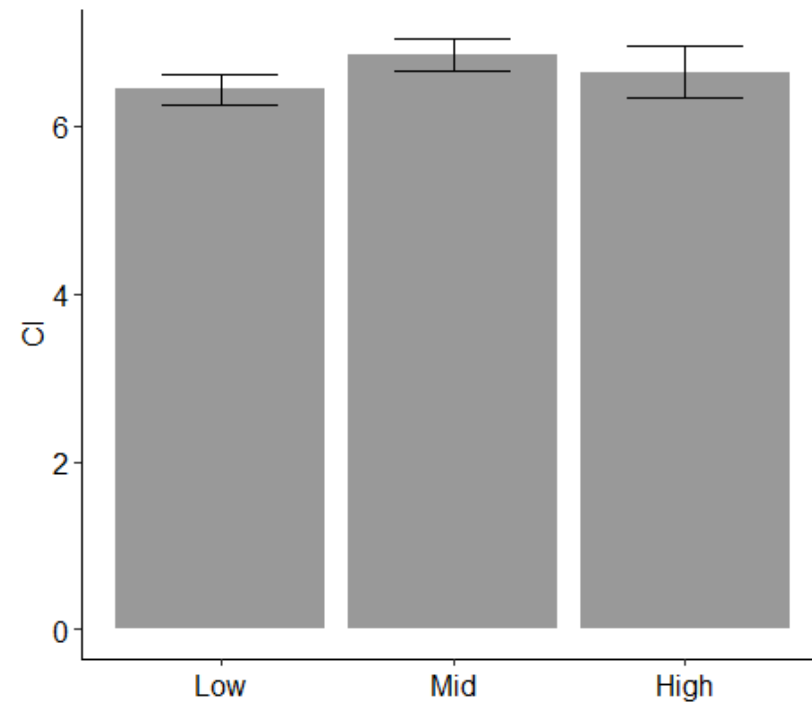


Elevation Gradient Transplant

Mussel Growth



Mussel Condition Index



Summary of Transplant

- Nutrient gradient altered the growth rate of both oysters and mussels
 - Opposite patterns between species: oyster growth was enhanced at the dam and mussels at the southern end
 - Condition Index mirrored growth trends
- Increased inundation time increased growth rates of both species
 - Condition index did not vary between elevations
- Growth differences were greater in the nutrient gradient experiment than the inundation experiment



Conclusions

- In this project, we are collecting data to inform how bivalves can be used as part of a water quality solution in Florida
- The Guana has extensive natural populations of mussels and oysters
- Transplant experiment revealed responses to varied nutrients and inundation time
 - Species-specific differences may be important for restoration designs



An aerial photograph of a wetland landscape. The image shows a complex network of water channels and vegetated islands. The water is a dark, muddy brown color, while the vegetation is a mix of green and greyish-brown, suggesting different plant species or stages of growth. The overall texture is highly irregular and organic.

Thank you!

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