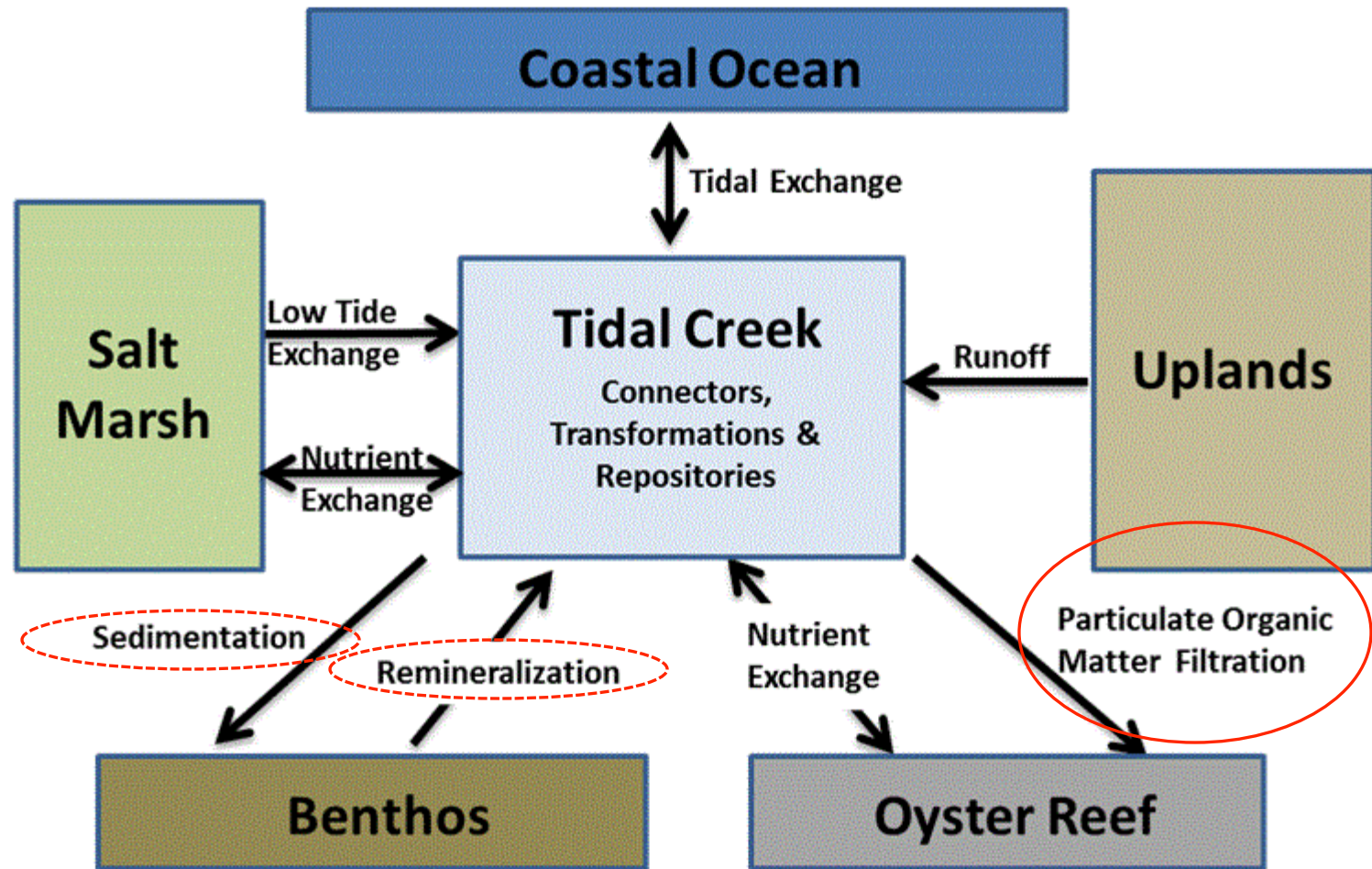


Assessment of particulate removal associated with the presence of oyster (*Crassostrea virginica*) structure in a tidally dominated creek system.

Mary Grace Lemon, Michael Mallin,  
Troy Alphin, and Martin Posey  
Center for Marine Science, UNCW



Schematic of tidal creek connectivity as presented by Holland (modified from Childers et al. 1993) and obtained from Southeast Tidal Creeks Summit 2011 – Summary and Identified Research, Management and Outreach Needs (Sanger et al. 2011)

# Buffer Capacity of Tidal Creeks

“...1<sup>st</sup> order connections between uplands and estuaries” – Holland et al. 2004



# Role of Oysters



# Main Questions

1. **Do oysters have a significant removal effect?**
2. **Is this removal biological, physical, or a combination?**
3. **Is this effect ecologically meaningful?**

# Study Site

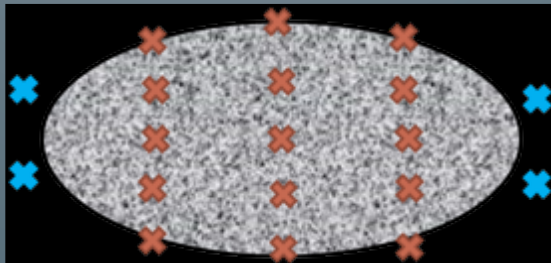


New Hanover Co.



# Method Summary

- Reef characterization
- Upstream/downstream water sampling
- Sediment collection
- Defaunation Experiment



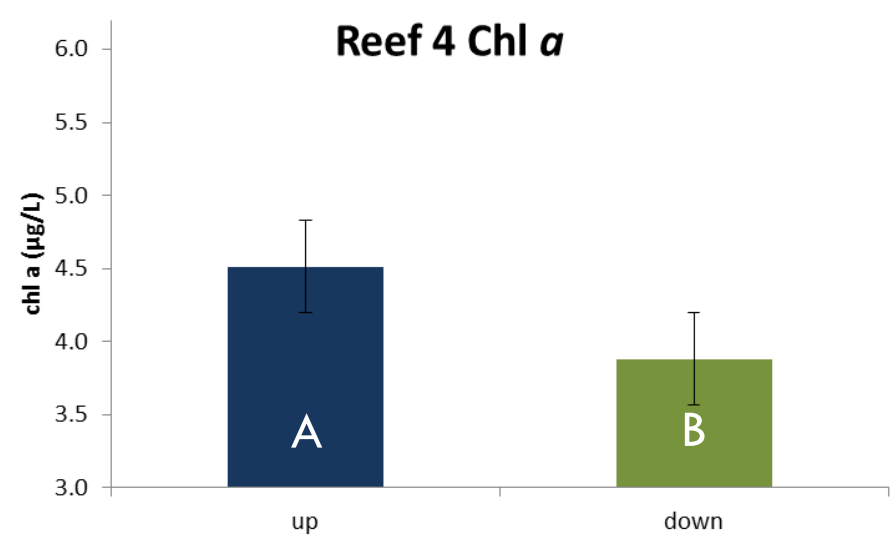
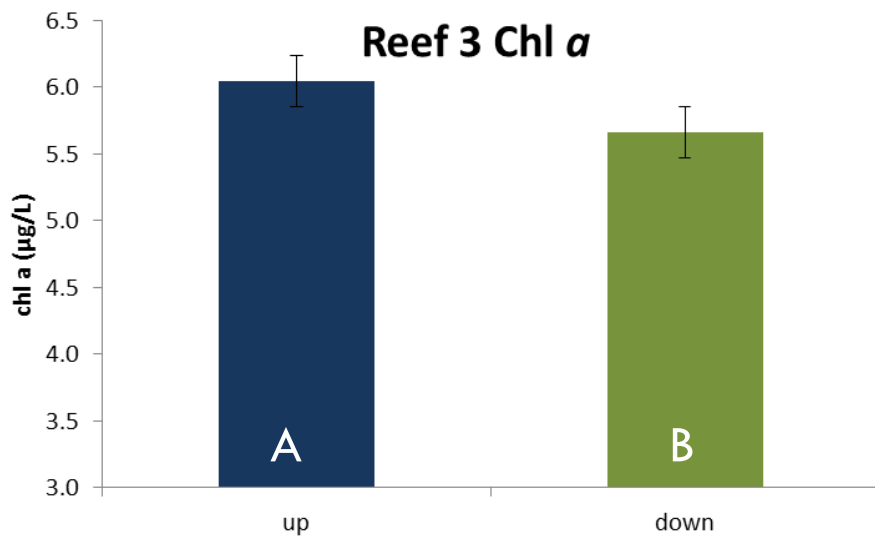
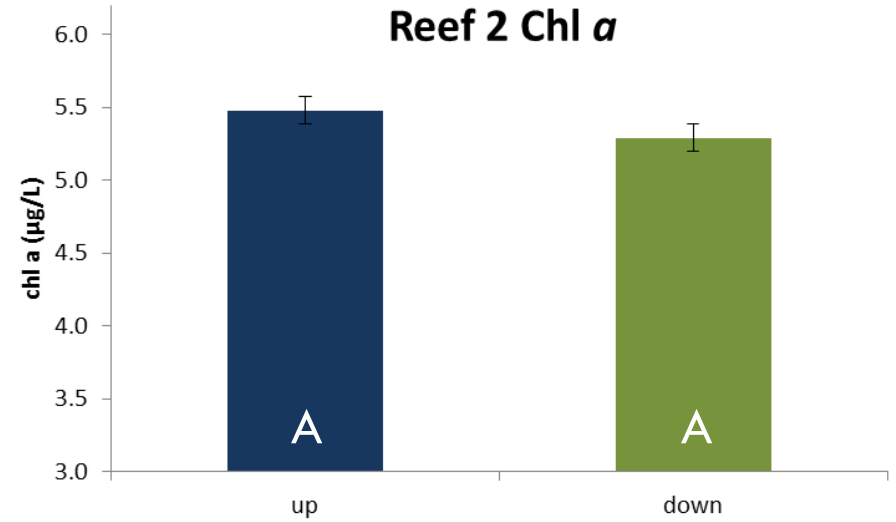
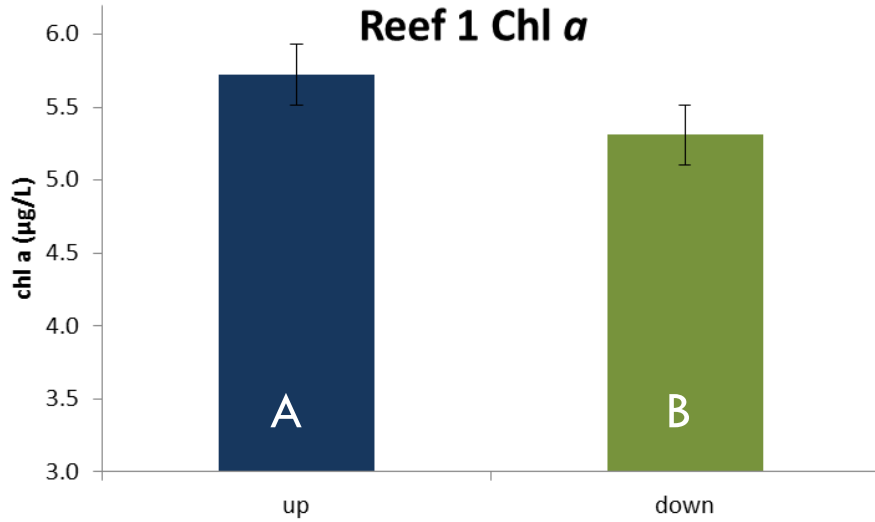
# Preliminary Results Overview

- Chl  $\alpha$  upstream/downstream
- TSS upstream/downstream
- Flow Velocity
- Reef Characteristics
- Sedimentation
- Defaunation

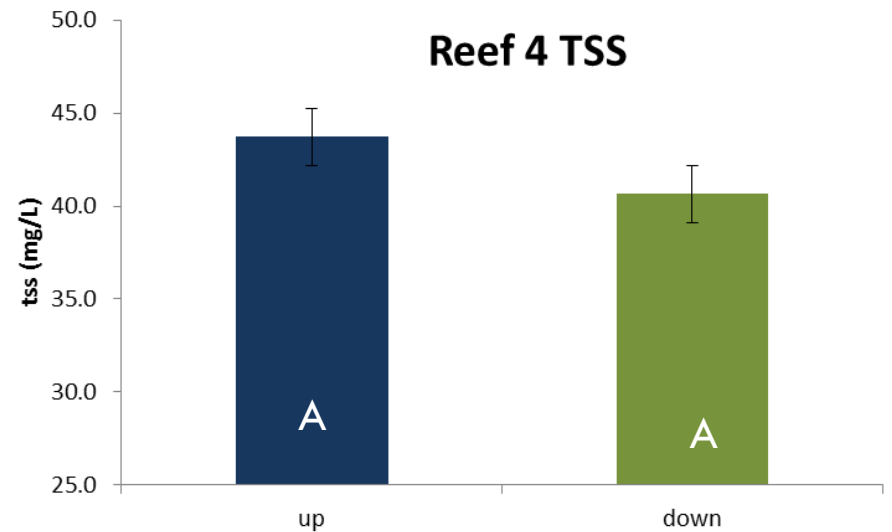
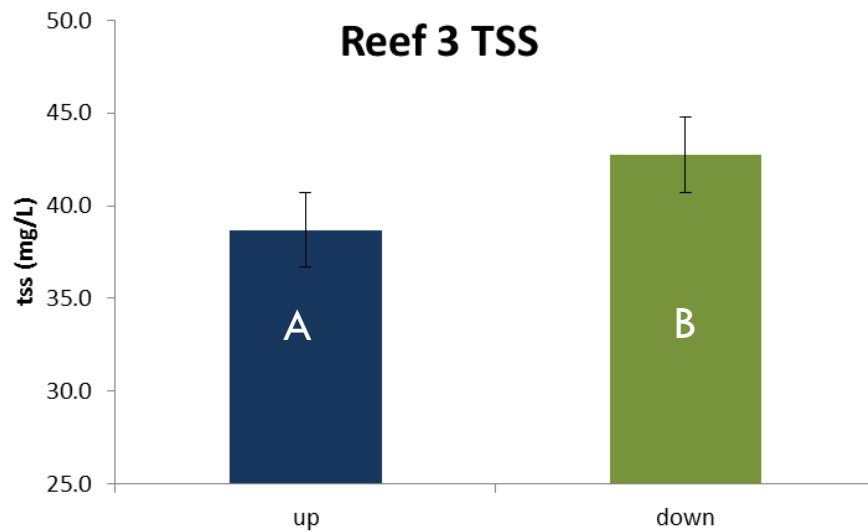
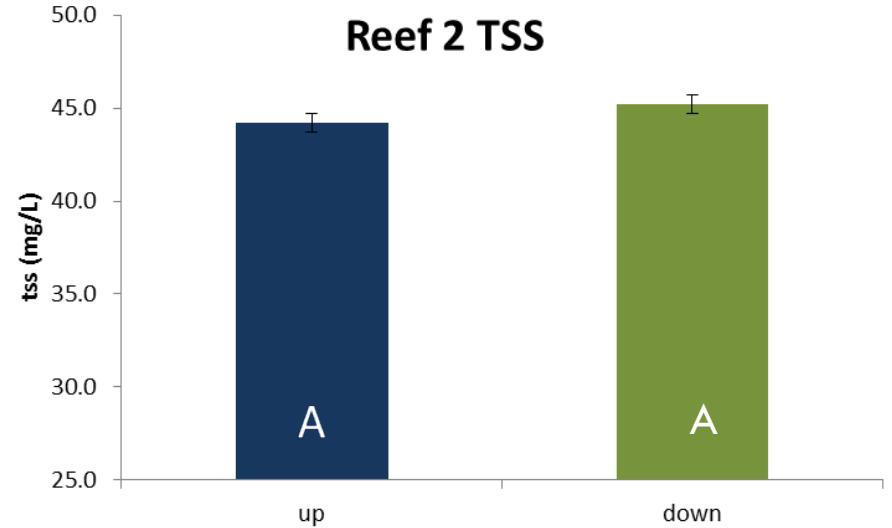
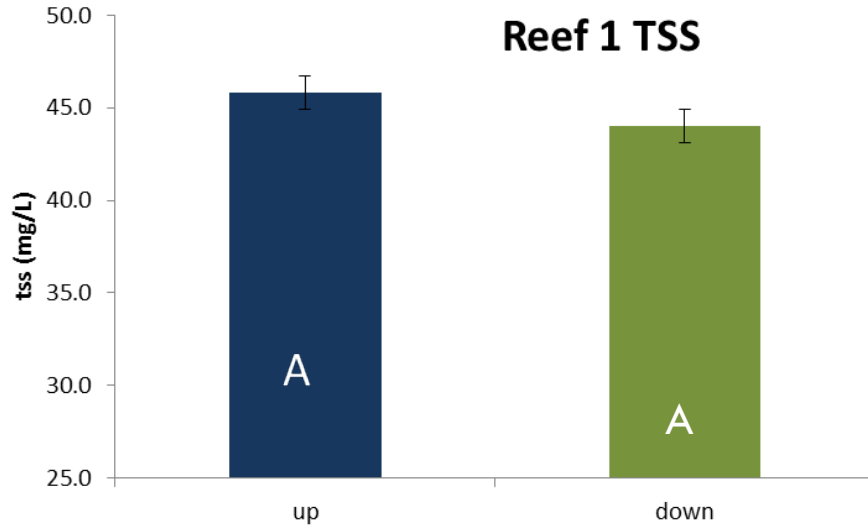




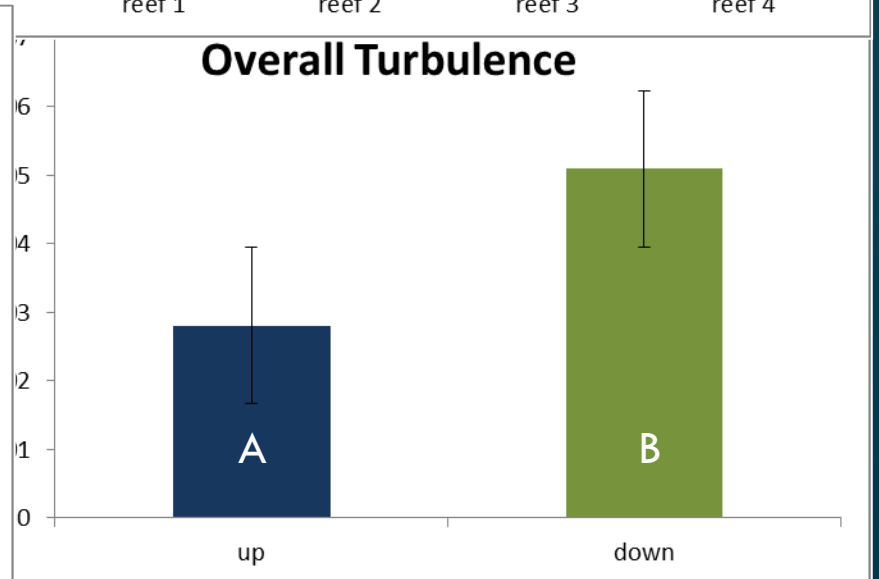
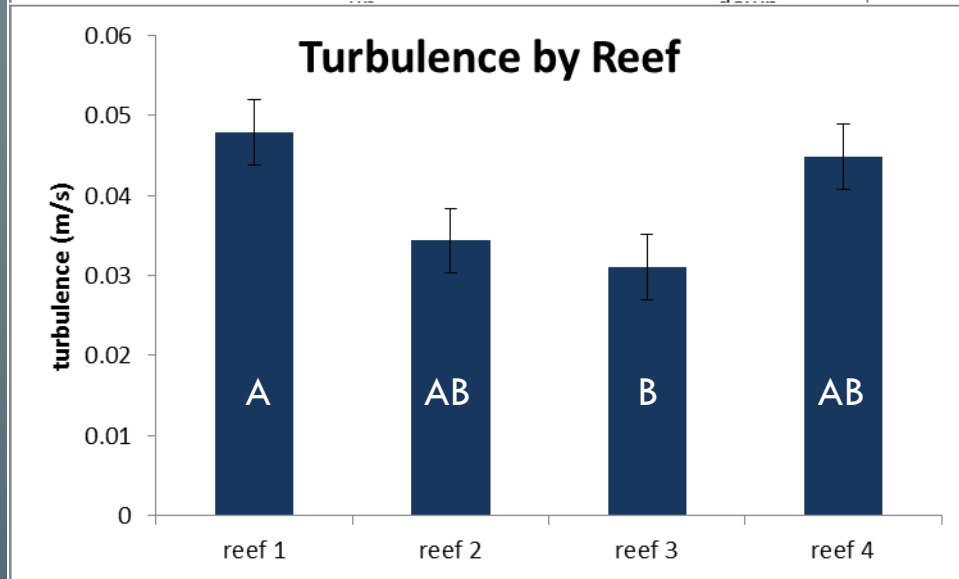
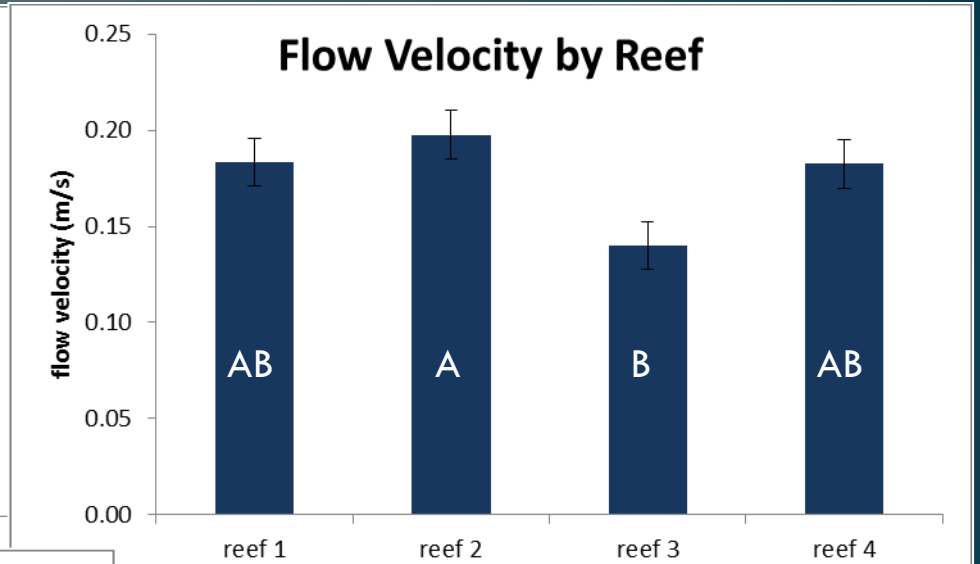
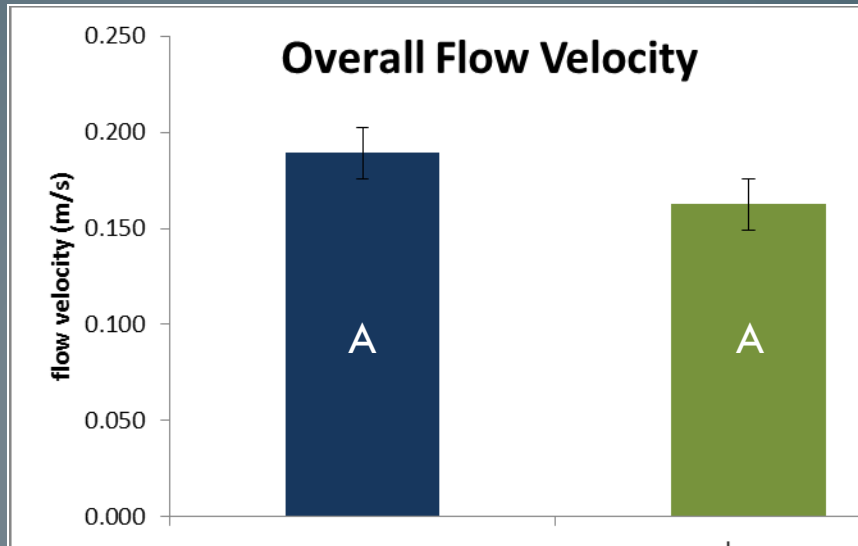
# Chlorophyll *a*



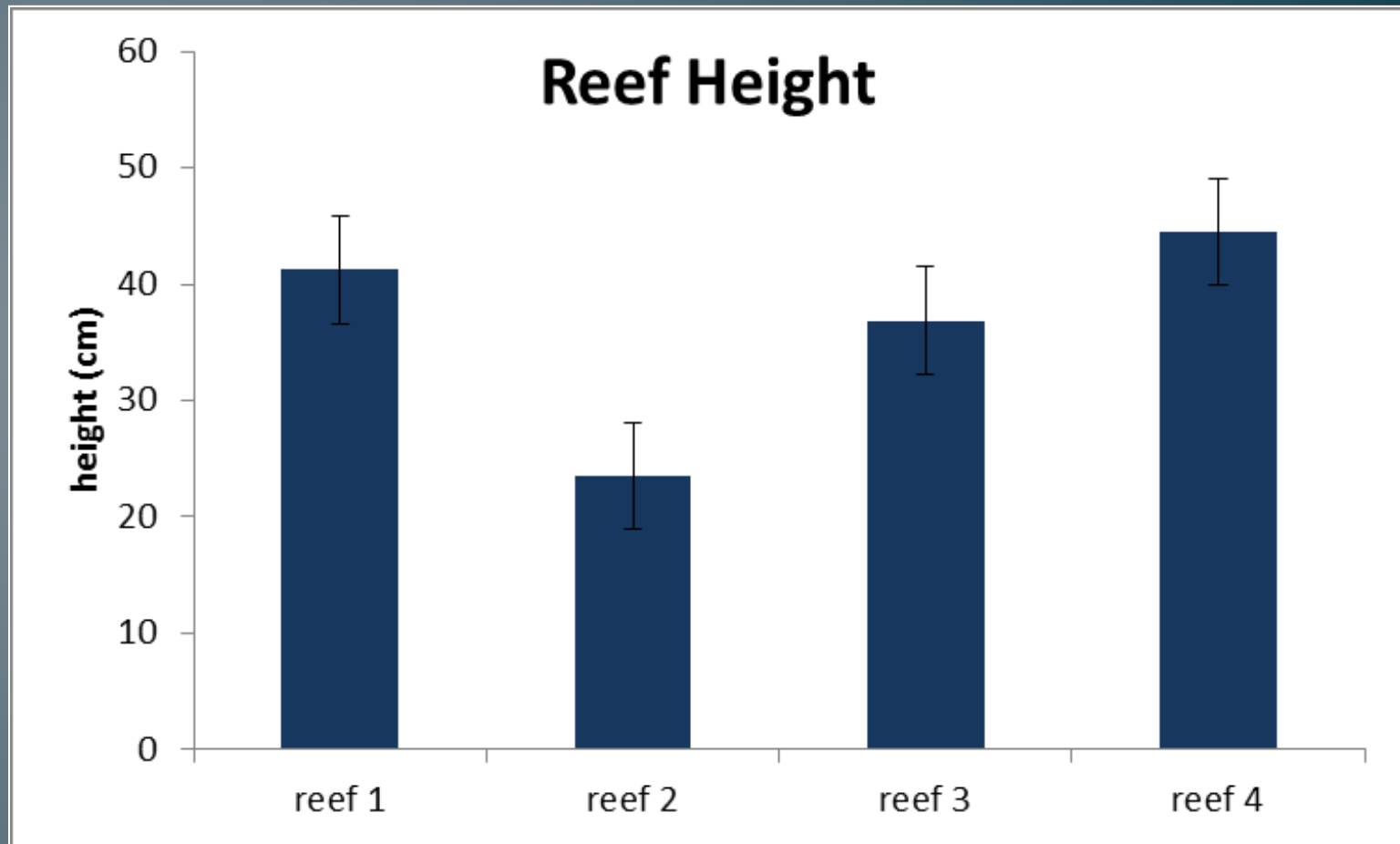
# Total Suspended Solids



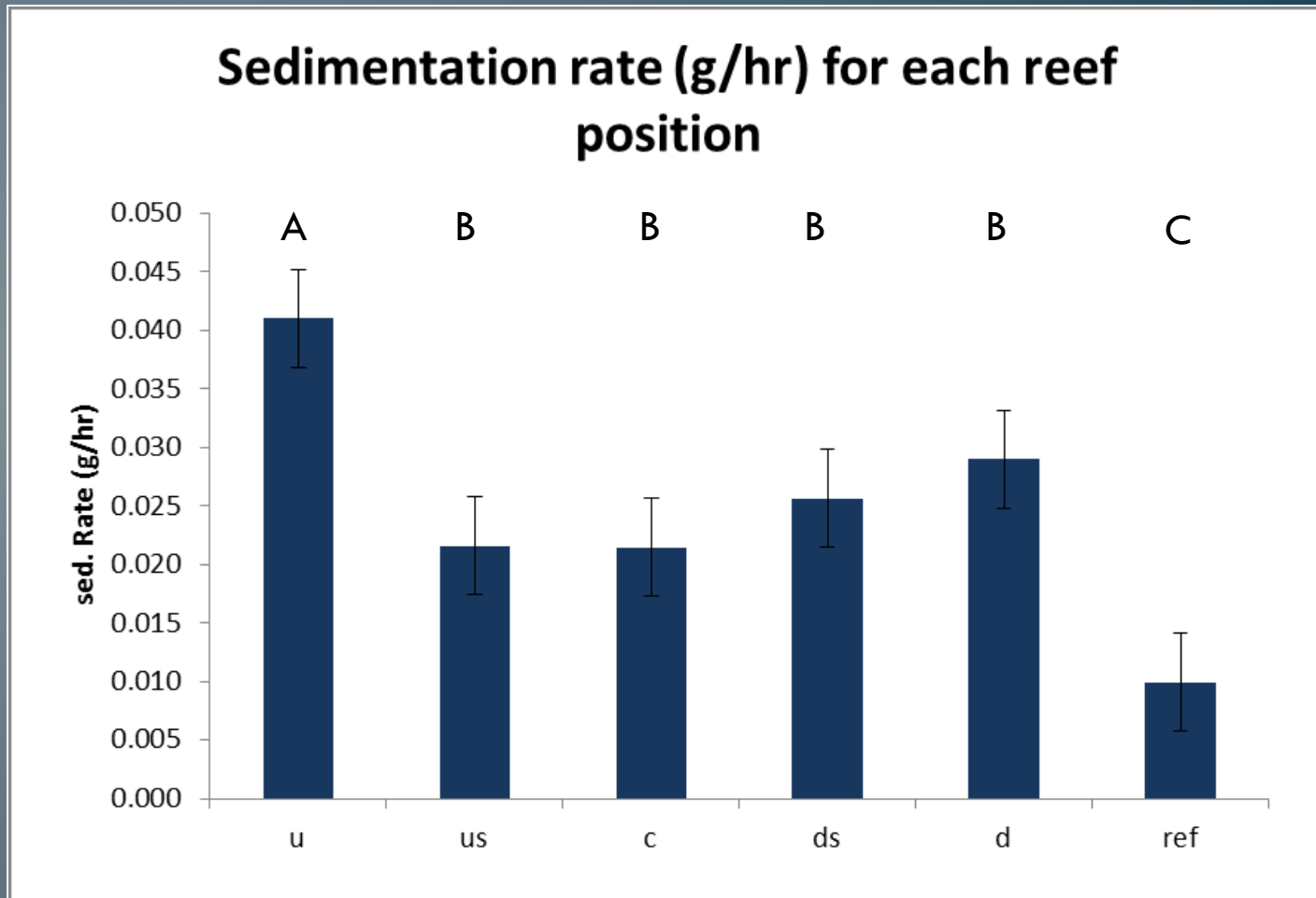
# Flow velocity



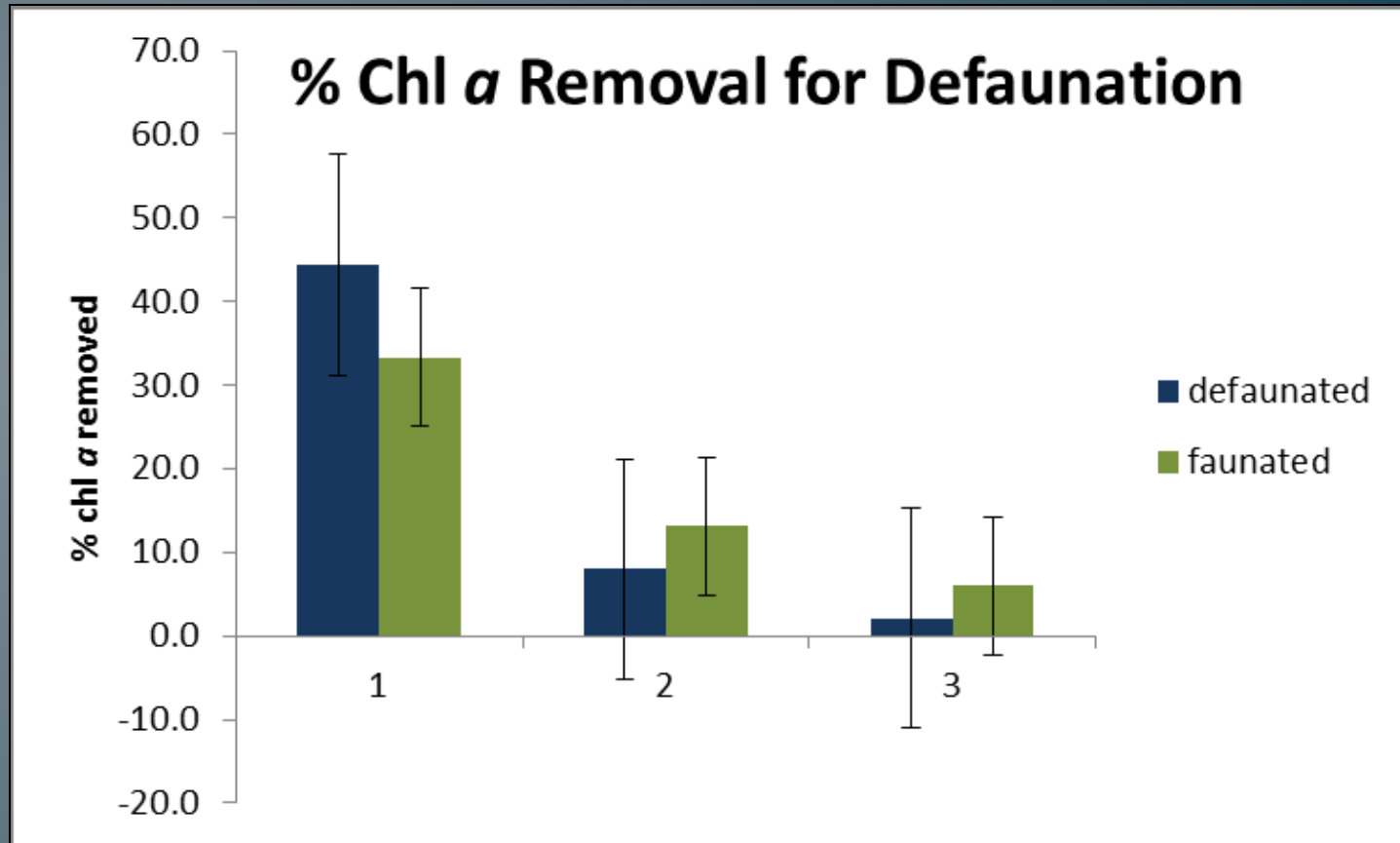
# Reef Characteristics



# Sedimentation



# Defaunation



# Preliminary Conclusions

## 1. Do oysters have a significant removal effect?

- Yes, we detected significant chl  $a$  removal even over the small spatial and temporal scale that we accessed

## 2. Is this removal biological, physical, or a combination? BOTH!

- Physical playing a larger role than what we may think
  - Defaunation
  - Velocity changes
  - Sedimentation

## 3. Implications for tidal creek ecosystems?

- Significant effects on such a small scale suggests an important role of oysters in removing material from the water column if blown up to the ecosystem scale
- Awareness of the physical role the oyster reefs play in removing material; not only biological
  - Need to take into account oyster reef structure and shape when making management decisions not just live density

# Next Steps

Is this removal biological, physical, or a combination?

- Look at reef specific characteristics
- Analysis of crest position and flood tide data
- Sediment grain size analysis
- Analysis of biodeposit trap data

Is this effect ecologically meaningful?

- Calculations of filtration rate using biodeposit method and upstream/downstream method



# Acknowledgements



- My advisors: Michael Mallin, Martin Posey, Troy Alphin, Lynn Leonard
- All members of the Benthic and Aquatic Ecology labs at UNCW for helping me design and implement this project
- Chris Finelli
- City of Wilmington

