Update on the Lone Cabbage Reef Restoration Project in Suwannee Sound

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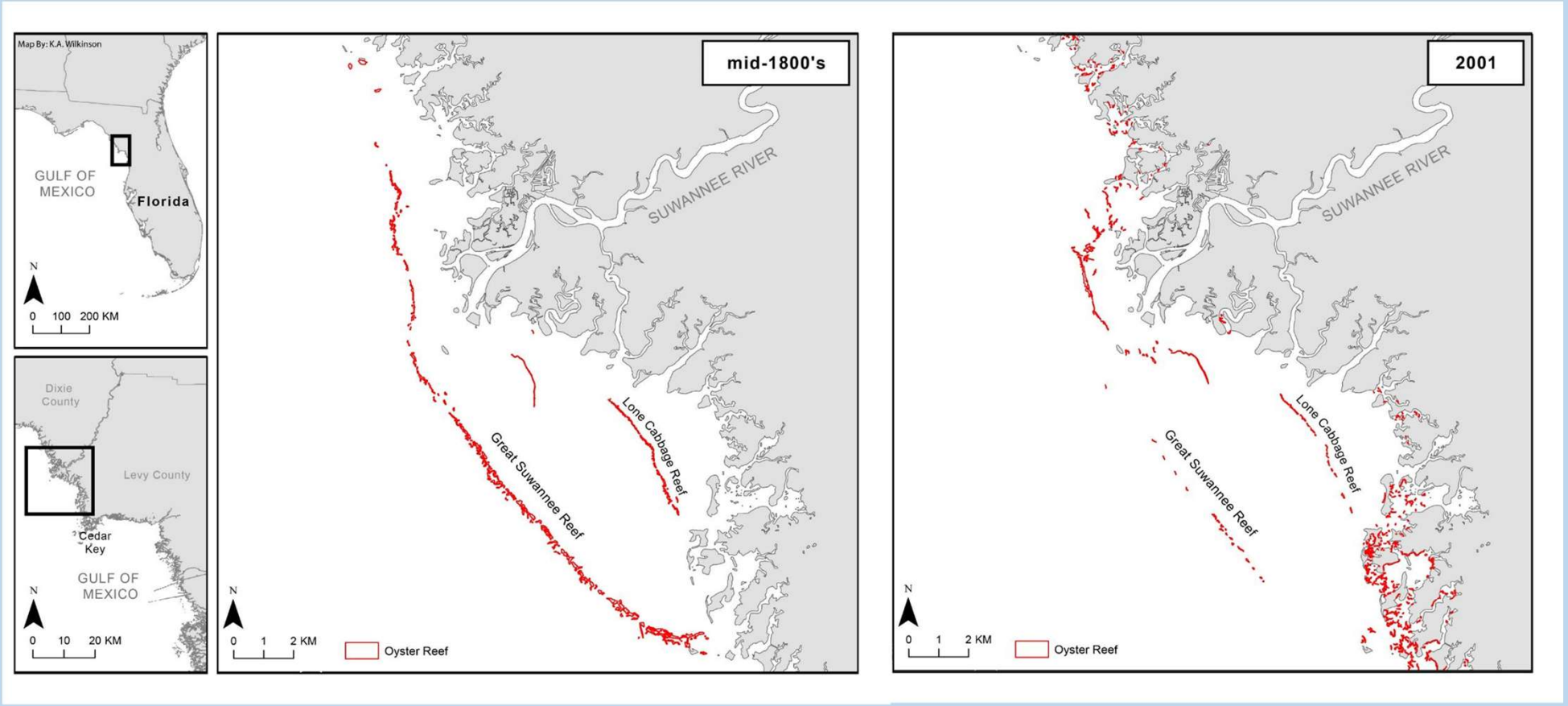
University of Florida

Oyster Integrated Mapping and Monitoring Program Workshop

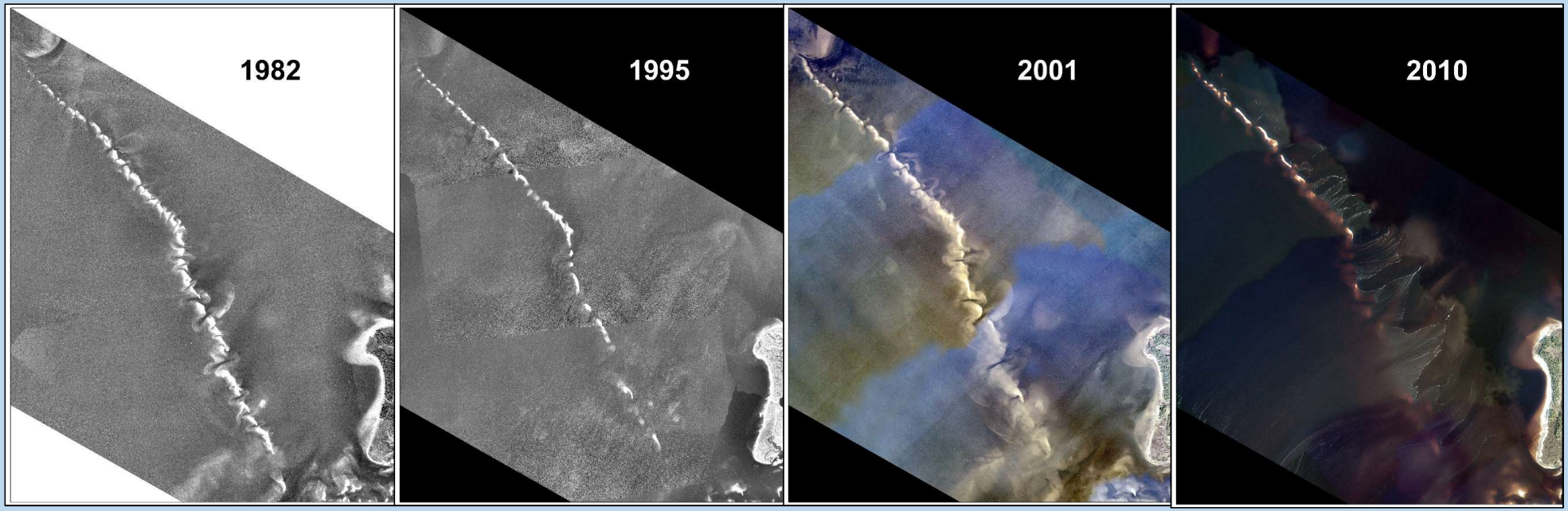
22-23 May 2018

PROJECT AREA:



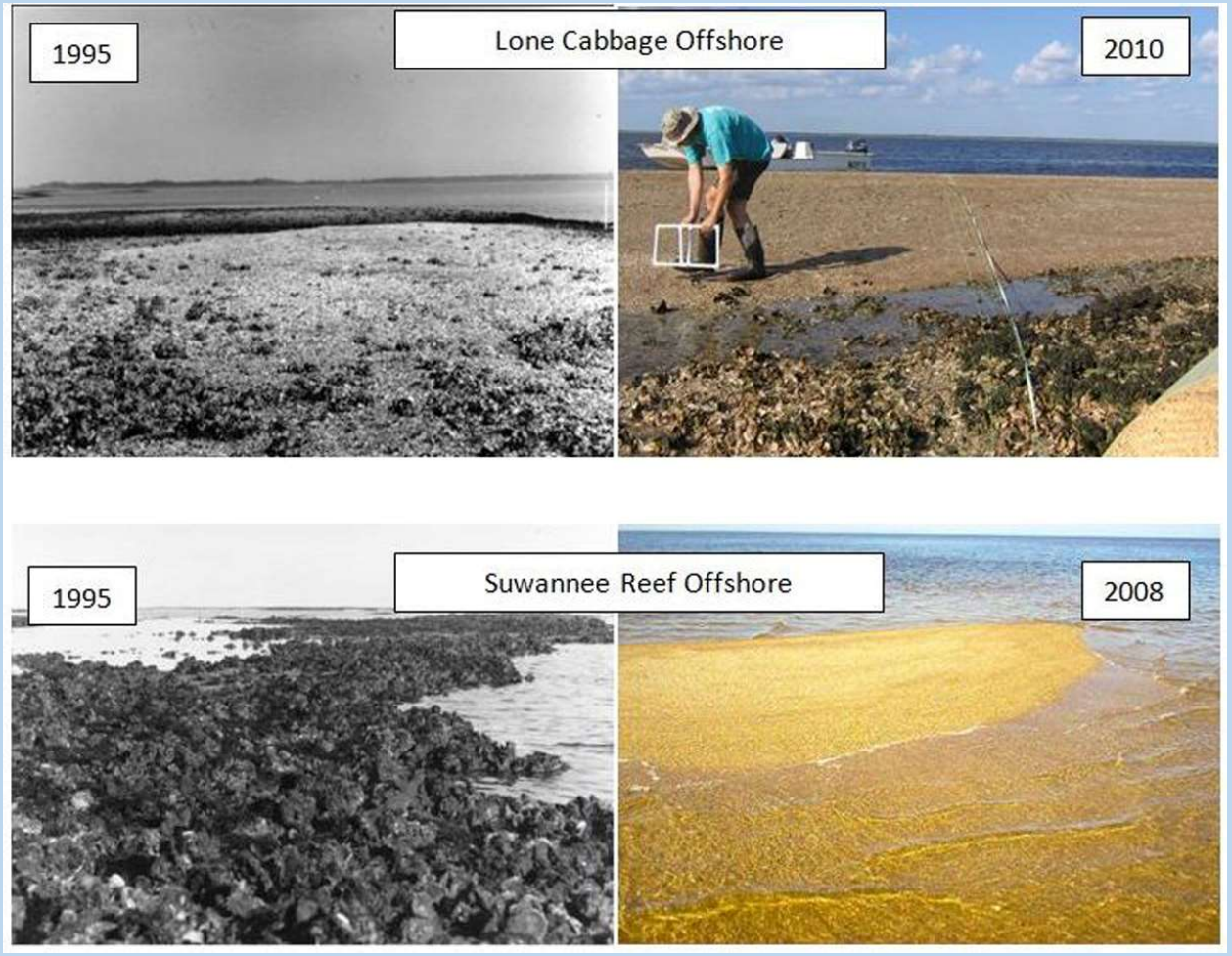
Raabe, E. A., A. E. Streck, R. S. Stumpf. 2004. Historic topographic sheets to satellite imagery: A methodology for evaluating coastal change in Florida's Big Bend tidal marsh. USGS Open File Report 02-211

Degradation of Lone Cabbage Reef



Intertidal Oyster Reef Change in the Big Bend Region

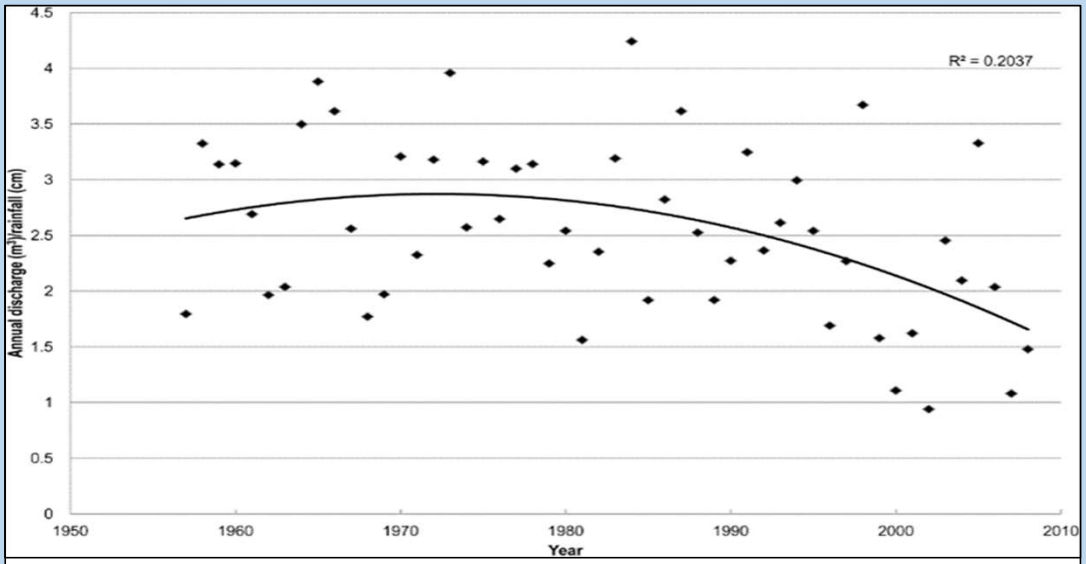
- **Reef Loss 1982-2011**
  - **Offshore: 88%**
  - **Nearshore: 61%**
  - **Inshore: 50%**
  - **Lone Cabbage Area: 70%**

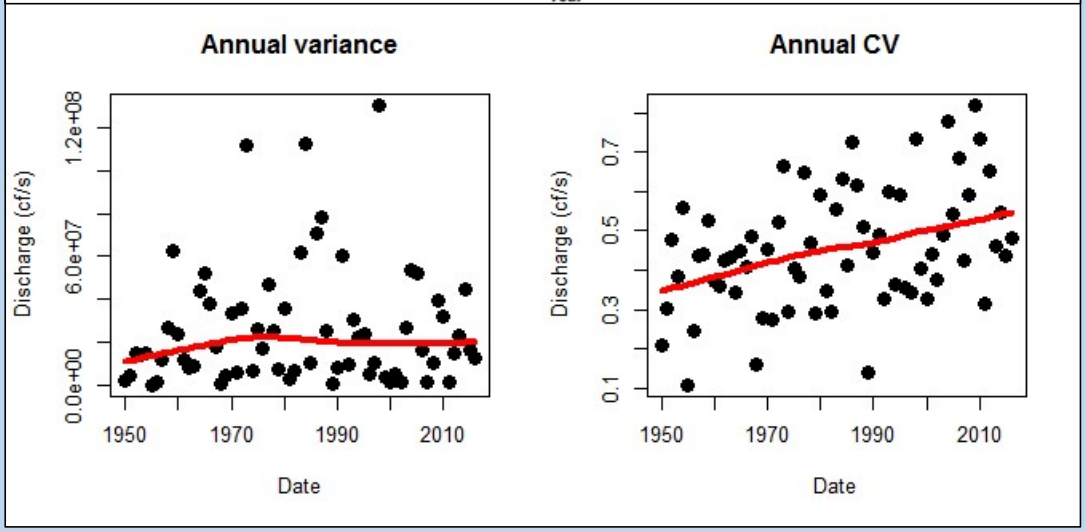


Seavey, J. R., W. E. Pine, III, P. Frederick, L. Sturmer, and M. Berrigan. 2011. Decadal changes in oyster reefs in the Big Bend of Florida's Gulf Coast. Ecosphere 2(10):114. doi:10.1890/ES11-00205.1

Possible Causes of Oyster Reef Change

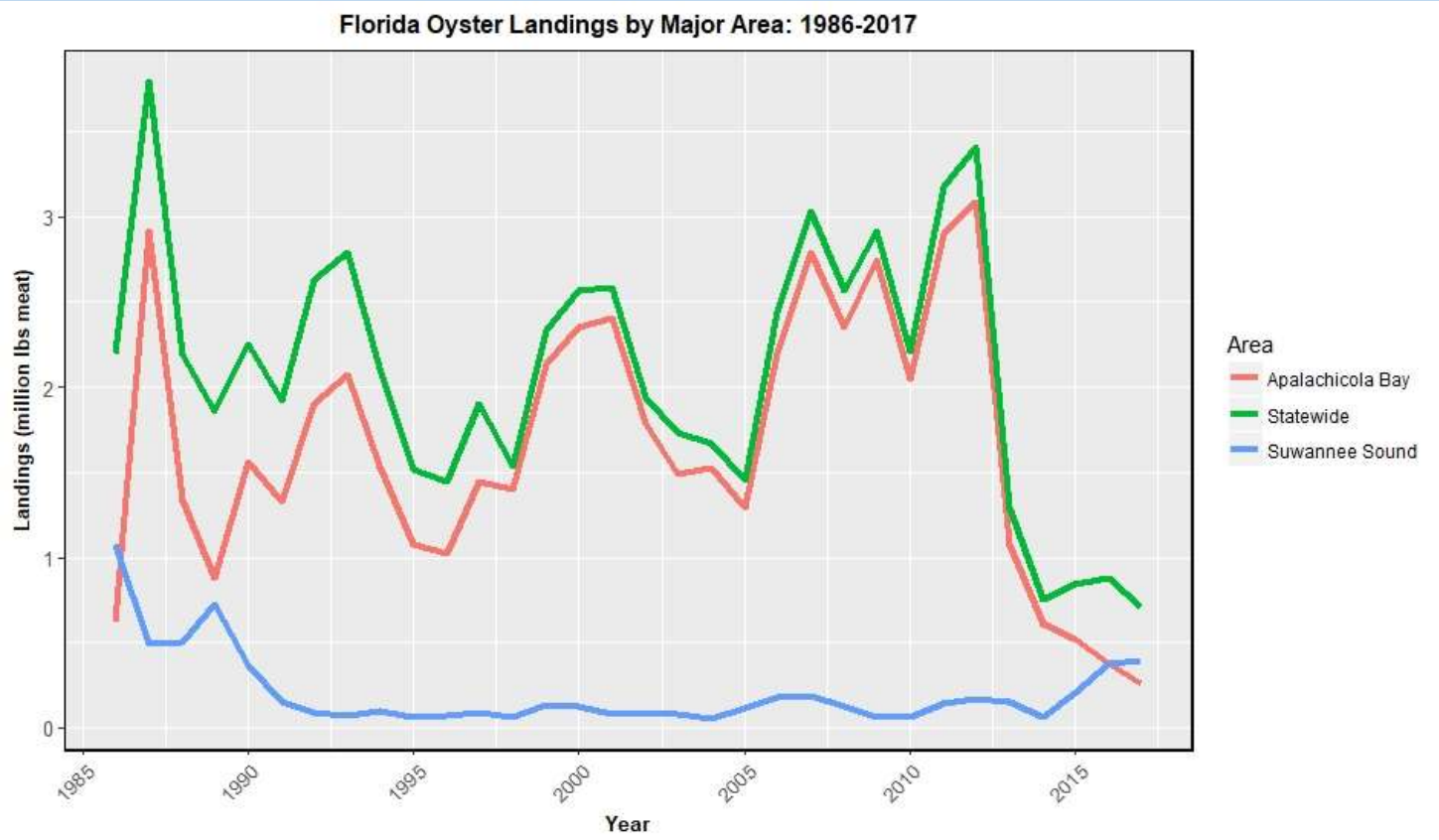
Are changes in Suwannee River discharge patterns affecting oyster populations?

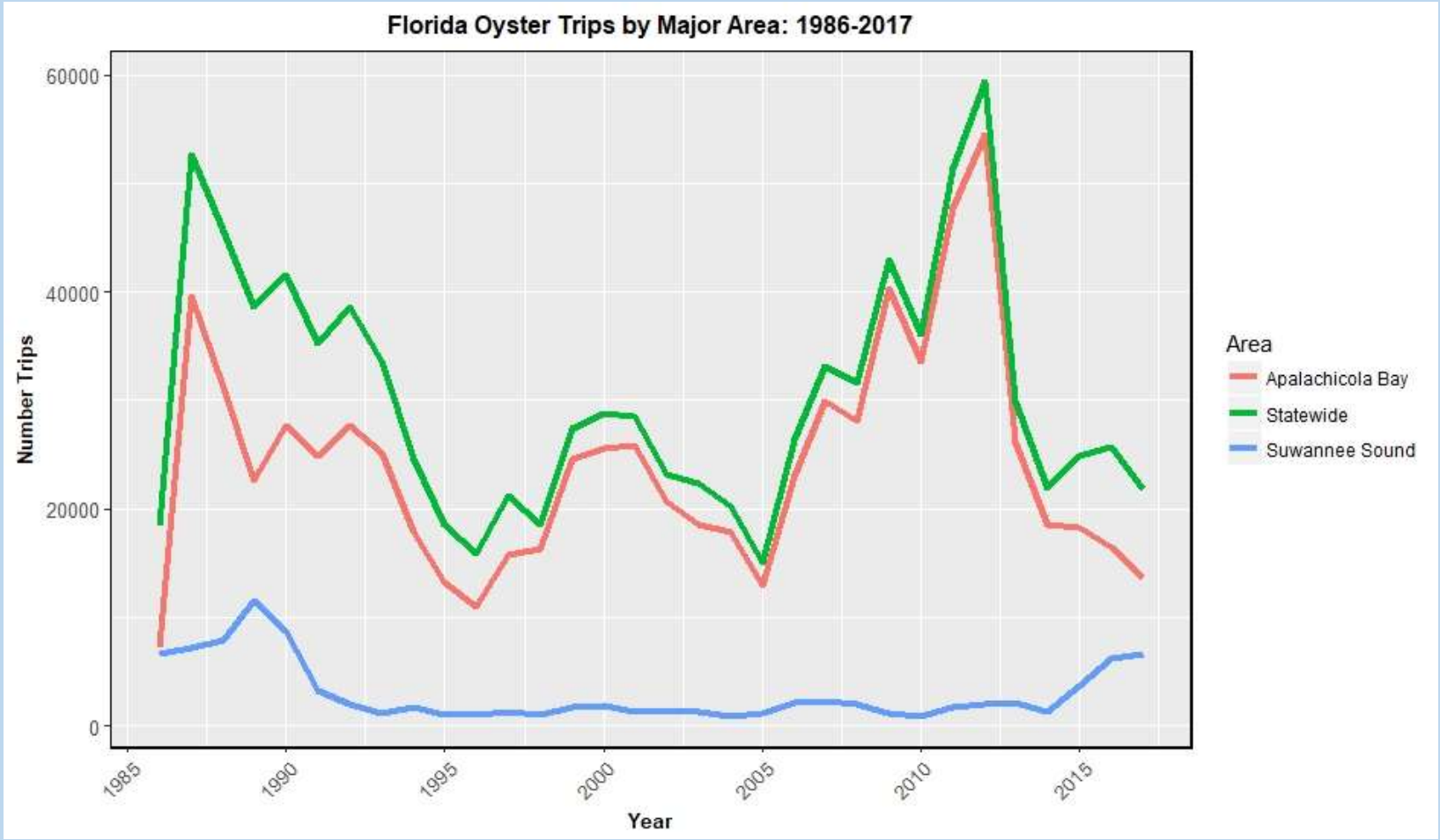


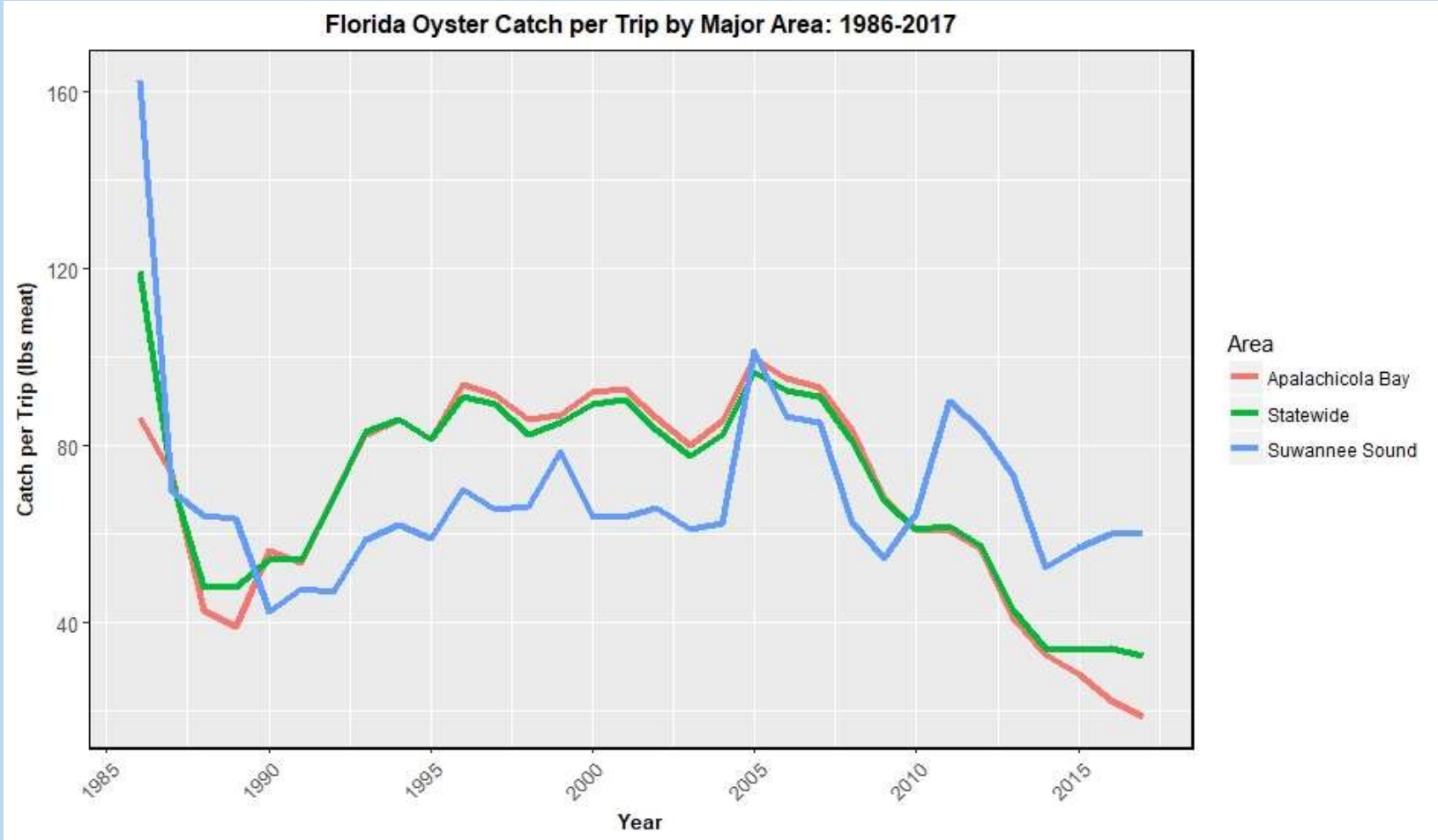


Possible Causes of Oyster Reef Change

Is overfishing negatively affecting reefs?

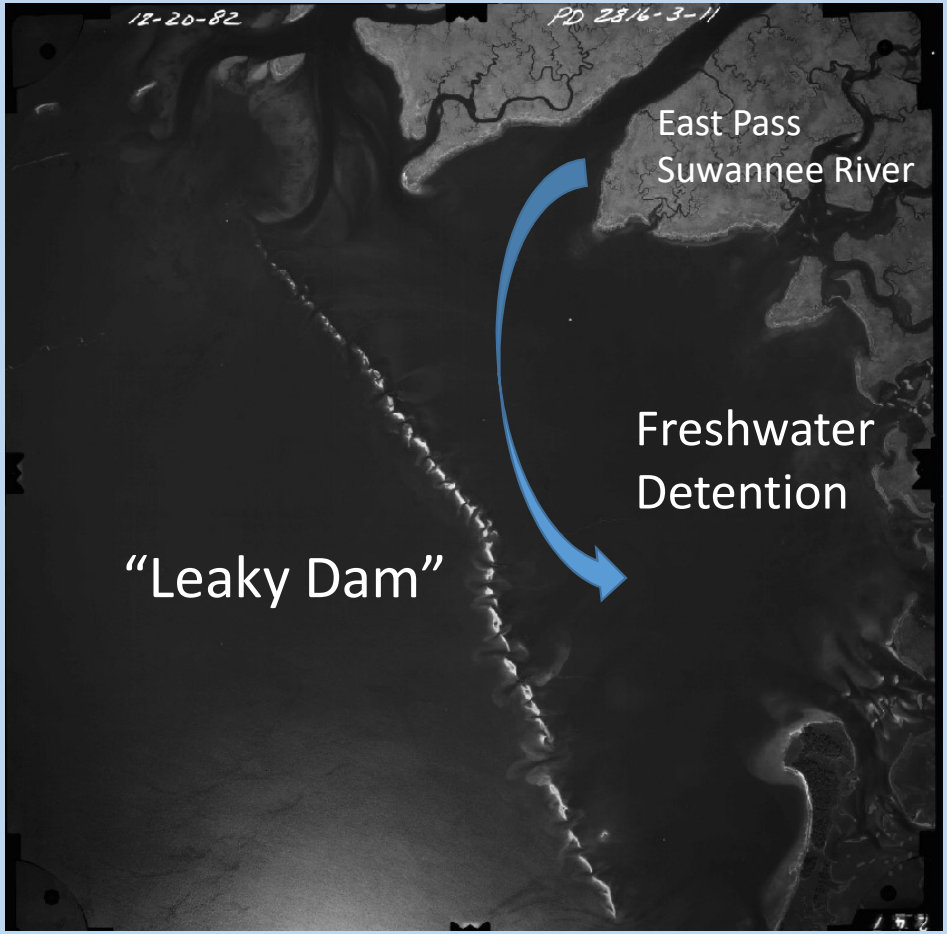


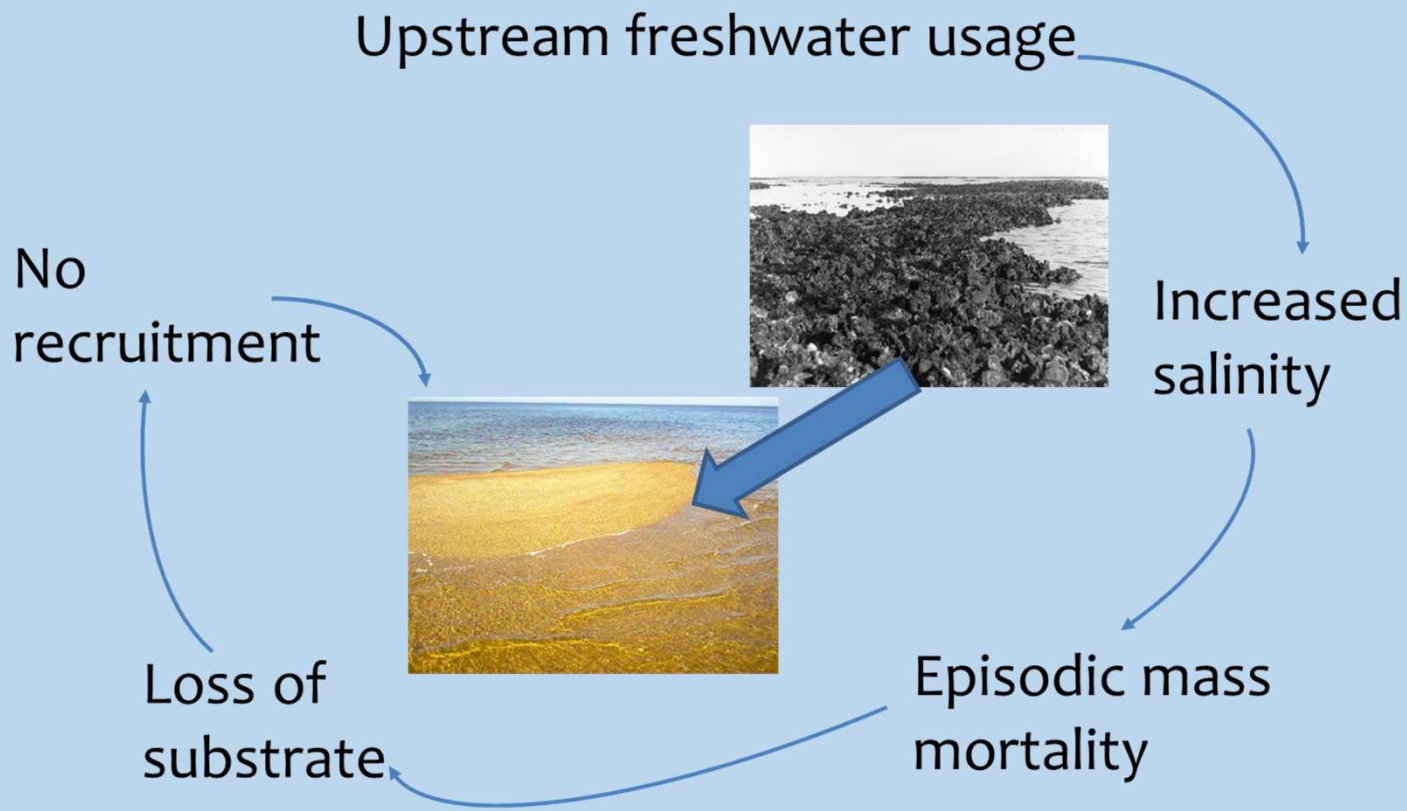

Florida Oyster Trips by Major Area: 1986-2017
Number Trips
60000
40000
20000
0
1985
1990
1995
2000
2005
2010
2015
Year
Area
Apalachicola Bay
Statewide
Suwannee Sound


Florida Oyster Catch per Trip by Major Area: 1986-2017
Catch per Trip (lbs meat)
160
120
80
40
1985
1990
1995
2000
2005
2010
2015
Year
Area
Apalachicola Bay
Statewide
Suwannee Sound

Oyster reefs as barriers

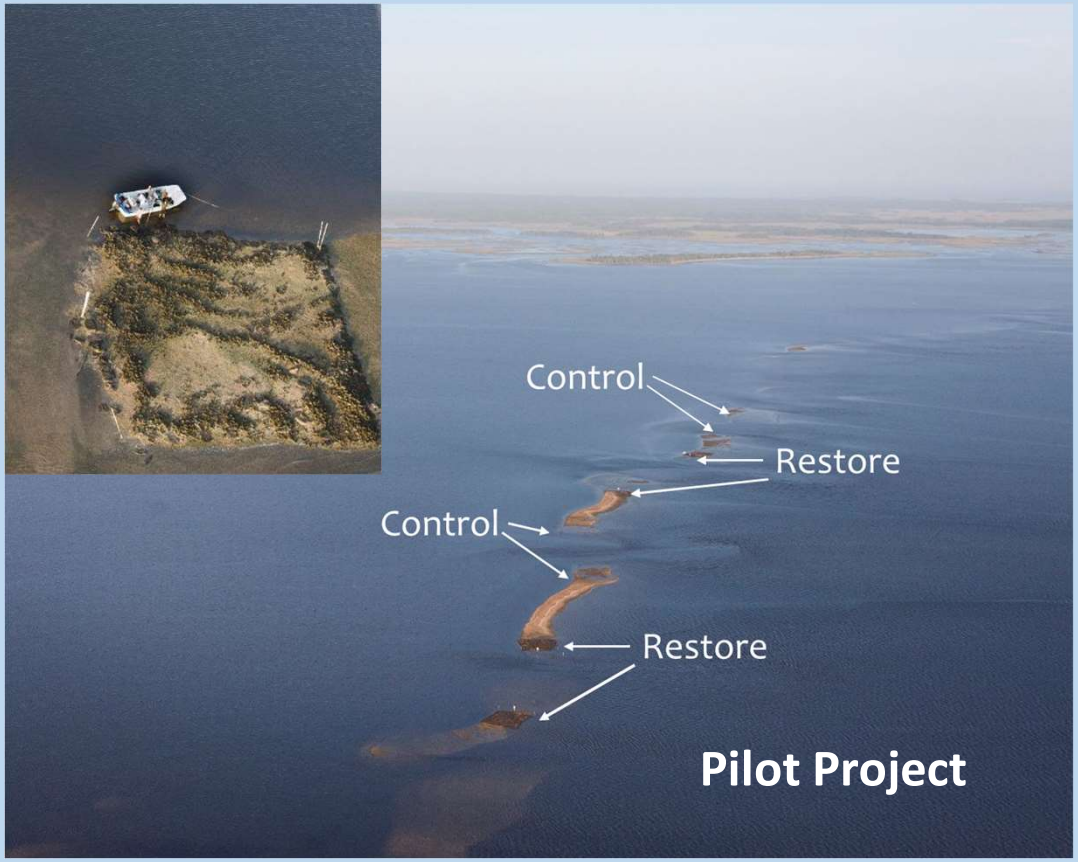
- **GOALS:**
  - **Ecosystem response to barrier reef restoration**
    - Restore/Maintain estuarine conditions
    - Coastal protection
    - Habitat, WQ improvement
  - **Local Oyster Restoration**
    - Provide durable substrate
  - **Model for other similarly degraded reefs in Big Bend Region**




Upstream freshwater usage
Increased salinity
Episodic mass mortality
Loss of substrate
No recruitment

Adding Substrate Works

- **Builds on Pilot Project success**
  - **9.2x increase in oyster density**



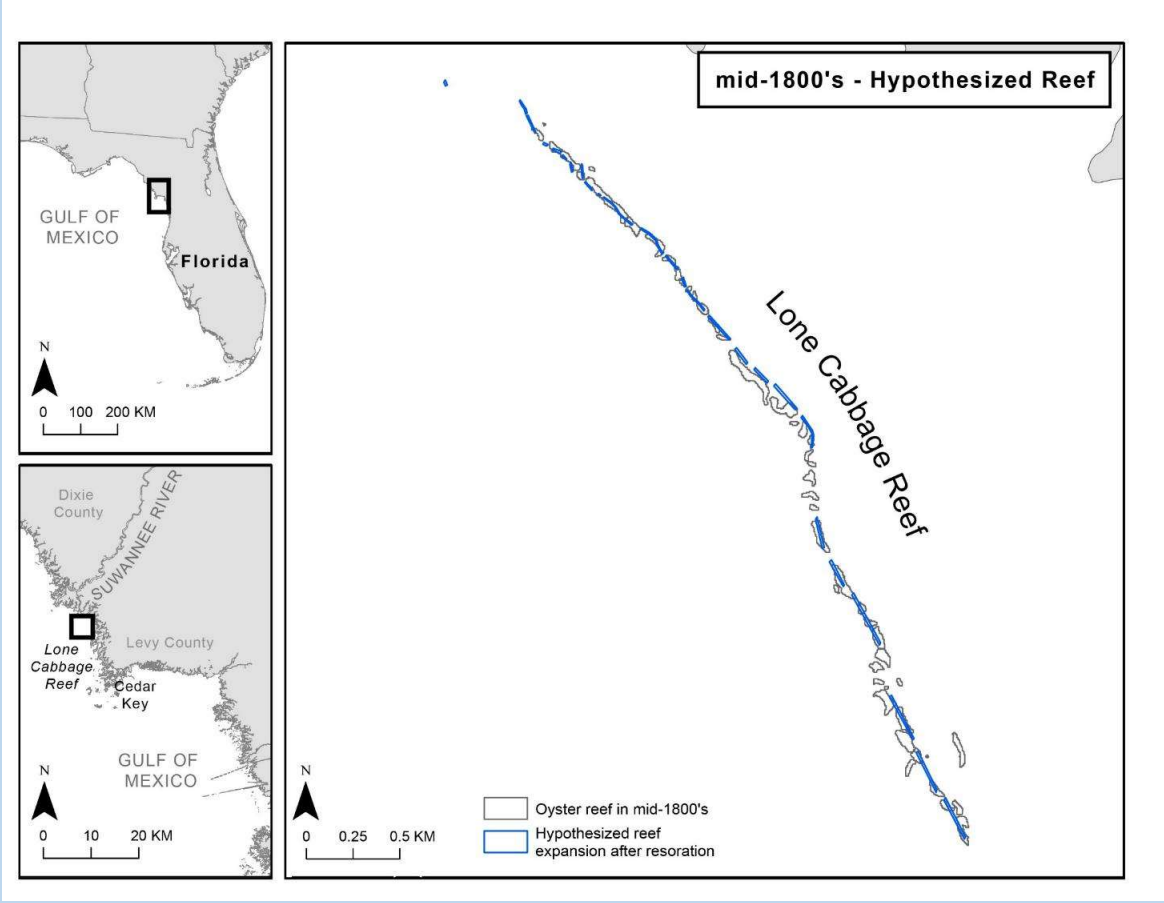
Frederick, P., N. Vitale, B. Pine, J. Seavey, L. Sturmer. 2016. Reversing a rapid decline in oyster reefs: effects of durable substrate on oyster populations, elevations, and aquatic bird community composition. Journal of Shellfish Research. 35(2):359-367.

Lone Cabbage Reef Restoration Project

- **Restore to mid 1800's extent**

- **22 reef elements**
- **7.26 acres**
  - ~3 linear miles (5 km)
  - 30 ft wide
- **16,894 cu yrds of rock**
- **8-10" local limerock**
- **Topped with clam/oyster shell**

- **85% of project funding**
  = construction



Restoration Predictions

1. **Rapid repopulation of oysters and reef fauna following episodic dieoffs**

2. **Increased resilience of oyster populations to low flow events**

3. **Decreased salinities in Suwannee Sound and landward marshes**

4. **Shifts in community composition: food web alterations**

Pilot Project -> 18 months post construction

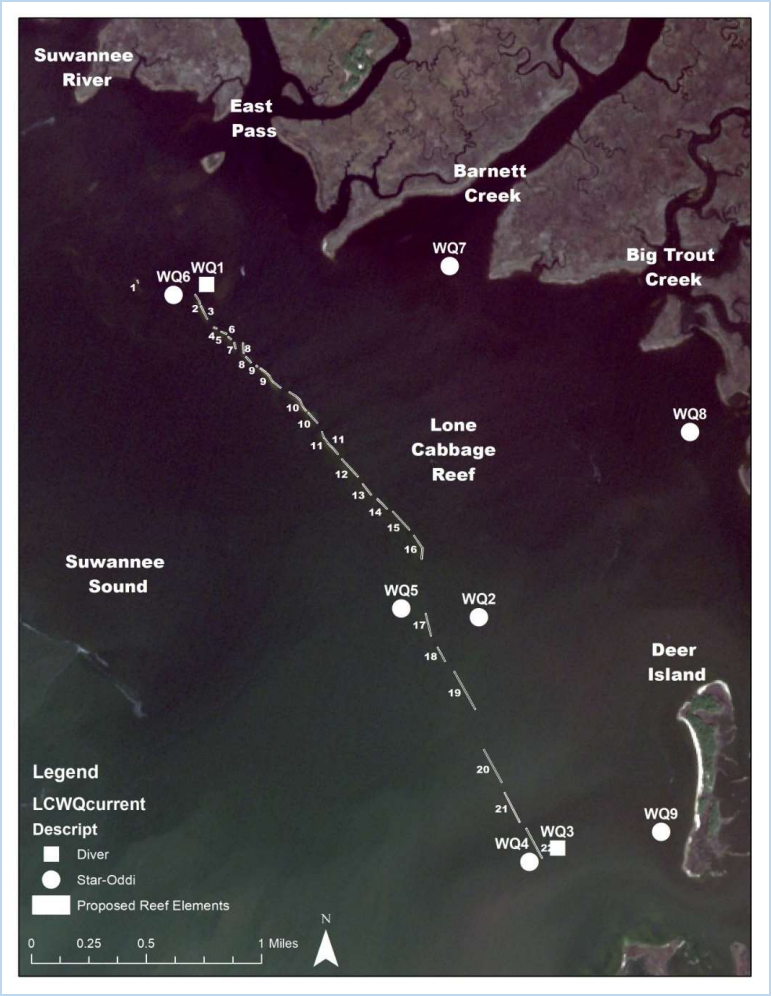
Monitoring Efforts: Water Quality

- **Will reef construction affect hydrologic regime?**

- **<u>Continuous recorders:</u>**
  - Nine sensors deployed August 2017
  - Hourly: Salinity, Temperature, Depth

- **<u>Water Chemistry (UF funded):</u>**
  - Monthly: chlorophyll, N, P, color, turbidity

- **<u>In Progress:</u>**
  - Compilation of Cooperator WQ Data
    - *FWC, FDACS, Dr. Tom Frazer*
  - Exploring river discharge/salinity relationships (USGS)



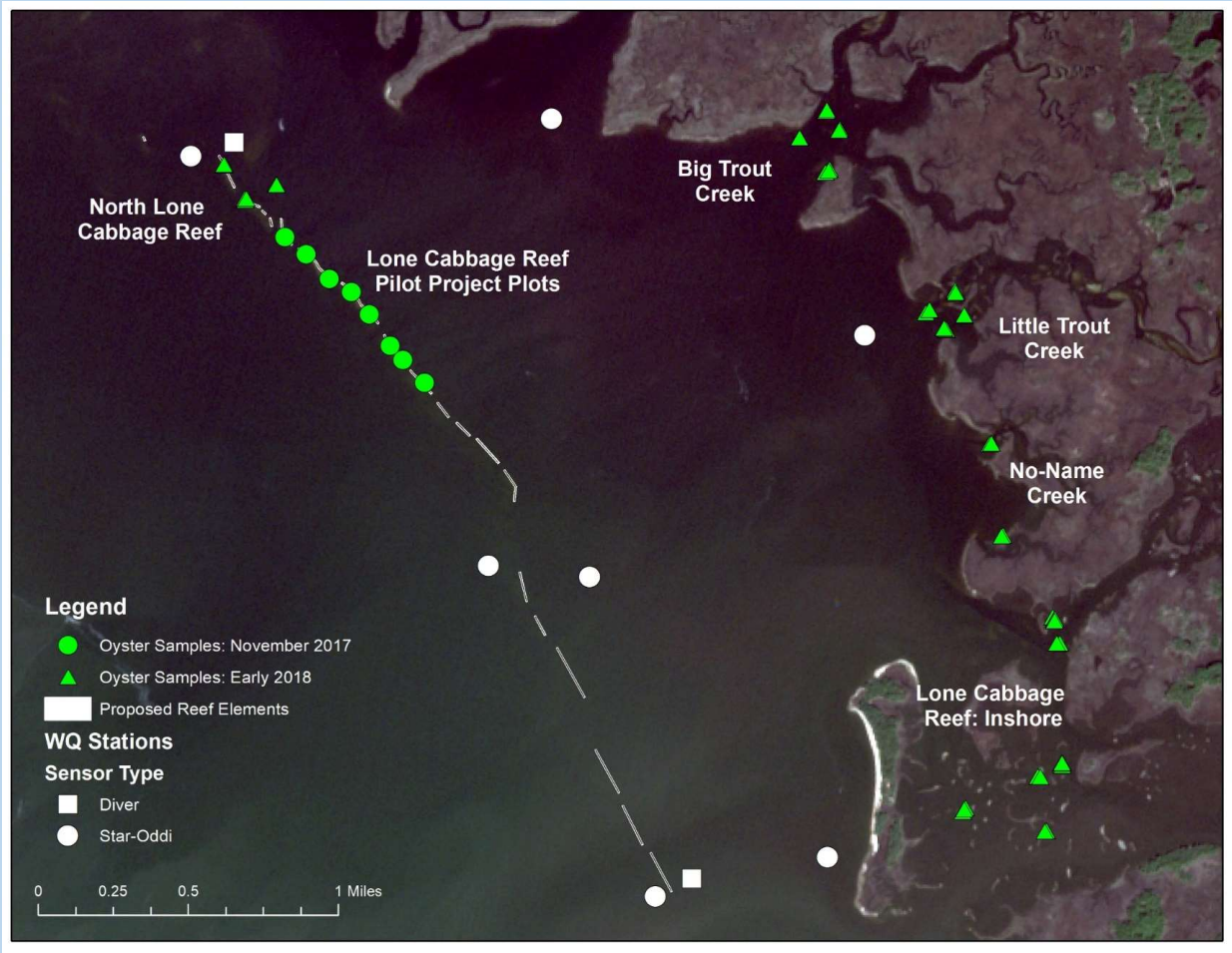
Monitoring Efforts: Oysters

- **Will reef construction affect oysters?**

- **<u>Intertidal Reef Metrics:</u>**
  - Live/Dead oyster density (Annual)
  - Oyster height distribution (Annual)
  - Recruitment (Monthly)

- **<u>Continue/Expand Pilot Project Methods:</u>**
  - Surface Quadrats
  - Belt Transects
  - PLUS Tile Spat Collectors

- **<u>Compile with our historic data</u>**

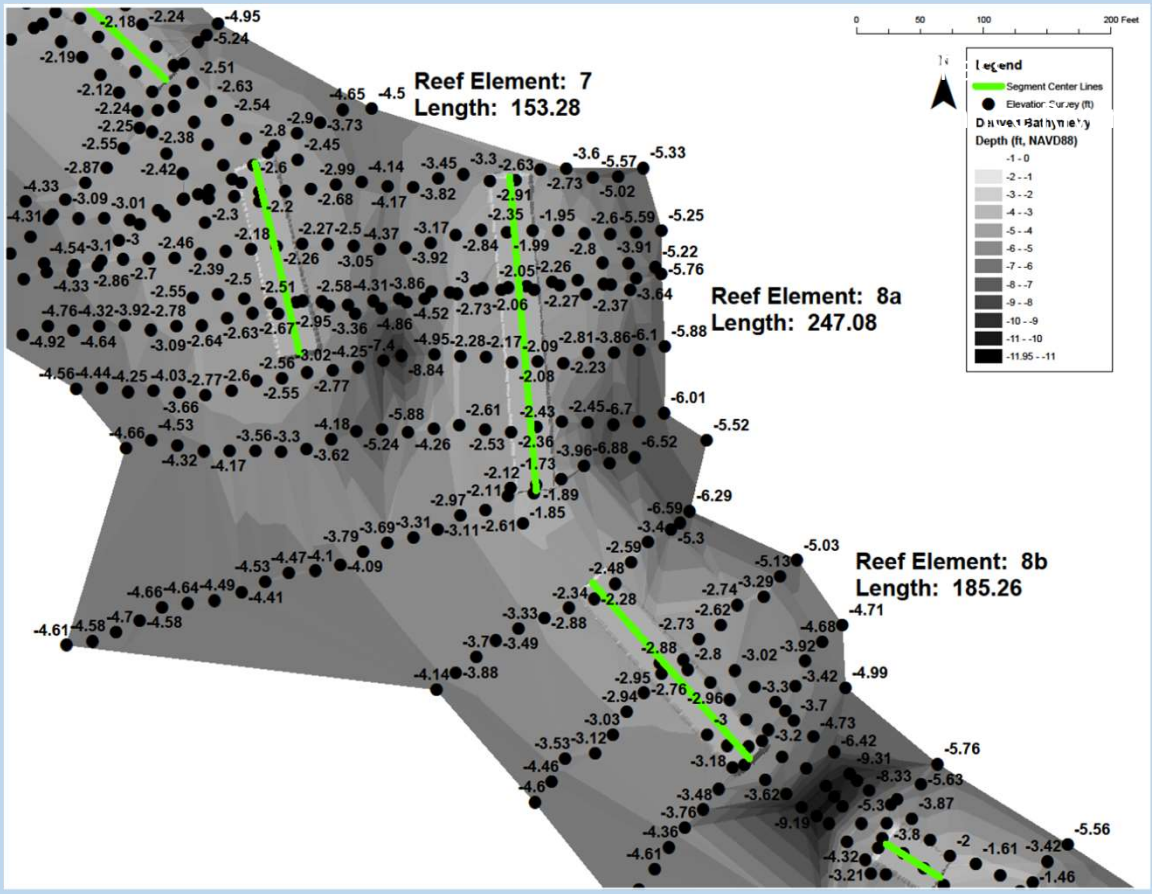


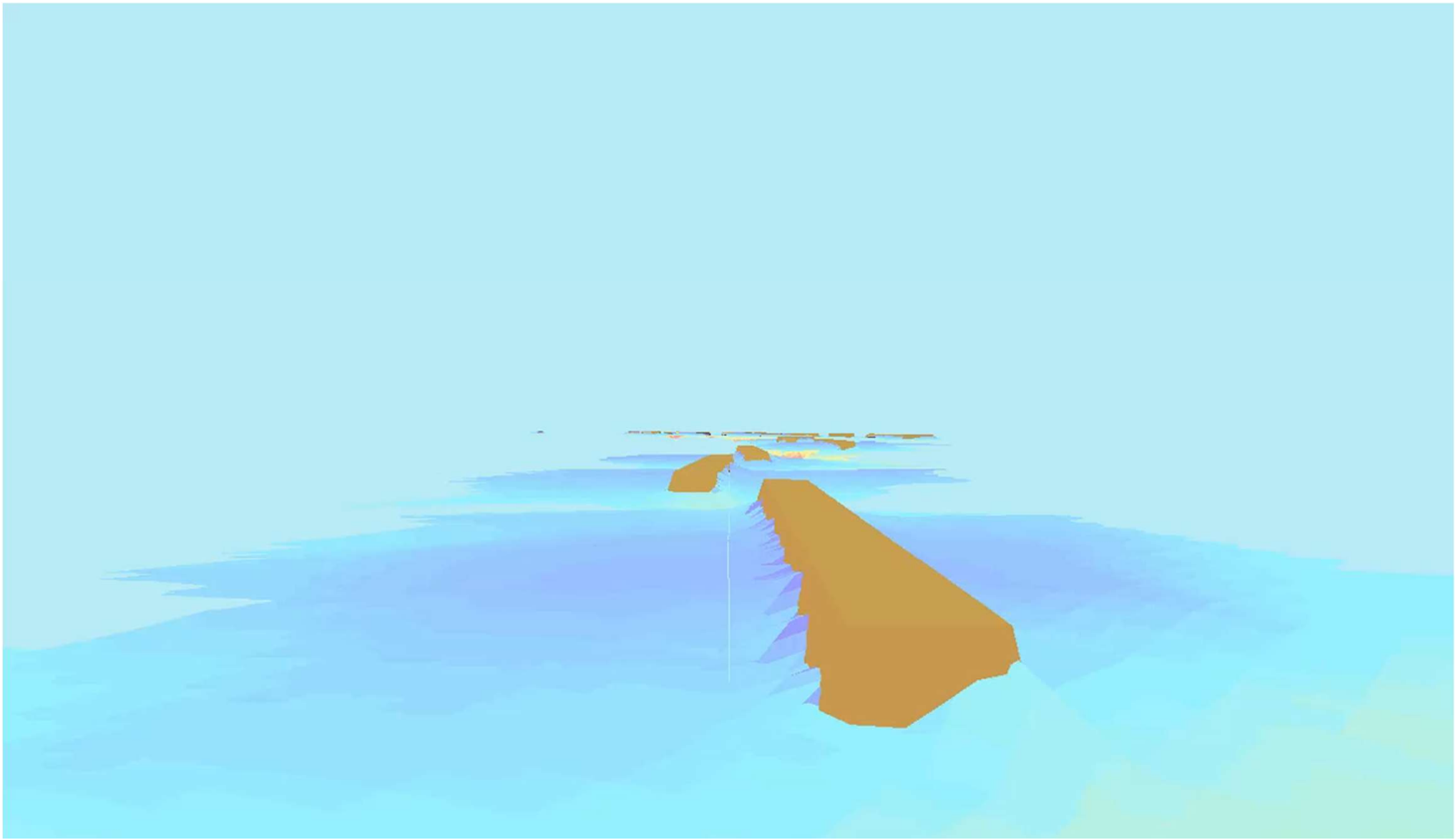
Monitoring Efforts: Elevation/Bathymetry

- **Project Reef Criteria**
  - Intertidal (-1.45ft NAVD88)
  - 3:1 slope

- **Surrounding Reef Change**
  - Average Reef Height
  - Oyster Density/Size Dist. and Elevation Relationship

Credit for 3D-work:
Joe Aufmuth



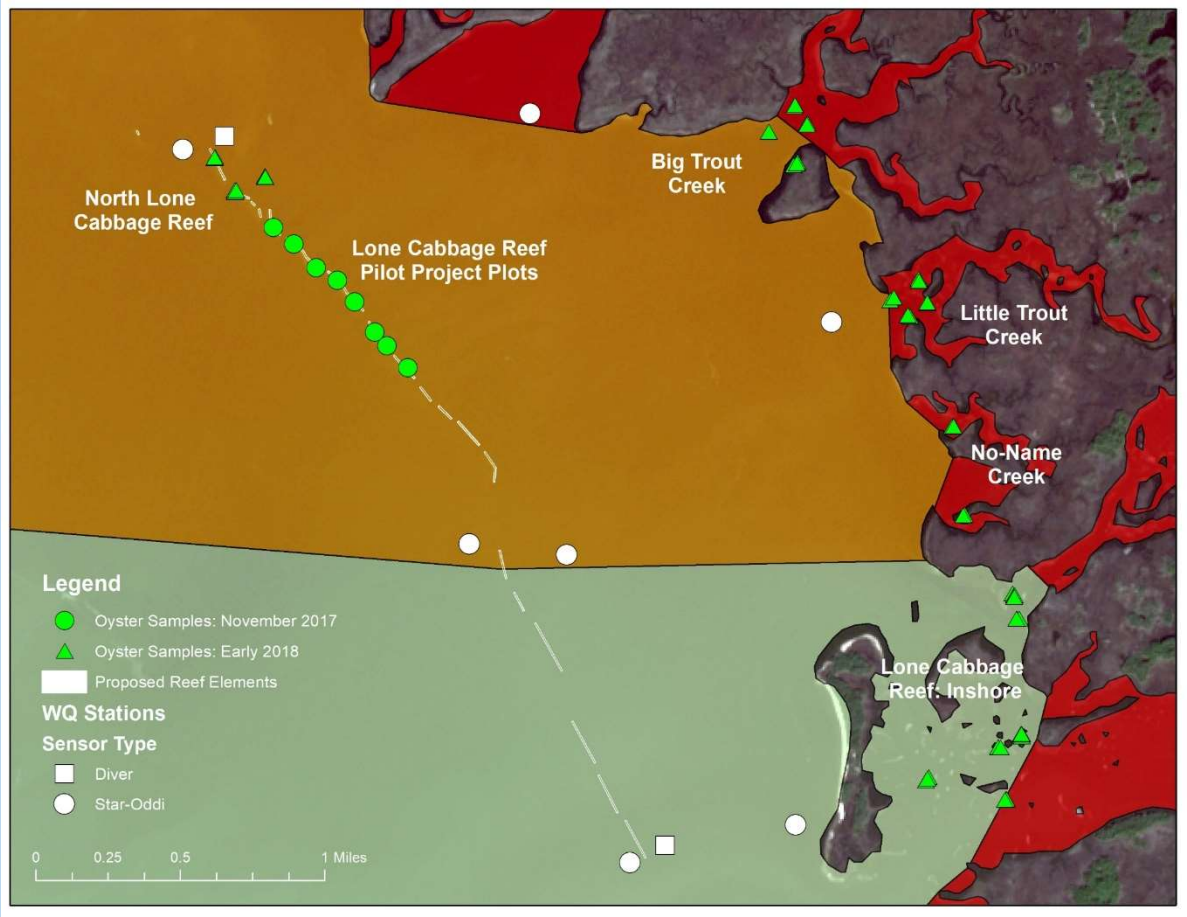


Varying Productivity in Tidal Creek Reefs

Monitoring Efforts: WISH LIST

- **Mapping:**
  - Intertidal/Subtidal Habitats
  - Geomorphologic Change
- **Sampling:**
  - Subtidal oyster
  - Benthic Macroinvertebrate
  - Nekton
  - Bird
- **Modeling:**
  - Elucidate oyster population response to hydrologic change and harvest
  - Intertidal and subtidal reef building dynamics and collapse thresholds
- **Engage Cooperators:**
  - **Potential large scale ecologic impacts**
  - Relate to/inform other oyster restoration projects

Reef Construction Scheduled: July 1, 2018



Thank You

More Information:
http://www.wec.ufl.edu/oysterproject/restoration.php
stevenbeck@ufl.edu

Lone Cabbage Reef Pilot Project Plot
November 2017