Tonging Surveys & Oyster Abundance Across the Bay

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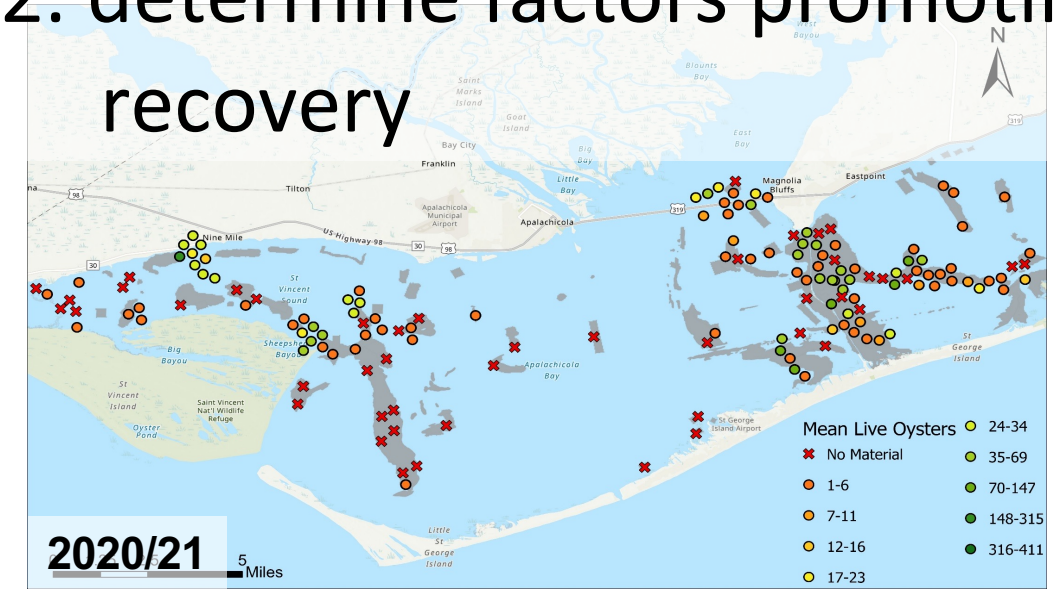
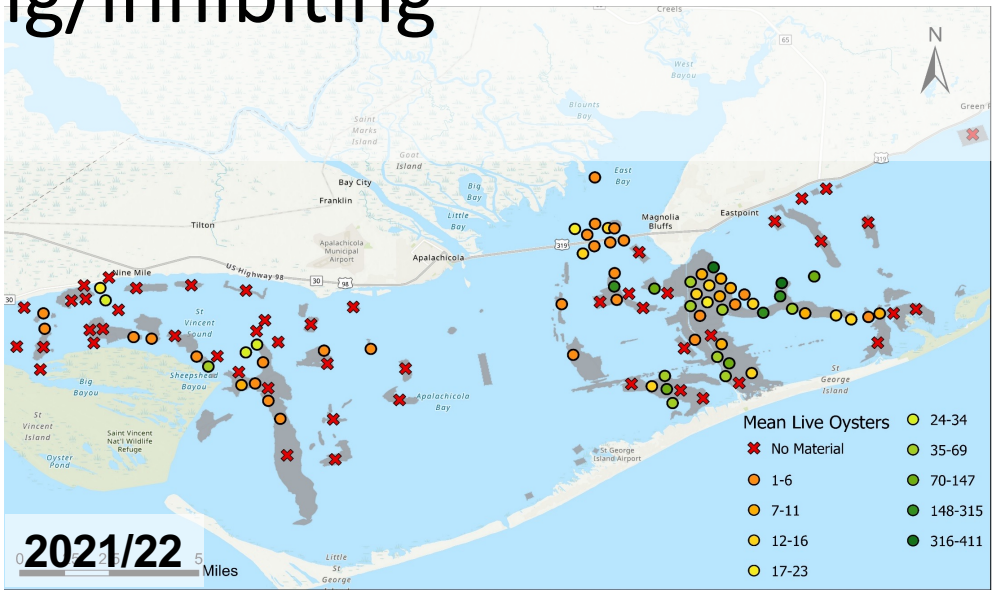
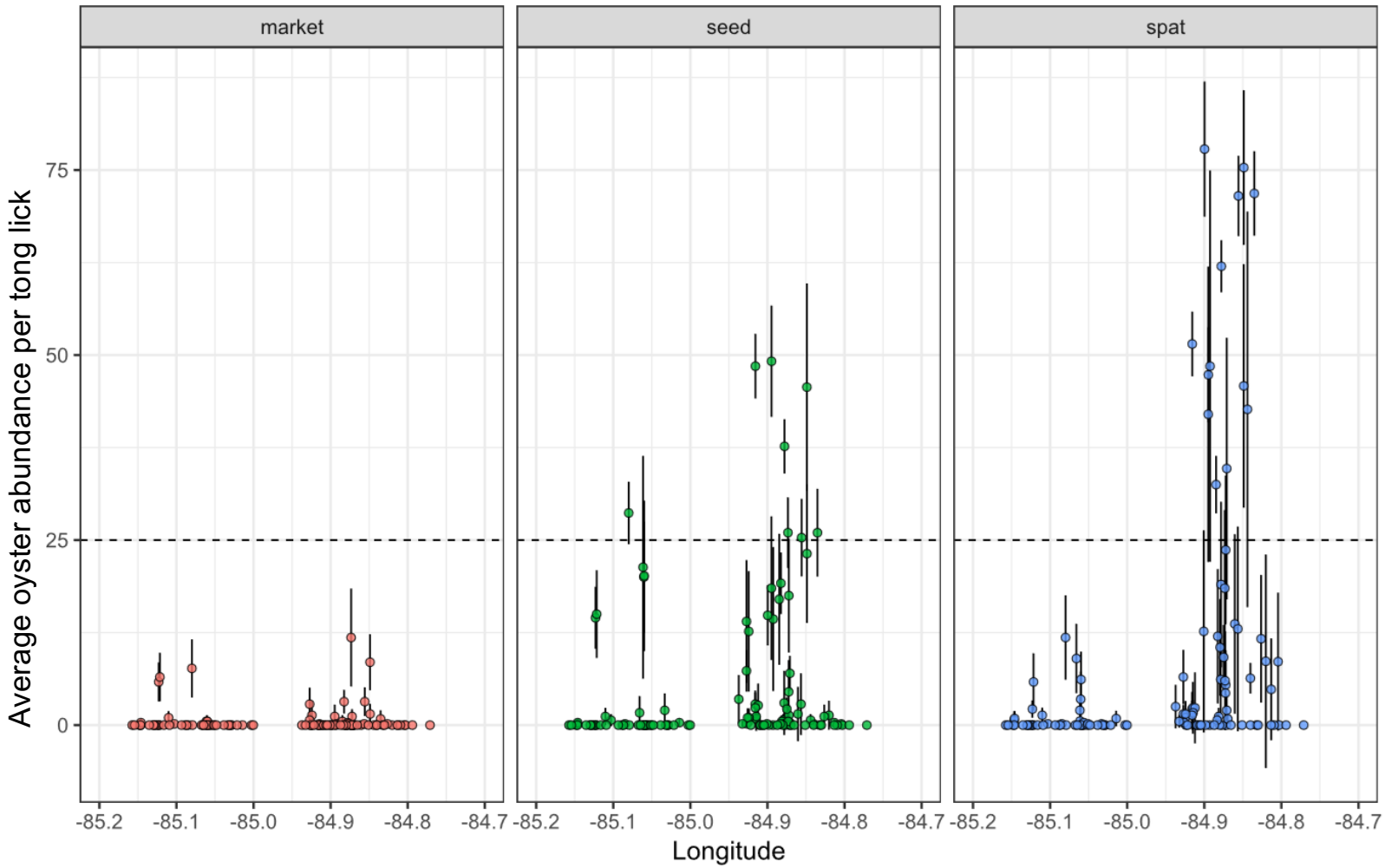
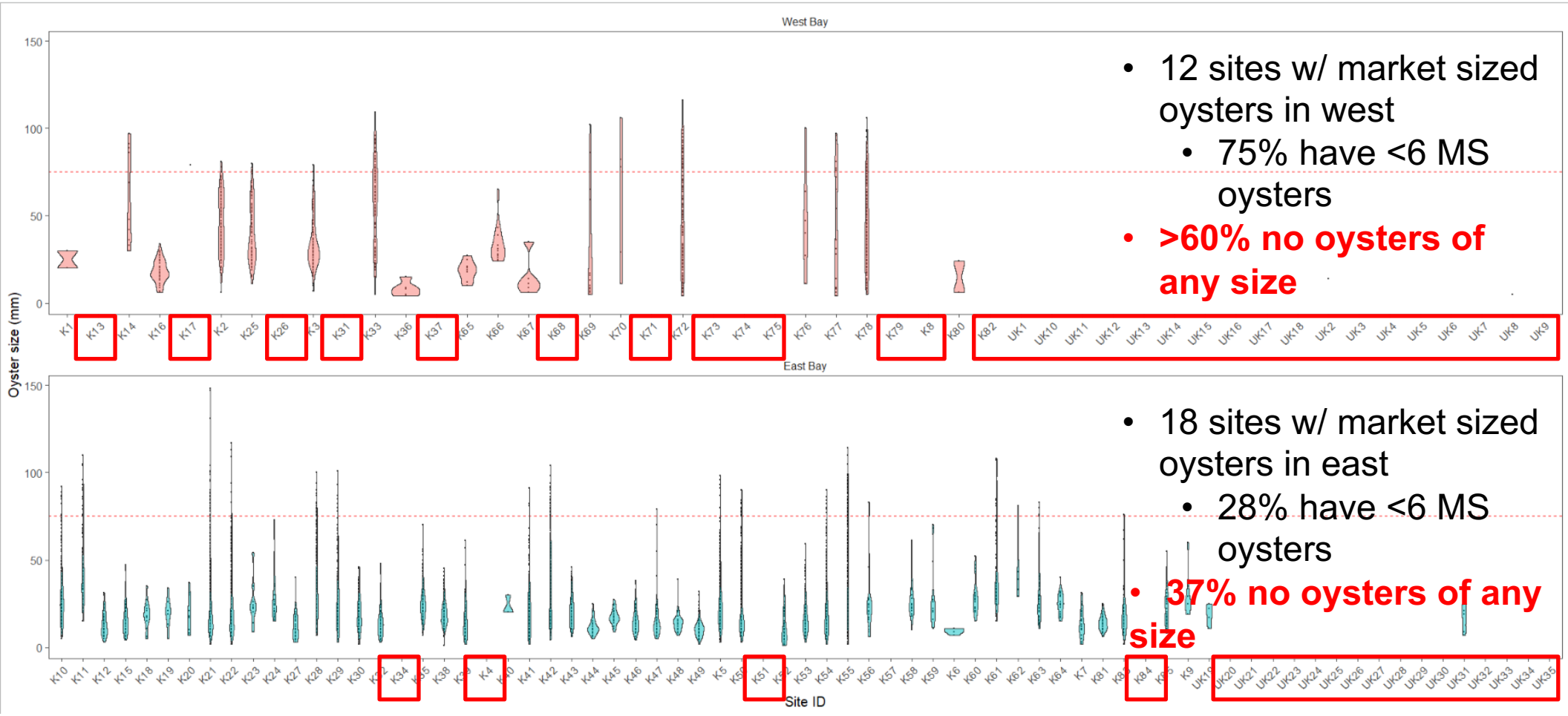
- Rapidly assess population status.
- Identify areas of the bay doing well/poorly to:

1. target potential restoration locations
2. determine factors promoting/inhibiting recovery



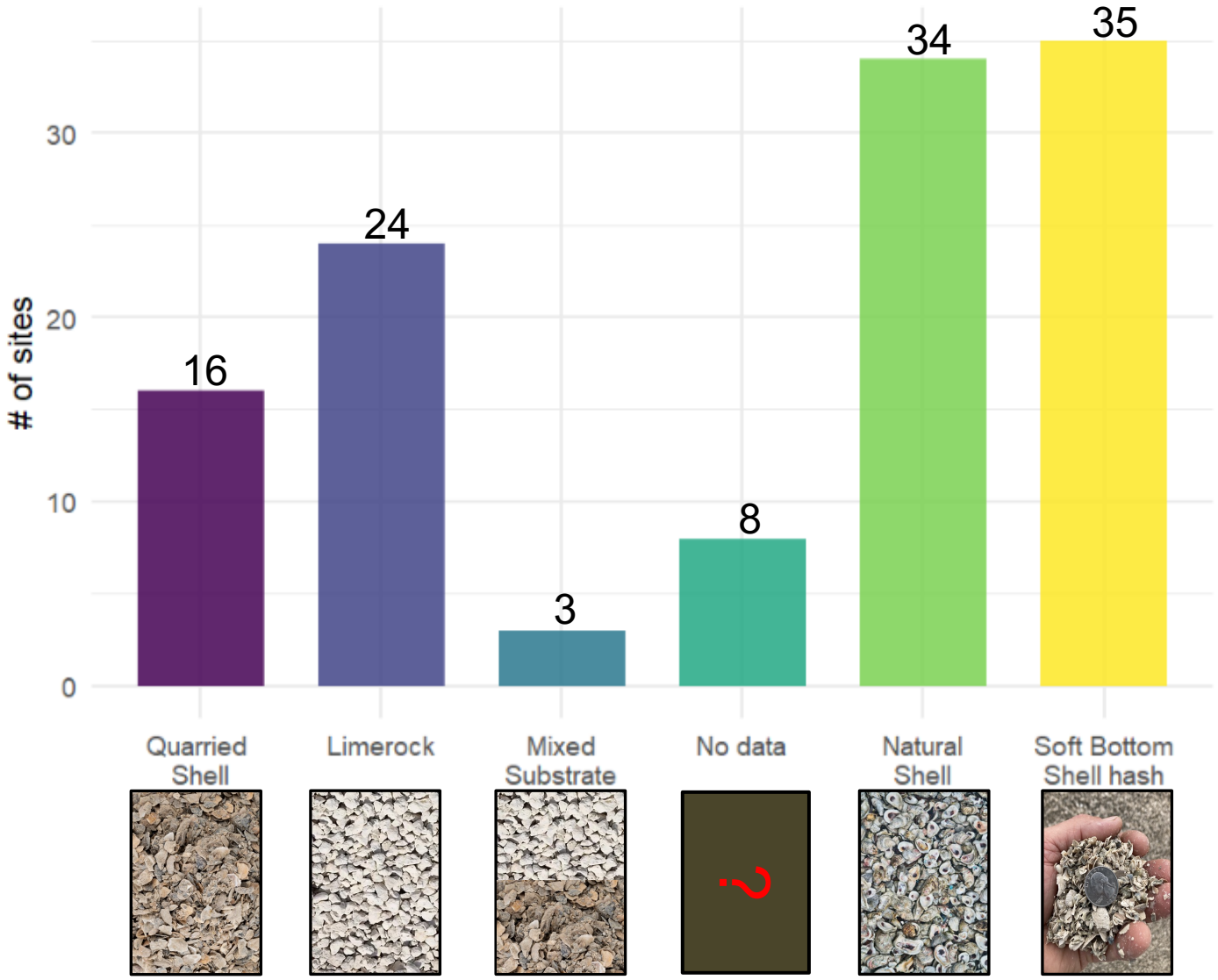


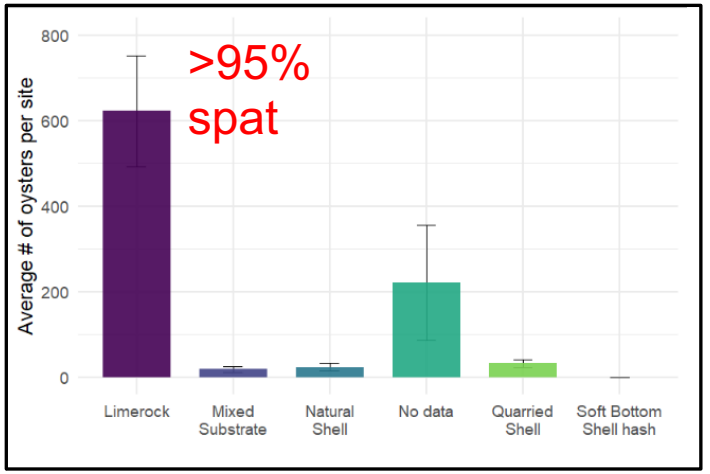

market
seed
spat
Average oyster abundance per tong lick
75
50
25
0
-85.2
-85.1
-85.0
-84.9
-84.8
-84.7
Longitude



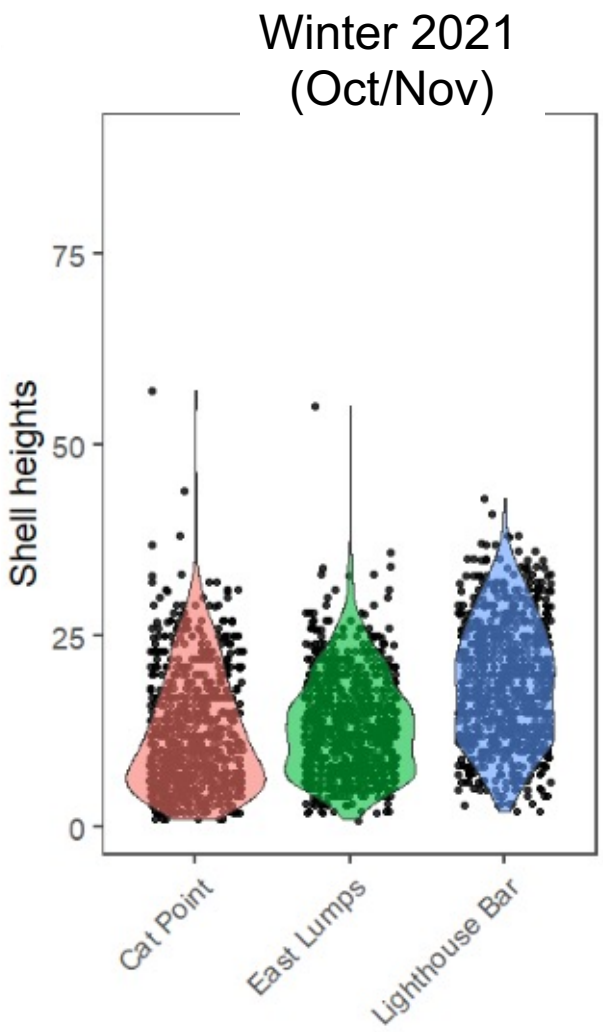
- 12 sites w/ market sized oysters in west
  - 75% have <6 MS oysters
- **>60% no oysters of any size**

- 18 sites w/ market sized oysters in east
  - 28% have <6 MS oysters
- **37% no oysters of any size**





32% of locations on targeted bars lack substrate suitable for oyster settlement


Winter 2021
(Oct/Nov)
Shell heights
75
50
25
0
Cat Point
East Lumps
Lighthouse Bar

Parasitism and Disease Research

Tara Stewart Merrill, Ph. D.
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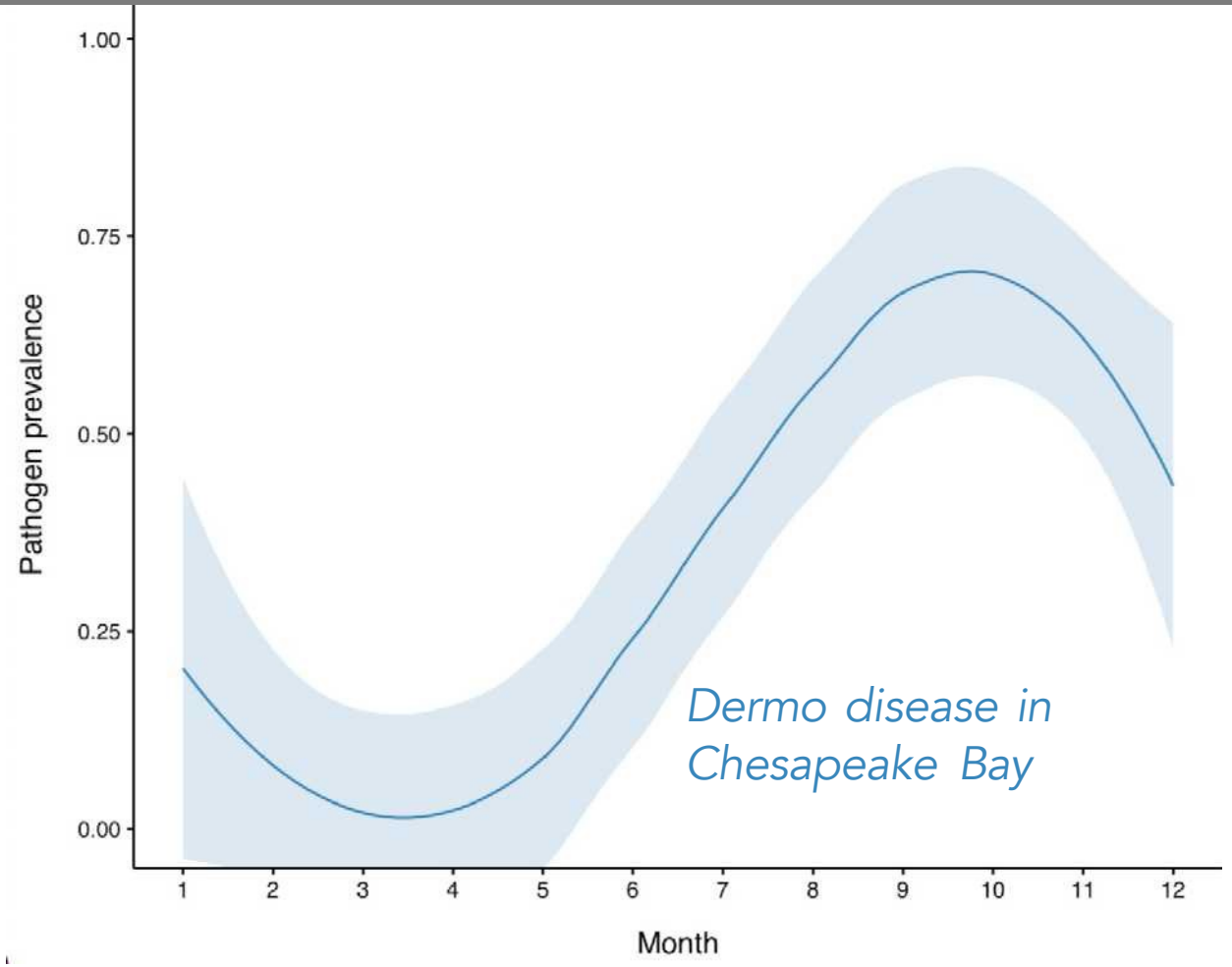
Parasitism and Disease

Withering syndrome
Local extinction of Black Abalone
from Southern California

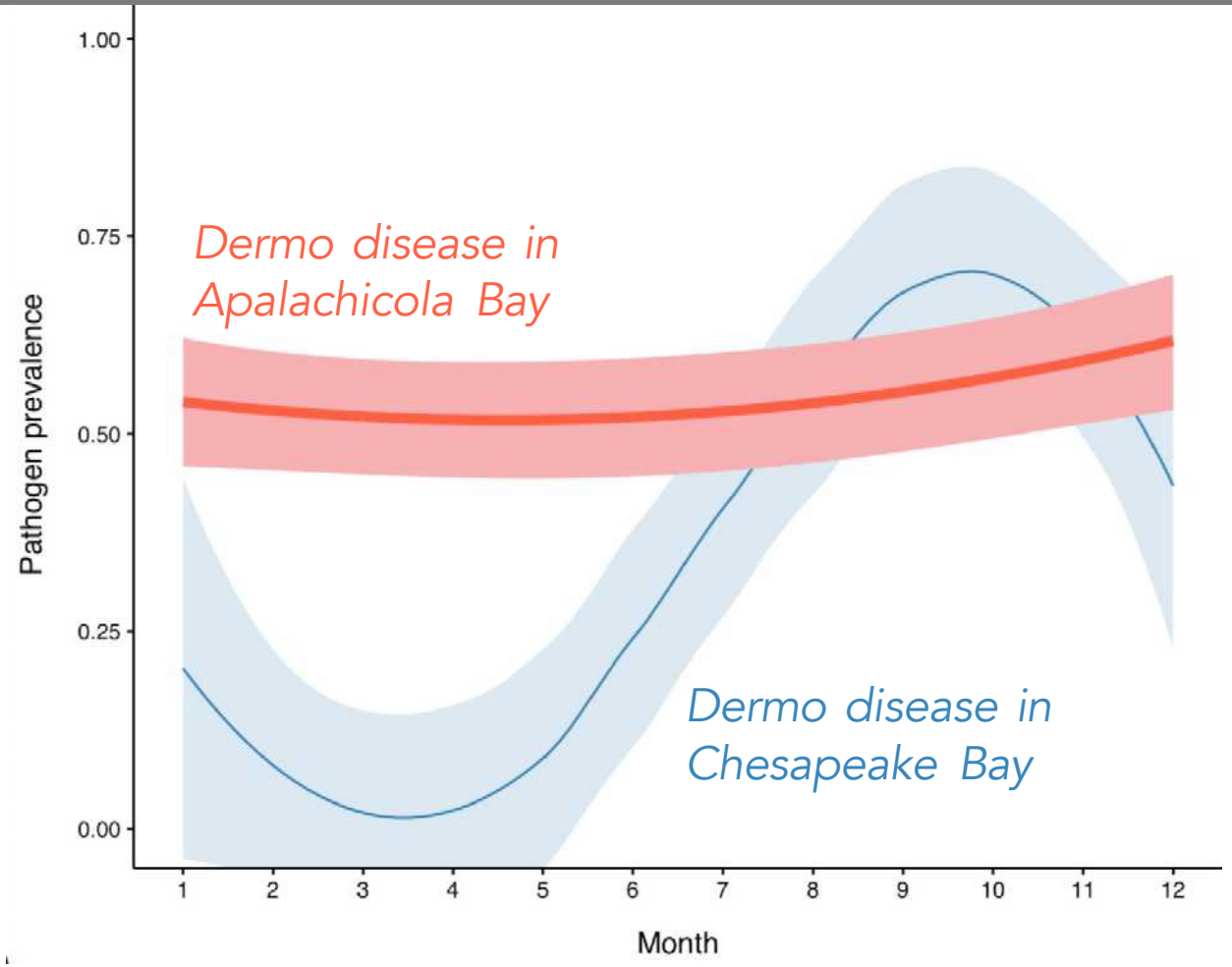
Haplosporidium
Imminent extinction of the
Fan Mussel in the Mediterranean

Dermo disease
Mass mortalities in
Eastern oysters
of the Eastern seaboard...
What about Apalachicola?

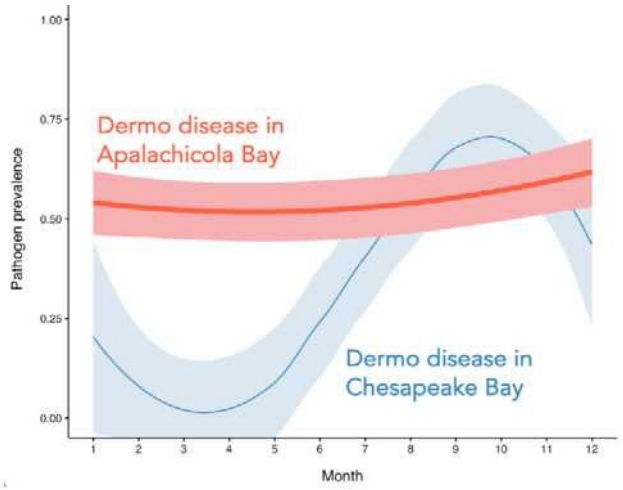
A motivating pattern



A motivating pattern



A motivating pattern



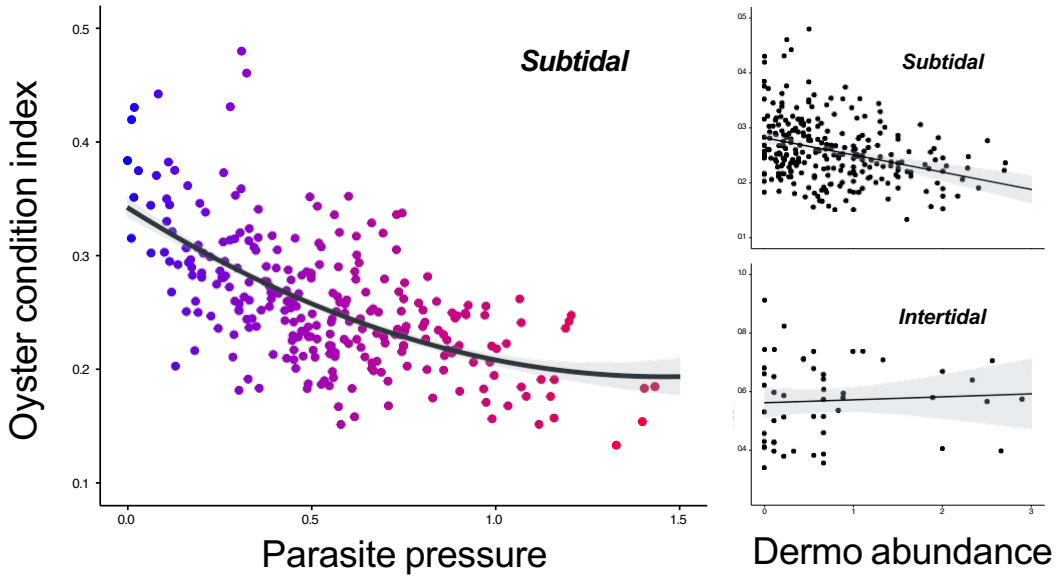
Why are the disease dynamics so different?

What does this difference tell us about the nature of the host-pathogen interaction?

What does this mean for disease impacts *now* and into the *future*?

Disease and oyster condition

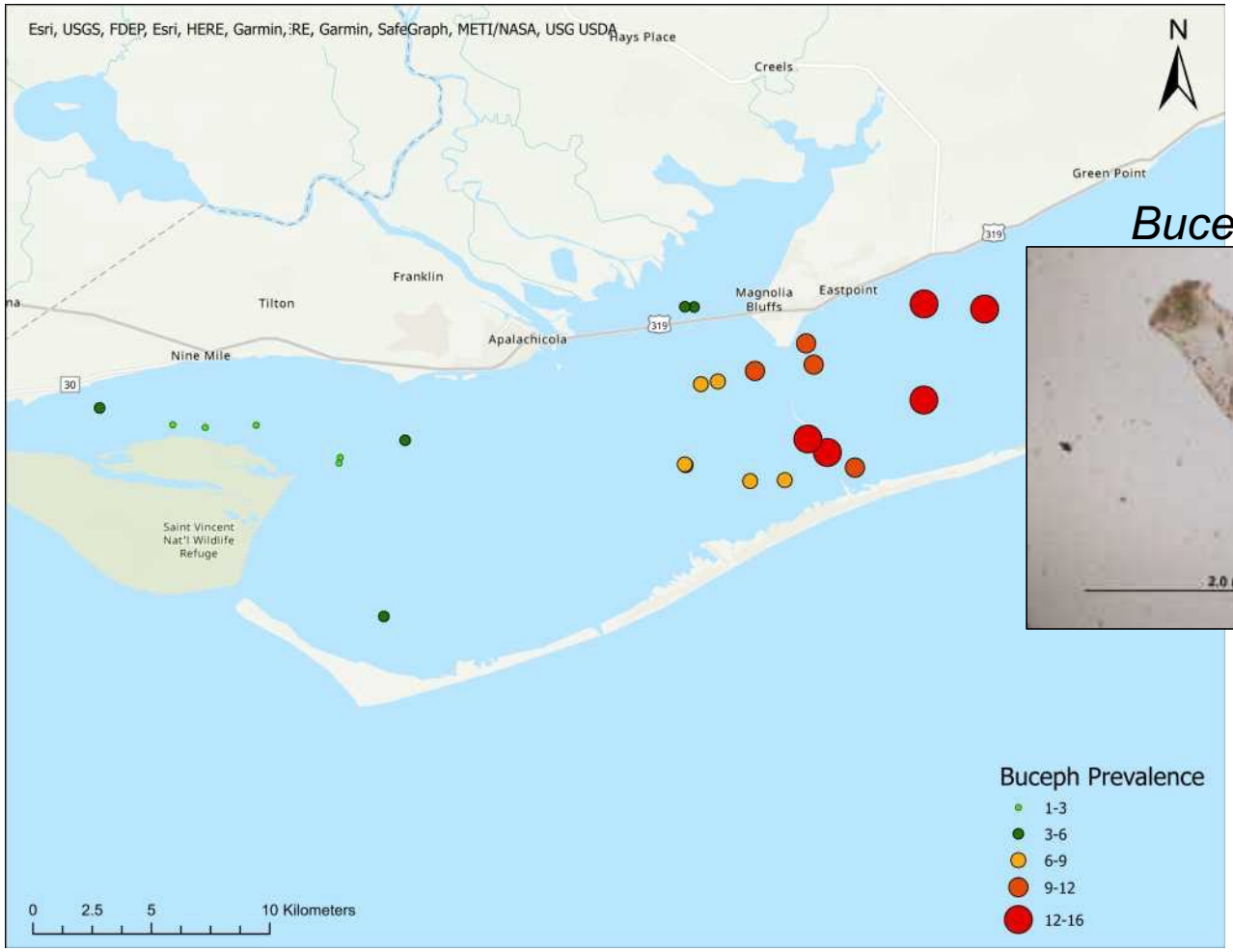
Analyzing FWC data from 2016 to the present to assess epidemiological patterns



Emphasis on:

Timing of infection and seasonality, environmental drivers of transmission, effects of disease on oyster populations (condition and survival)

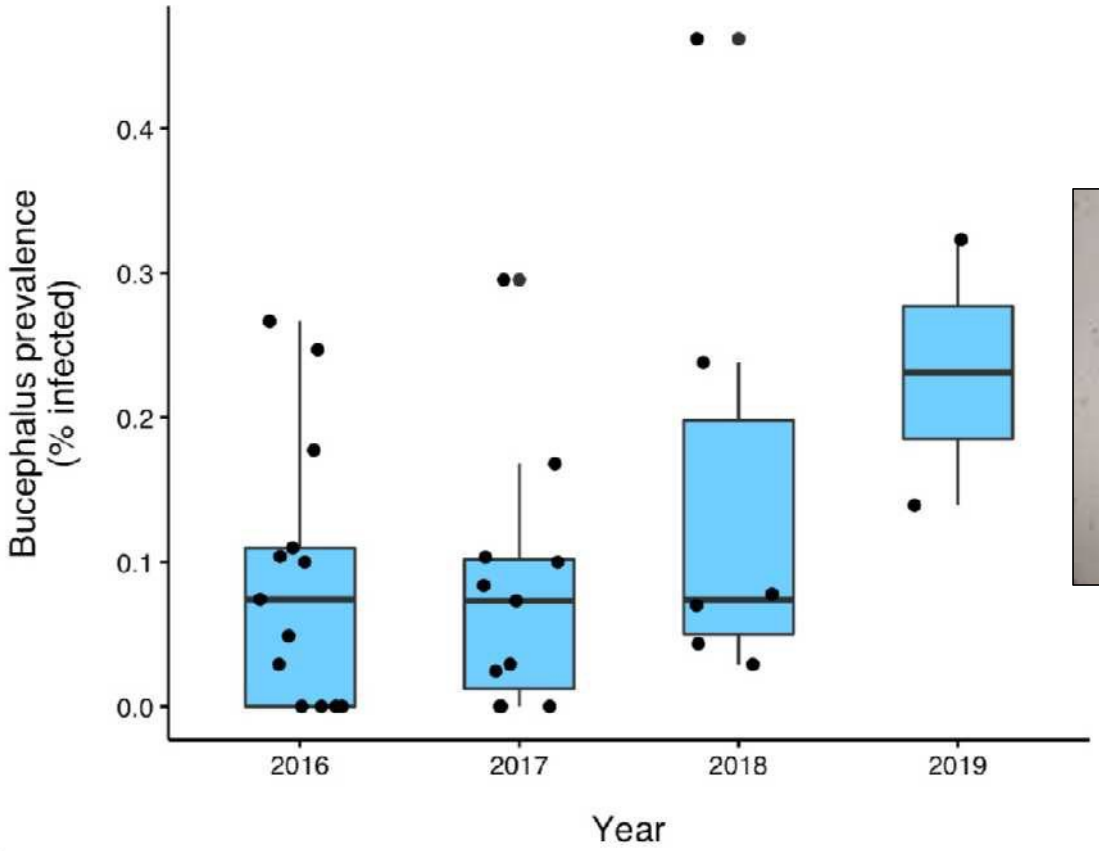
Trouble from parasitic castrators!



Bucephalus sp.

Lives in the oyster gonad and castrates the oyster – a spawning problem

Trouble from parasitic castrators!



Bucephalus sp.

Lives in the oyster gonad and castrates the oyster – a spawning problem

Approximately 10% of collected oysters, on average, are infected

Oysters, Sediment Biogeochemistry, and Apalachicola Bay Health

Josh Breithaupt, Ph. D.
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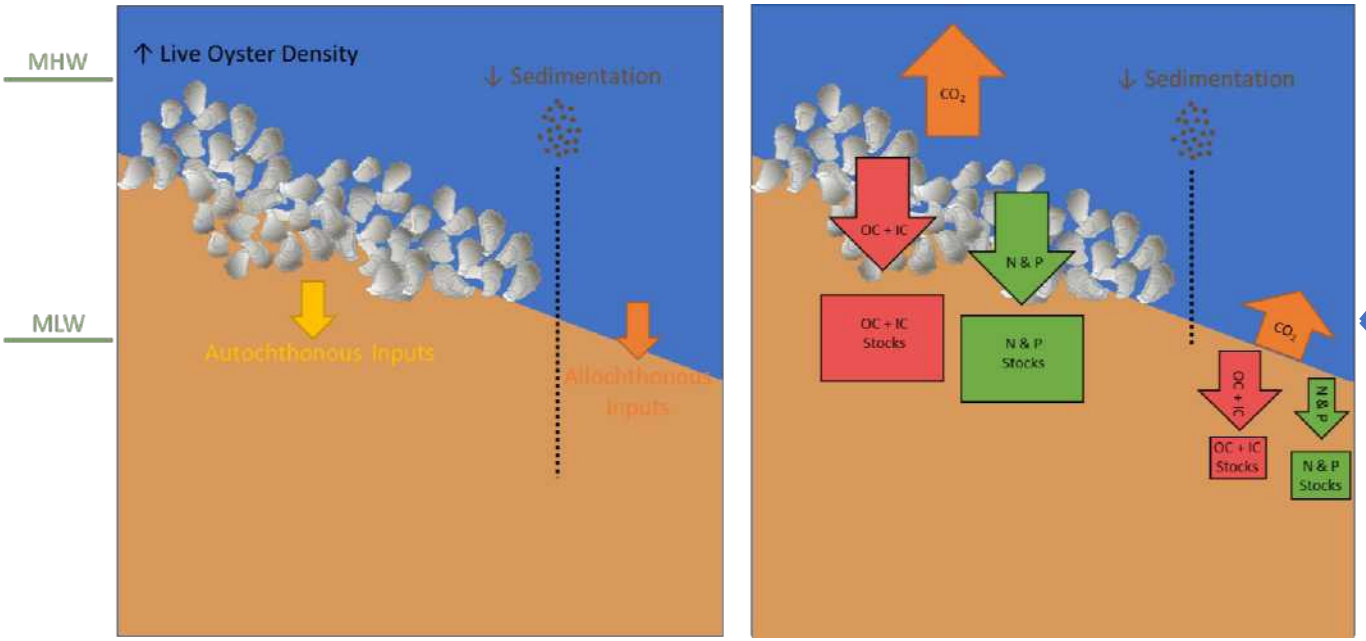
FSU

Oysters filter organic matter from the water and concentrate it in sediments (SOM).



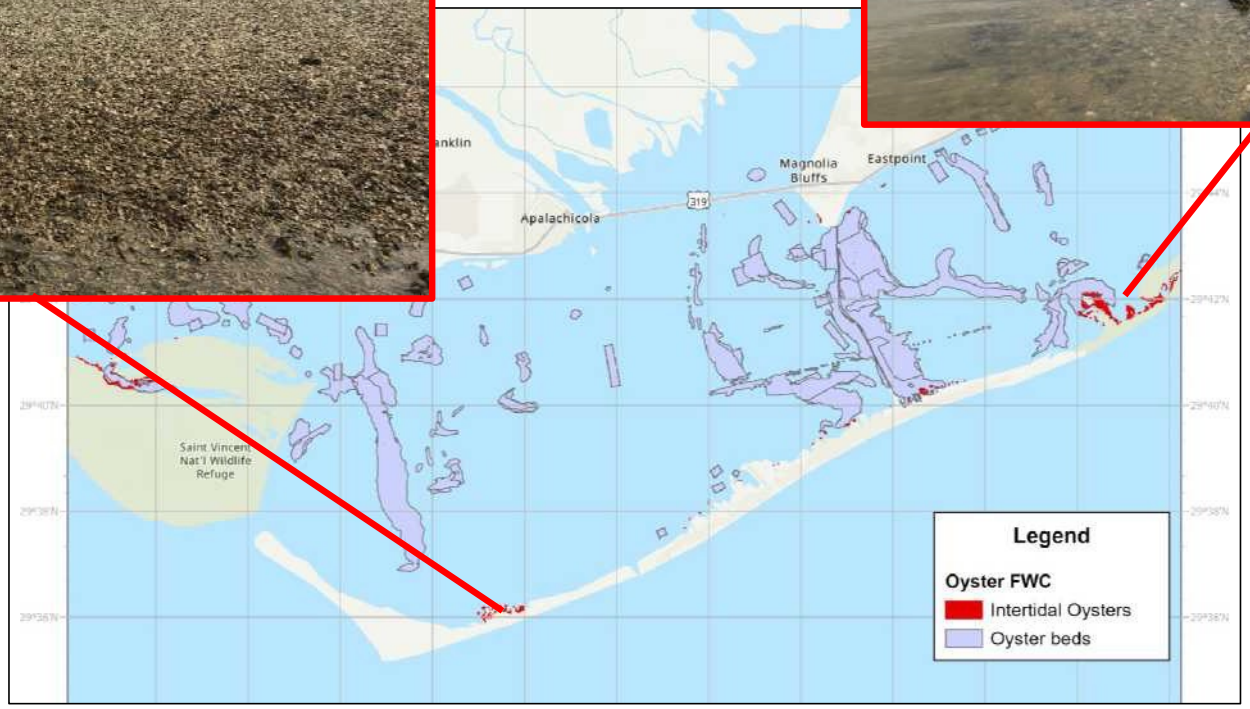
Q1: What is the history of SOM sequestration on reefs?

Q2: What happens to the Bay when the oysters are gone?

Intertidal reef health varies substantially within the region.

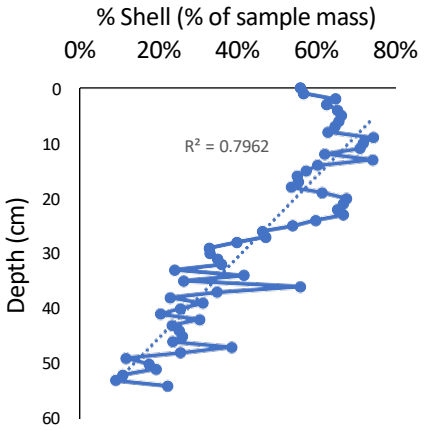
Pilot's Cove

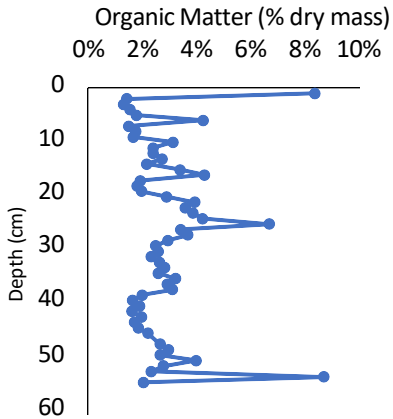
East Cove

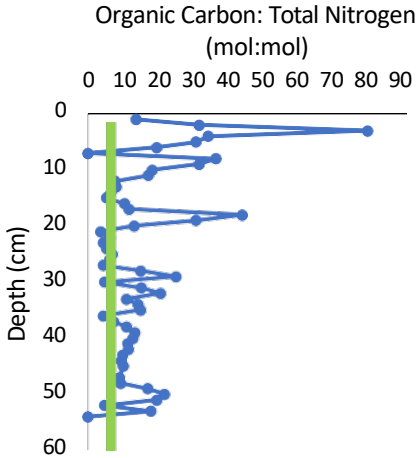


Q1: how does oyster abundance affect reef sediment organic matter characteristics?

- Organic matter quantification & characterization
- Grain size & shell abundance analysis
- Pb-210 dating
- Comparisons with ABSI oyster cluster density maps
- Can SOM be used as a non-destructive sampling proxy for live oyster abundance?





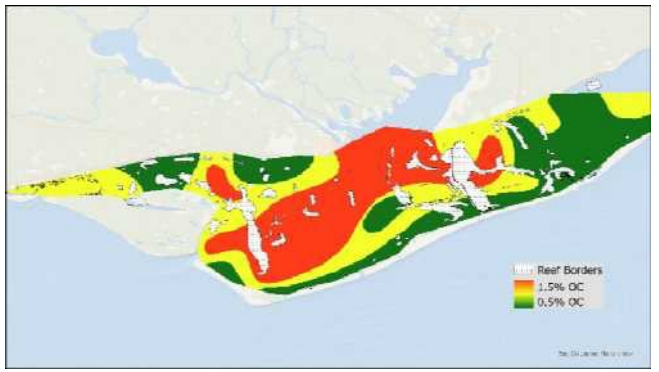


Q2.1: how has collapse of the oyster population affected the health of the Bay?

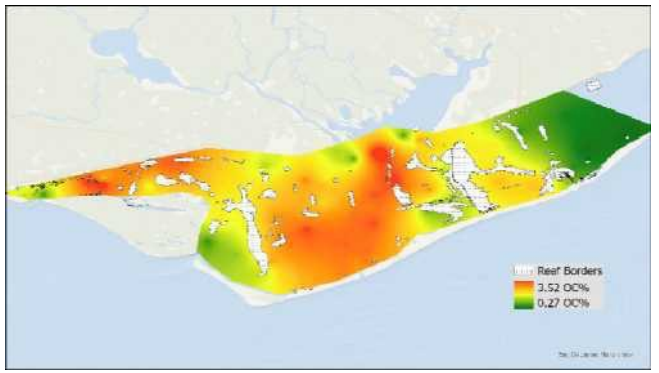
	TOC (mg g^{-1}) ≤10	10–35	>35
Mean $E(S_{10})$	5.3 (171)	4.2 (68)	2.4 (50)
Percent samples with degraded benthos (B-IBI score 3; sensu Van Dolah et al. 1999)	7.6% (170)	54% (67)	78% (50)
Percent samples with high chemical contamination of sediments (mean ERM quotient > 0.058, sensu Hyland et al. 1999)	3.5% (171)	31% (68)	90% (50)
Percent samples with low DO in near-bottom water (DO < 2 mg l^{-1}, sensu Diaz & Rosenberg 1995)	0.6% (170)	4.5% (67)	24% (50)

Declining benthic species richness

Hyland et al. 2005

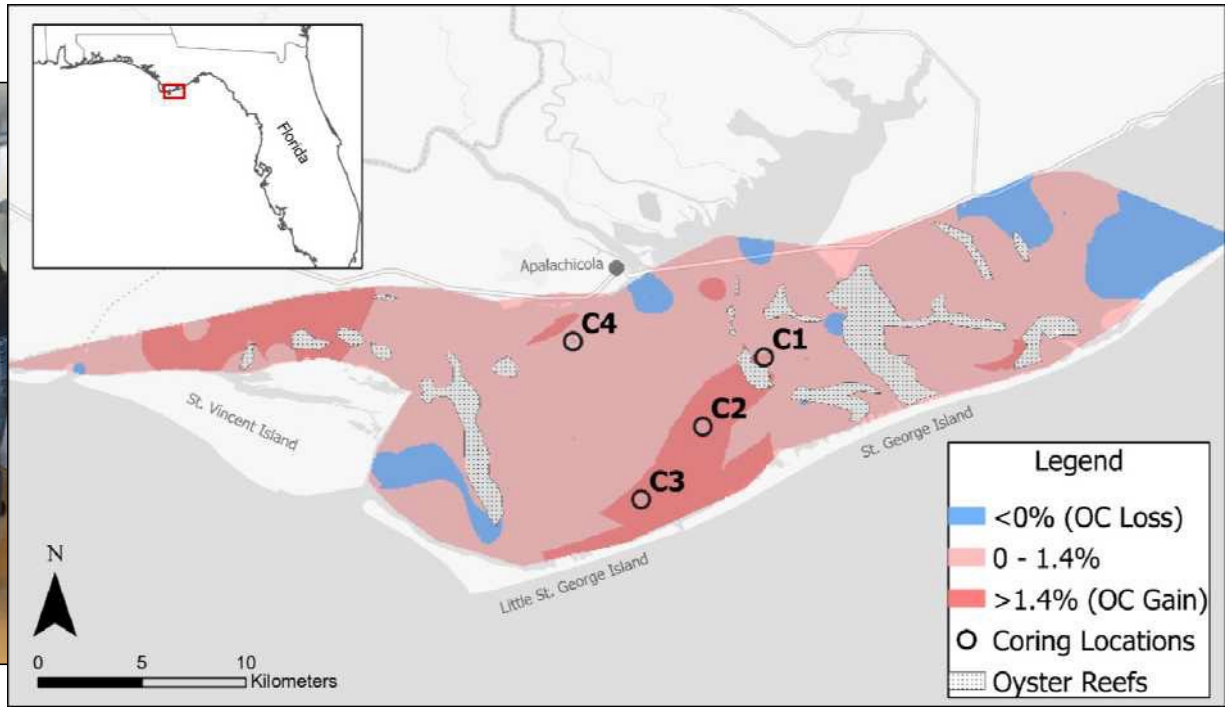


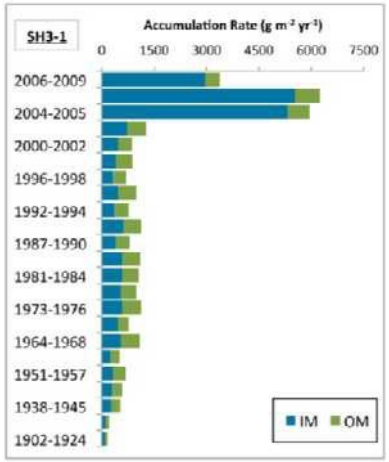
Kofoed & Gorsline 1963

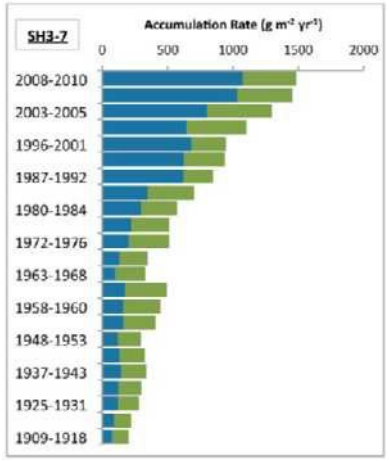


2021 Data

Q2.2: what is the timing and source of this organic enrichment of the Bay?







Breithaupt et al. 2014

Q3: What factors contribute to the “greening” of intertidal reefs by marshes and mangroves?