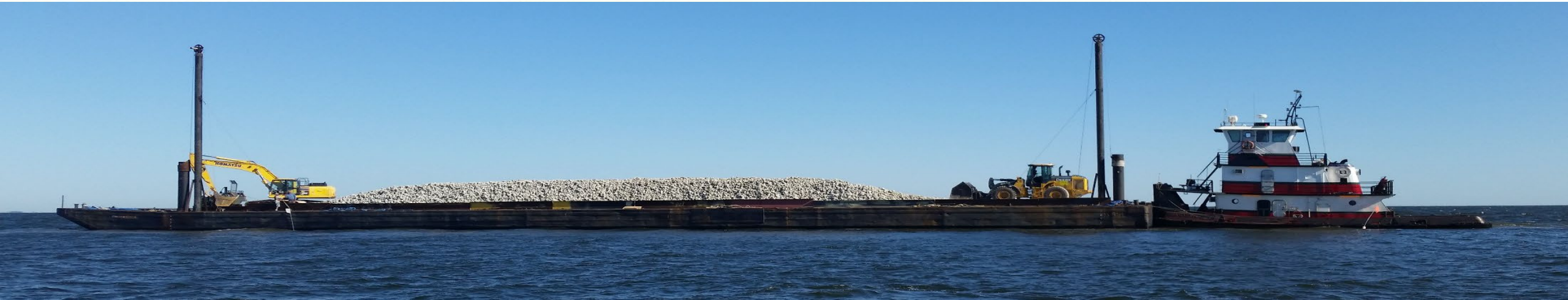
NCDMF Reef Building Programs

DEPARTMENT OF ENVIRONMENTAL QUALITY

Marine Fisheries

Jason Peters | November 8, 2023



Overview

- Organizational Structure
- Shellfish Rehabilitation Overview
  - Oyster Sanctuaries
  - Cultch Planting
- Artificial Reefs

Organizational Structure

Habitat and Enhancement Section

Enhancement

- Shellfish Rehabilitation
  - Oyster Sanctuaries
  - Cultch Planting
- Artificial Reefs

Aquaculture

- Shellfish Lease and Aquaculture

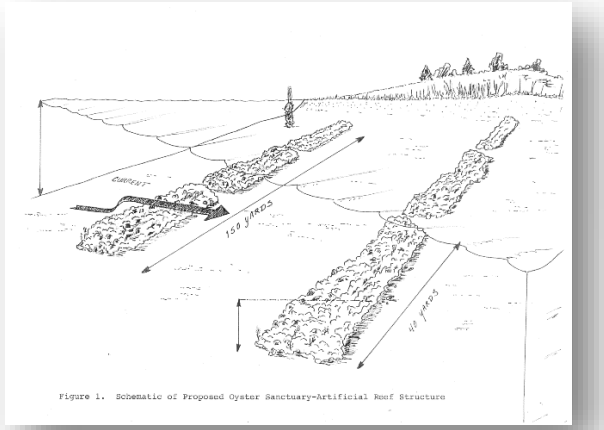
Habitat

- Coastal Habitat Protection
  - Habitat Permitting
  - Estuarine Benthic Mapping
  - CHPP

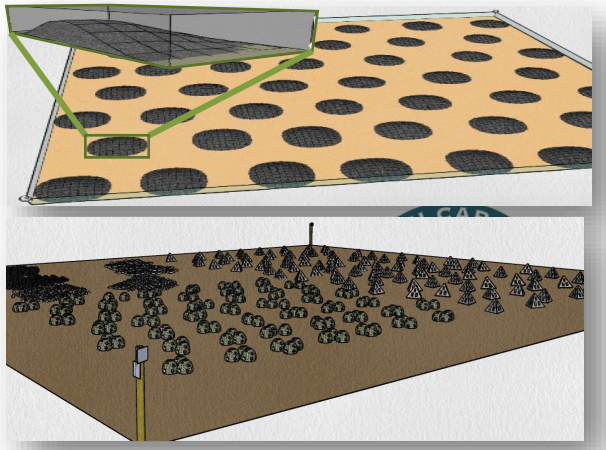
Shellfish Rehabilitation in NC: a two-part approach

Part 1: Oyster Sanctuaries (no harvest)

- Primary objective: supply viable larvae, system wide
- Area of focus – Pamlico Sound
- General design:
  - Large areas ~40-80 acres each
  - High relief habitat (2-6')
  - Ridges, mounds, patches
  - Large aggregate rock (5-12") or other materials



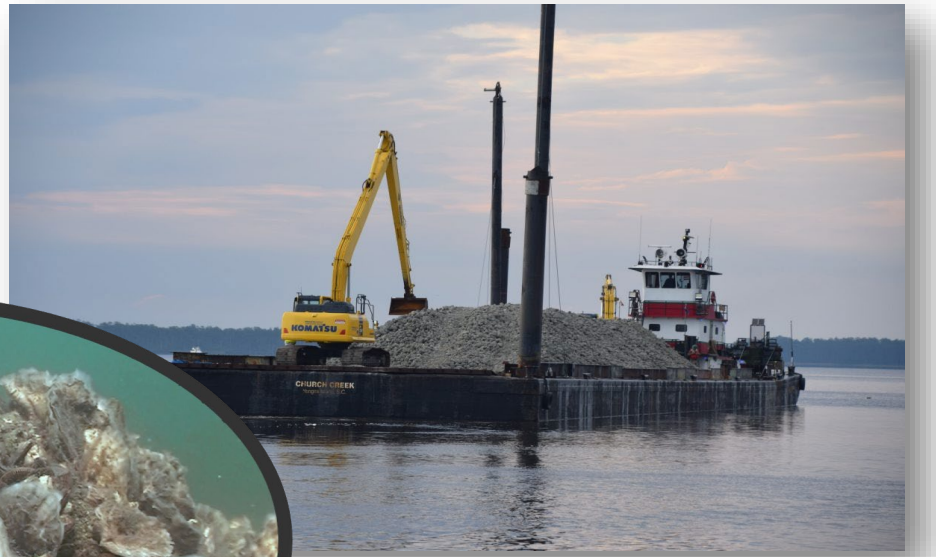
- Material types: Limestone marl, crushed concrete, granite, basalt, ERUs (engineered reef units), recycled concrete pipe, precast concrete

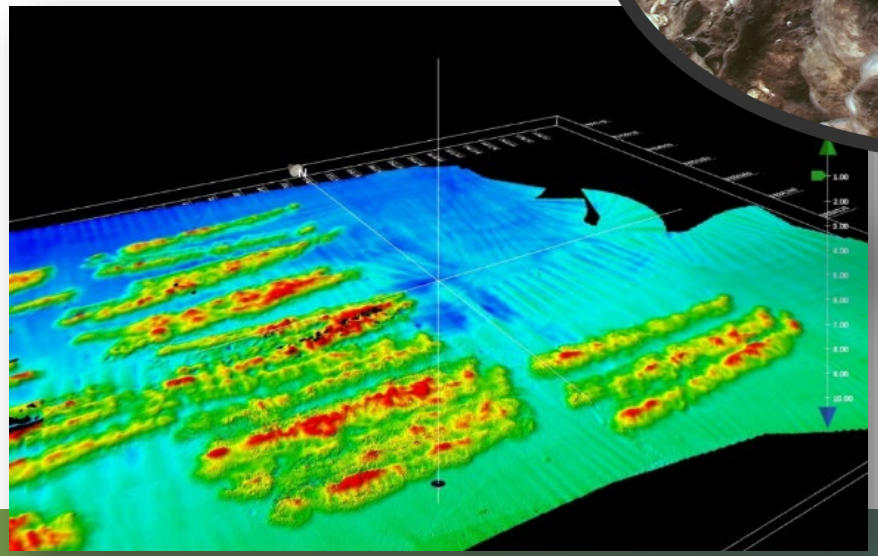


Where are Oyster Sanctuaries located?

Oyster Restoration in NC

Oyster Sanctuaries: How do we do it?

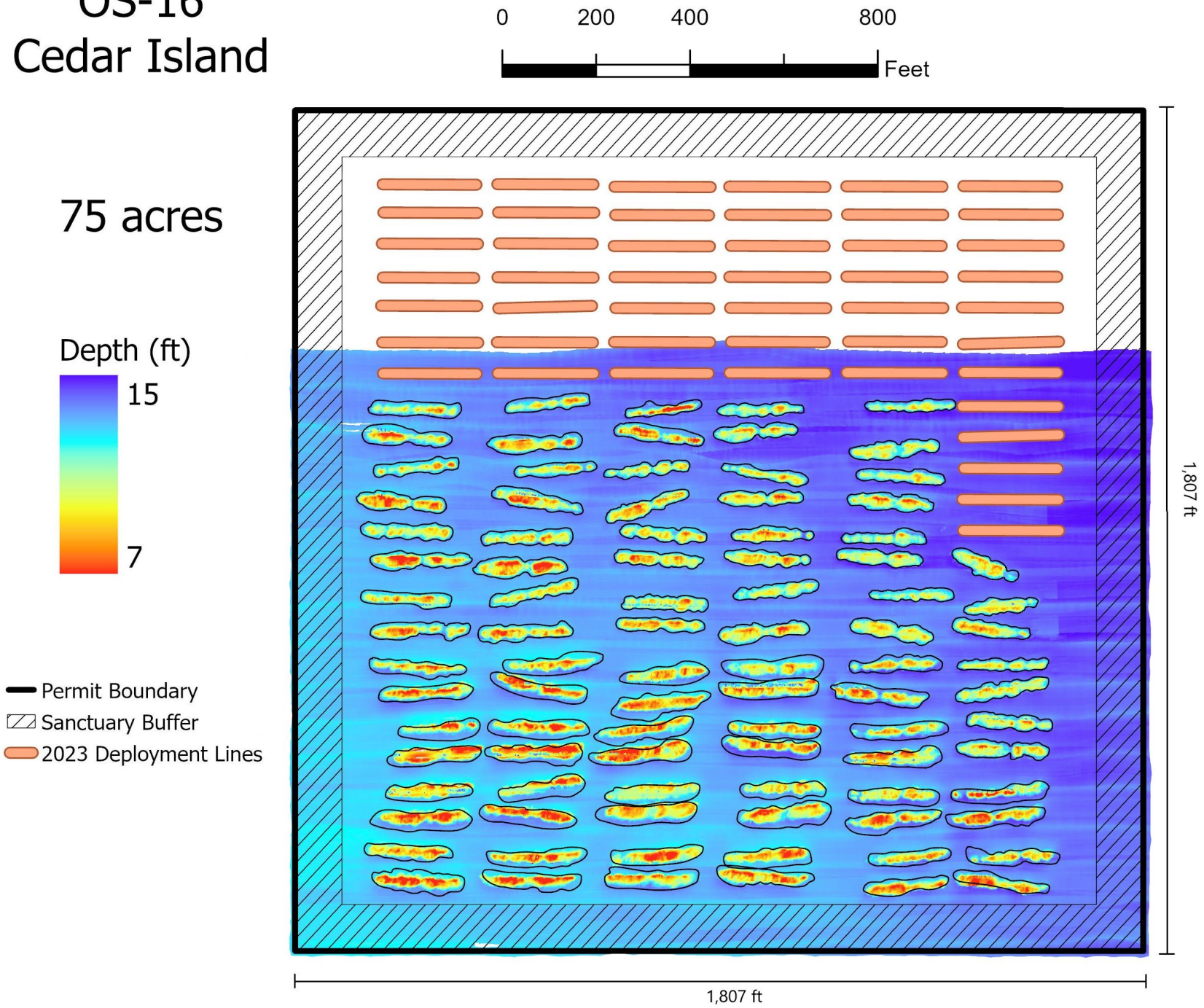




NORTH CAROLINA MARINE FISHERIES 1822 2022 CELEBRATING 200 YEARS OF MANAGEMENT AND CONSERVATION

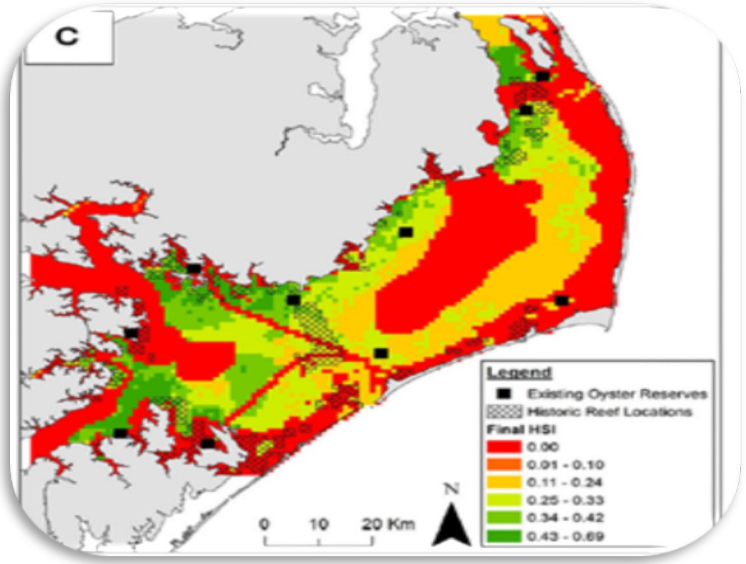
OS-16
Cedar Island

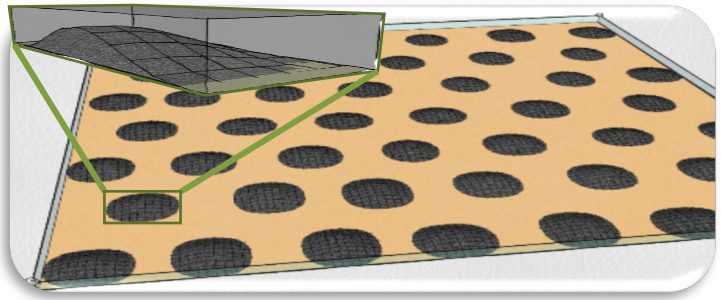
75 acres

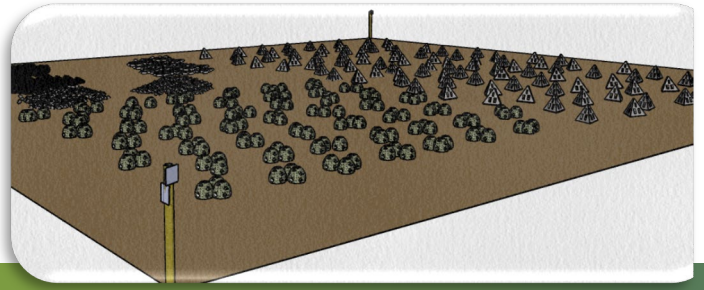


1.25 Empire State Buildings

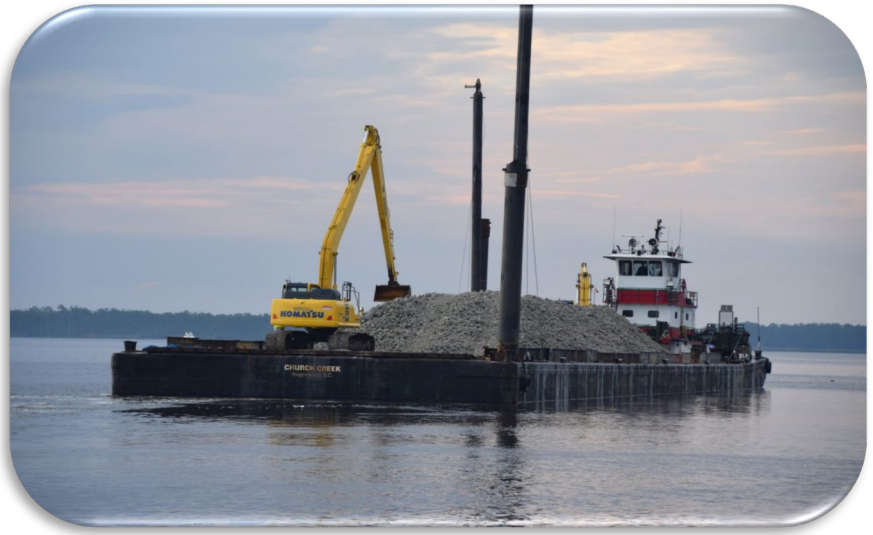
Site Selection

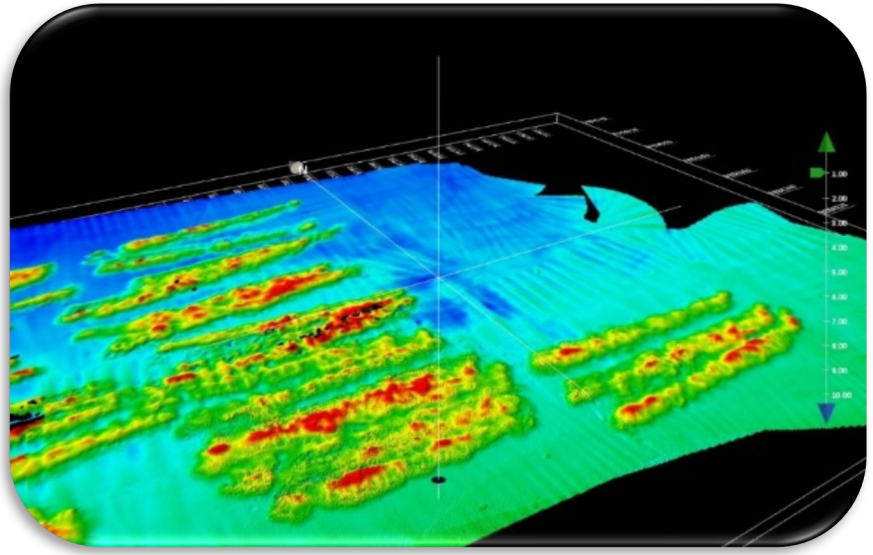






Construction

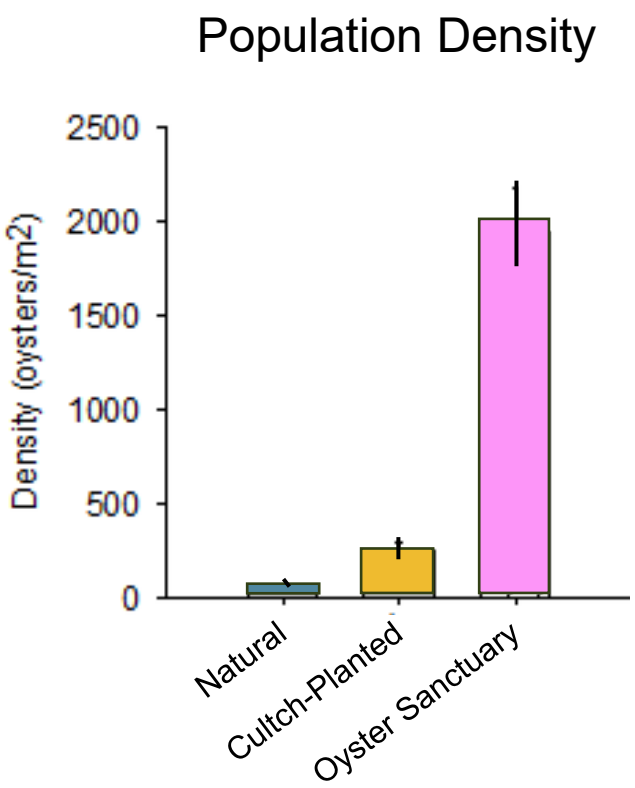


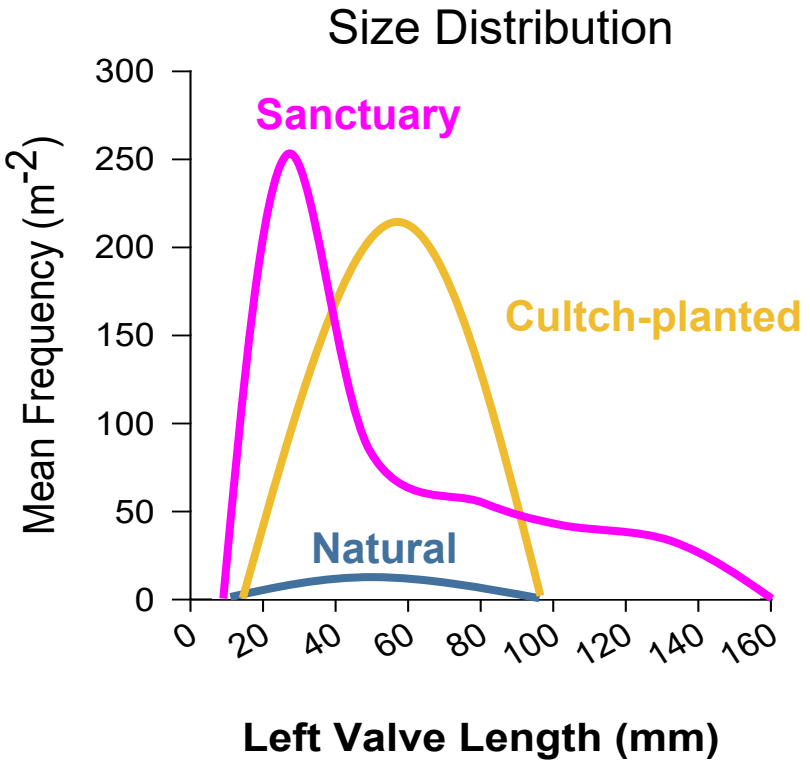


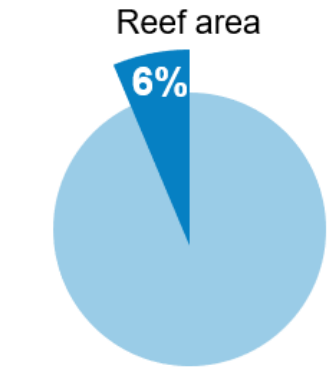
Monitoring

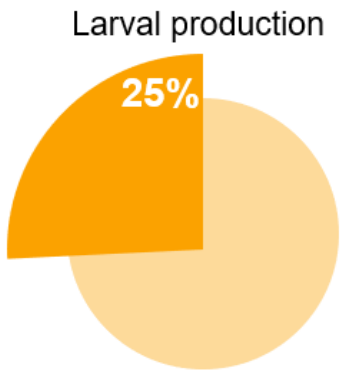
Why are Oyster Sanctuaries important?

Sanctuaries strengthen and support the oyster population







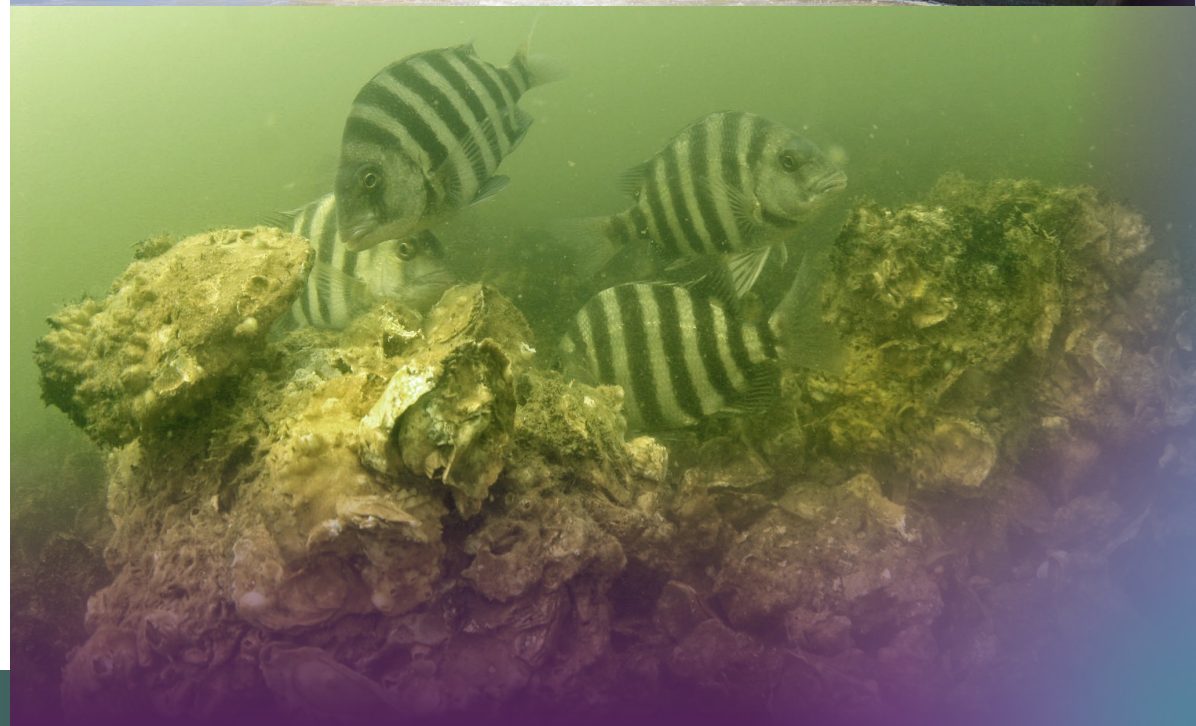


Department of Environmental Quality

Puckett et al. (2012), Peters et al. (2017)

Recent Accomplishments: Oyster Sanctuaries

- Cedar Island Oyster Sanctuary
  - 75 acres
  - 46,500 tons of marine limestone marl
  - 5,500 tons of recycled concrete
  - 104 million lbs./ 15,000 F-150s, ~386 staff days, 61 barge loads
- Successful monitoring season
  - ~22,000 oysters measured (136 locations on 14 sanctuaries)
  - Integrate results for improving future site selection
  - Draw comparisons to natural and cultch-planted reefs



Coming up for Oyster Sanctuaries

- 3- year partnership with the North Carolina Coastal Federation
  - $14.9 million NOAA Habitat Restoration and Resilience
  - ~50,000 tons per year (3x current volume)
  - Meet a statewide target of 500 combined acres of oyster sanctuary area

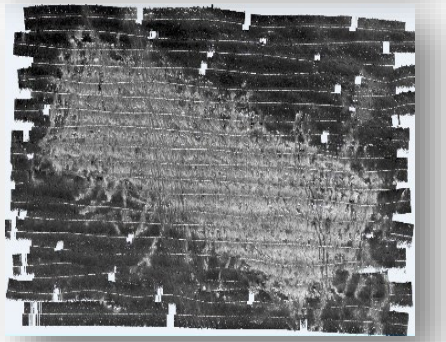
392 → 500+

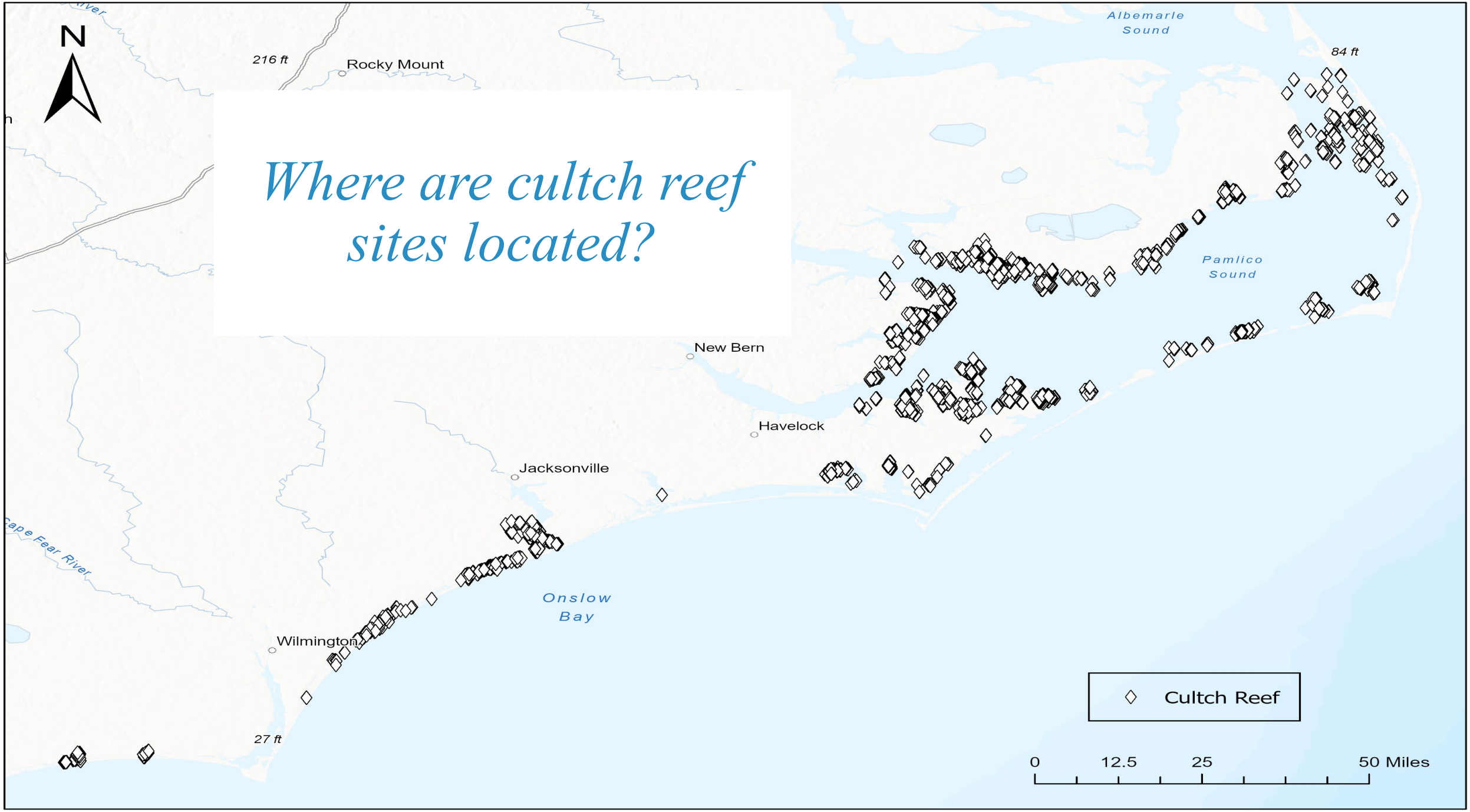
- Developing future goals beyond 500 acres

Shellfish Rehabilitation in NC: a two-part approach

Part 2: Cultch Planting (harvest)

- Primary objective: restore available hard substrate for recruitment
- Area of focus – Dare to Brunswick
- General design:
  - Small areas ~3 acres each
  - Low relief habitat (12-18”)
  - Continuous veneer
  - Small materials (2-4” pieces)
- Material types: Oyster shell, grade ASTM 4 limestone marl





Where are cultch reef sites located?

Cultch Planting: how do we do it?

Heavy Equipment Fleet



















6 vessels
7 wheel-loaders
1 semi tractor & lowboy trailer
3 dump trucks
2 conveyors

Recent Accomplishments: Cultch Planting

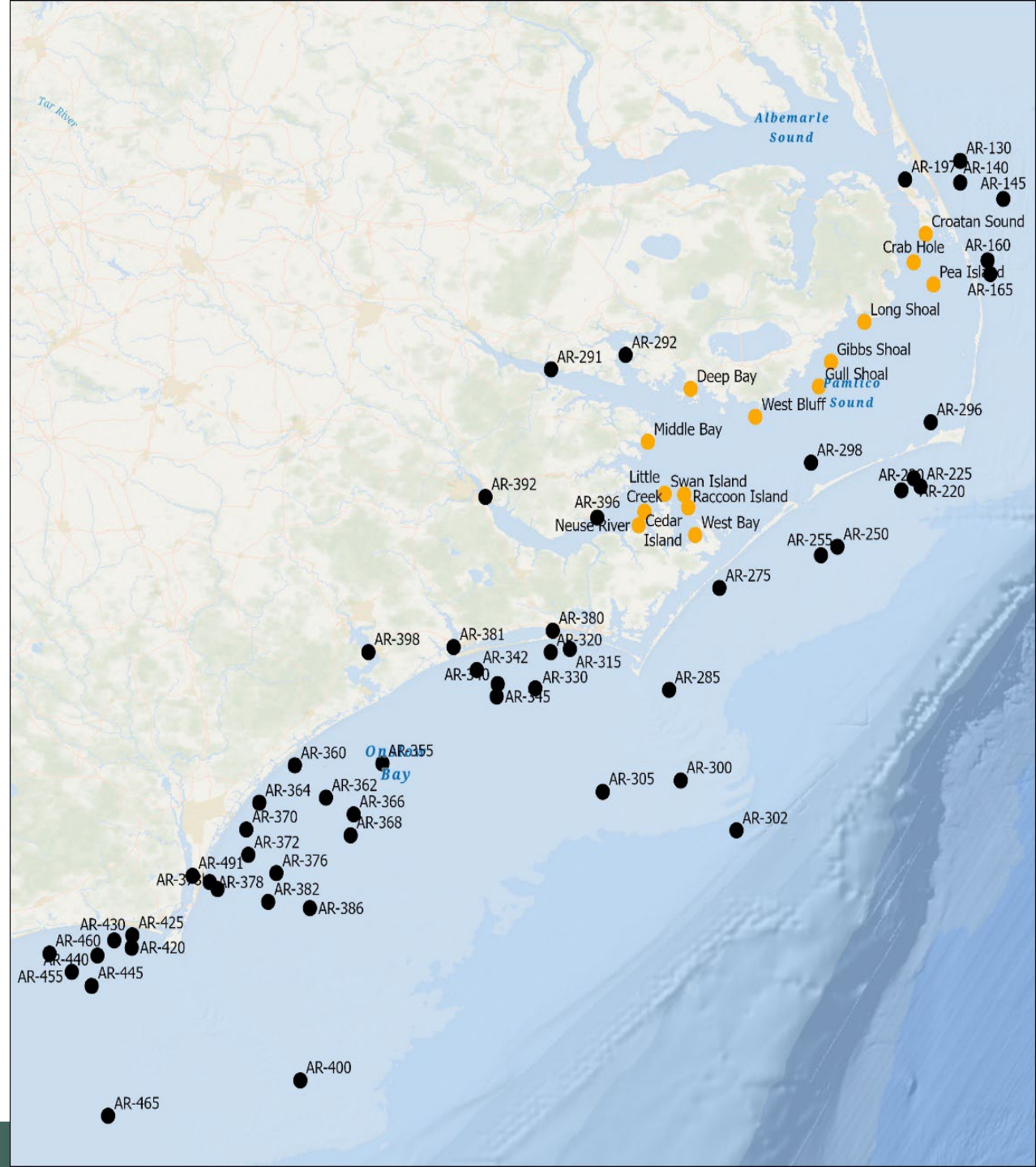
- 2021-2023: 127 combined acres built (894,878 bushels, 36 sites)
- Developing plans on alternate fishery management strategies (rotational harvest)
- New sampling program
- Purchased new 120’ flagship vessel, *RV Oyster Creek*

What are Artificial Reefs?

- Hardbottom habitat built using non-natural materials, placed in featureless areas
- Provide fishing and diving opportunities: sited with public accessibility in mind
- Reef design: stable and durable
  - Ships
  - Demolished bridges
  - Concrete pipe
  - Reef balls

NC Artificial Reef Program

- NC Manages 70 reefs
  - 27 estuarine (10-140 ac.)
    - 15 oyster sanctuaries
  - 43 offshore (160-650 ac.)
- Funded mostly by Sportfish Restoration and CRFL



Artificial Reefs: How do we do it?

NORTH CAROLINA MARINE FISHERIES 1822 2022
CELEBRATING 200 YEARS OF MANAGEMENT AND CONSERVATION

Recent Accomplishments: Artificial Reefs

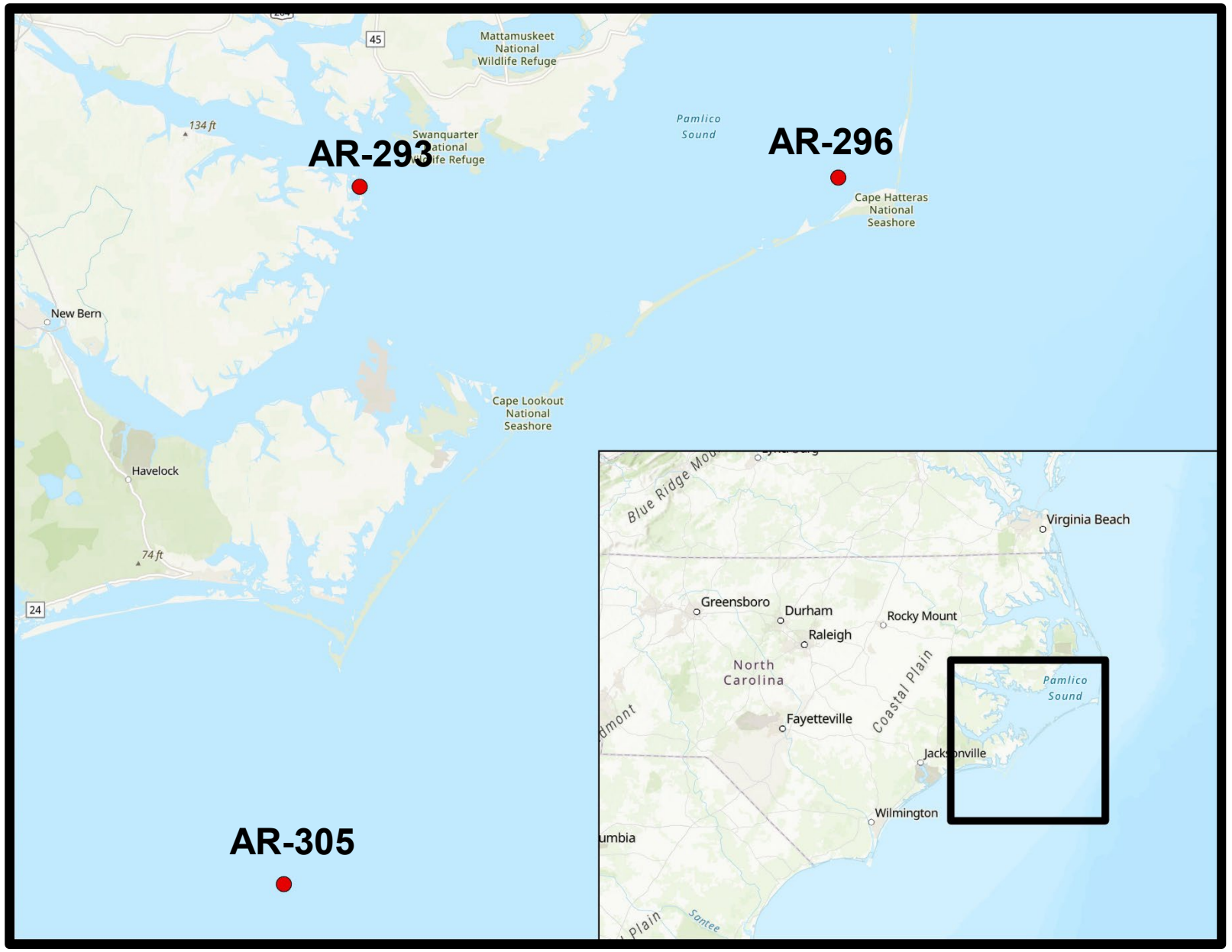
- 17 Artificial reefs enhanced 2021-2023:

- AR-130 → ~13,200 tons concrete (Bonner Bridge)*
- AR-140 → ~14,400 tons concrete (Bonner Bridge)*
- AR-145 → ~15,600 tons concrete (Bonner Bridge)*
- AR-160 → ~31,200 tons concrete (Bonner Bridge)*
- AR-165 → 532 reef balls, 108' tugboat *Valley Forge,* 75' caisson door
- AR-250 → ~1,200 tons concrete (Bonner Bridge)*
- AR-255 → ~1,200 tons concrete (Bonner Bridge)*
- AR-291 → 100 reef balls
- AR-293 → 202 reef balls, 100 Natrx units
- AR-305 → 1,700 tons concrete pipe
- AR-320 → ~3,600 tons concrete (Bonner Bridge)*
- AR-340 → ~1,200 tons concrete (Bonner Bridge)*
- AR-360 → 31 Eternal Reefs
- AR-368 → 1000 tons pipe, 170 reef balls
- AR-380 → 200 reef balls
- AR-372 → 25 Veteran's Memorial Reefs
- AR-430 → ~2000 tons pipe
- AR-460 → ~2000 tons pipe

*80,000 tons of concrete - the largest reef enhancement in NC history

- Hydrographic surveys of ~ 7,600 acres of reef habitat: Artificial Reef Guide
- Visual diver surveys of ~ 30 ocean Artificial Reefs

Recent and Upcoming Artificial Reef Projects



October 2023
AR-293
Inshore, Pamlico Point
202 Reef balls and 100 NATRX units

Spring 2024
AR-296
Inshore, Buxton/ Clam Shoal
Aggregate rock, concrete

Summer 2024
AR-305
Offshore, Cape Lookout
Vessel TBD

Summary

- Healthy reef habitat is critically important for fisheries
- Investing in reef enhancement is an insurance policy to help sustain fisheries for future generations
- NCDMF is a clear leader:
  - Most robust shellfish rehabilitation efforts among coastal states
  - One of the largest and most active Artificial Reef programs in the nation
- As a state, we should be proud of our accomplishments, but humbly recognize the need for improvement
  - Public engagement!

Questions

Jason Peters

Program Supervisor

Oyster Sanctuaries | Cultch Planting | Artificial Reefs