Restoring Functional Oyster Reef Habitat in the Coastal Bays of Virginia

Bowdoin Lusk – The Nature Conservancy

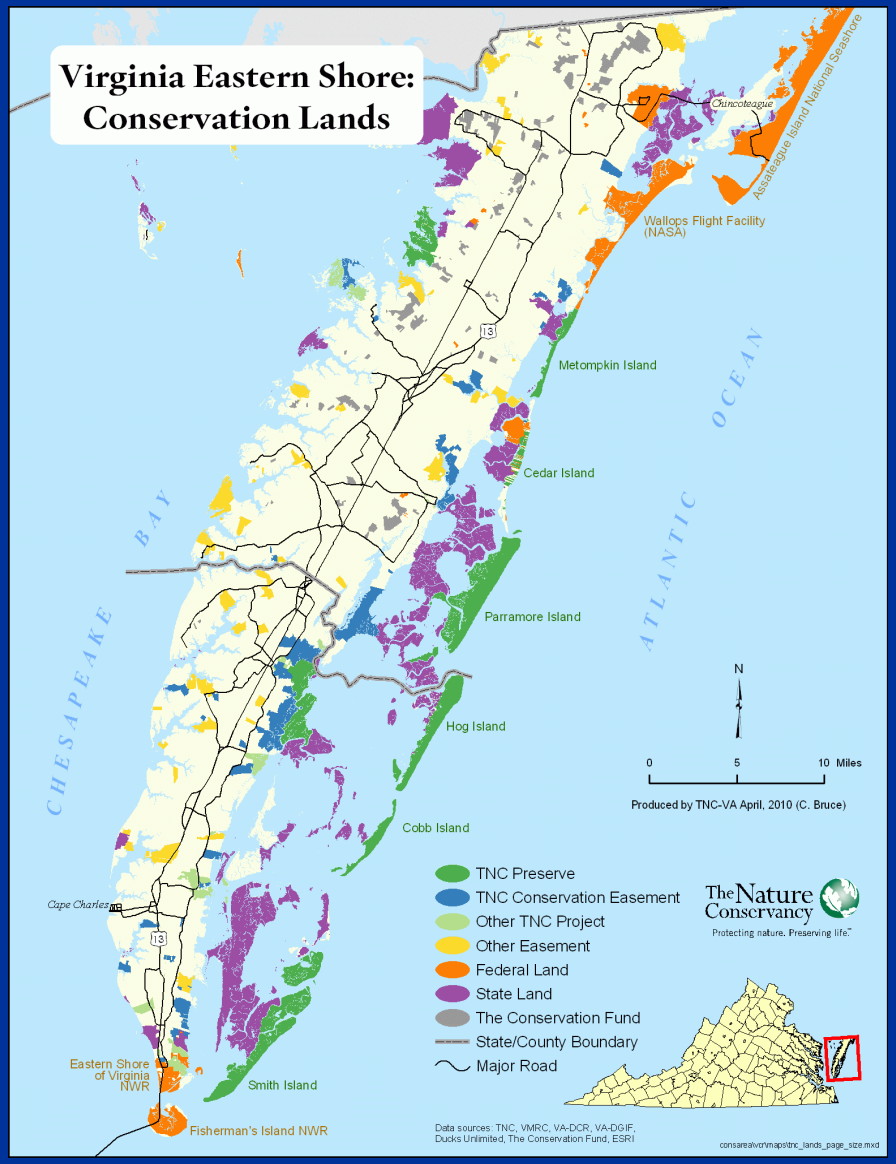
Barry R. Truitt – The Nature Conservancy

James A. Wesson – Virginia Marine Resources Commission

Gus Lorber – Allied Concrete

COASTAL BAYS VISION

VCR coastal bays provide a mosaic of structurally diverse and healthy habitats, robust ecological functions, and resiliency in the face of global climate change to support bay - dependent biodiversity, healthy fisheries, water quality and shoreline buffering.



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Virginia Marine Resources Commission

William & Mary VIMS
Virginia Institute of Marine Science
School of Marine Science

Virginia Coastal Zone Management Program

National Oceanic and Atmospheric Administration
NOAA
U.S. Department of Commerce

"Community Restoration Program"

Virginia Coastal Zone Management Program

Seaside Heritage Program

US Army Corps of Engineers®

VA Aquatic Resources Trust Fund

Hampton Roads Community Foundation
Inspiring Philanthropy. Changing Lives.

VCR LTER

Allied Concrete Co.

New Inlet Seafood

Terry Bros. Seafood

The Volgenau Foundation

The Campbell Foundation

Norfolk Southern

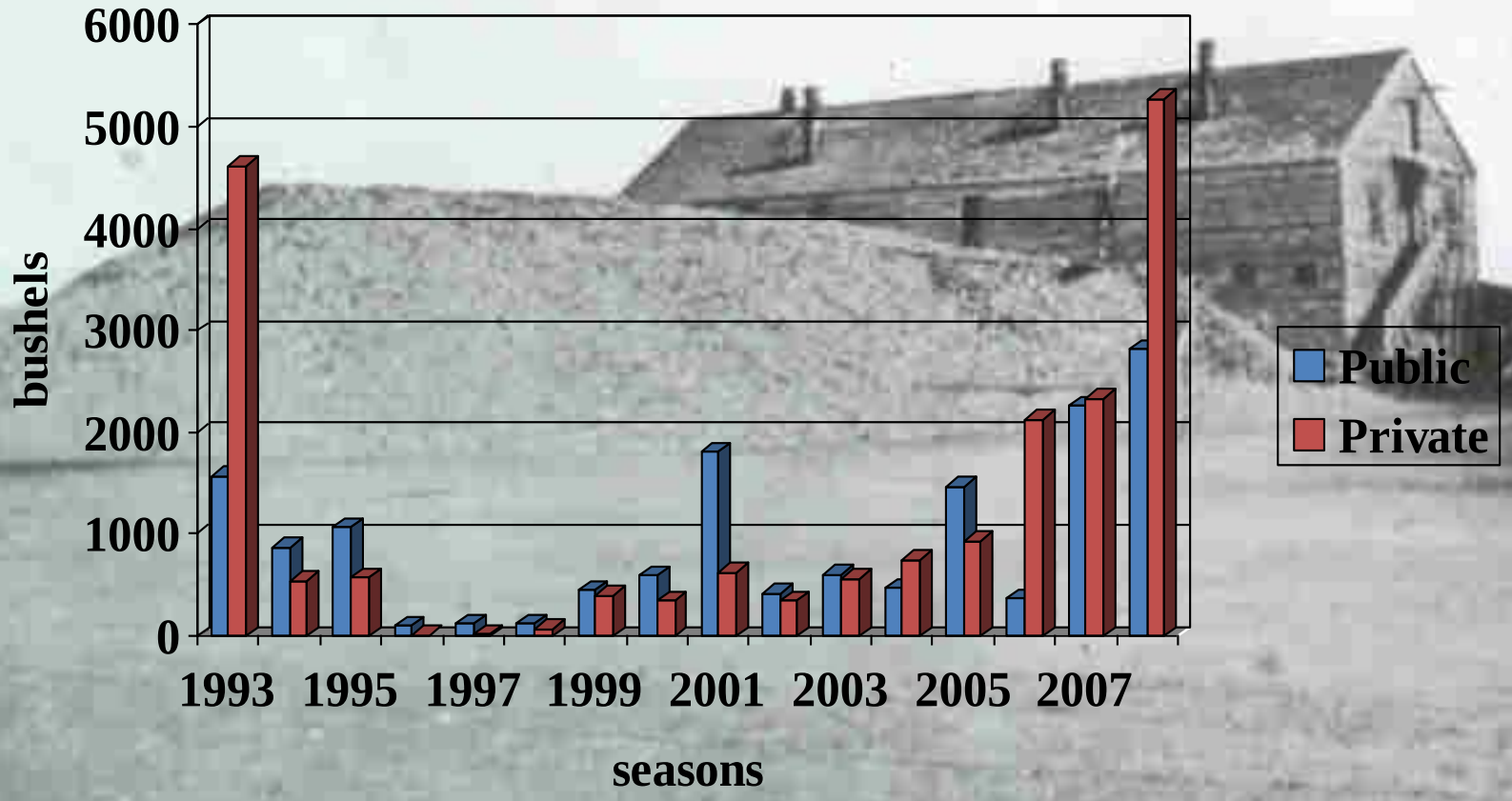
Virginia Eastern Shorekeeper

Virginia Seaside Oyster Restoration- Unique Set of Circumstances

- All oysters are intertidal – we have no subtidal reefs
- Adequate broodstock exists for consistent recruitment
- Disease is prevalent but many tolerant individuals persist
- Lack of shell cultch is greatest limiting factor

SYSTEM-LEVEL STATE CHANGE

SEASIDE EASTERN SHORE, PUBLIC AND PRIVATE OYSTER HARVEST, 1993/1994 TO 2008/2009



COMMERCIALLY EXTINCT

VIRGINIA MARINE RESOURCES COMMISSION

+

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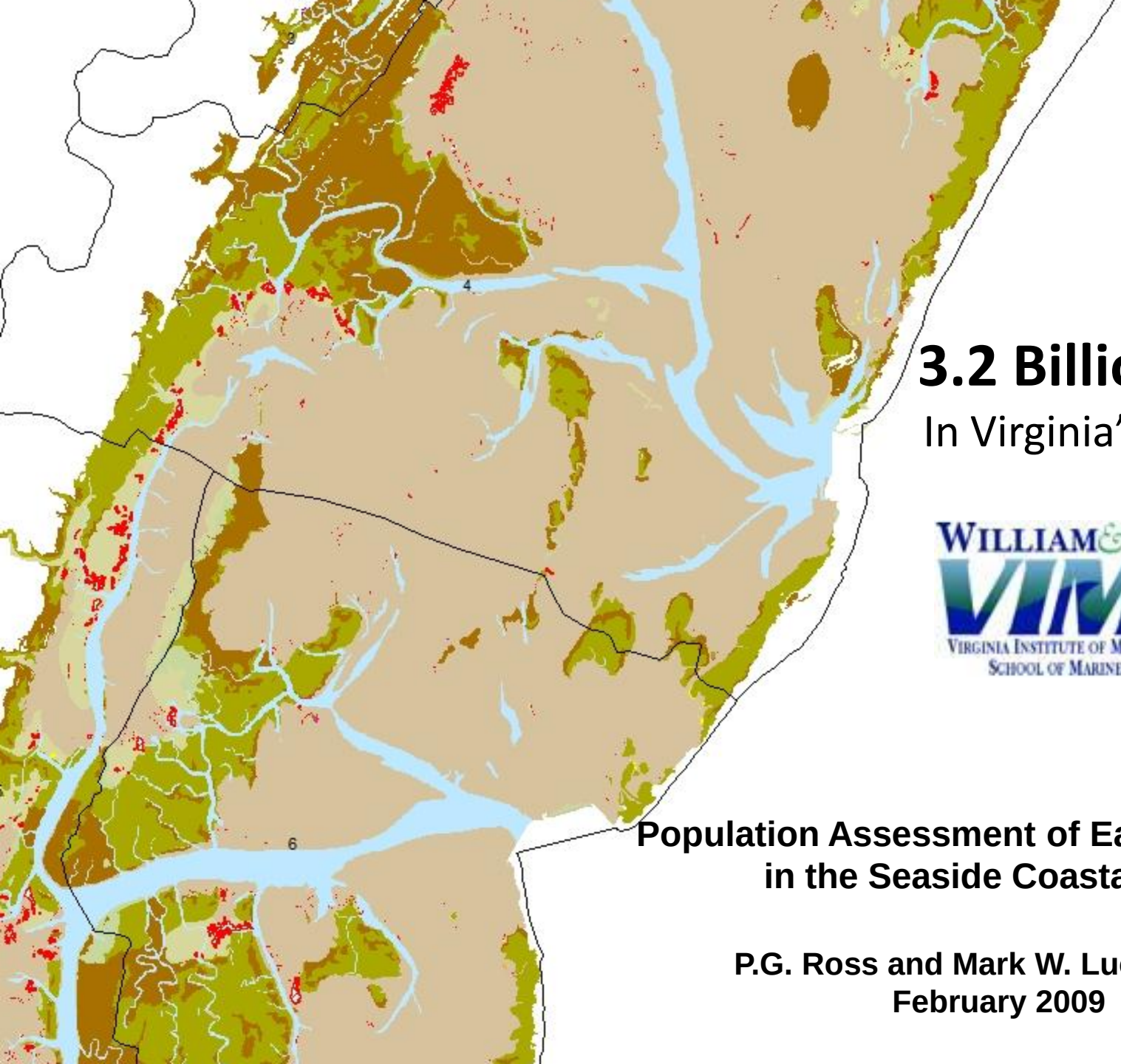
- Proof of Concept
- Functional Oyster Reefs
- “Ecosystem” Services
- No Harvest Sanctuaries

Restored 27 acres over 8 years



3.2 Billion Oysters

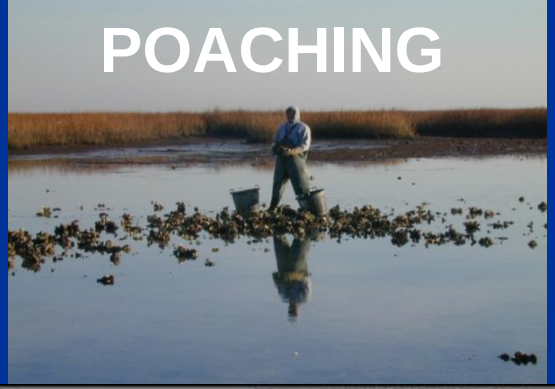
In Virginia's Seaside Bays

WILLIAM & MARY
VIMS
VIRGINIA INSTITUTE OF MARINE SCIENCE
SCHOOL OF MARINE SCIENCE

Population Assessment of Eastern Oysters in the Seaside Coastal Bays

P.G. Ross and Mark W. Luckenbach

February 2009



MOU

2009

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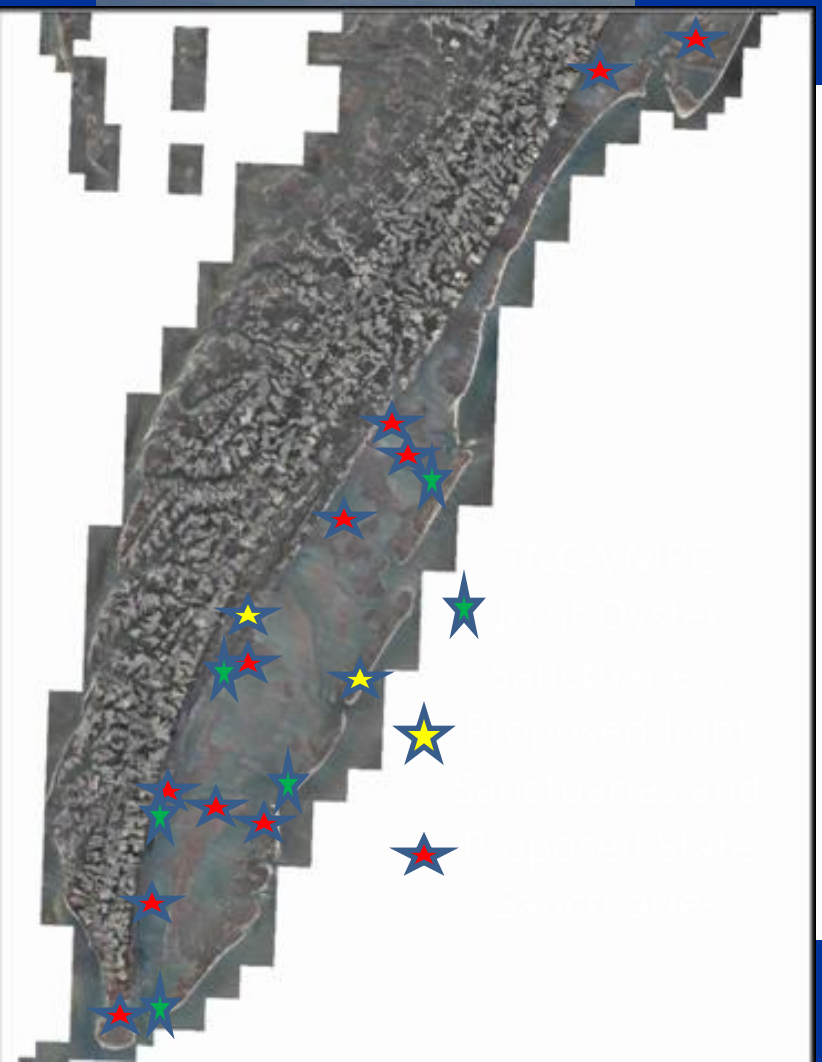
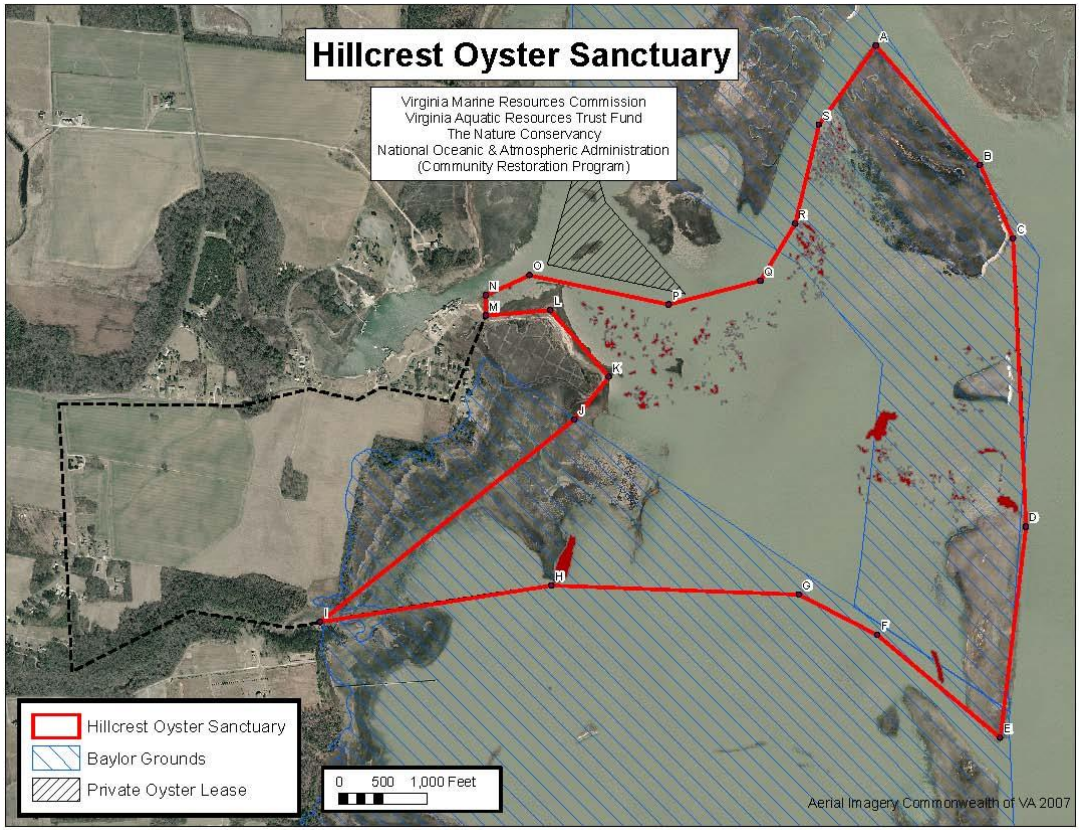


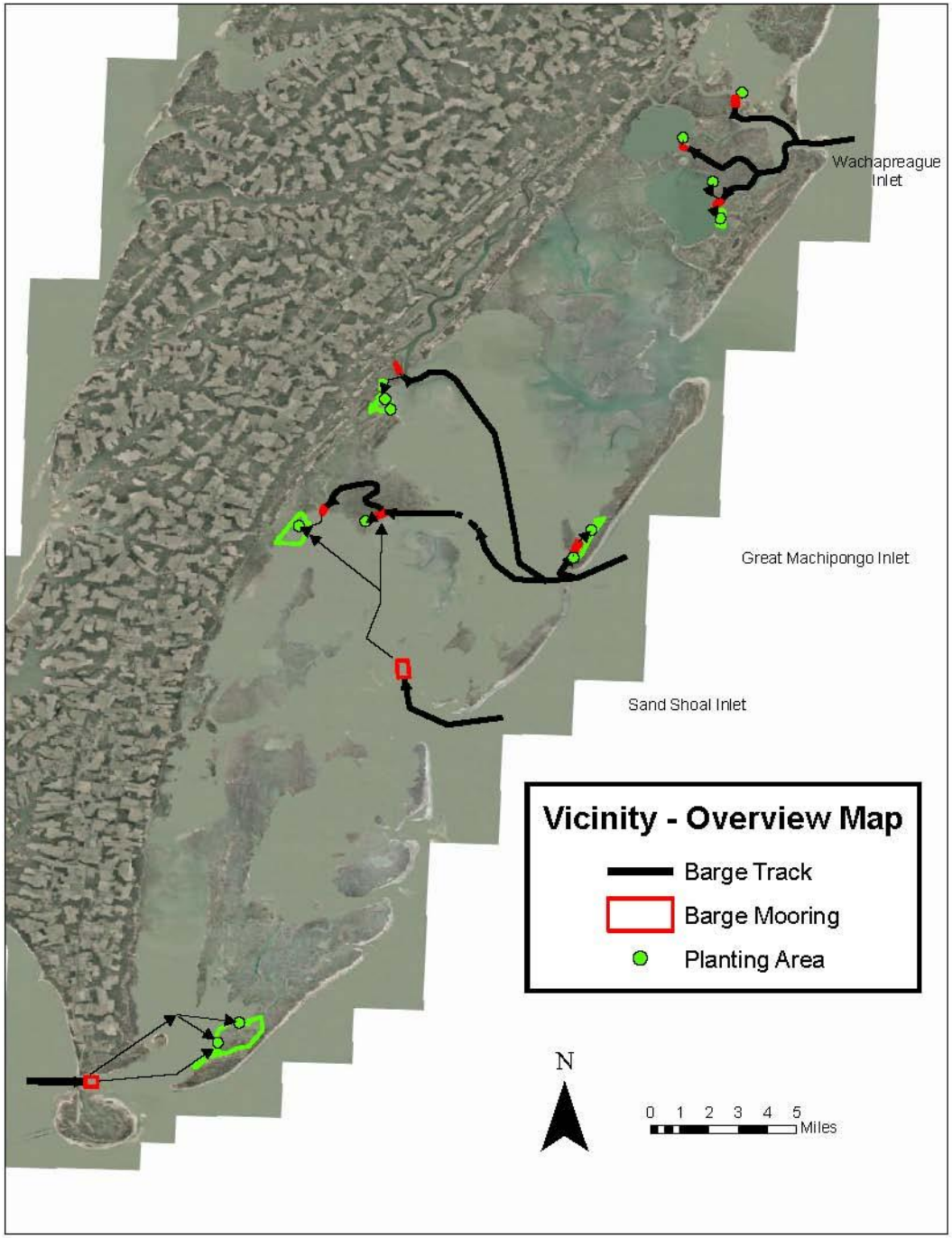


Oyster Reef Restoration
2 to 4 acres / year

SCALE

ARRA Oyster Reef Restoration
22 acres / 18 months

Create oyster reefs at scale and spatial distribution to restore critical habitat structure and ecological functions for biodiversity


Wachapreague Inlet
Great Machipongo Inlet
Sand Shoal Inlet
Vicinity - Overview Map
Barge Track
Barge Mooring
Planting Area
N
0 1 2 3 4 5
Miles

The Cost of Speed

- 180,544 bushels of shell
- 11.6 acres created
- $900,000 cost
- Nonlocal shell $77.5k / acre vs. Local shell $35k / acre

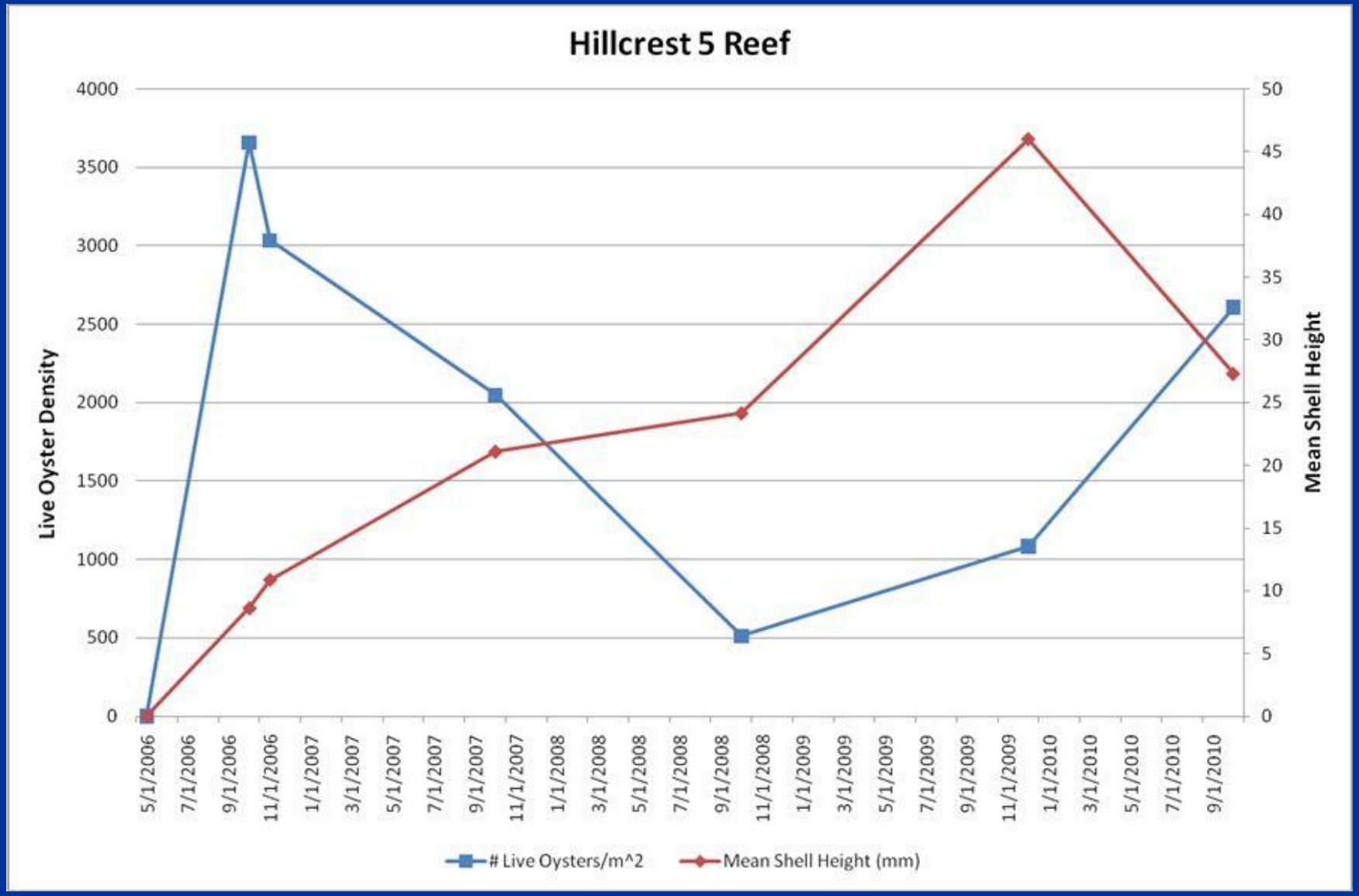
Annually monitor 42 reefs
Average 4-5 samples per reef
Current cost of 2 interns for 6 mos + boat trips = $40,000 per year

ARRA Oyster Monitoring Results So Far:

- 2,239 live spat per m^2

- 20.2 mm average shell length

- Only 8 of 14 reefs planted in time to receive spat set


Hillcrest 5 Reef
Live Oyster Density
Mean Shell Height
4000
3500
3000
2500
2000
1500
1000
500
0
50
45
40
35
30
25
20
15
10
5
0
5/1/2006
7/1/2006
9/1/2006
11/1/2006
1/1/2007
3/1/2007
5/1/2007
7/1/2007
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1/1/2010
3/1/2010
5/1/2010
7/1/2010
9/1/2010
Live Oysters/m^2
Mean Shell Height (mm)

ADAPTIVE APPROACHES TO RESTORATION & MANAGEMENT

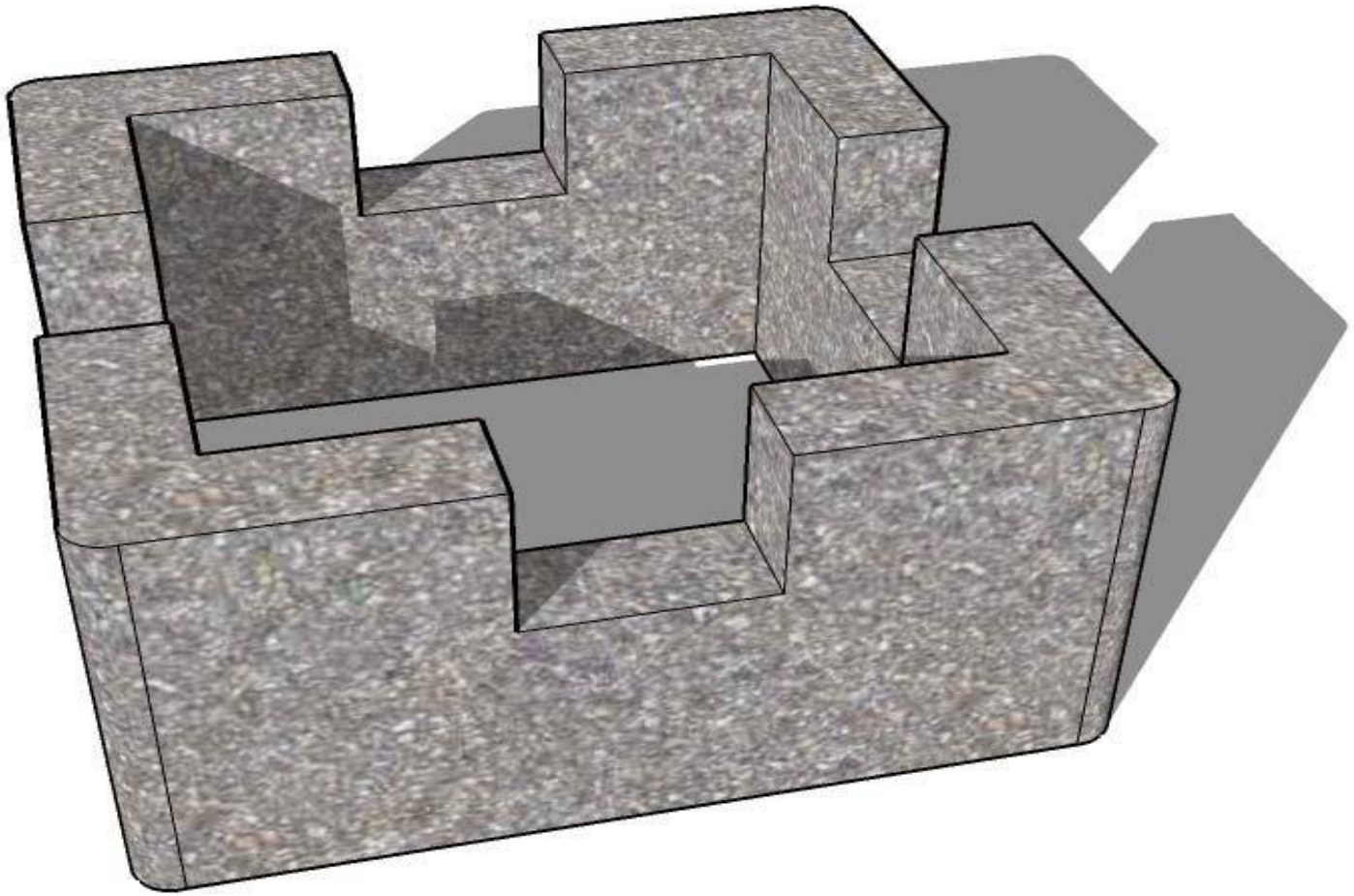
Lack of Suitable Substrate → **Alternative Substrate**

“OYSTER CASTLES”

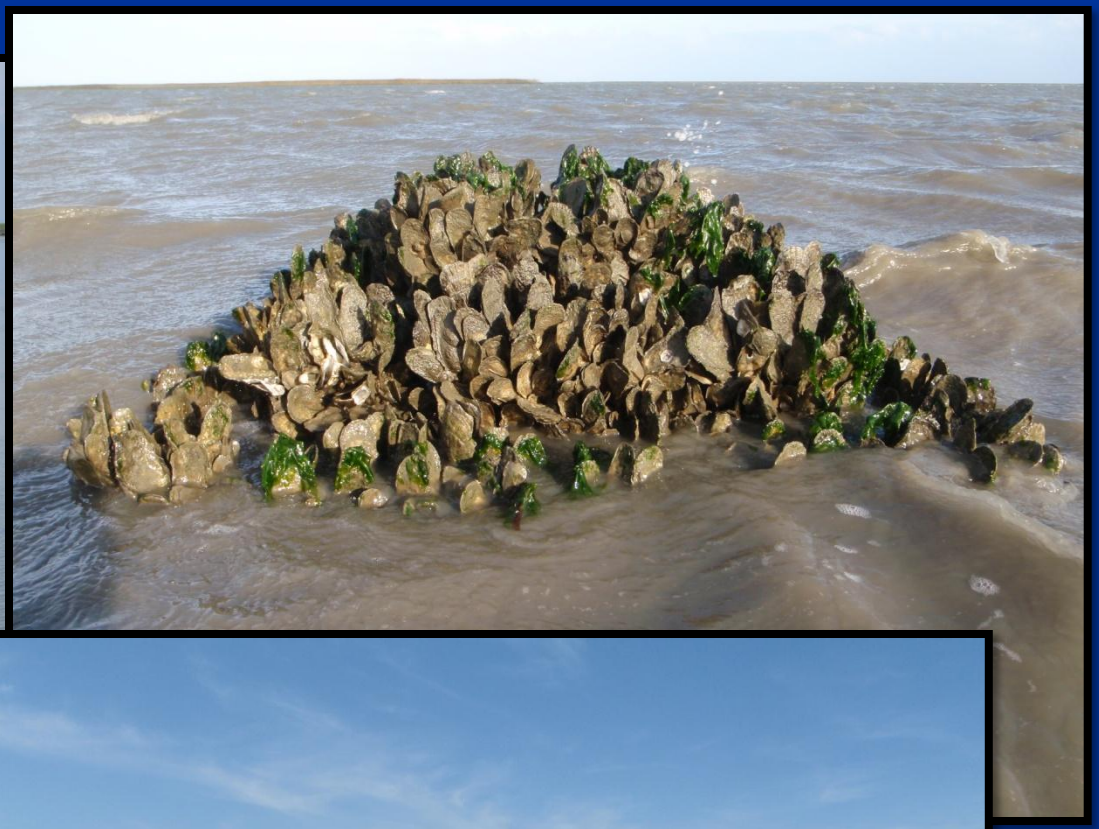
ALLIED CONCRETE CO.

An “Oyster Castle”

Designed and Produced by Allied Concrete



A Typical Castle Stacking Arrangement



Oyster Castles – Like building reefs with Legos