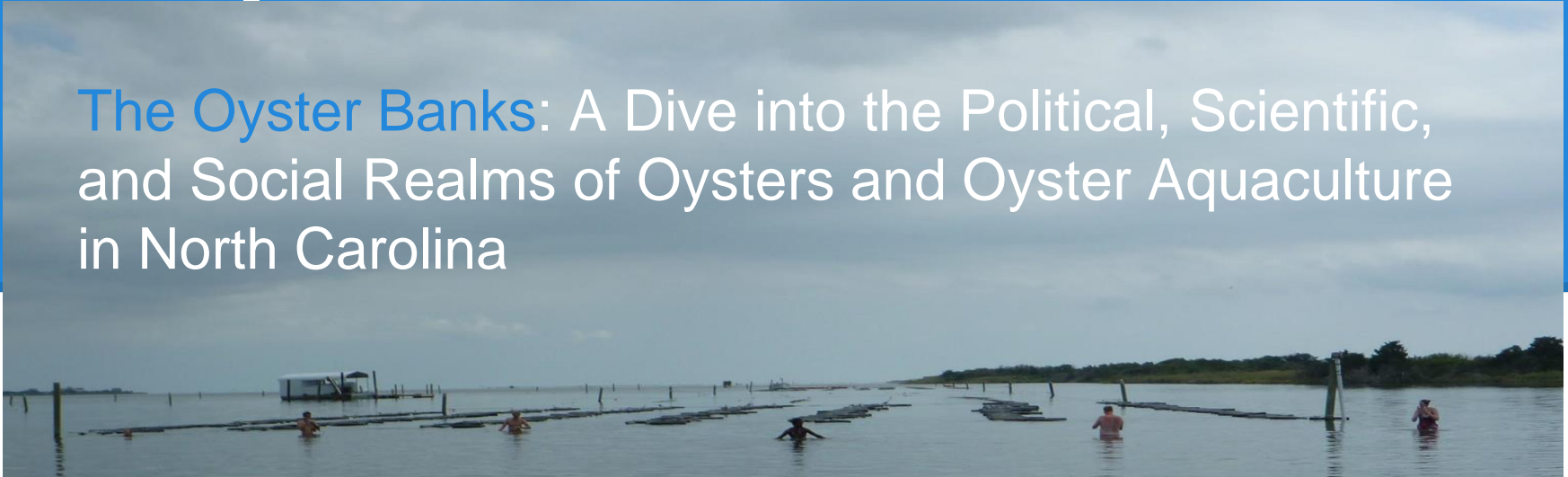


Outer Banks Field Site Capstone 2014

The Oyster Banks: A Dive into the Political, Scientific, and Social Realms of Oysters and Oyster Aquaculture in North Carolina



Capstone goals

#1 Provide us with opportunities to gain research experience

#2 Conduct locally relevant natural and social science research



Economic value of oyster aquaculture in NC

Comparing NC and VA oyster aquaculture revenues

Oyster industry in NC:

- \$2.9 million industry annually
- aquaculture comprises only 21%

Year	Virginia	North Carolina
2005	\$240,000	\$257,143
2006	\$930,000	\$306,698
2007	\$1,440,000	\$272,154
2008	\$2,842,000	\$221,946
2009	\$3,276,000	\$154,054
2010	\$5,239,000	\$247,074
2011	\$6,990,000	\$332,565
2012	\$9,554,000	\$595,446

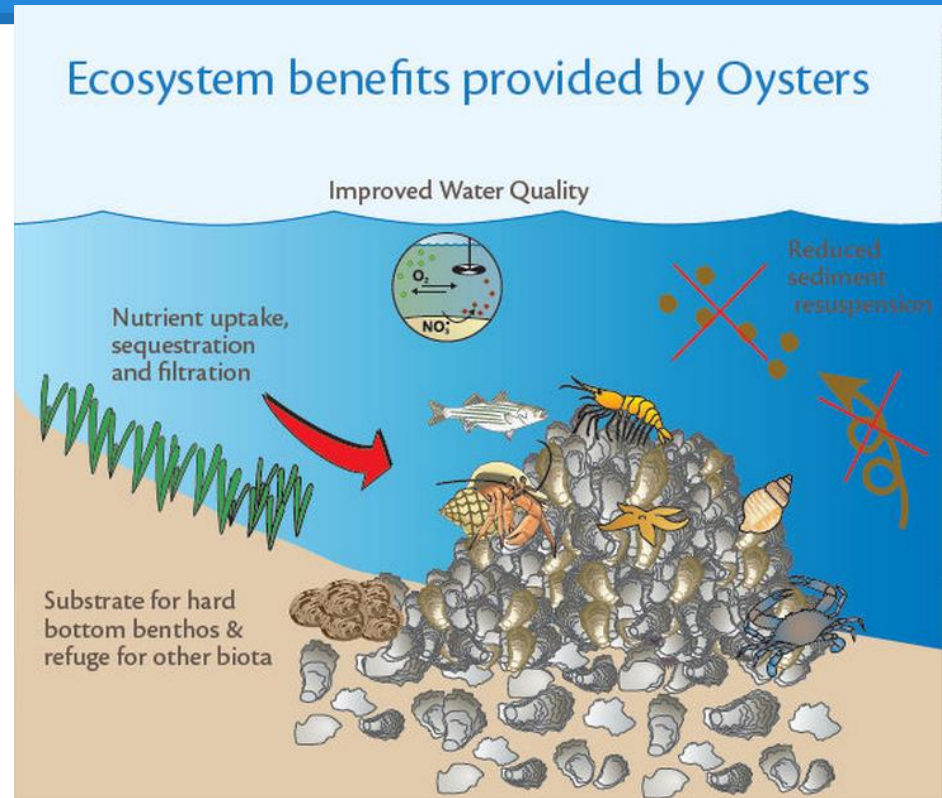
Oysters and ecosystem services

Ecosystem services = benefits ecosystems provide to people

We know that natural oyster reefs:

- ◆ Provide habitat
- ◆ Provide shoreline protection
- ◆ Filter water, which:
 - ◇ Improves water clarity
 - ◇ Regulates nutrients
 - ◇ Increases the amount of light reaching submerged aquatic vegetation

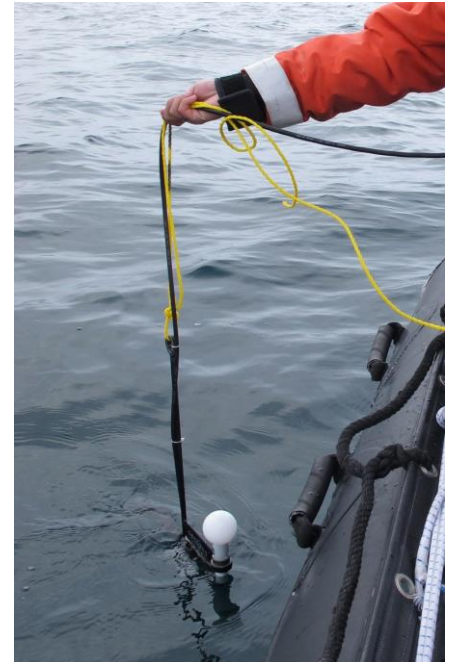
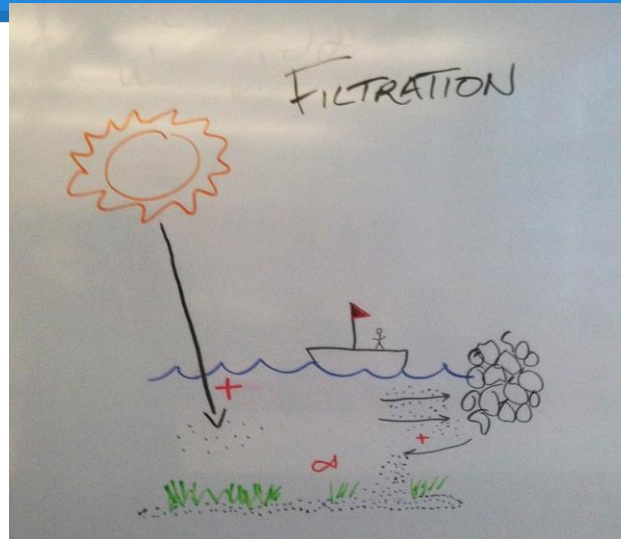
Do oyster aquaculture facilities provide the same benefits?



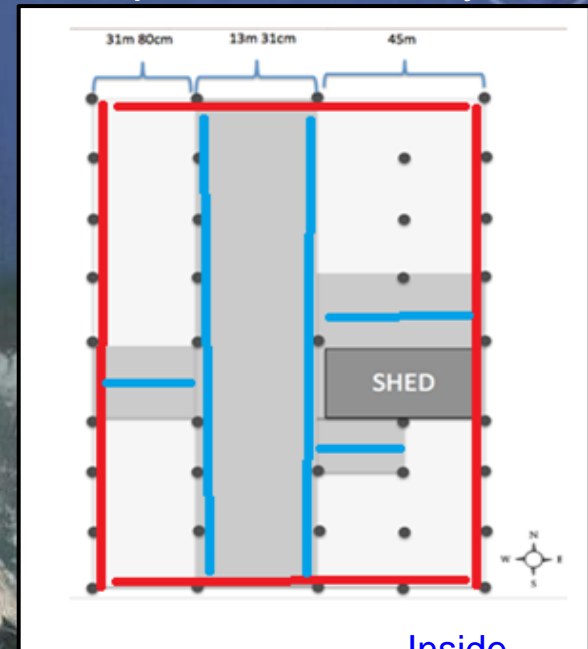
Natural science research

What we measured:

- Habitat provision
- Water clarity
- Submerged aquatic vegetation (SAV; underwater grass)



Map of oyster aquaculture facility



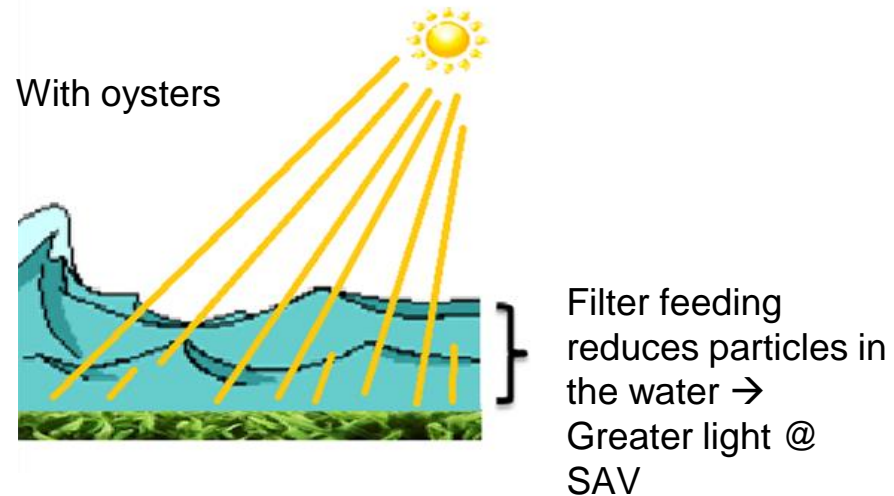
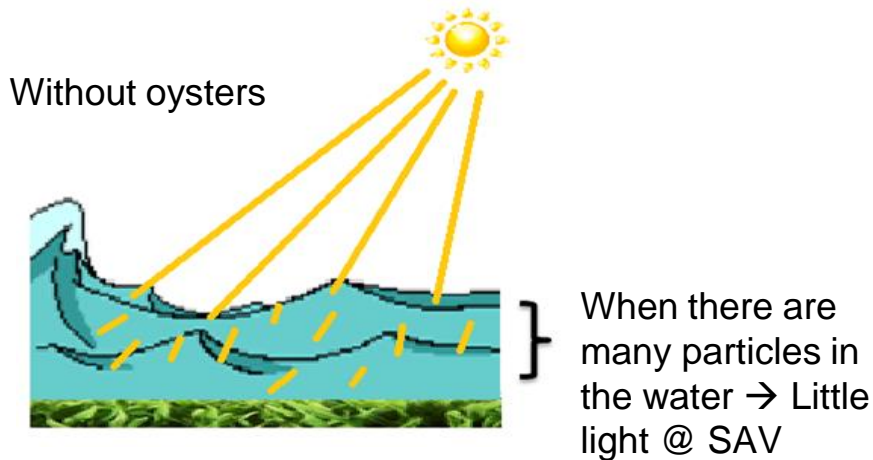
Inside
Outside
Control

Study Sites

- North of Oregon Inlet
- South of Roanoke Island
- In Roanoke Sound
- Adjacent to dredge spoil islands

Oyster aquaculture and water clarity

- Oysters are filter feeders



- Consistently greater water clarity surrounding facility than at control site

Oyster aquaculture and SAV abundance and distribution



Less SAV in and around the facility relative to control site, but SAV still present at facility at densities that are not significantly different from the control

Oyster aquaculture and habitat provision

Number of species found in 4 racks

- 8 species of finfish
- 6 species of invertebrates

Number of individuals found in 4 racks

- 84 individual finfish
- 387 individual invertebrates

5 species of fish and 2 species of crabs at the study site that either utilize oyster reefs as habitat or prey upon oysters, including:

- sheephead (recreational fishery)
- blue crabs (recreational and high value commercial fishery)



http://tbep.org/pics/featured_creature/sheepshead.jpg



<http://www.aqua.org/~media/Images/Animals/Blue%20Crab/animals-BlueCrab-slide5-web.jpg>

Social science research

Qualitative interviews

- With oyster restaurant professionals
- Informed survey design

Quantitative surveys

- Questions about beliefs and opinions about and knowledge of oysters
- Administered: Downtown Manteo and two popular oyster restaurants on the barrier beach



Knowledge of, preference for, and willingness to pay for oysters

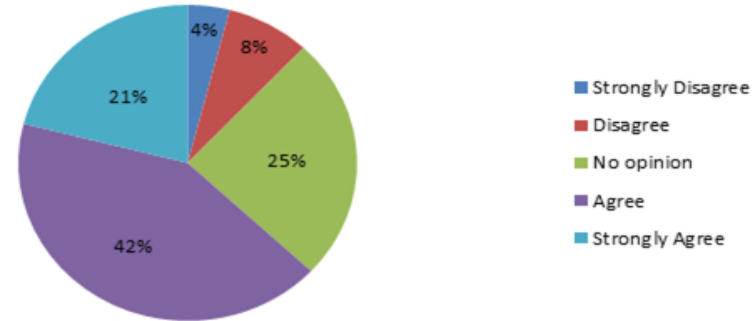
Knowledge and willingness to pay

- People who have eaten oysters know significantly more about them
- Those who know more about oysters are willing to pay more
- When people believe that oysters are useful for more than just food. They are willing to pay more

Preference

- People prefer to eat local oysters

It is important to me that the oysters I eat are locally harvested.



Policy analysis considerations



Challenges for oyster aquaculture in NC:

- Cost and hassles of survey
- NC hatchery production unable to provide oyster seed in needed quantities and best varieties – this will get more serious as the industry expands
- Variability in the interpretation of SAV protection during State permitting

Policy options that NC could consider to promote aquaculture:

- Streamline the leasing process and reducing the fees associated with the permits
- Provide subsidies or other state support for hatcheries
- More holistic view of environmental effects of aquaculture on SAV and ecosystem services (more research should be done to confirm our results)

Our study suggests:

Oyster aquaculture provides valuable ecosystem services

- Improved water clarity
- Habitat for fish and invertebrates

No significant detrimental impacts on SAV

If natural science results are confirmed, the public seems likely to support the industry:

- 62% - willing to pay more for environmentally produced food
- Most believe oysters are useful for more than just food

If our findings are confirmed, NC may want to consider revising policies to encourage aquaculture



Thank you!

Questions?

Funding was provided, in part, by the Northeastern NC Coastal Research and Environmental Education Foundation at the NC Community Foundation