

# Metapopulation Dynamics Guides Oyster Restoration in Pamlico Sound

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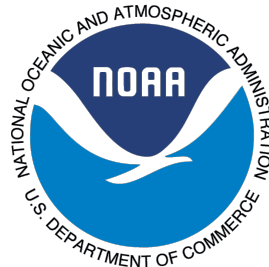
Safe & sustainable seafood supply requires, in part, high quality & abundant habitat



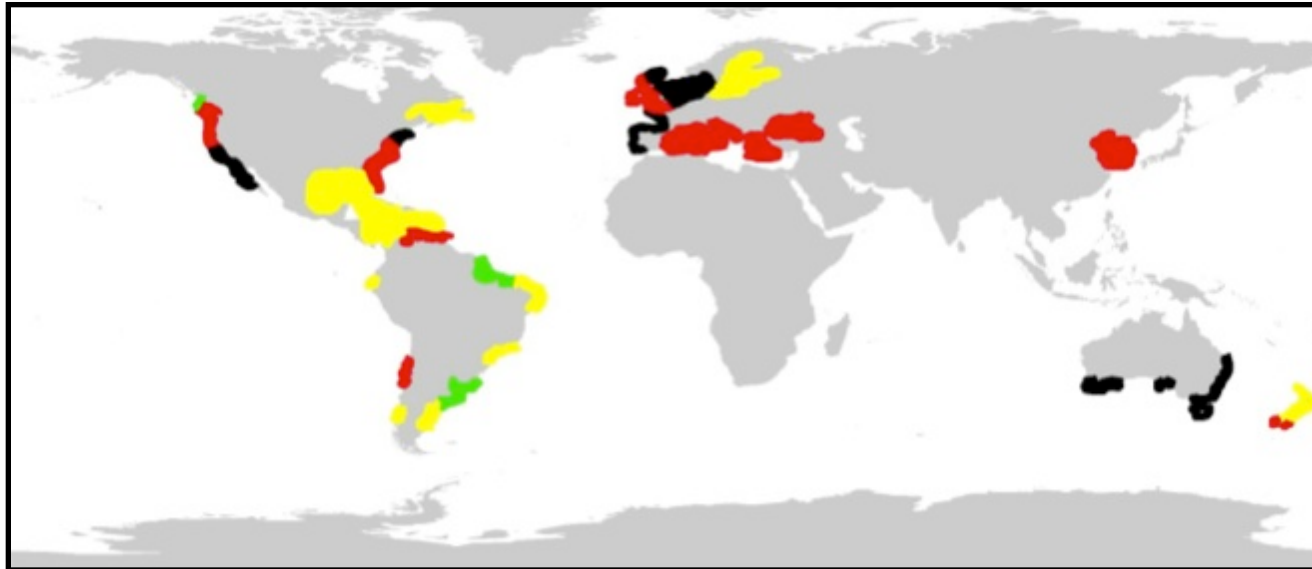
North Carolina Sea Grant Research Symposium:  
Investments & Opportunities



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# Why Oyster restoration?



% decline	
<span style="color: green;">■</span>	< 50%
<span style="color: yellow;">■</span>	< 90%
<span style="color: red;">■</span>	< 99%
<span style="color: black;">■</span>	> 99%

Global decline of oyster reefs as a % of historical abundance (Beck et al. 2011)



Water quality



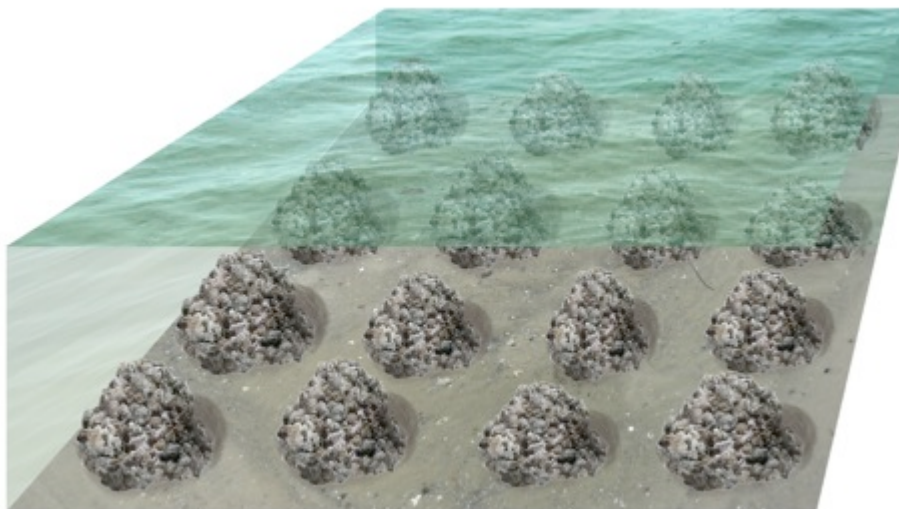
Essential fish habitat



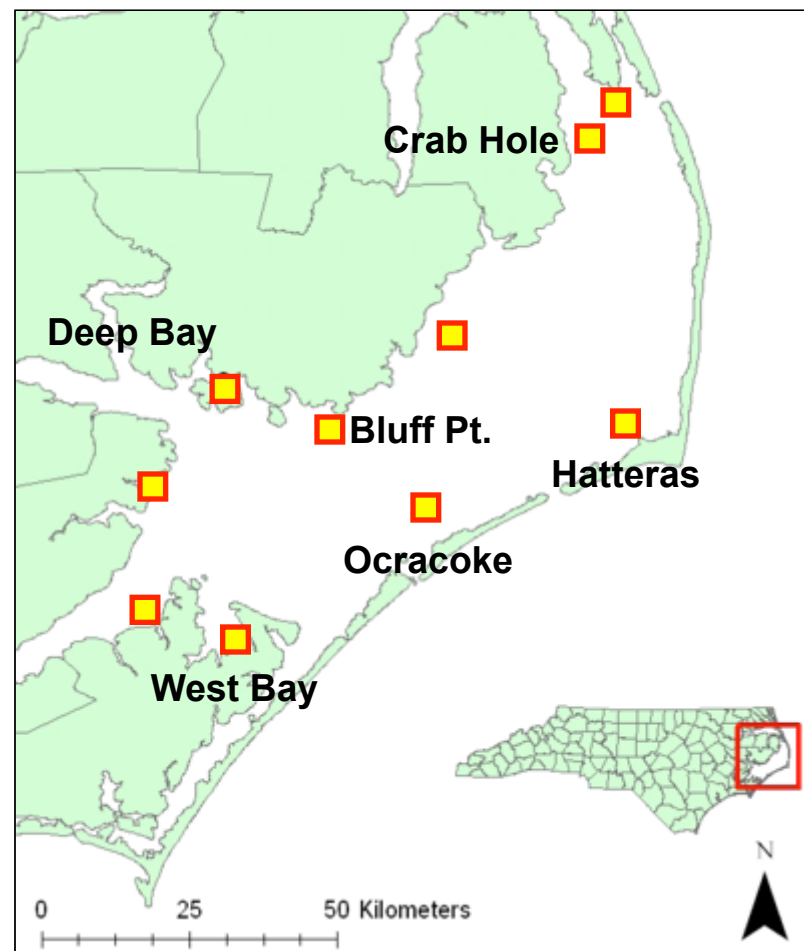
Recreational fishing

# Oyster restoration via broodstock reserves in Pamlico Sound

- NC DMF created 12 oyster reserves (i.e., **metapopulation**)
- Distances range from 10-125 km
- Areas range from 0.16-0.54 km<sup>2</sup>



How do we maximize habitat restoration “bang for the \$”?



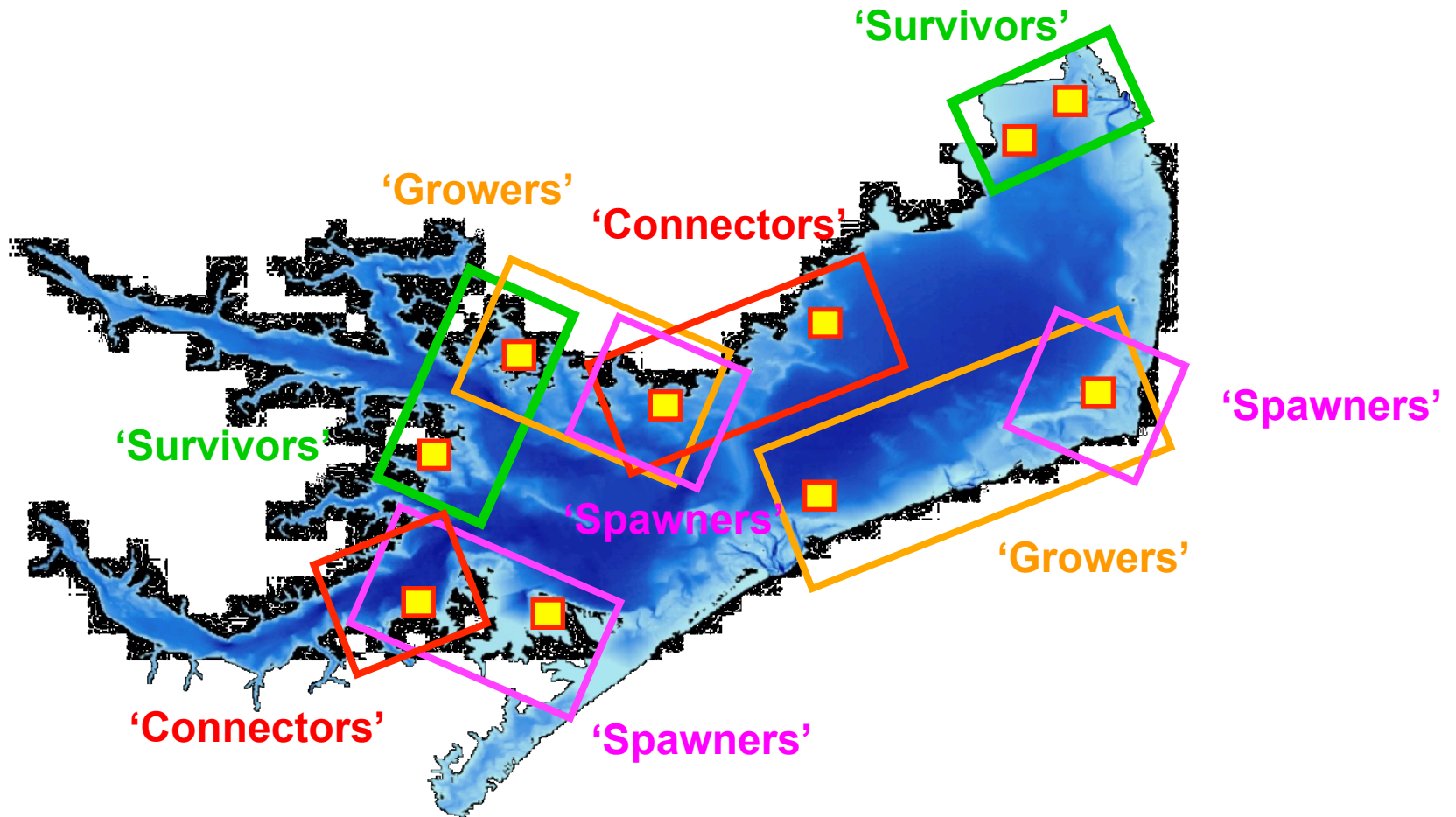
# Methods

1. Field measurements & experiments
2. Laboratory experiments
3. Physical oceanographic studies
4. Computer simulation modeling

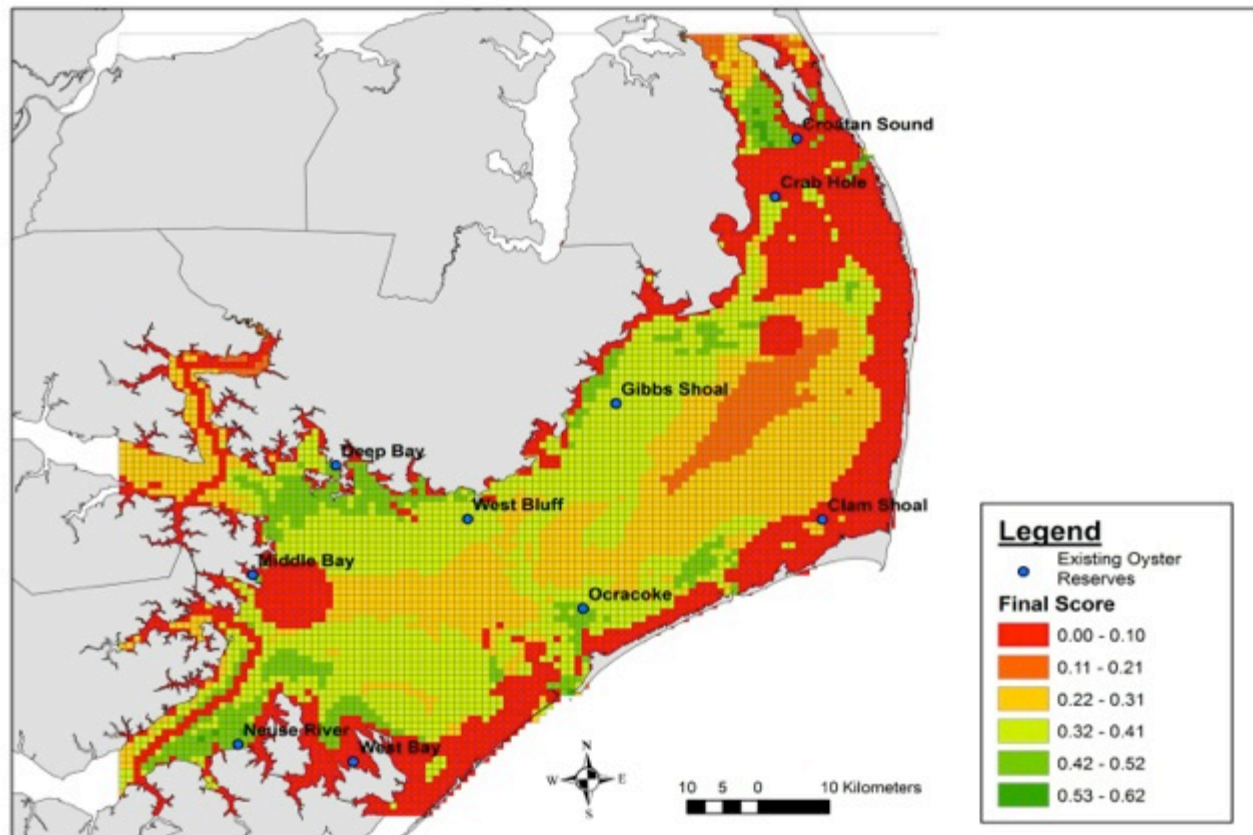


# How do present reserves function?

Oyster metapopulation has different demographic strengths



# Where should new reserves be built?



- 37% of Pamlico Sound unsuitable
- Optimal sites clustered in SW and NE portions of PS
- Integrates biological & economic considerations
- Decision support tool

# Implications

## (1) Information on how to:

- Restore & conserve an ecologically & economically important species
- Apply metapopulation approach to assess restoration goals
- Apply hierarchical GIS modeling to guide future restoration

## (2) Information used by:

- NC DMF & US ACOE (Other states and countries)
- Where to build & what materials?

## Leveraging NC Sea Grant \$

