Oyster Reefs in North Carolina

hardened shoreline reefs

natural intertidal reefs

restored subtidal cultch reefs

natural subtidal reefs

restored subtidal sanctuary reefs

Image credits: coastalreview.org; Jason Fleming; reefinnovations.org
Reefs of Pamlico Sound

646 reefs!

Theuerkauf et al. (in prep), can be found in downloadable NCSU dissertation
# Reefs of Pamlico Sound

<table>
<thead>
<tr>
<th>Reef Type</th>
<th>Number of Unique Reefs</th>
<th>Total Reef Area (ha)</th>
<th>Average Reef Area (ha)</th>
<th>Average Initial Density (ind. m$^{-2}$)</th>
<th>Average Population Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subtidal Natural Reefs</td>
<td>301</td>
<td>934.27</td>
<td>3.12</td>
<td>61</td>
<td>2,307,464</td>
</tr>
<tr>
<td>Subtidal Cultch Reefs</td>
<td>53</td>
<td>15.32</td>
<td>0.29</td>
<td>152</td>
<td>438,967</td>
</tr>
<tr>
<td>Subtidal Sanctuary Reefs</td>
<td>14</td>
<td>66.02</td>
<td>4.72</td>
<td>670</td>
<td>26,323,847</td>
</tr>
<tr>
<td>Hardened Shoreline Reefs</td>
<td>149</td>
<td>2.69</td>
<td>0.10</td>
<td>69</td>
<td>69,653</td>
</tr>
<tr>
<td>Intertidal Natural Reefs (Pamlico Sound)</td>
<td>57</td>
<td>10.43</td>
<td>0.28</td>
<td>121</td>
<td>384,183</td>
</tr>
</tbody>
</table>

Theuerkauf et al. (in prep), can be found in downloadable NCSU dissertation.
Emergence of GIS-based Decision Support Tools

- **Challenge**: identifying optimal locations in vast water bodies to restore

- **How**: spatially integrate relevant biophysical and socioeconomic factors

Theuerkauf et al. (PLoS ONE, in review)
NCDMF Oyster Rehabilitation Efforts

NC DEPARTMENT OF ENVIRONMENTAL QUALITY

Jacob Boyd | NC Division of Marine Fisheries

NC Oyster Summit | Raleigh, NC | March 12, 2019
Oyster Rehabilitation
Status

Sanctuary Program: 15 oyster sanctuaries
- Average ~40 acres each
- High relief habitat - ridges, mounds, patches

Cultch Planting Program
- 10-20 sites (~40-50 acres total) built annually
- Estimated 1,000+ sites built since 1915
Synergistic Approach

Oyster Rehabilitation

Science-based

Suitability

Water Quality

Oyster Sanctuaries

Partnerships

Efficiencies

Cultch Planting

Long-term Monitoring

Measurables
Oyster Rehabilitation
Success Stories: Swan Island

Year 1: ~ 20 acres, Year 2: ~ 10 acres, Year 3: ~ 10 acres
Living Shorelines: 
Another Strategy for Oyster Rehabilitation

Lexia M. Weaver, Ph.D.
If You Build It They Will Come: Ongoing and Future Efforts to Promote Healthy Wild Oyster Stocks
NC Oyster Summit
March 12, 2019
Living Shorelines

- Reduce shoreline erosion while protecting and restoring natural shoreline features including salt marsh, oyster and fisheries habitat
- Cost-effective, longer term approaches with little to no maintenance
- Provide better shoreline protection against storms
- Increase shoreline resiliency
- Help to improve water quality

The bulkhead above was replaced with a living shoreline.
Living Shorelines:
A Valuable Oyster Restoration Tool

Photo Credit: Dr. Christine M. Voss