Coastal and Marine Spatial Planning: Oyster Aquaculture Siting Optimization

Oyster Aquaculture Tiger Team
What is Coastal and Marine Spatial Planning (CMSP)

- Comprehensive, adaptive, integrated, ecosystem-based, and transparent spatial planning process, based on sound science, for analyzing current and anticipated uses of ocean and coastal areas.

- Coastal and marine spatial planning identifies areas most suitable for various types or classes of activities in order to:
  - reduce conflicts among uses,
  - reduce environmental impacts,
  - facilitate compatible uses,
  - and preserve critical ecosystem services to meet economic, environmental, security, and social objectives.
GIS Planning Goals

• Decrease user conflicts, improve planning and regulatory efficiencies and decrease costs and delays, and preserve critical ecosystem services
  o Reduce conflicting Interests

  • High Boat use regions and pathways would be primary conflicting use.
  • Conflicting uses would be exclusion areas for aquaculture.
  • Mixed or overlapping uses may be excluded or rated as a low interest area due to the type of uses and conflicts.
  • Optimally aquaculture lease areas would be located in areas with low conflicted interests or highly compatible uses.

• Places science-based information at the heart of decision-making.
• Emphasizes stakeholder and public participation.
Current Data

• Human-Use Considerations
  o Navigational Channels
  o Historic Channel dredging
  o Marinas, public and private boat ramps, high use boat slip regions

• Physical Data
  o Bathymetry
  o Bottom sediment data
    • DNREC Clam Abundance Surveys
    • Chrzastowski (1986)

• Ecological Data
  o Clam abundance and potential habitat
  o Seasonal important Bird Habitat
Human-Use Considerations

- Navigational Channels
- High-use boat locations
- Marinas
- Boat ramps
- High density boat slip locations
Boat Usage
Digitized Boat Usage
(July 3, 2010)

Legend
- Stationary Boats
- Boats in Motion

2 Miles
3 Kilometers

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Public and Private Boat Ramps, High Density Boat Slips, and Marinas

Legend
- High Density Boat Slips
- Public/Private Boat Ramps
- Marinas

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Physical Data

- **Bathymetry**
  - DNREC 2004 Bay wide Surveys (NAVD 88, ft)

<table>
<thead>
<tr>
<th>Date</th>
<th>Coverage</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>IR Inlet and Surrounding areas</td>
<td>USACE</td>
</tr>
<tr>
<td>2004</td>
<td>Inland Bays</td>
<td>DNREC</td>
</tr>
<tr>
<td>2004</td>
<td>Love Creek</td>
<td>DNREC</td>
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<tr>
<td>2004</td>
<td>Herring Creek</td>
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<tr>
<td>1998</td>
<td>Guinea Creek</td>
<td>DNREC</td>
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<tr>
<td>2000</td>
<td>Bald Eagle Creek</td>
<td>DNREC</td>
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<tr>
<td>2005</td>
<td>Roosevelt Inlet (Lewes Rehoboth Canal)</td>
<td>USACE</td>
</tr>
</tbody>
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- **Bottom sediment data**
  - DNREC Clam Abundance Surveys
  - Chrzastowski (1986)

- **Salinity**
Inland Bay Bathymetry

Legend
DNREC Bathymetry (2004)
NAVD 88, ft

-13.6 - -8.1
-8.0 - -6.0
-5.9 - -3.9
-3.8 - -1.8
-1.7 - 4.5

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Multi- and Single Beam Survey Data (USACE, 2004)

Bathymetry
- 0 to 10 ft
- 10 to 20 ft
- 20 to 30 ft
- 30 to 40 ft
- >40 ft

Figure 2-15. Bathymetry (NAVD88) obtained from USACE (2004)
Bottom Sediment Data

- Mike Bott, DNREC (2010) Shellfish surveys of the Inland Bays
  - 278 quantitative sediment sampling locations
Biological/Ecological Data

• Shellfish
  o Clam abundance and potential habitat
    • Mike Bott, DNREC (2010) Shellfish surveys of the Inland Bays
      o 278 quantitative sampling locations
      o Clam abundance and sediment type

• Intertidal and Supratidal Habitat
  o Seasonal important Animal habitat
    • DNREC Heritage Program
      o Birds
Data Needs

- Bottom Sediment Data
  - NRCS data for subaqueous soils in bays

- Bathymetry
  - DNREC
  - USACE

- DNREC Heritage Program:
  - Species Distribution Update

- Potential Development areas (Long-term)
  - Marinas
  - Private ramps
  - Coastal development
Data (GIS) collection and synthesizing subcommittee

- Determine what data has been collected and what data is still needed to form a Commercial oyster aquaculture suitability map (GIS layer).
  - Report to team at June 5th meeting

- Synthesize data into a GIS layer showing optimal oyster aquaculture areas.
  - Draft product presented to team at July 3rd meeting