The Effect of Long Piers on Salt Marsh Birds

Alison B Rogerson
CIB STAC
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Possible habitat impacts:
• Aesthetics
• Shoreline access
• Loss of vegetation
• Erosion
• Invasion of new species
• Water Quality
• Habitat Fragmentation
Possible bird impacts:

- Increased human activity
- Habitat fragmentation
- Reduced habitat quality
- Predator access
Site Selection

Pier site example

Nonpier site example
• Point count surveys
  – Passive
  – Call back
• 4 site replicates per year
• Sunrise and sunset
• May-July 2005-2006
Birds of the Salt Marsh

**Obligate Marshbirds**
- Swamp Sparrow
- Virginia Rail
- Willet

**Facultative Marshbirds**
- Red-winged Blackbird
- Boat-tailed Grackle
- Fish Crow
- Common Tern

**Heron & Egrets**
- Tri-colored Heron
- Great Egret
- Black-crowned Night-heron

**Gulls & Terns**
- Laughing Gull
- Great Black-backed Gull
- Common Tern
Pier Analysis

• Data analysis using 4 bird guilds:
  – Between treatment types using Analysis of Covariance (ANCOVA)
    – Relative abundance
    – Species richness
  – Relationship to long pier density using linear regression
    – Relative abundance
    – Species richness
  – Habitat variation
  – Bird detection probability
Results – Relative Abundance

<table>
<thead>
<tr>
<th>Taxa</th>
<th>Pier Sites</th>
<th>Nonpier</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obligate Marshbirds</td>
<td>10</td>
<td>6</td>
<td>0.213</td>
</tr>
<tr>
<td>Facultative Marshbirds</td>
<td>12</td>
<td>8</td>
<td>0.072</td>
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<tr>
<td>Herons &amp; Egrets</td>
<td>4</td>
<td>2</td>
<td>0.015</td>
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<tr>
<td>Gulls &amp; Terns</td>
<td>10</td>
<td>6</td>
<td>0.064</td>
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</table>
Results – Species Richness

<table>
<thead>
<tr>
<th>Species Category</th>
<th>Pie Sites</th>
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<th>P-value</th>
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</thead>
<tbody>
<tr>
<td>Obligate Marshbirds</td>
<td>0.5</td>
<td>1.5</td>
<td>P = 0.038</td>
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<tr>
<td>Facultative Marshbirds</td>
<td>2</td>
<td>2.5</td>
<td>P = 0.641</td>
</tr>
<tr>
<td>Herons &amp; Egrets</td>
<td>1.5</td>
<td>2</td>
<td>P = 0.34</td>
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<tr>
<td>Gulls &amp; Terns</td>
<td>3</td>
<td>3.5</td>
<td>P = 0.273</td>
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</tbody>
</table>
Results: Long Pier Density

• Obligate Marshbirds
  – Relative Abundance: negatively related
    \[ P < 0.001, \ R^2 = 0.22 \]
  – Species Richness: negatively related
    \[ P = 0.004, \ R^2 = 0.15 \]
• **Facultative Marshbirds**
  - Relative Abundance: no relationship
    \[ P = 0.696 \]
  - Species richness: negative relationship
    \[ P = 0.054, R^2 = 0.08 \]
Results: Long Pier Density

- **Heron & Egrets**
  - Relative Abundance: no relationship
    \[ P = 0.690 \]
  - Species Richness: no relationship
    \[ P = 0.937 \]
Results: Long Pier Density

- **Gulls & Terns**
  - Relative Abundance: positive relationship
    \[ P = 0.014, R^2 = 0.12 \]
  - Species richness: positive relationship
    \[ P = 0.021, R^2 = 0.11 \]
Discussion – Pier Analysis

• Obligate marshbirds
  – Consistent impacts
  – Sensitive to long piers
  – Lifestyle restrictions → indicator species

• Facultative marshbirds
  – Abundant species, foraging flexibility
  – Red-winged Blackbird sensitivity – shoreline clearing

• Herons and egrets
  – Foraging and security
  – Piers as attractants for perching

• Gulls and terns
  – Gulls vs. Terns
  – Foraging flexibility
Management Implications

• Reduce and limit the presence and density of long piers in tidal wetlands

• Conserve contiguous marsh area
Support community piers

Replace permanent piers with floating or seasonal docks

T dock with floating end

Adapt to new research

Minimize construction disturbance

Non-leaching wood
DNREC Division of Water Resources
Wetland and Subaqueous Lands Section
www.dnrec.delaware.gov/
302-739-9943

Boat Docking Facilities Guidance Document