Monitoring Potential Changes in Macroalgal Communities on Nearshore Hardbottom Habitats Following Beach Nourishment in Indian River County, Florida

Erin Hodel, Keith Spring, Jeffery Landgraf – CSA International
Peter Seidle – Applied Technology & Management
Dr. Jonathan Gorham – Indian River County / Inwater Research Group
Nearshore Hardbottom Resources

Photo IRG
Monitoring Methods

I. Quantitative Video

• Nearshore & Offshore segments (20 m length each)

• Digitize video and create non-overlapping still frames

• Analyze each frame using point count method
Monitoring Methods

I. *In-Situ* Quadrat Sampling

- 10 quadrats per transect at fixed locations
- Visual estimates of percent cover of macroalgae, fauna, and substrates
- Nearshore = 0-40 m
  Offshore = >40 m
Multivariate Statistical Analyses

H₀₁: No significant difference in the composition of the macroalgal community among surveys.

H₀₂: No significant difference in the composition of the macroalgal community between Primary and Reference (Nearshore and Offshore) areas.

Construct Bray-Curtis similarity matrices (Primer 6.1.6)

Apply multi-dimensional scaling (MDS) and cluster analysis

Run analysis of similarities (ANOSIM)

Run similarity percentage routines (SIMPER).
## Results - Taxonomic Richness

- 33 genera and 27 species have been identified to date.

<table>
<thead>
<tr>
<th>Taxa</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Video</td>
<td>Quadrat</td>
<td>Video</td>
</tr>
<tr>
<td>Chlorophyta</td>
<td>6</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Phaeophyta</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Rhodophyta</td>
<td>7</td>
<td>13</td>
<td>14</td>
</tr>
<tr>
<td>Turf</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>17</strong></td>
<td><strong>22</strong></td>
<td><strong>28</strong></td>
</tr>
</tbody>
</table>
Common Taxa

*Caulerpa prolifera*
*Caulerpa spp.*
*Cladophora prolifera*
*Ulva spp.*

*Sargassum platycarpum*
*Spatoglossum Schroederi*

*Agardhiella subulata*
*Botryocladia occidentalis*
*Bryothamnion seaforthii*
*Gelidiopsis planicaulis*
*Gracilaria spp.*
*Hypnea spp.*
*Laurencia spp.*
Preferred Species?

Photo - IRG

Bryothamnion seaforthii

Laurencia poiteaui

Algae photos from Litter, Litter, and Hanisak, 2008
Results - Video

Nearshore

Offshore

Percent Cover (%)

Turf
Unidentified
Rhodophyta
Pheaophyta
Chlorophyta

2007 2008 2009
Results - Quadrat

Nearshore

Percent Cover (%)

Offshore

2007 2008 2009

Turf
Rhodophyta
Phaeophyta
Chlorophyta
Community Composition - ANOSIM

- Project = Reference
- Nearshore ≠ Offshore
  \( R = 0.119, \ p = 0.017 \)
- 2007 = 2008
- 2007 ≠ 2009 \( R = 0.385, \ p = 0.0002 \)
- 2008 ≠ 2009 \( R = 0.457, \ p = 0.0002 \)
## Results - Video Data

### Compositional Differences - SIMPER

<table>
<thead>
<tr>
<th>Year</th>
<th>Offshore</th>
</tr>
</thead>
</table>
| Nearshore | **Caulerpa prolifera** and **Turf Algae (nearshore)**  
            | **Bryothamnion seaforthii** (offshore) |

<table>
<thead>
<tr>
<th>Year</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td><strong>Turf Algae, Caulerpa prolifera, Bryothamnion seaforthii</strong> (2009)</td>
</tr>
</tbody>
</table>
<pre><code>        | **Caulerpa prolifera**, **Turf Algae** (2009)                           |
</code></pre>
Community Composition - ANOSIM

- Project = Reference
- Nearshore = Offshore
- 2007 ≠ 2008 \( (R = 0.218, p = 0.009) \)
- 2007 ≠ 2009 \( (R = 0.202, p = 0.001) \)
- 2008 ≠ 2009 \( (R = 0.338, p = 0.001) \)
### Compositional Differences - SIMPER

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2009</th>
</tr>
</thead>
</table>
Quadrat Data - Year

Similarity

Year

▲ 2007
▼ 2008
● 2009
Annual variations in the macroalgal community are stronger than spatial variations.

Fluctuations in proportional percent cover of several dominant species driving differences among surveys (Turf algae, *B. seaforthii*, *C. prolifera*).

Taxonomic richness among surveys is similar.

Turtle favorites *Bryothamnion seaforthii* and *Laurencia poiteaui* are common in Sectors 1 & 2. Monitoring these species may be important for juvenile Green turtle habitat management and conservation.

No significant difference between project and reference areas.
Acknowledgments

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