Cleveland Harbor Green Breakwaters Demonstration Project

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US Army Corps of Engineers
BUILDING STRONG®
Great Lakes (GL) Green Breakwaters Study

- Evaluate alternatives for enhancing aquatic ecosystem benefits at existing breakwaters and navigation structures
- During routine repairs and maintenance, as part of modifications, or during comprehensive structural repairs and replacements
- Concept extends to shore protection structures, non-USACE structures
Demonstration Projects - Approach

- Demonstrate potential improvements
- GL coastal structures during routine maintenance activities
- Simple design modifications to structural elements
- Potential to reduce environmental impairments within GL region
Cleveland East Arrowhead Breakwater

• Beyond indirect and unplanned habitat creation
• Modify design of featureless concrete toe blocks used for breakwater maintenance
• Provide features creating habitat opportunities for GL fish and other aquatic life
• Examines creation of habitat surfaces on toe blocks
  ➢ Protected indented shelf
  ➢ Dimpled block surface
  ➢ Grooved block surface
Deteriorating Breakwater

Short Repair Section w/ Block

8’ x 4’ x 4’ Repair Toe Block
Are there ways to improve biological value of blocks?
Cleveland & Ashtabula, OH

- Control
- Grooved
- Dimpled
- Grooved Shelf
Texture Scale
Sample Collection

Post-sampled Area
## Schedule

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<thead>
<tr>
<th></th>
<th>Cleveland</th>
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<tbody>
<tr>
<td>Construction</td>
<td>April 2012</td>
</tr>
<tr>
<td>Monitoring 1</td>
<td>October 2012</td>
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<tr>
<td>Monitoring 2</td>
<td>June 2013</td>
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<tr>
<td>Monitoring 3</td>
<td>October 2013</td>
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<td>Monitoring 4</td>
<td>September 2014</td>
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Results – Abundance (October 2012)
What Have We Learned to Date?

- Initial colonization (Oct. 2012) greater for most groups on grooved blocks
  - Invertebrate secondary production increase
- Potential to provide juvenile fish refuge
- Awaiting sample processing and analysis from other monitoring events
- Extended monitoring?
Cleveland Harbor Products and Awards

- Brochures
- Trade Publications
- PIANC WwN Certification
Path Forward

- Seek opportunities to conduct demonstrations or full scale projects with partners
- Assess and report on benefits and realized ecosystem goods and services
- Lessons learned – adaptively manage
- Fully communicate with partners, academia, and the public

Ashtabula Harbor, Ohio