

Presentation to Lake Erie Allegany Partnership

18 March 2015

USACE Green Breakwaters / Engineering With Nature Pilot Projects on Lake Erie

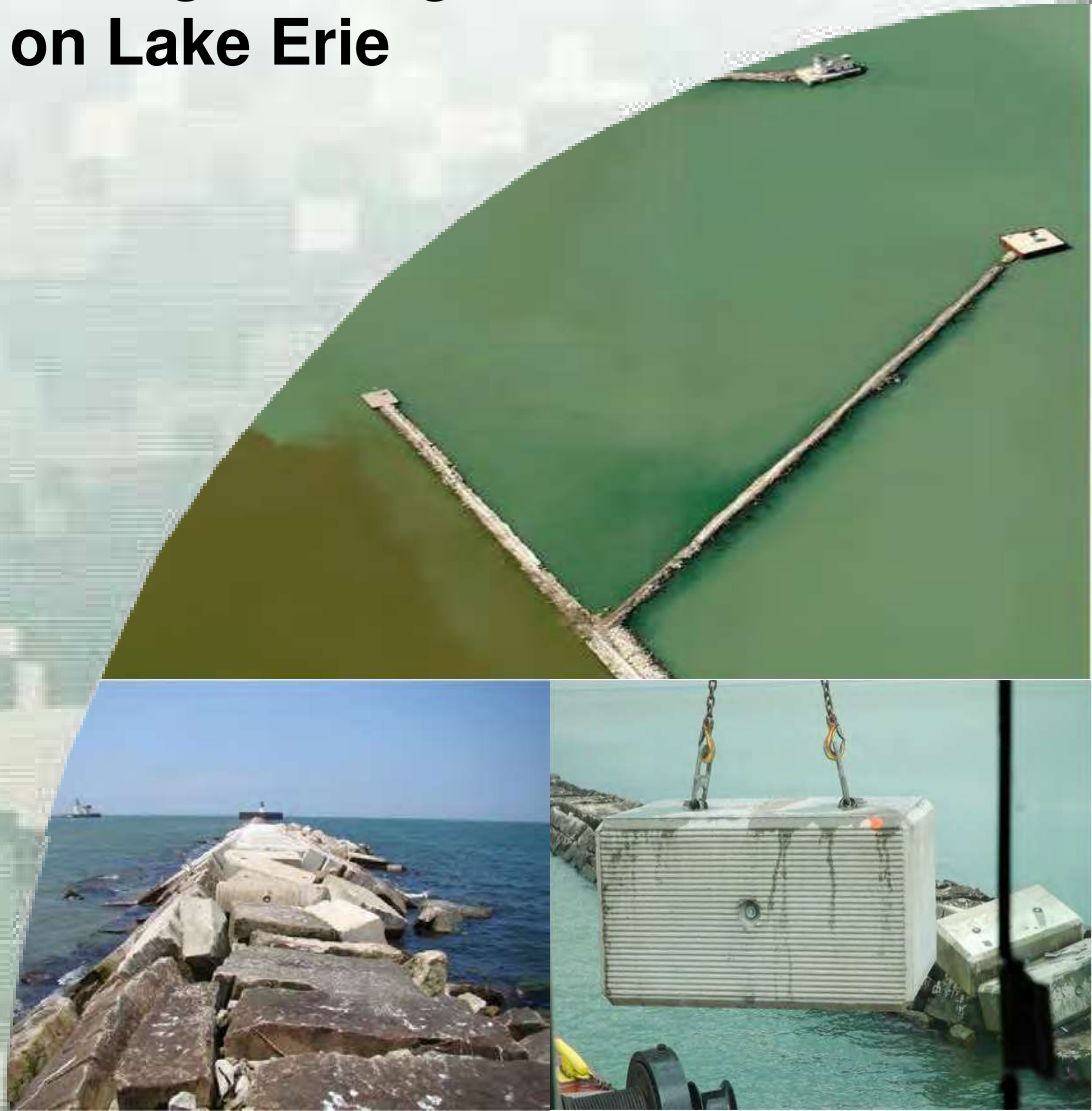
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Navigation Structure Repair Program Manager

Buffalo District



US Army Corps of Engineers
BUILDING STRONG®



Outline

- Engineering With Nature
- GLRI Green Breakwaters Projects
 - ▶ Cleveland Harbor Pilot Project
 - ▶ Ashtabula Harbor Pilot Project

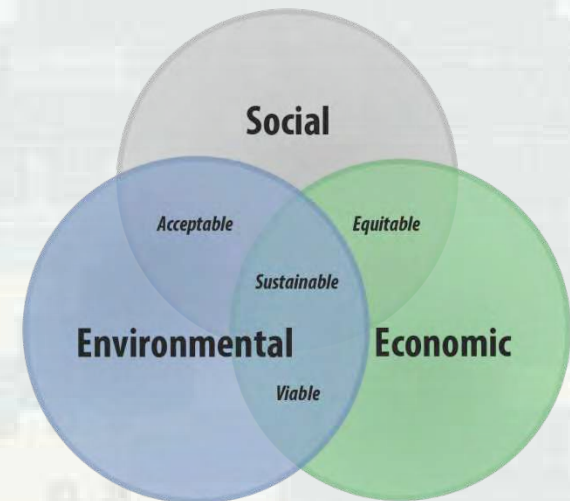


Engineering With Nature...

...the intentional alignment of natural and engineering processes to efficiently and sustainably deliver economic, environmental and social benefits through collaborative processes.

Key Elements:

- Science and engineering that produces operational efficiencies
- Using natural process to maximum benefit
- Broaden and extend the benefits provided by projects
- Science-based collaborative processes to organize and focus interests, stakeholders, and partners



GLRI Green Breakwaters

- EPA funded pilot projects demonstrating the potential to economically incorporate aquatic habitat features into the O&M repairs of Federal Navigation Structures, and to provide nesting habitat for targeted bird species on top of existing breakwater structures.
- EPA funding covered the differential cost of including the habitat features into the existing O&M repair projects
- Cleveland Harbor – Aquatic habitat only
- Ashtabula harbor – Aquatic habitat, common tern nesting area, low growing vegetation habitat



60 Commercial Projects, including
51 Commercial Harbors (45 with structures)

79 Recreational Projects, including
71 Recreational Harbors (61 with structures)

Harbor Project

Commercial Recreational

60 Commercial Projects, including
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 **Commercial**
 **Recreational**



Deteriorating Breakwater



Short Repair Section w/ Block



8' x 4' x 4' Repair Toe Block



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Are there ways to improve biological value of blocks?





Control



Grooved



Dimpled

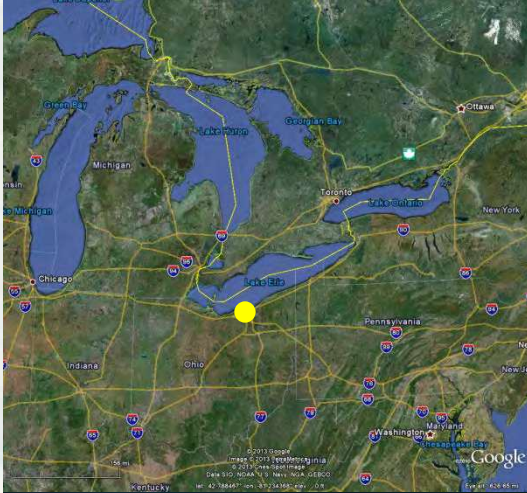


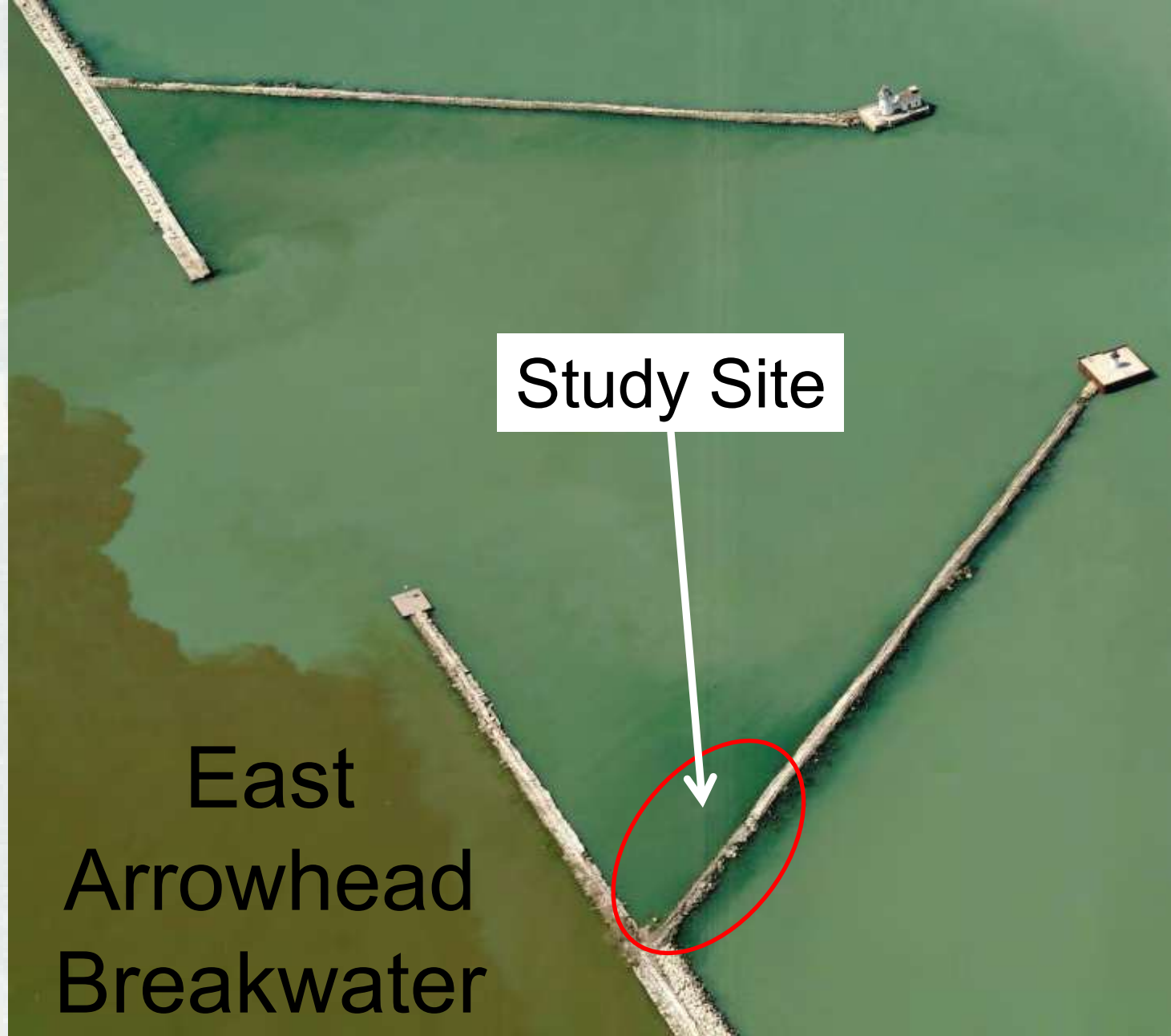
Grooved Shelf

Texture Scale



Cleveland Harbor Study Site





East
Arrowhead
Breakwater

Study Site



Cleveland Project Schedule

- April/May 2012 – 13 toe blocks installed
- October 2012 – sampling
- April/May 2013 – 3 of the 2012 blocks reset – Hurricane Sandy repairs – no new toe blocks
- June 2013 – sampling
- October 2013 – sampling
- April/May 2014 – remaining 21 blocks set
- 2014/15 - data analysis & reporting



Toe Block Layout



S – Shelf (5)
D – Dimple (2)
C – Control (3)
G – Groove (3)

- A total of 34 blocks were set
- 2013 work was delayed due to necessary Hurricane Sandy repairs





Sampling Grid

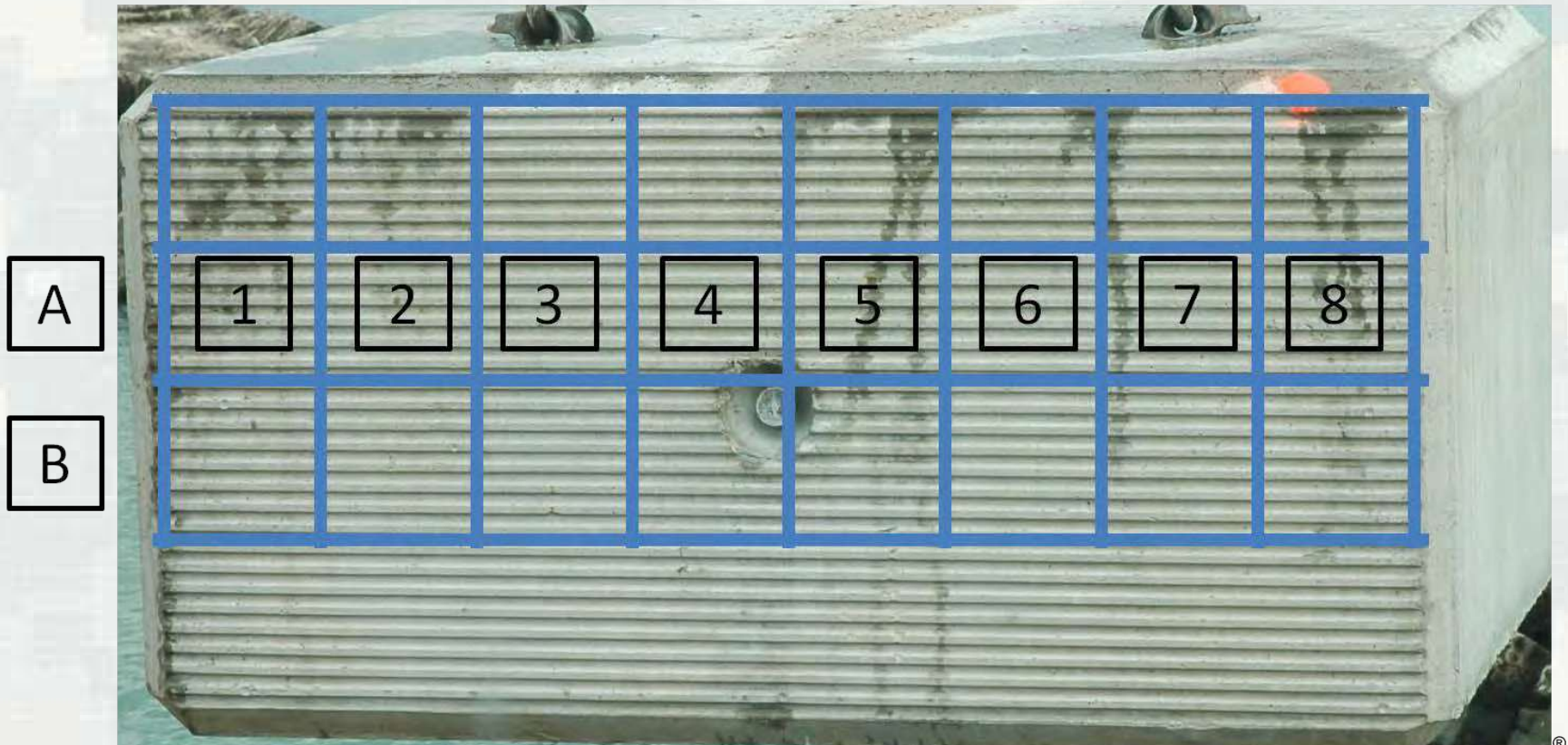


Sample Collector



Sampling Grid

- Top row was not submerged





Sample Collection



Post-sampled Area

Representative Samples



Control



Grooved

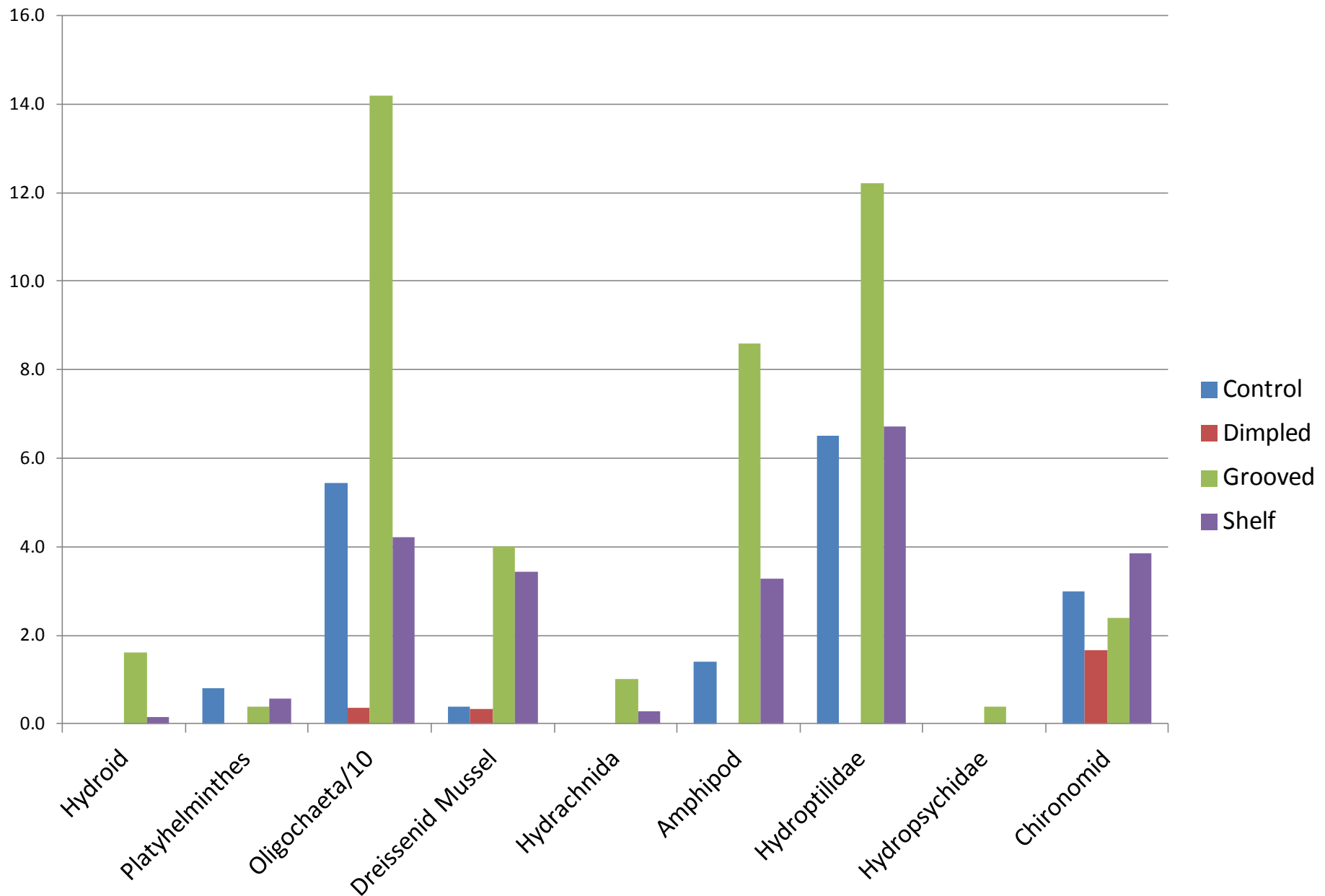


Dimpled



Grooved Shelf

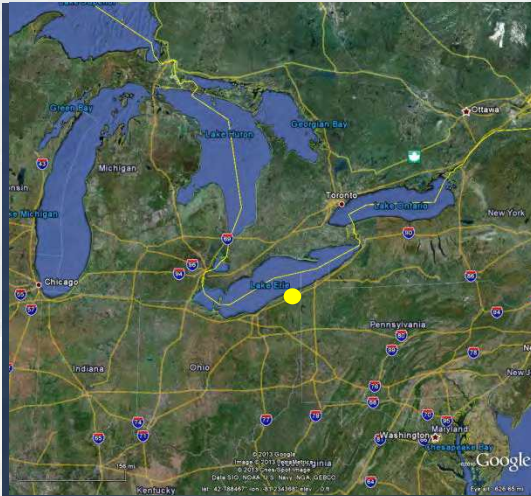
Preliminary Results – Abundance – October 2012



Preliminary Conclusions

- Initial colonization greater for most groups on grooved blocks
 - ▶ Invertebrate Secondary Production Increase
- Potential to provide juvenile fish refuge





Ashtabula Harbor Study Site



Study Site



East Breakwater



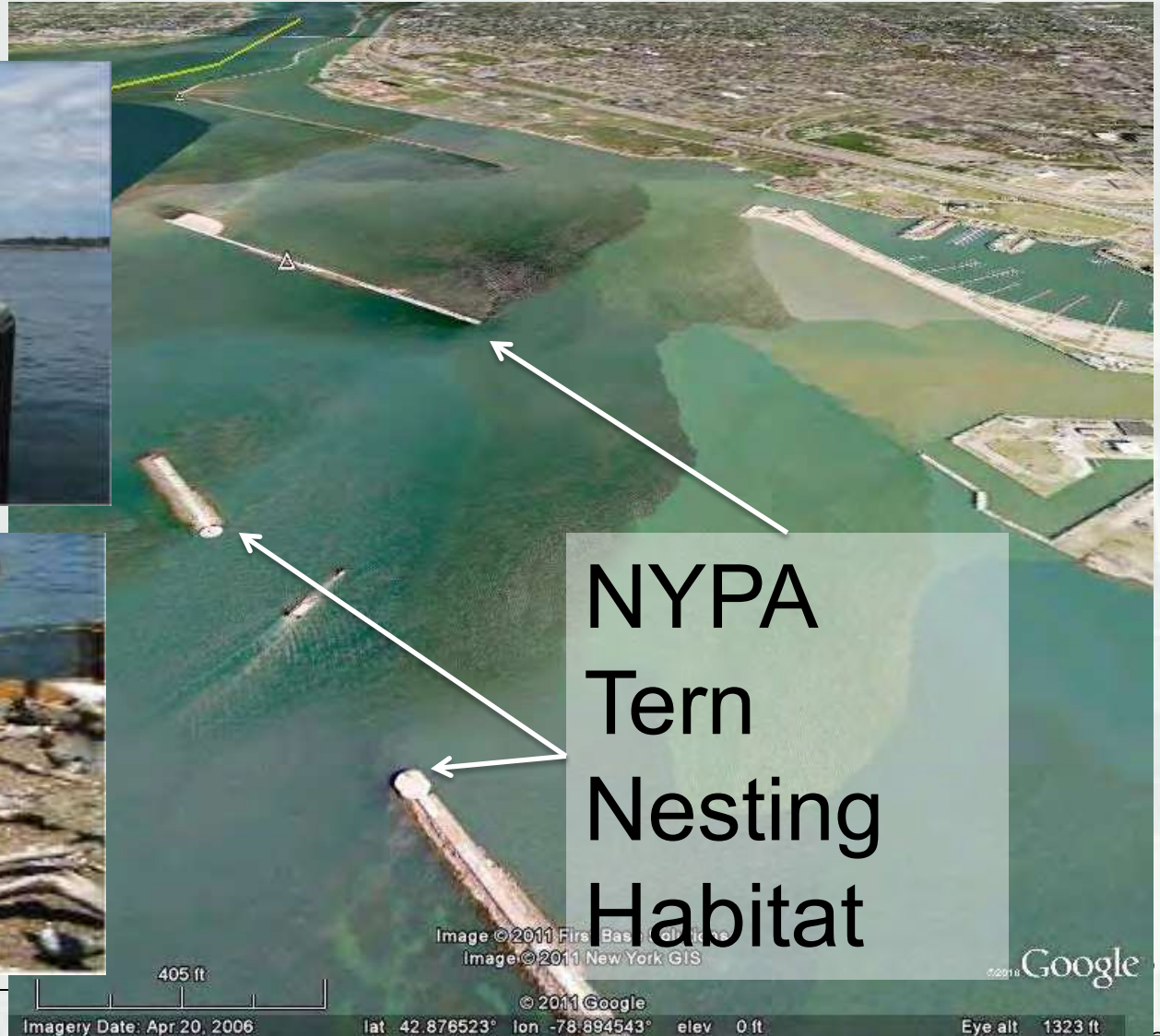
Ashtabula Project Schedule

- Phase I Construction (2013)
 - Aquatic habitat block installation
 - 250 sq ft of tern nesting habitat
- Phase II Construction (2014)
 - Aquatic and low growth vegetation habitat block installation
 - Additional 250 sq ft of tern nesting habitat
- Phase III Construction (2015 Planned)
 - Complete installation of habitat blocks
- Monitoring
 - Planned monitoring period 2014-2017
 - No terns yet
 - Aquatic and low growth vegetation monitoring starting in 2015
- O&M of Tern Habitat
 - By The Nature Conservancy once USACE study is completed



Tern Nesting Habitat

New York Power Authority – Buffalo, NY



Ashtabula, OH Tern Nesting Blocks



The Nature Conservancy
Protecting nature. Preserving life.®



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Phase I Tern Habitat





Solar powered call box

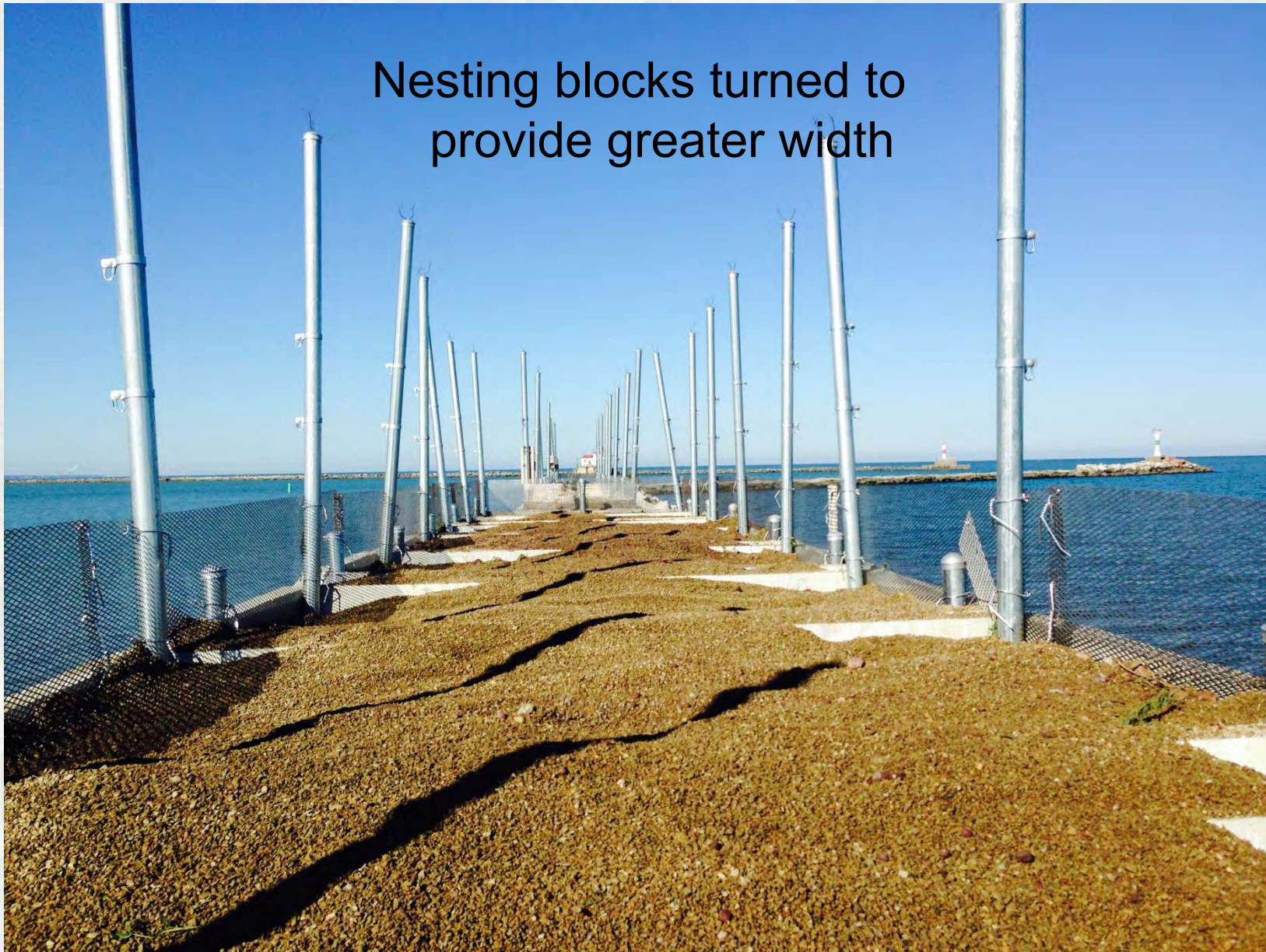
Grooved texture
on slope blocks



Phase II Tern Habitat



Nesting blocks turned to
provide greater width







CERTIFICATE OF RECOGNITION

PIANC, the World Association for Waterborne Transport Infrastructure,

hereby grants the company

US ACE

the **"Certificate of Recognition"** for the project

(name) "Cleveland Arrowhead Breakwater"

(place/country) United States

developed following the **"Working with Nature"** philosophy as approved by the jury.

Brussels, October 8, 2013 (date)

Louis Van Schel
Secretary-General

Geoffroy Caude
President



The USACE Team

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Questions?

