Presentation to Lake Erie Allegany Partnership
18 March 2015

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

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Buffalo District

Great Lakes RESTORATION

EWN

US Army Corps of Engineers

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Outline

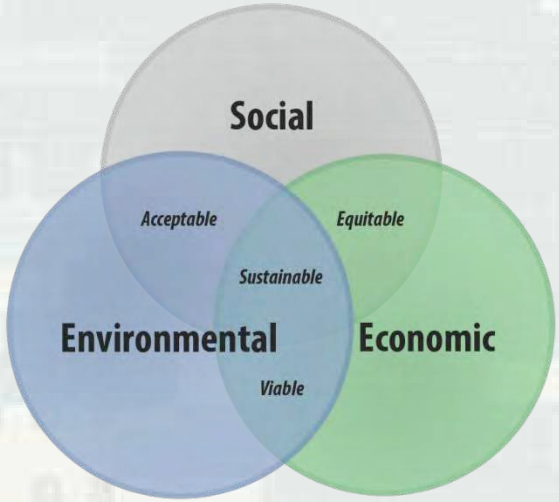
- Engineering With Nature
- GLRI Green Breakwaters Projects
  - Cleveland Harbor Pilot Project
  - Ashtabula Harbor Pilot Project

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:

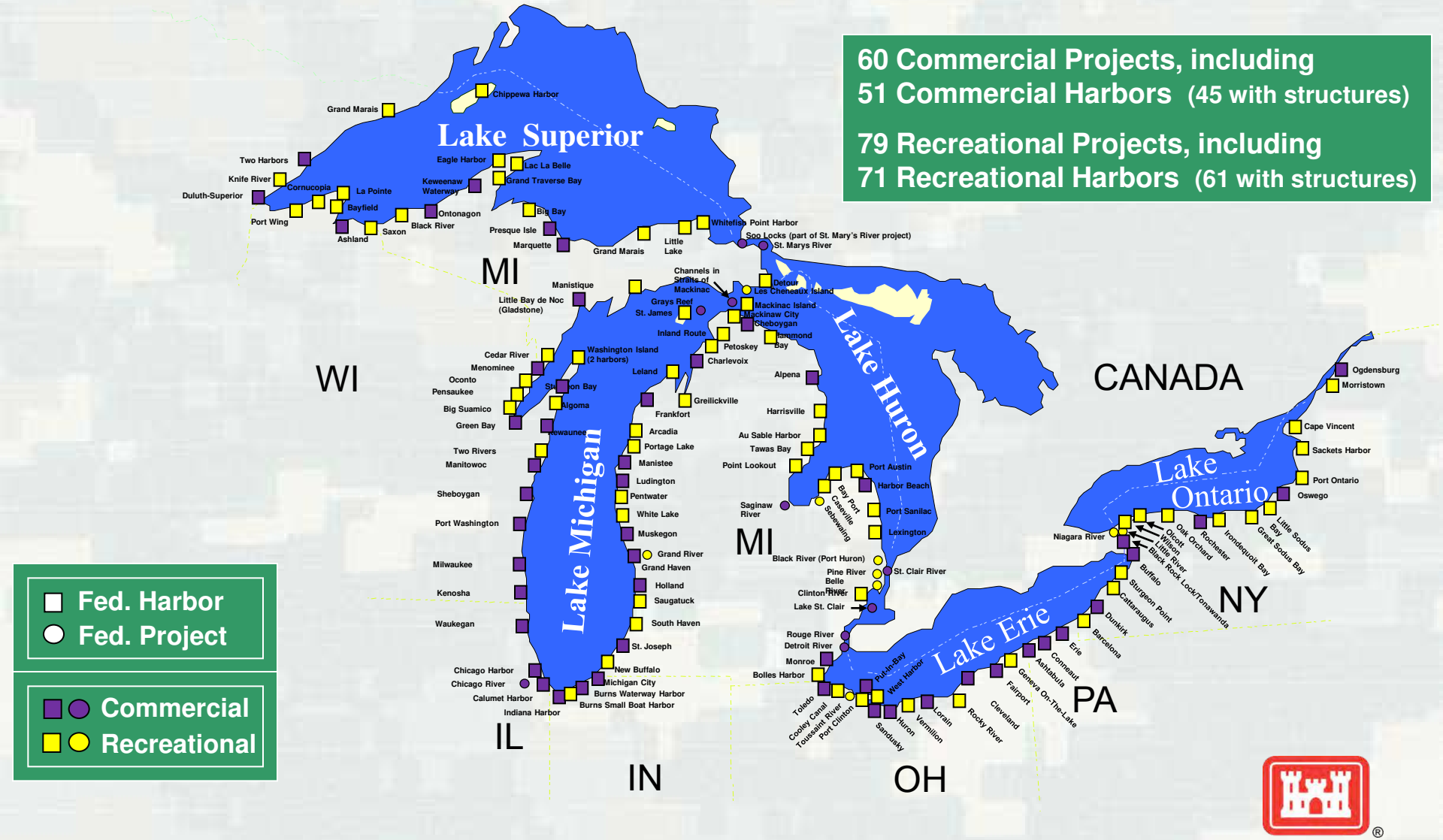
- Science and engineering that produces operational efficiencies
- Using natural process to maximum benefit
- Broaden and extend the benefits provided by projects
- Science-based collaborative processes to organize and focus interests, stakeholders, and partners



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

Great Lakes Navigation System (GLNS)



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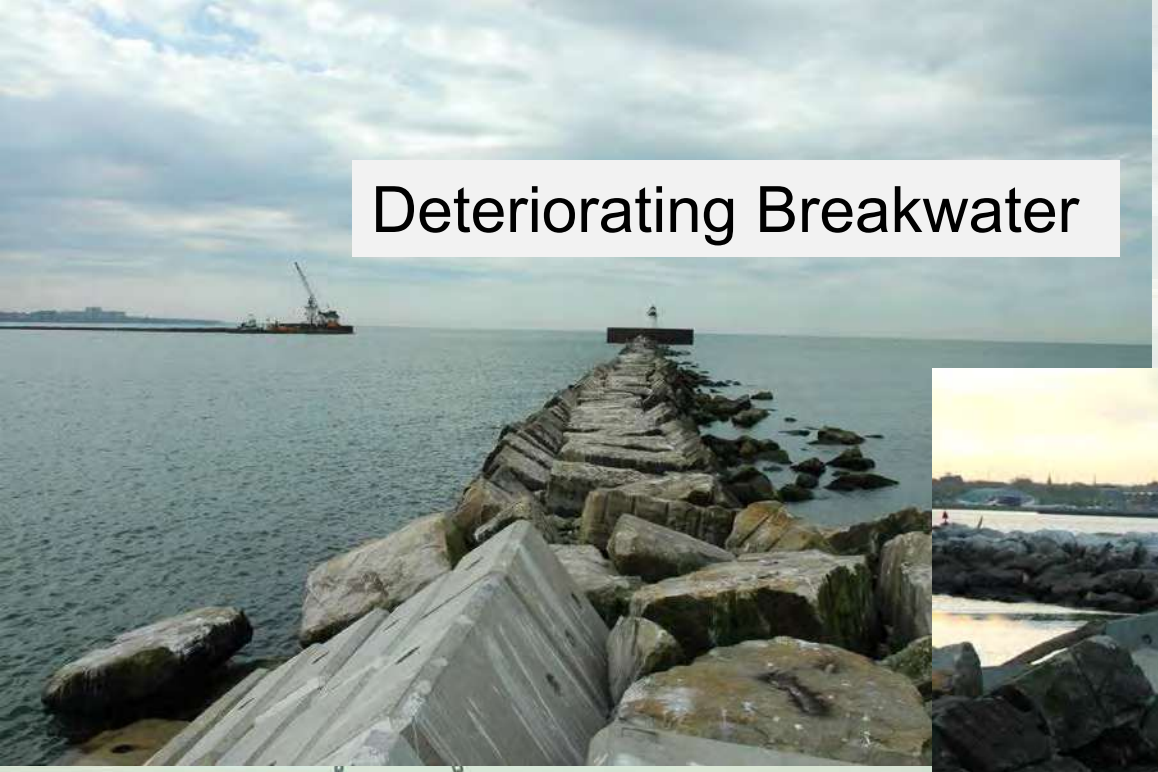

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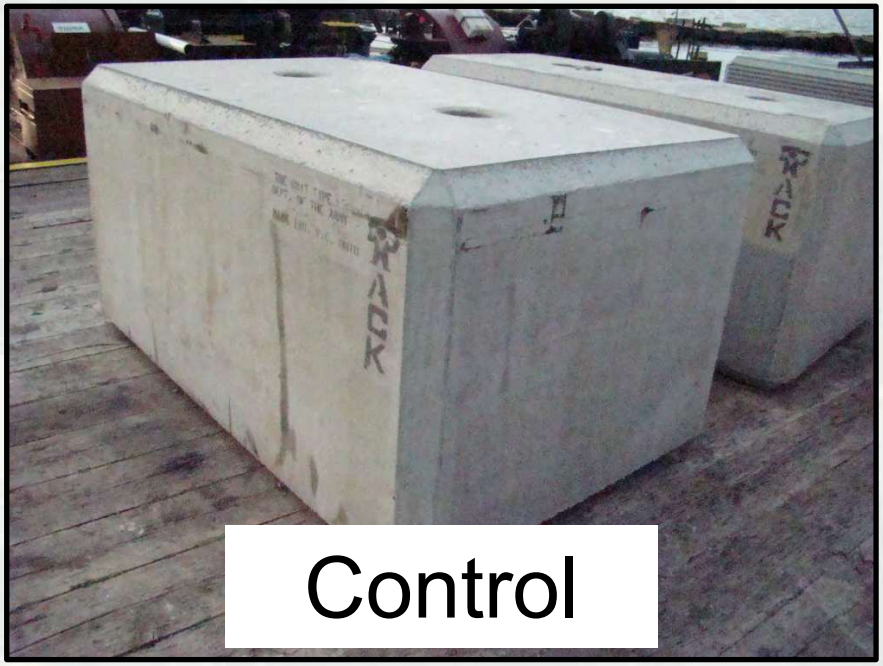
Are there ways to improve biological value of blocks?


Control


Grooved


Dimpled


Grooved Shelf

Texture Scale

Cleveland Harbor Study Site

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Study Site
East
Arrowhead
Breakwater

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)

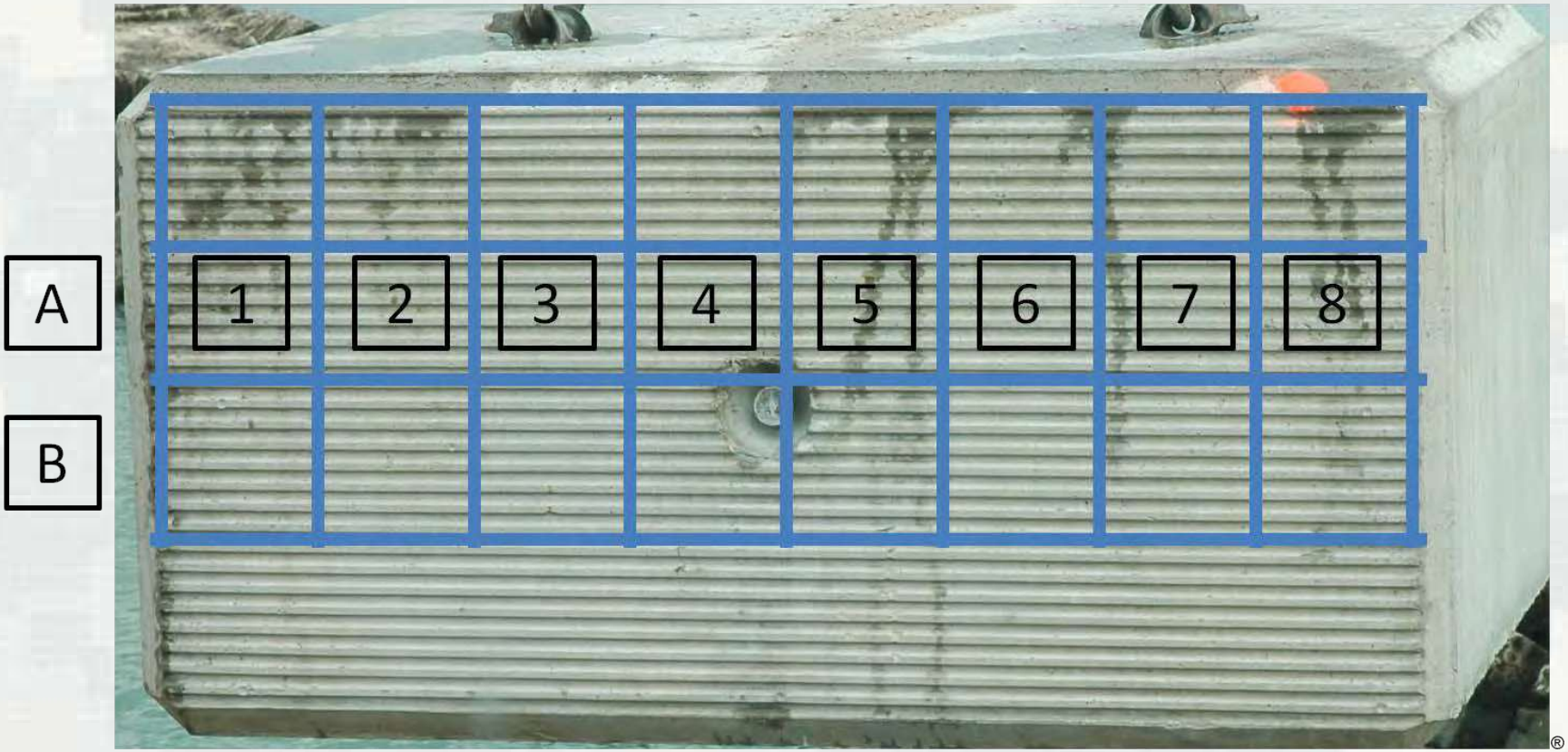
- A total of 34 blocks were set
- 2013 work was delayed due to necessary Hurricane Sandy repairs

Sampling Grid

Sample Collector

Sampling Grid

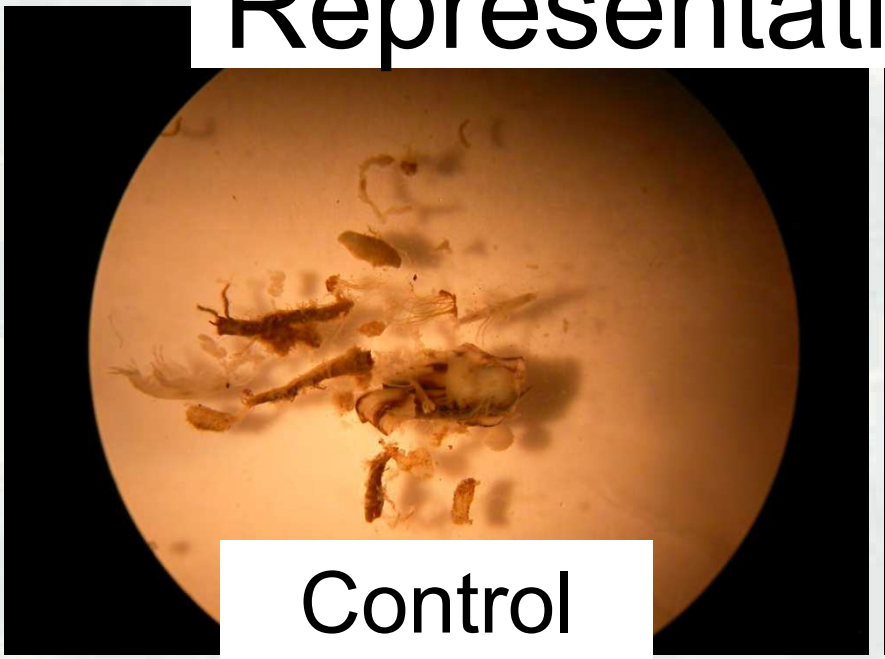
- Top row was not submerged



Sample Collection

Post-sampled Area

Representative Samples



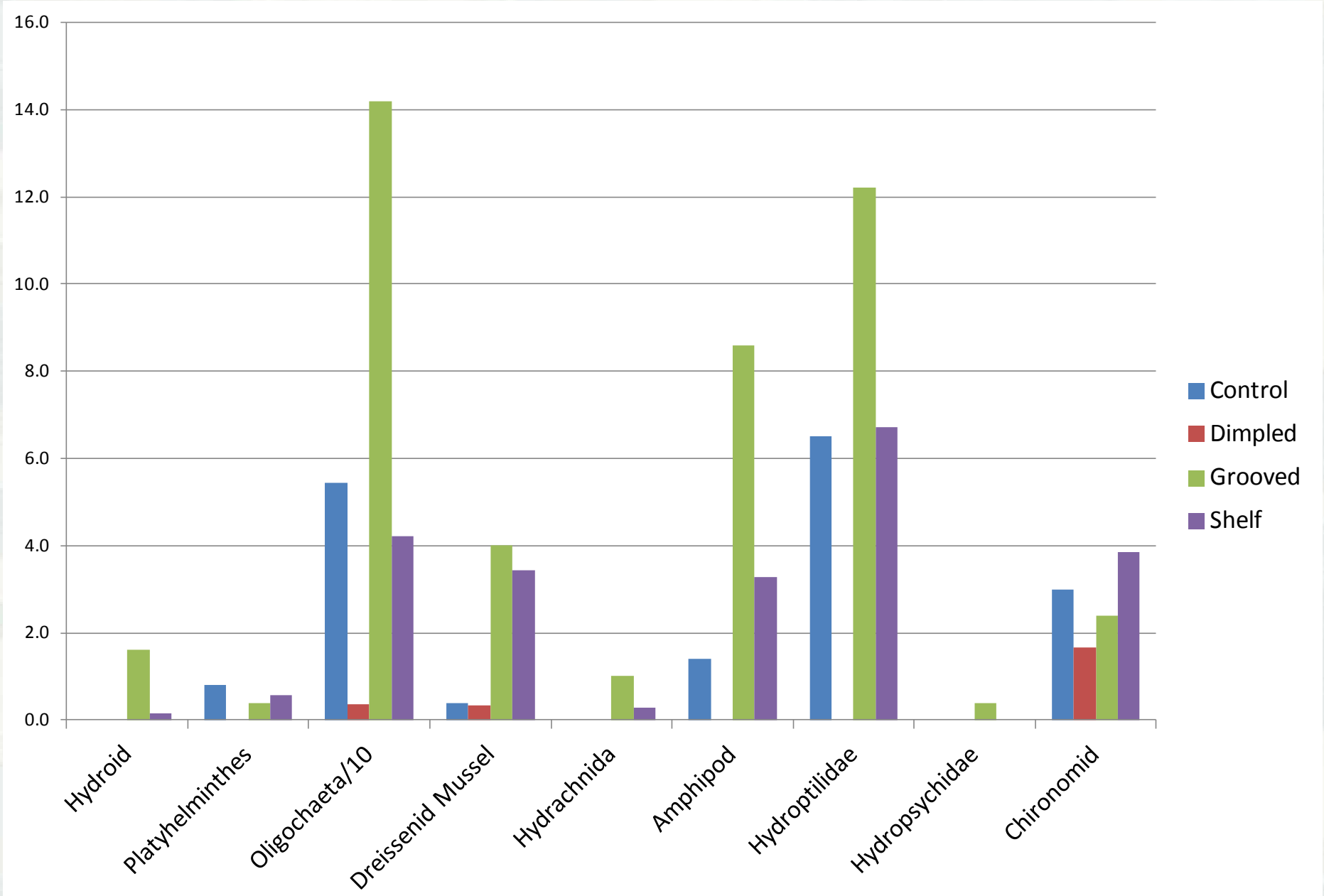
Control

Grooved

Dimpled

Grooved Shelf

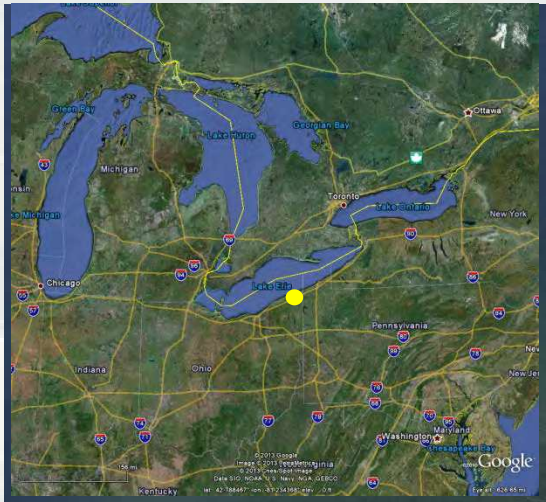
Preliminary Results – Abundance – October 2012

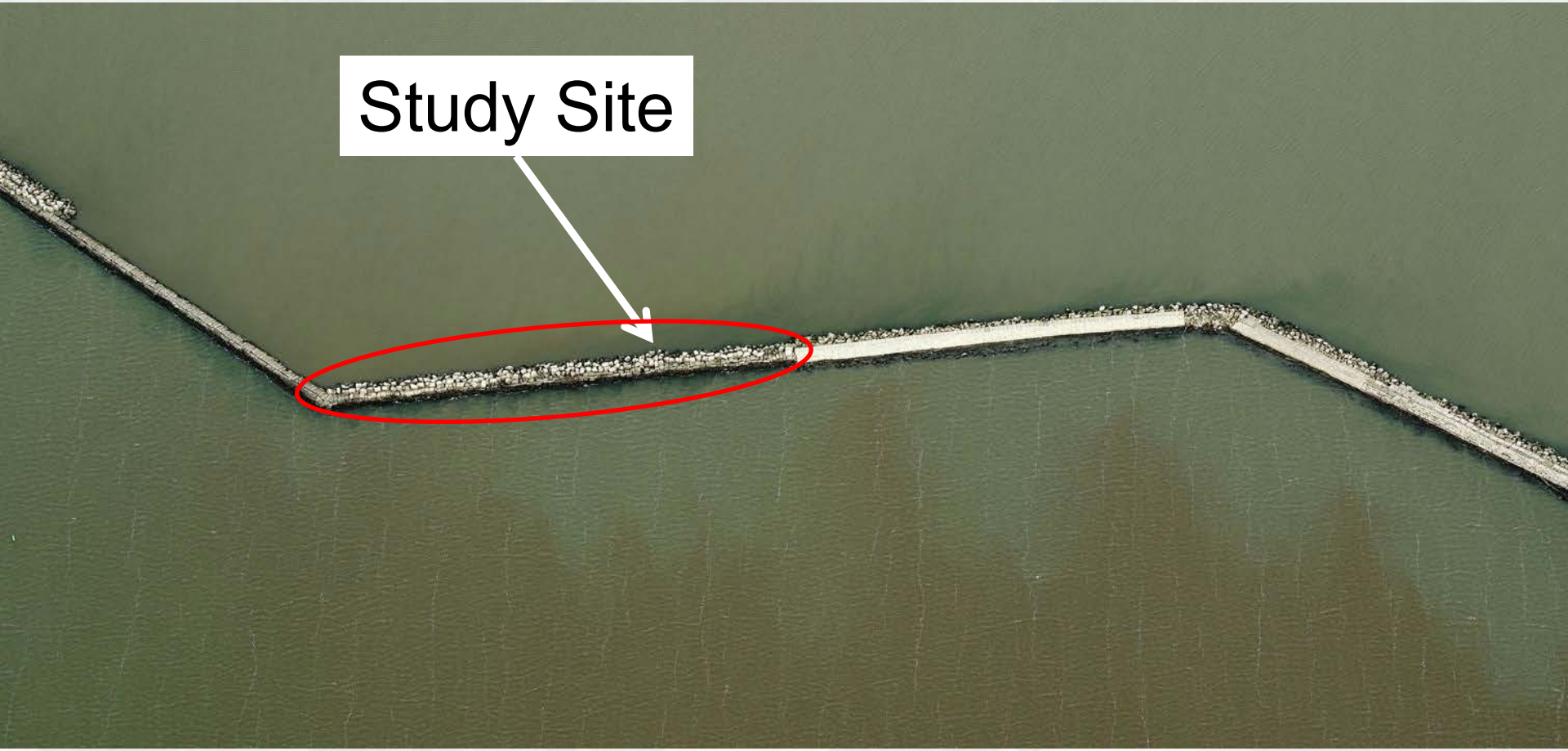


Preliminary Conclusions

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

Ashtabula Harbor Study Site



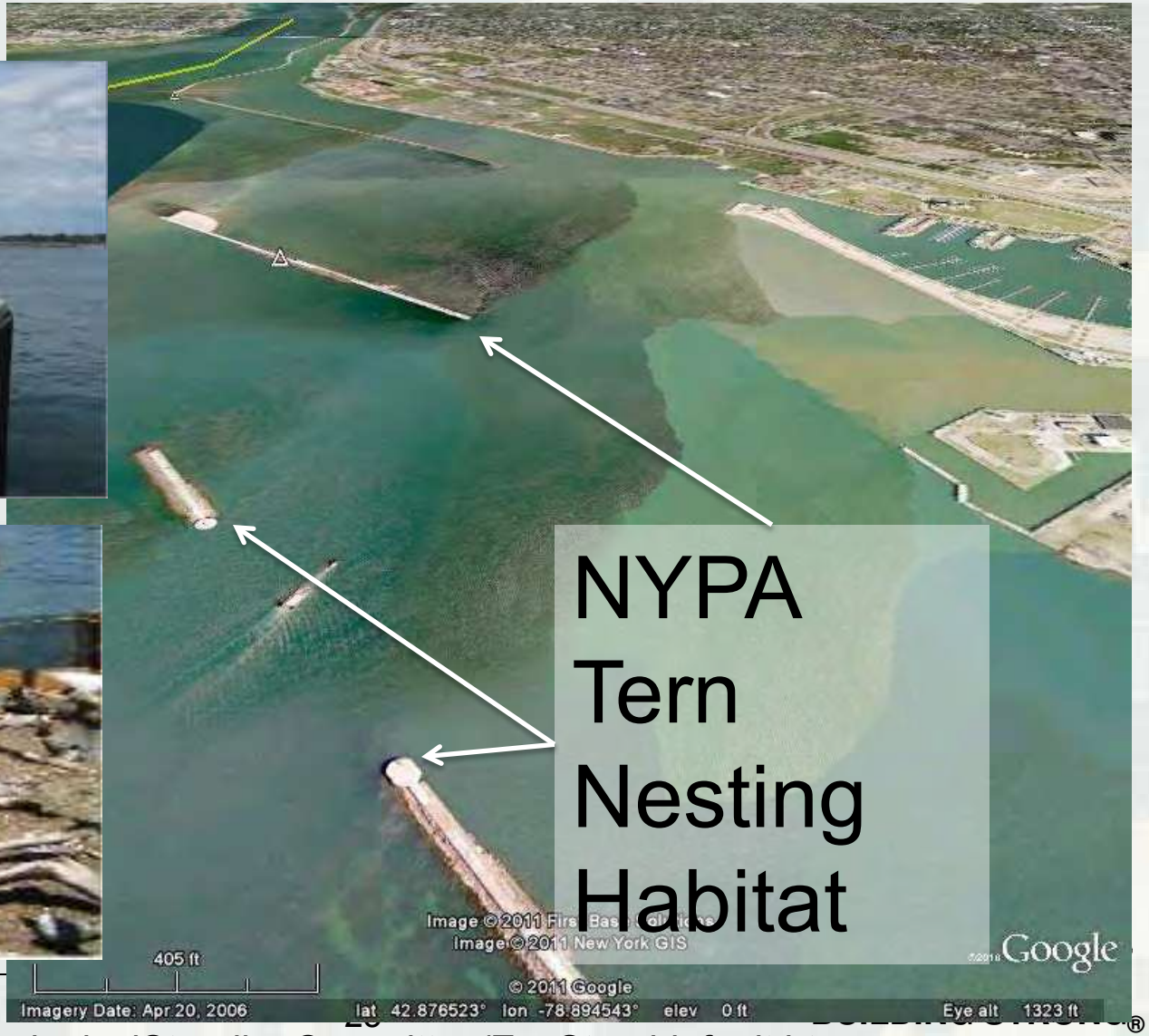


East Breakwater

Ashtabula Project Schedule

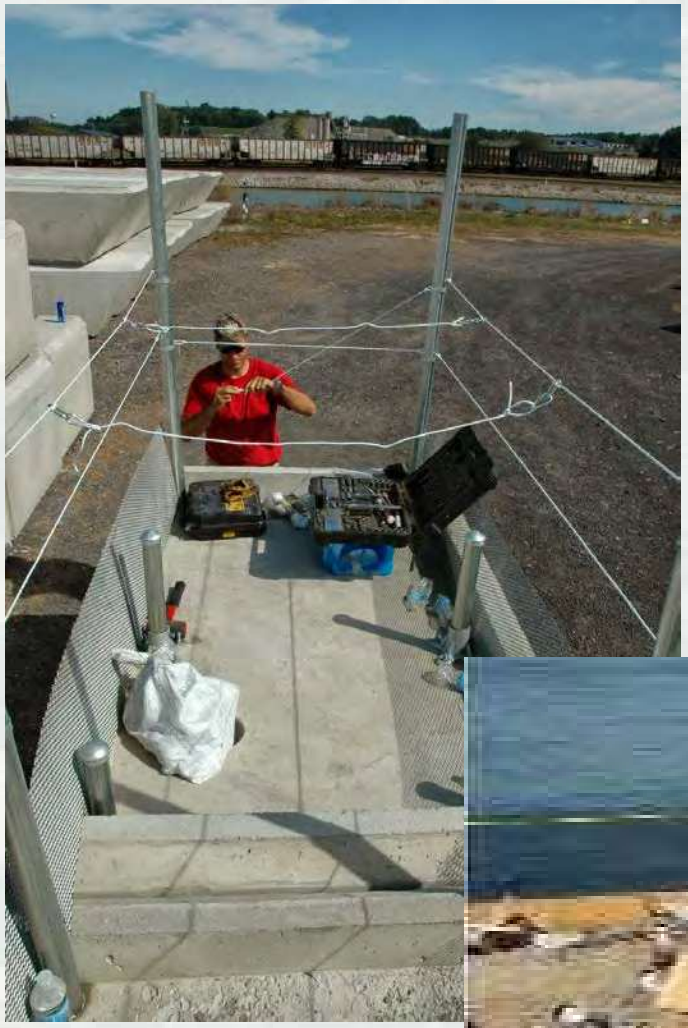
- Phase I Construction (2013)
  - Aquatic habitat block installation
  - 250 sq ft of tern nesting habitat
- Phase II Construction (2014)
  - Aquatic and low growth vegetation habitat block installation
  - Additional 250 sq ft of tern nesting habitat
- Phase III Construction (2015 Planned)
  - Complete 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



See http://niagara.nypa.gov/EcologicalStandingCommittee/EcoStanddefault.htm

Ashtabula, OH Tern Nesting Blocks



The Nature Conservancy
Protecting nature. Preserving life.

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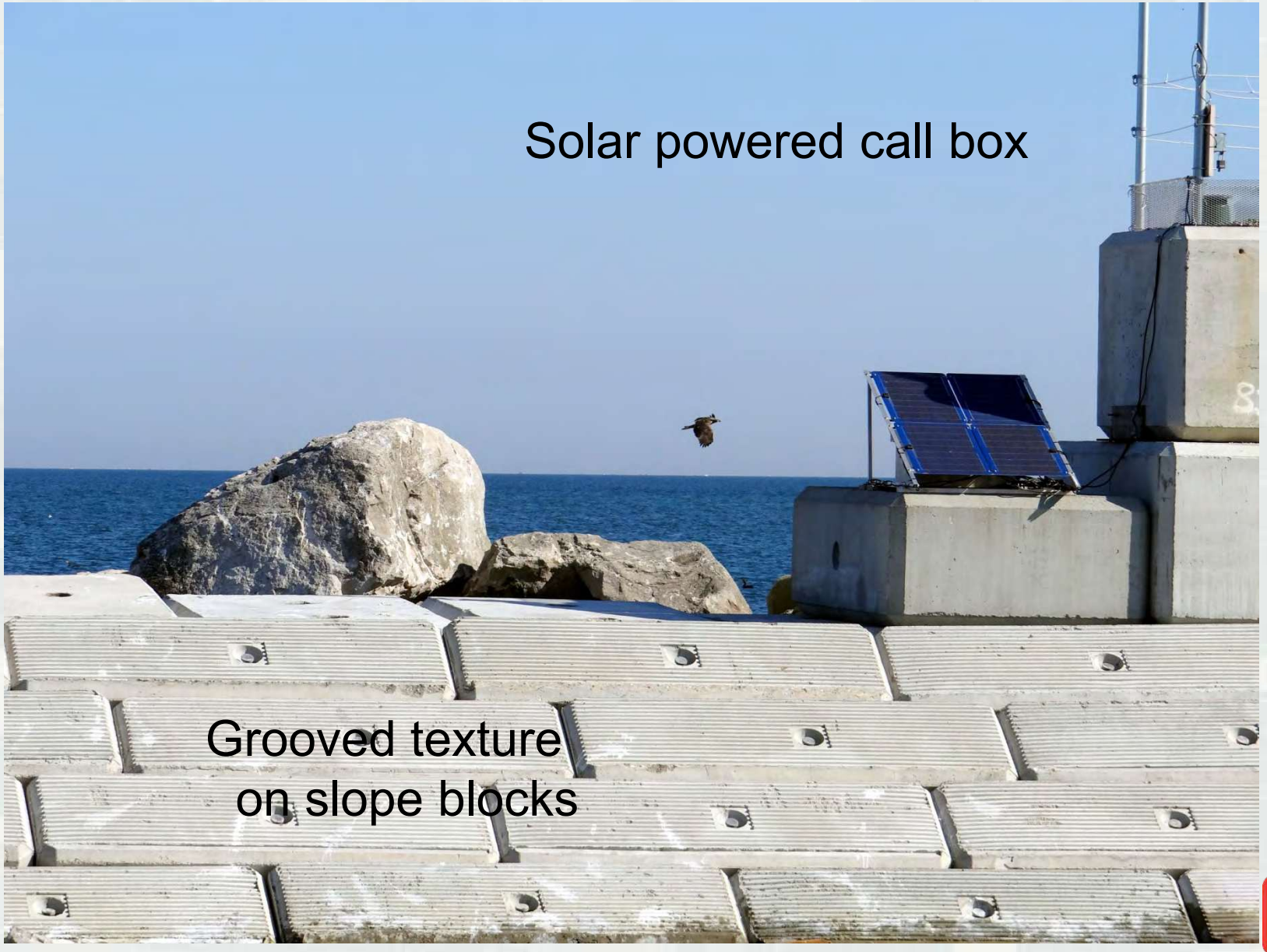
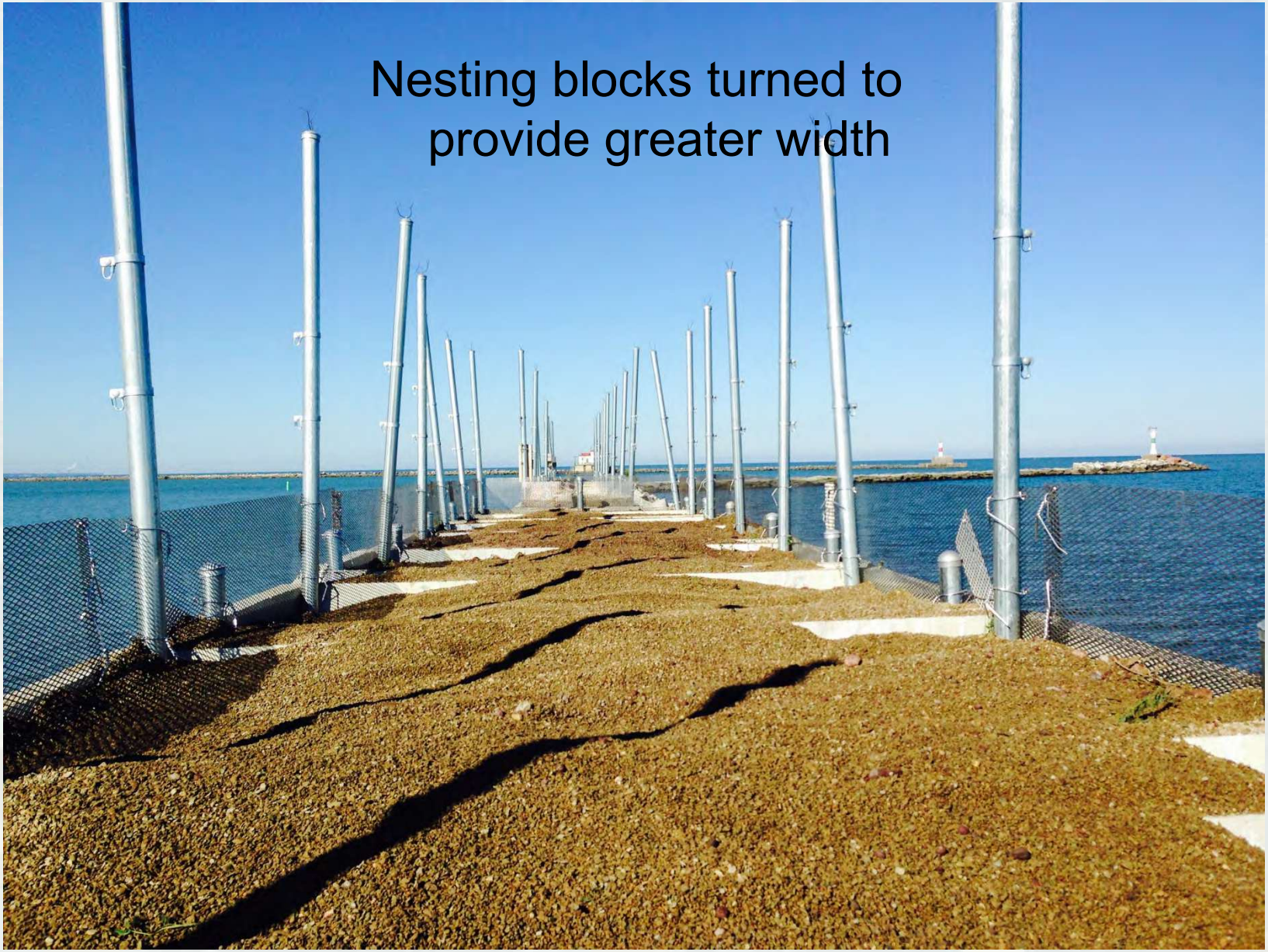
Phase I Tern Habitat


Wildlife Management Area
No Trespassing
Please Do Not Disturb
For Information Contact:
U.S. Army Corps of Engineers, Buffalo District
ATTN: Operations Branch
1776 Niagara Street Buffalo, NY 14207 (716) 879-4377
US Army Corps of Engineers
4S


Solar powered call box
Grooved texture
on slope blocks

Phase II Tern Habitat


Nesting blocks turned to
provide greater width


Phase I
Phase II

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?