A New Look at Great Lakes Breakwaters. Can they be Greener?

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Great Lakes RESTORATION

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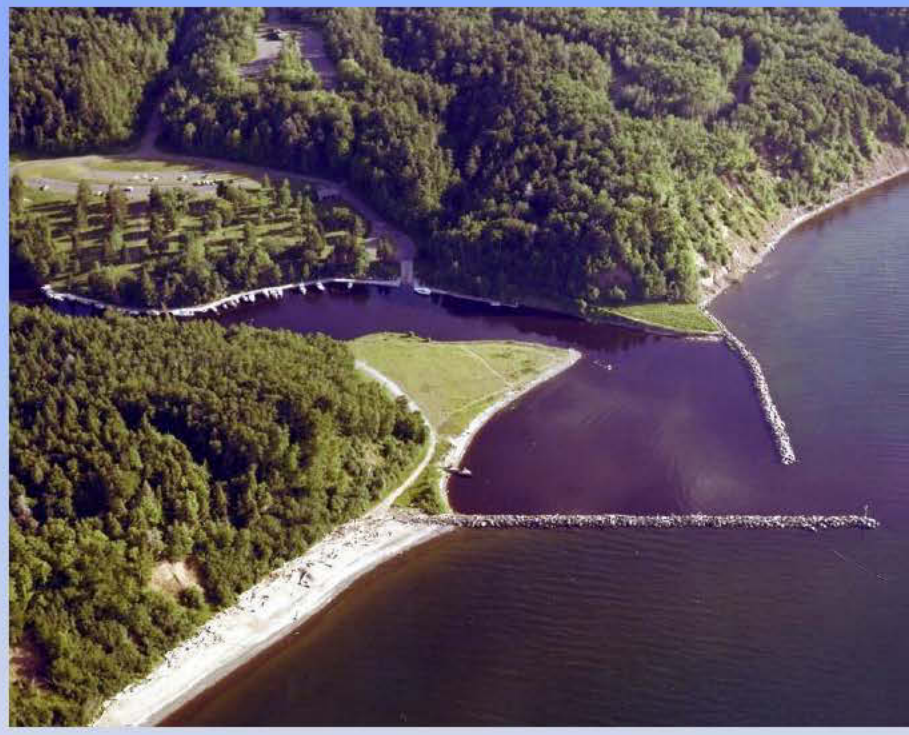

Breakwater Ecosystem Improvement Study

- 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

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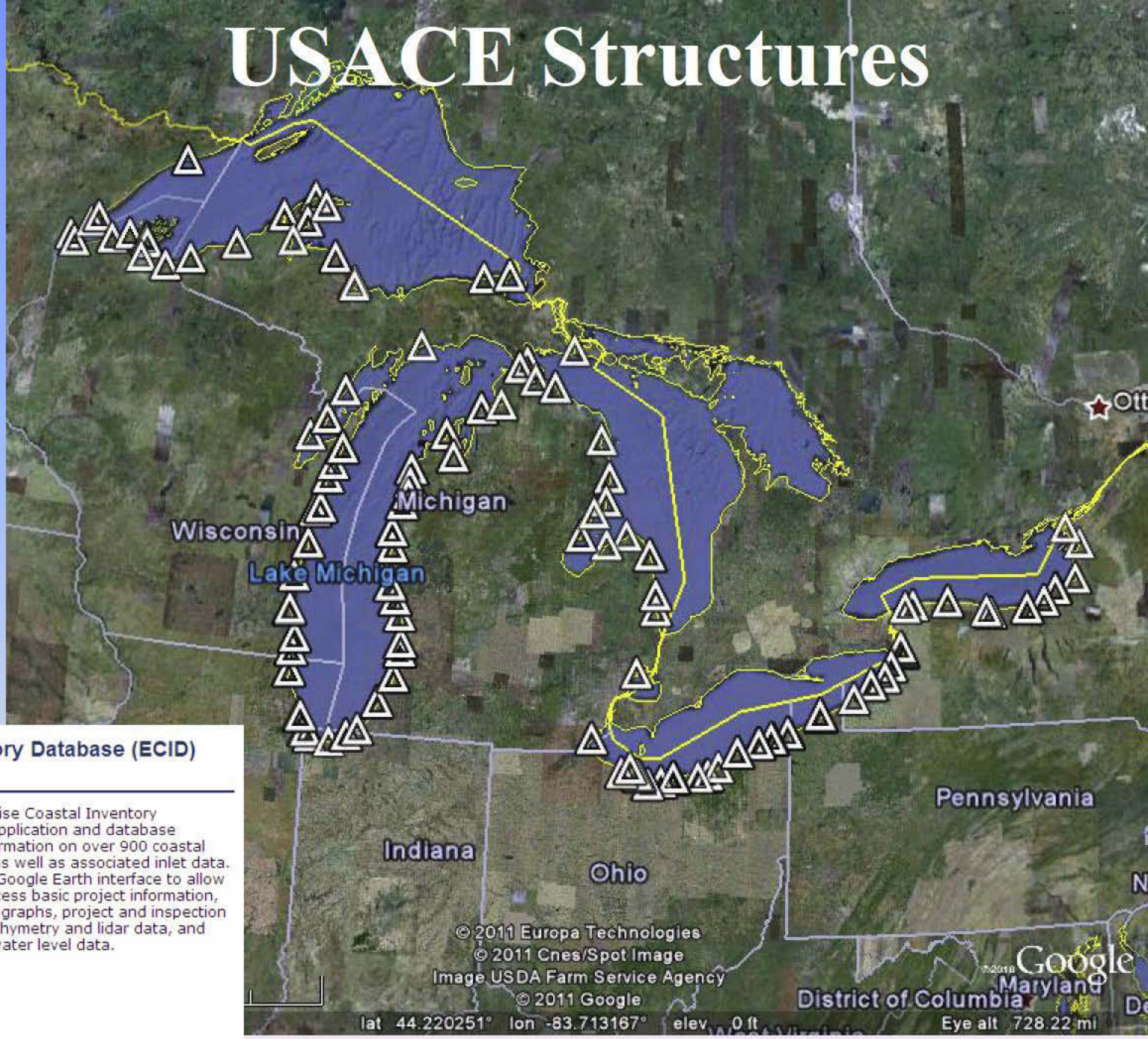
Great Lakes Green Breakwaters Overall Concept & Approach

USACE Structures



Enterprise Coastal Inventory Database (ECID)

Active Project

Enterprise Coastal Inventory (ECI)
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The Enterprise Coastal Inventory Database application and database houses information on over 900 coastal structures as well as associated inlet data. ECI uses a Google Earth interface to allow users to access basic project information, aerial photographs, project and inspection reports, bathymetry and lidar data, and wave and water level data.

Areas of Concern in the Great Lakes - St. Lawrence River Basin

GLRI Goal Compatibility

- **Focus Area 1** Toxic Substances and Areas of Concern
  - Areas of Concern are cleaned up, ***restoring the areas*** and removing the beneficial use impairments.
- **Focus Area 3** Nearshore Health and Nonpoint Source Pollution
  - ***Nearshore aquatic communities consist of healthy, self-sustaining plant and animal populations*** dominated by native and naturalized species.
- **Focus Area 4** Habitat and Wildlife Protection and Restoration
  - Protection and restoration of Great Lakes aquatic and terrestrial habitats, including physical, chemical, and biological processes and ecosystem functions, ***maintain or improve the conditions of native fish and wildlife*** .
  - ***Development activities are planned and implemented in ways that are sensitive to environmental considerations and compatible with fish and wildlife and their habitats***.

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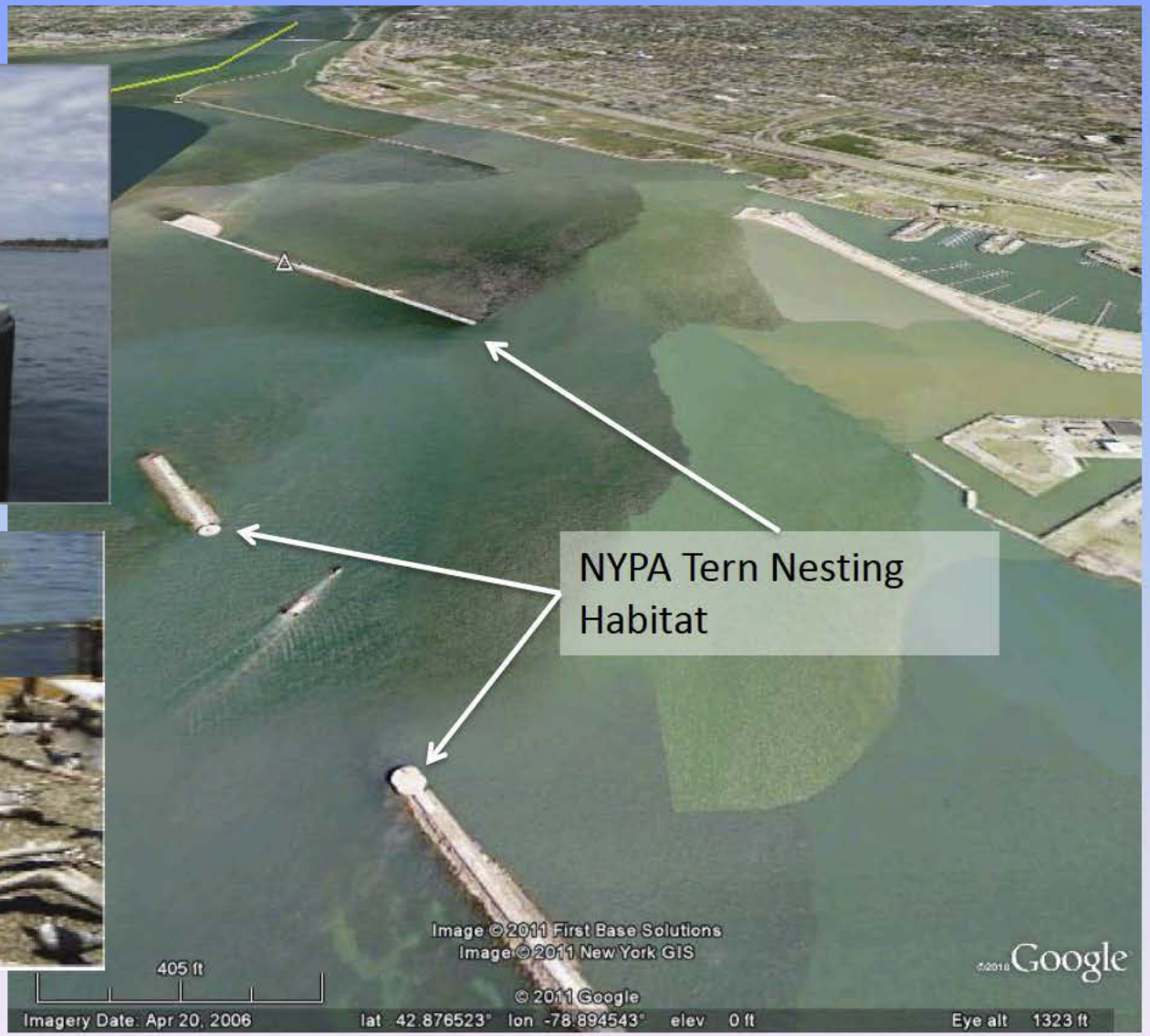
Tern Nesting Habitat
New York Power Authority – Buffalo, NY



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

South Bay Marina

- Spur Jetties to create marsh and protected shallows.
- Fish spawning stones incorporated into design.

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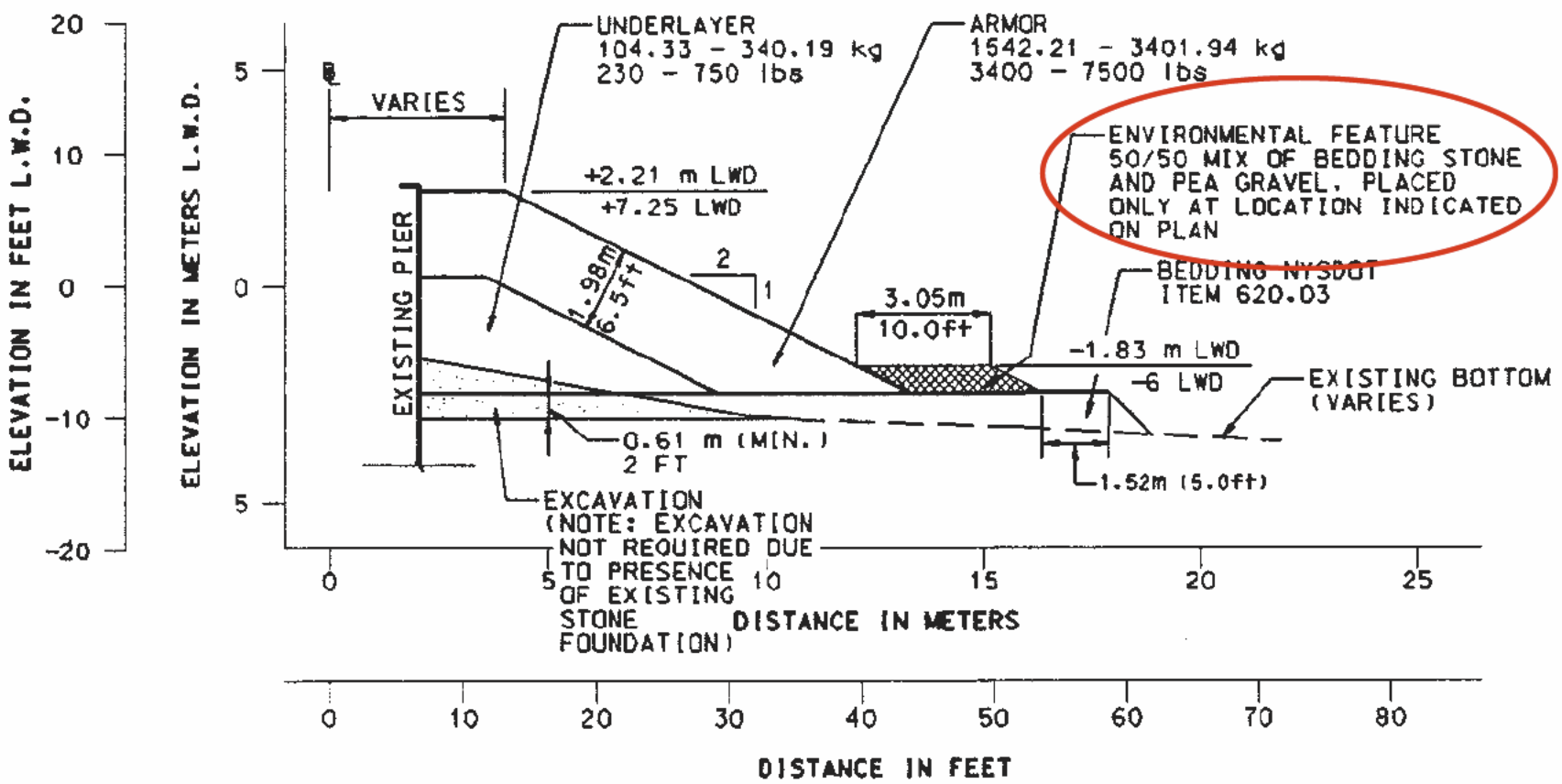
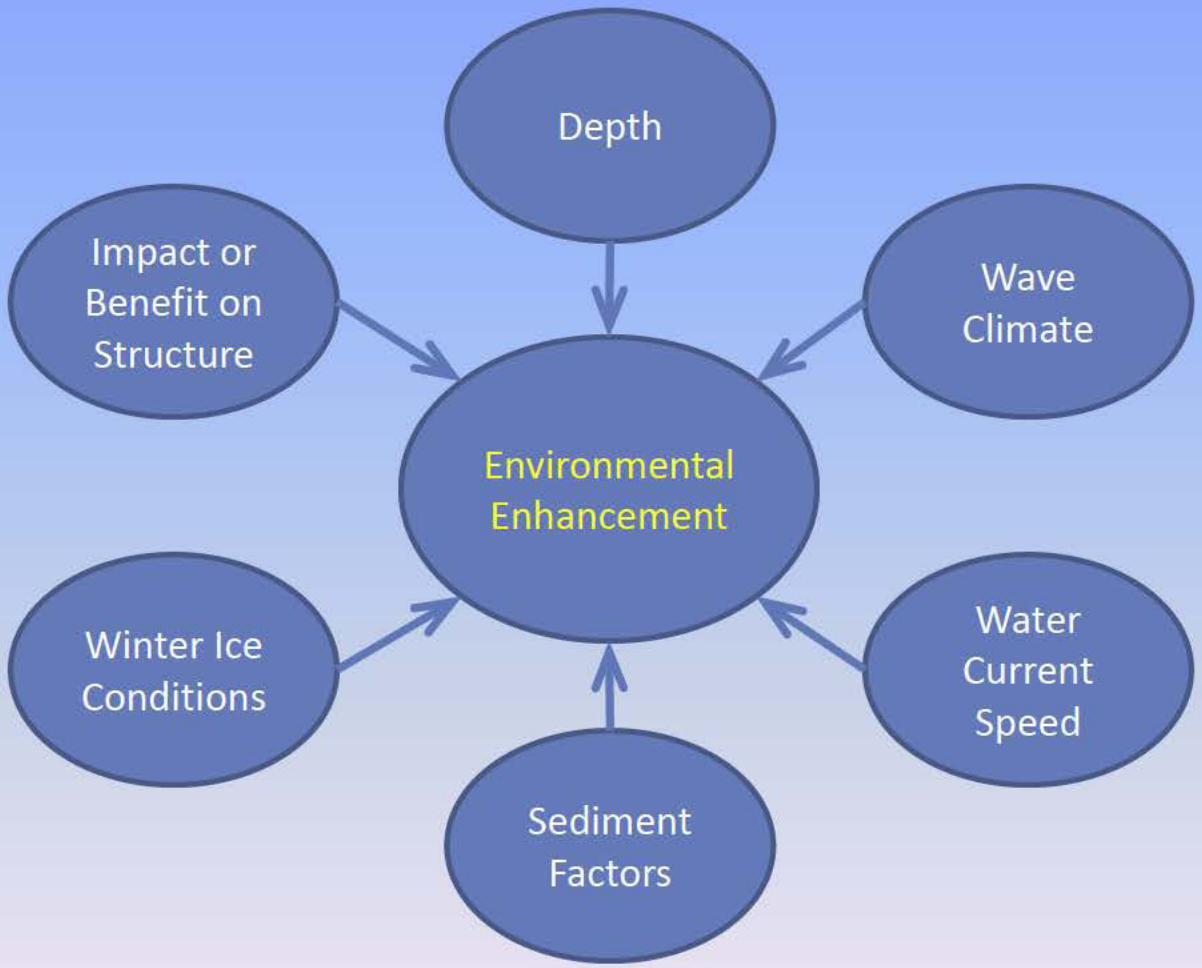
Rochester Harbor Wave Absorber Project



EE Compatibility Considerations



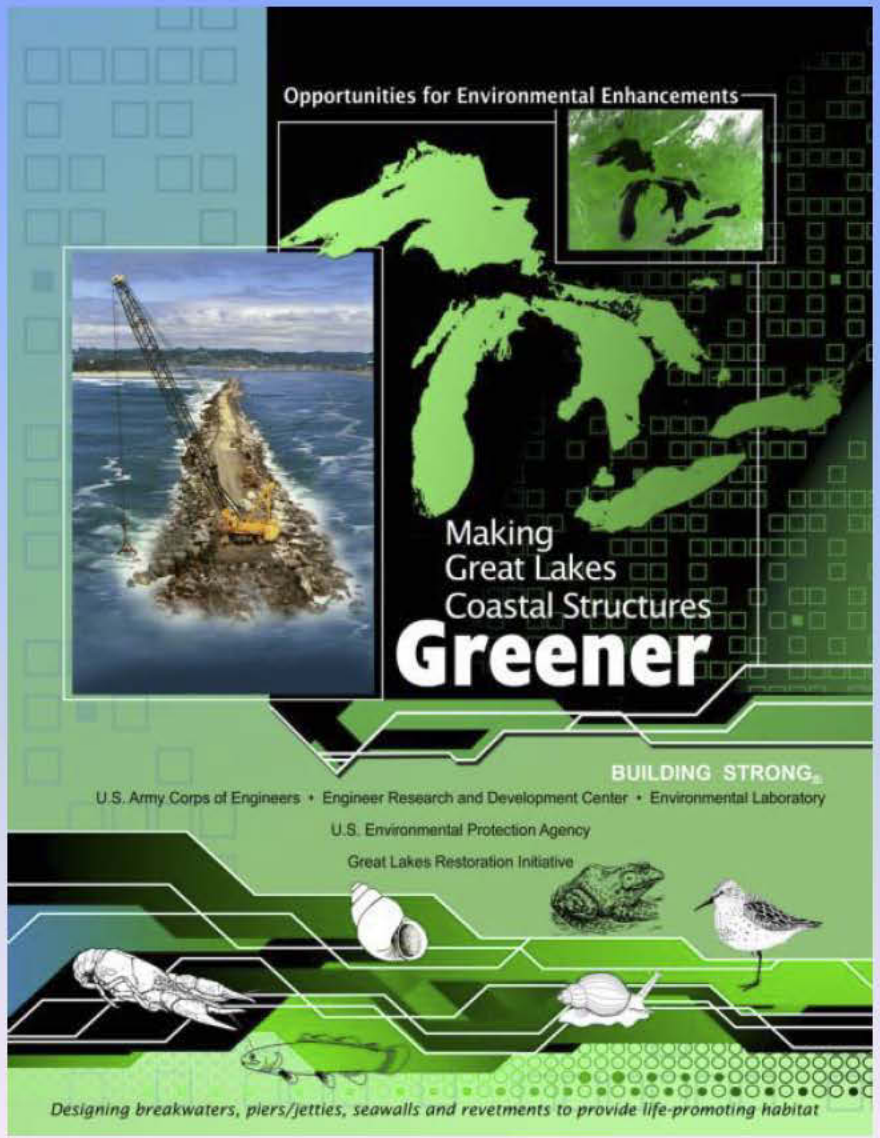
Green Ideas

- Pea gravel apron – fish spawning habitat
- Mixed rock gradation, shelves, and caverns
- Add substrate at bottom of sheet pile structures
- Fish spawning stones
- Create submerged spurs/sinuous toe
- Rock headlands
- Develop wetlands on sediment trapped by structures
- Tern nesting habitat
- Osprey nesting platforms
- Create littoral sediment bypass
- Create flow channels

Top Research Needs

- Document case studies and benefits
- Conduct demonstration projects
- Develop success assessment tools
- Prioritization of sites where EE might work

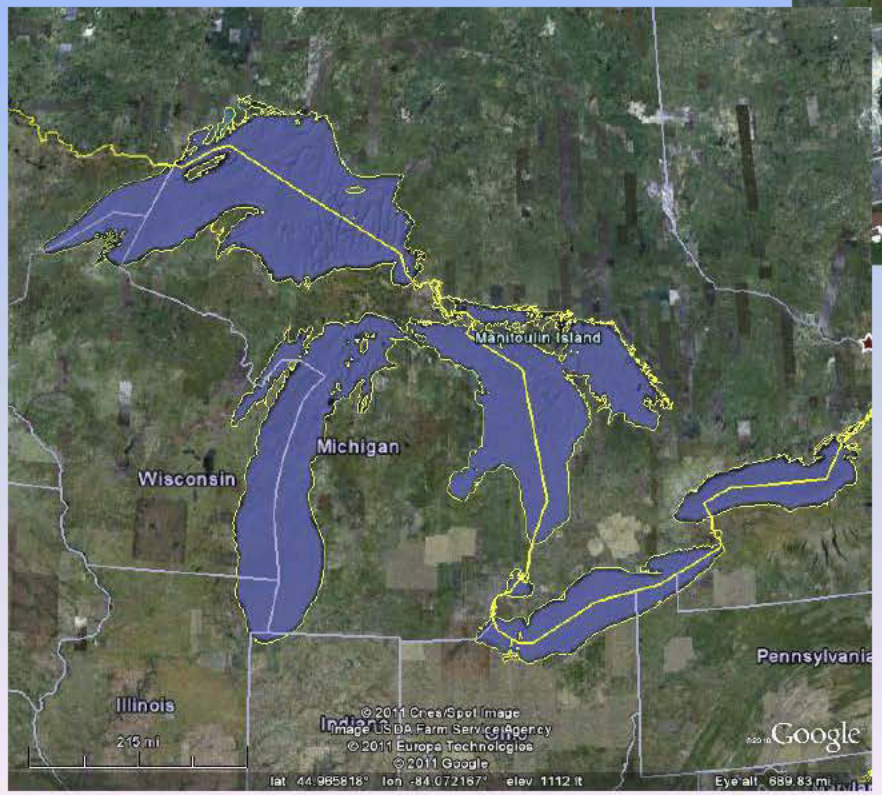
Draft Brochure



Next Steps

- Proposal for GLRI funding (FY12-13)
- Compatibility matrix/screening
- Reporting
  - Example project summaries

Thanks for your attention!



What are your ideas?