

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

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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



**Great Lakes Green  
Breakwaters  
Overall Concept &  
Approach**

Inventory &  
Classify Structures

Identify  
Environmental  
Enhancements (EE)

Identify  
Environmental  
Map Layers

Conduct Webinars to  
Elicit EE Ideas & ID  
Candidate Sites

Create Compatibility Matrix  
of Breakwater Classes & EE

23 Feb, 8 & 10  
Mar 2011

Current  
Activities

Case Study &  
Candidate Sites

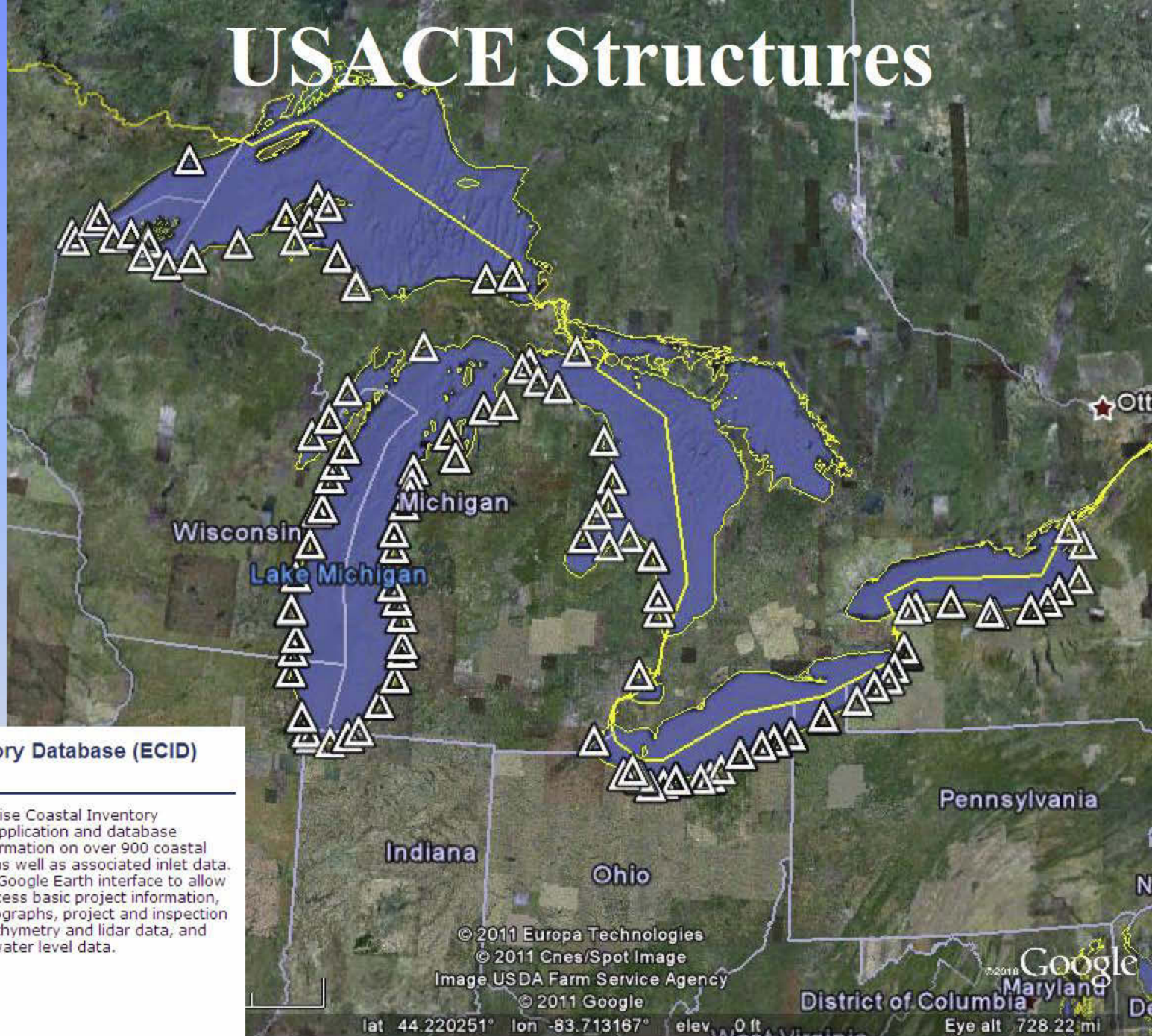
Tech Note -  
Detailed

Technical Report

Tech Note – PR  
Style



# USACE Structures



## Enterprise Coastal Inventory Database (ECID)

Active Project



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.

Enterprise Coastal Inventory (ECI)  
Enlarge: 1000x663  
(278kb)

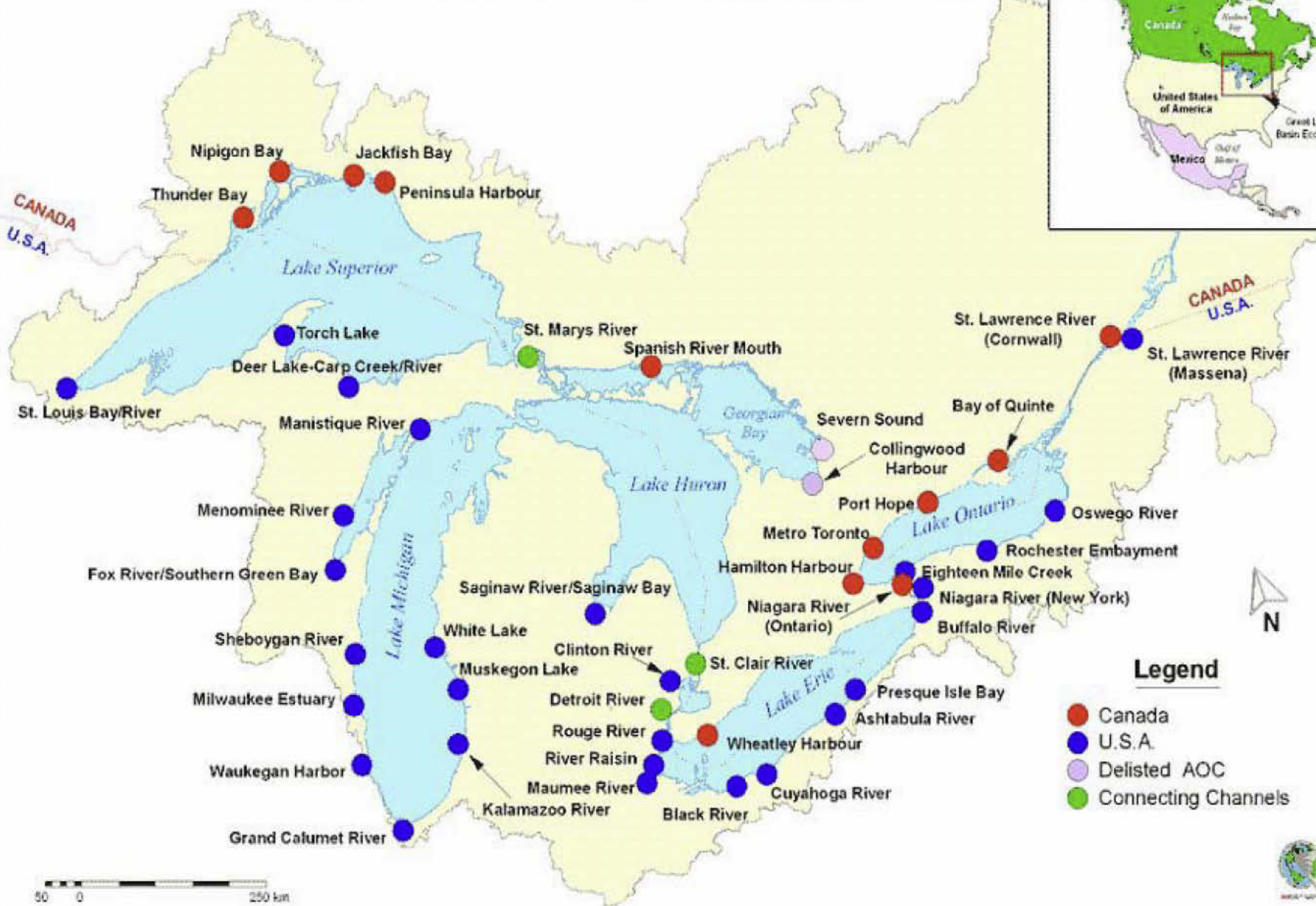
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Google  
Maryland  
District of Columbia  
Eye alt 728.22 mi

lat 44.220251° lon -83.713167° elev 0 ft



# 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.*

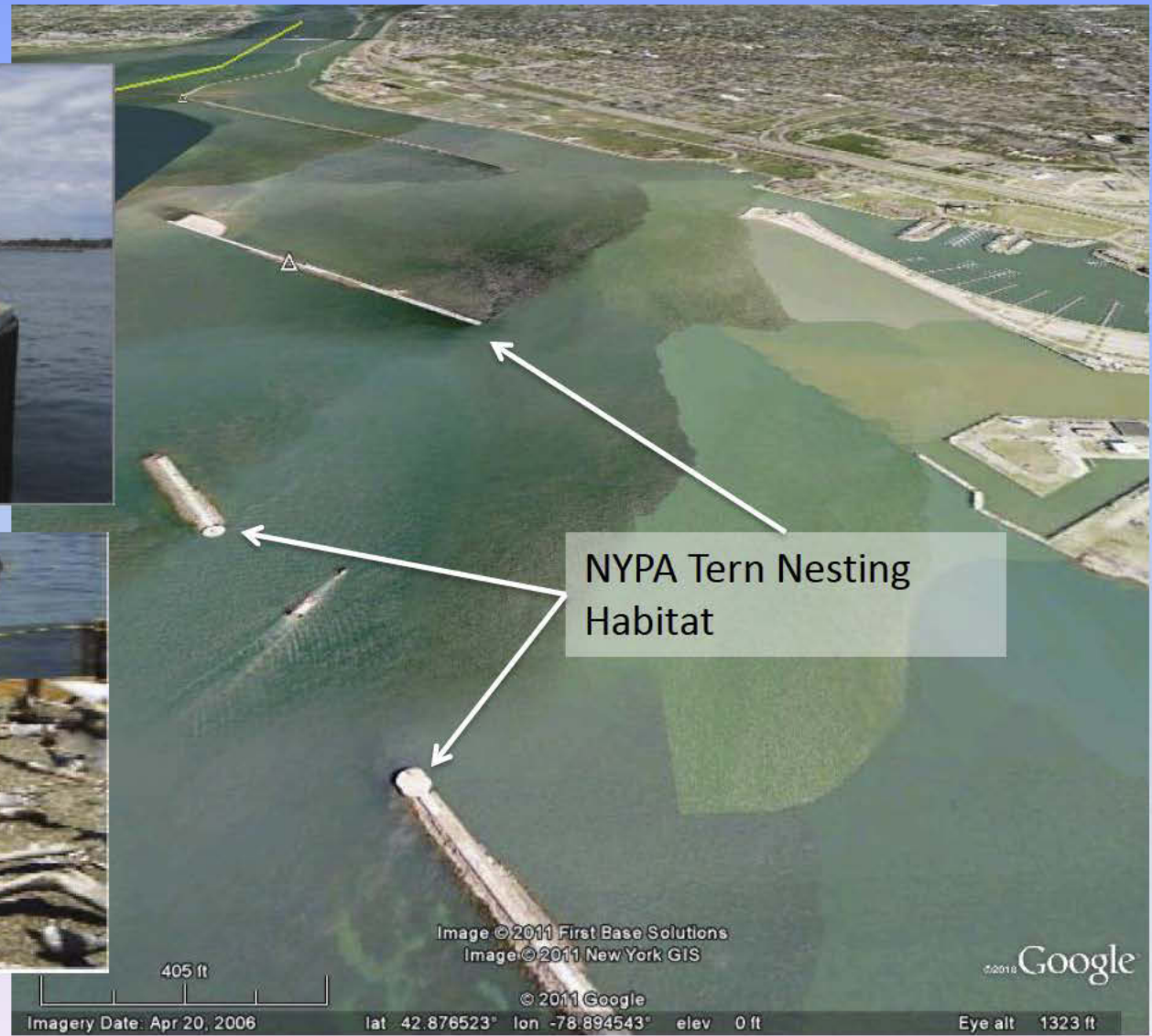
Great Lakes  
RESTORATION





# Tern Nesting Habitat

## New York Power Authority – Buffalo, NY



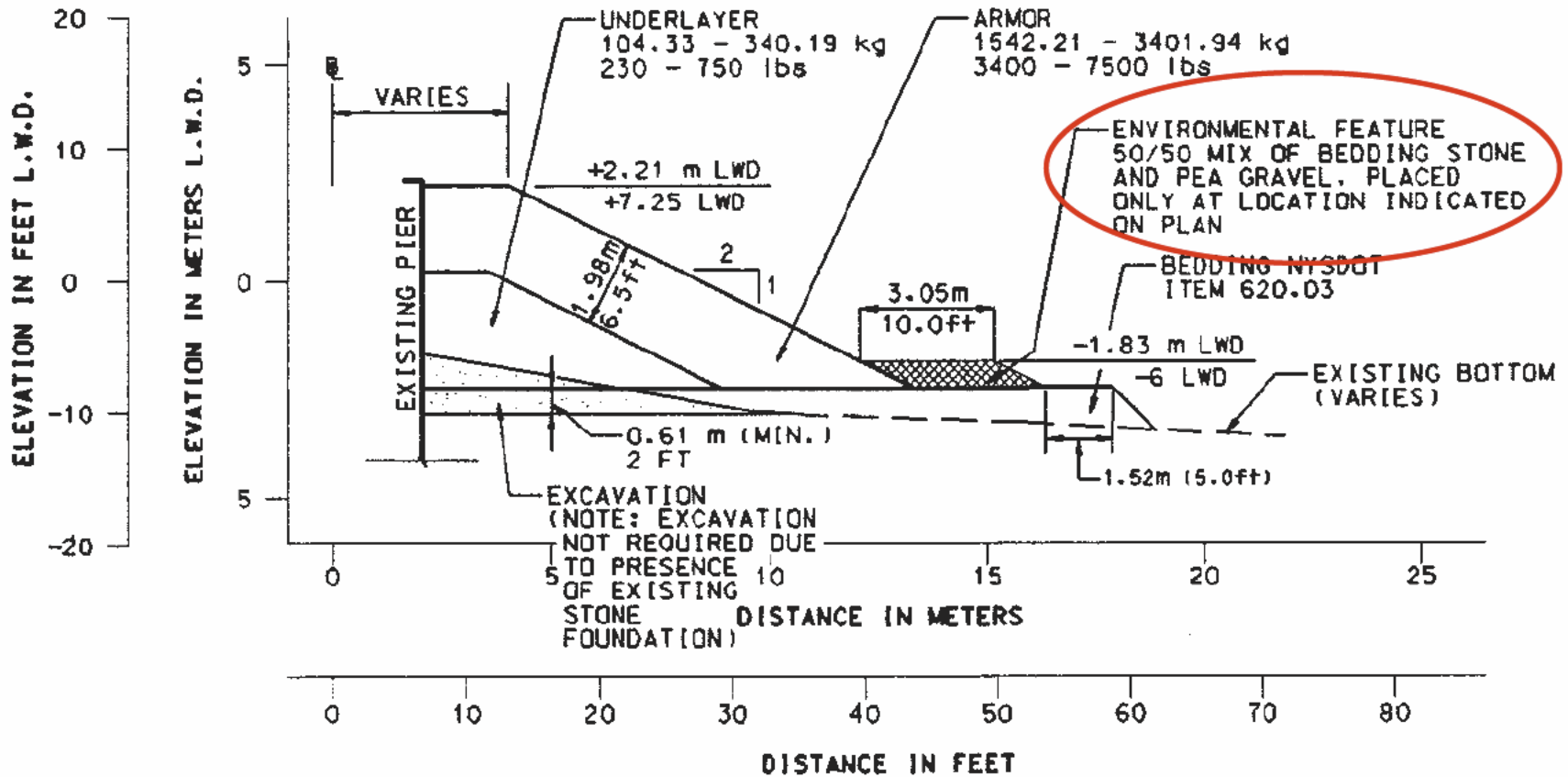


# South Bay Marina



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

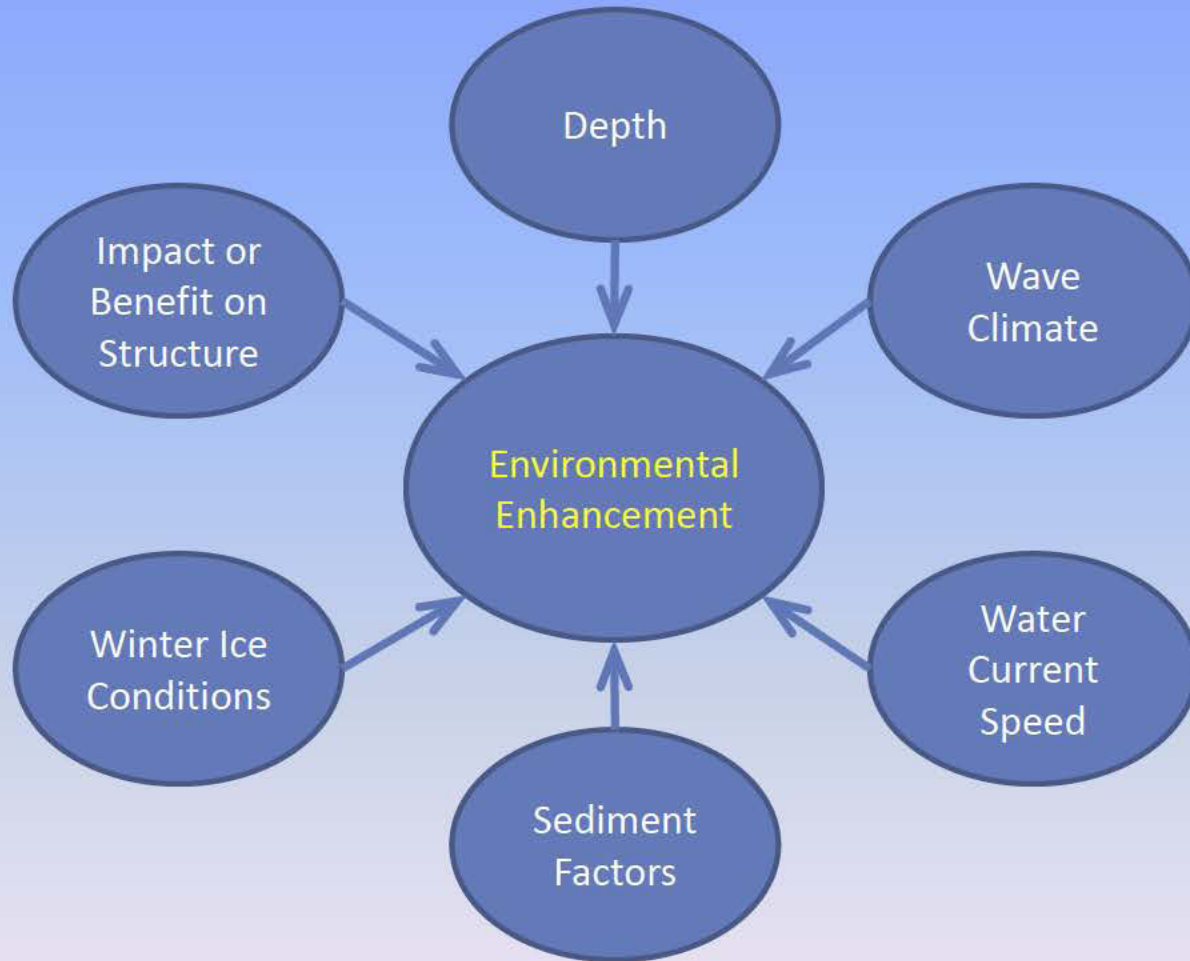
# Rochester Harbor Wave Absorber Project



TYPICAL SECTION: ABSORBERS 4 AND 8



# 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/sinuuous 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

The brochure cover features a central map of the Great Lakes region in a vibrant green color. To the left, a photograph shows a large yellow crane on a barge in the water, with a large rock being lifted. Above the map, a smaller inset photo shows a close-up of green aquatic plants. The background is a dark green with a grid of white squares. The title 'Making Great Lakes Coastal Structures Greener' is prominently displayed in white and green text.

Opportunities for Environmental Enhancements

Making Great Lakes Coastal Structures **Greener**

**BUILDING STRONG<sub>®</sub>**  
U.S. Army Corps of Engineers • Engineer Research and Development Center • Environmental Laboratory  
U.S. Environmental Protection Agency  
Great Lakes Restoration Initiative

*Designing breakwaters, piers/jetties, seawalls and revetments to provide life-promoting habitat*

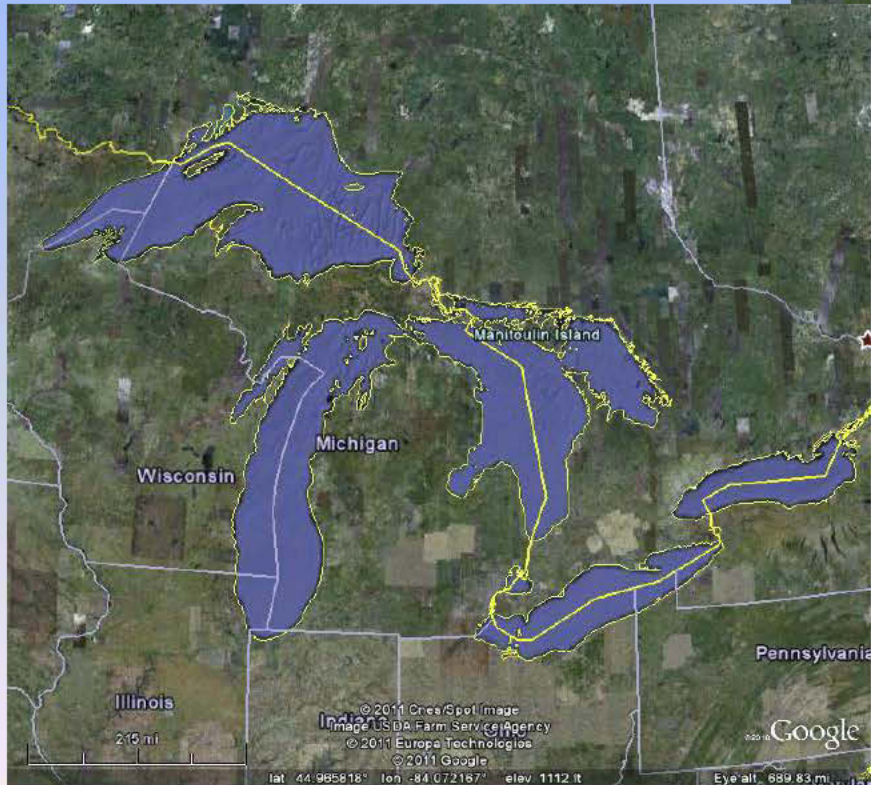


# Next Steps

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



# Thanks for your attention!



*What are your ideas?*