

Great Lakes 101: Lake Erie

A Joint Effort Between New York Sea Grant, United States Army Corps of Engineers, New York State Department of Environmental Conservation, and New York State Department of State

Introduction / Housekeeping

- Meeting will be recorded for those that could not attend
 - Everyone will be muted except speakers, but feel free to use chat function to ask questions throughout
 - There will be a Q&A Panel at the end for further questions
 - Funding provided by NYSDEC
- Agenda
 - Roy Widrig (NYSG)
 - David Denk (NYSDEC)
 - Beth Geldard (NYSDEC)
 - Matt Maraglio & Peter Bayzon (NYSDOS)
 - Steven Metivier (USACE)
 - Q&A Panel (ALL)

Why we're here

- We want to make the permitting process easier, leading to more complete permit applications and stronger projects
- We will:
 - Detail why regulations are in place
 - Provide background on what considerations go into permitting decision
 - Go through examples of a successful permit application process
 - Consider local, state and federal perspectives
 - Answer your questions in regards to the coastal environment, regulations and the permitting process



Great Lakes Coastal Processes

Great Lakes 101: Coastal Processes

- The Great Lakes coastlines are dynamic places, and have formed and continue to change based on environmental and climate processes
 - *Coastal Processes are the interactions between wind, waves, shoreline and sediment transport. Essentially: **erosion** and **accretion** of shoreline features.*
 - Shoreline structures, shoreline type, wind, waves, water levels all factor into these processes
 - These are natural processes, but human influences have many different affects

Why these processes matter

- Connections – ecological and geological
 - Conservation of the shoreline environment
- Neighboring/up and downdrift
- Wave energy – deflection, scour, etc.



Why these processes matter

- Scour
 - Vertical Walls
 - Erosion at base or toe of wall
- Obstruction
 - Structures built outward into the lake
- Reflection
 - Sending the waves somewhere else (such as neighboring properties)
 - Most common issue

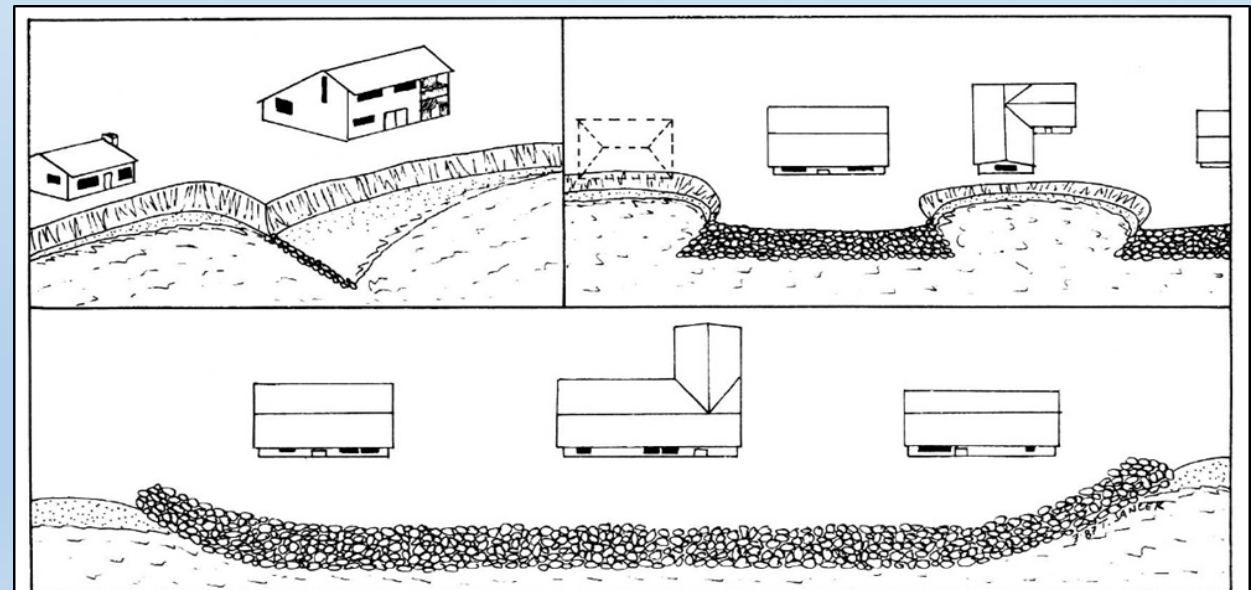


Figure 2. Attempts to control coastal erosion on a property-by-property piecemeal basis is often ineffective, with individual protective structures sometimes shifting erosion problems to adjacent properties or being damaged by continued erosion on adjacent properties. A proper erosion control approach is a unified, group project.

Shoreline Types



Shoreline Types

Bedrock Cliffs of Lake Erie

- Much more dynamic than they seem
- Erosion resistance is high, but erosion at the bluff crests is frequent

Concerns

- Drainage improvements above, beach building below
- **Sediment supply is crucial to maintain the beaches at the toe of these cliffs**



Shoreline Types

Bluffs (non-bedrock)

- Common, heavily reported erosion concerns along Erie shoreline
- Often a concern overlying bedrock cliffs

Concerns

- **Extremely** important in supplying sediment to beaches
- Tend to be hazardous – risk of losing large portions of earth during storm events, slumping, freeze/thaw, spring melt
- Where its easiest to make the most mistakes



Shoreline Types

Rocky/Shaley Beaches

- Abundant, highly dynamic, ecologically important
- Often feature small streams and rivers, lower elevation, higher population areas

Concerns

- Higher erosion rates, more complicated coastal environment
- Important habitat areas – shorebirds, fish spawning (in-water)
- Significant source of **downdrift** material – sand and gravel



Shoreline Types

Sandy Beaches and Dunes

- Not common, but integral to recreation locally
- Mostly public, but some private properties along the Erie shoreline

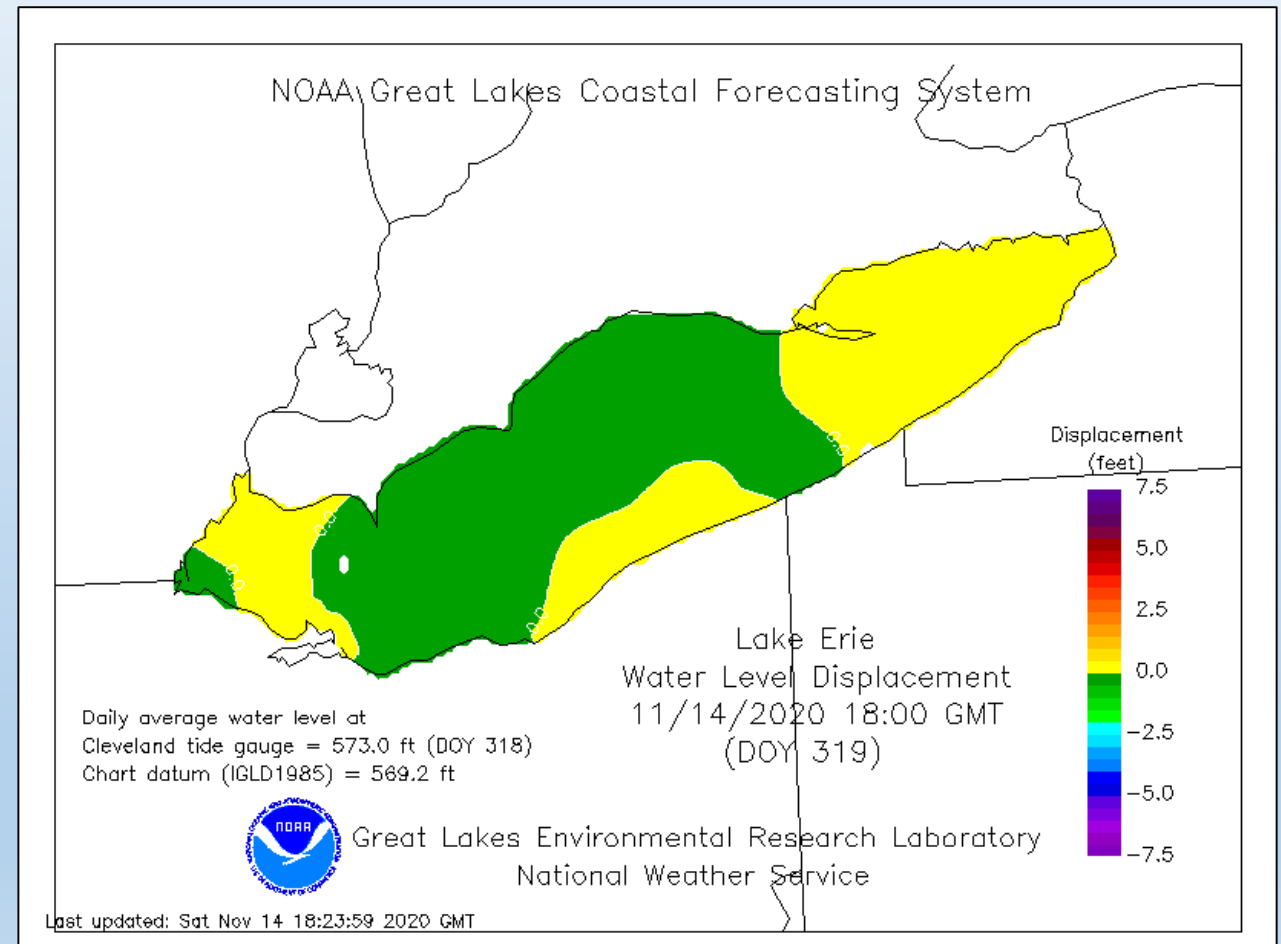
Concerns

- **Extremely** important for sediment supply and accretion of coastal landforms
- **Extremely** vulnerable to sediment loss, **extremely** important coastal habitats



Weather

- Seiche – building up of water on one end of Lake Erie due to sustained winds
- Planning for seiche – waves and water beyond the revetments
 - How is water beyond the wall managed? Can drainage be improved?



Lake & Shoreline Interaction



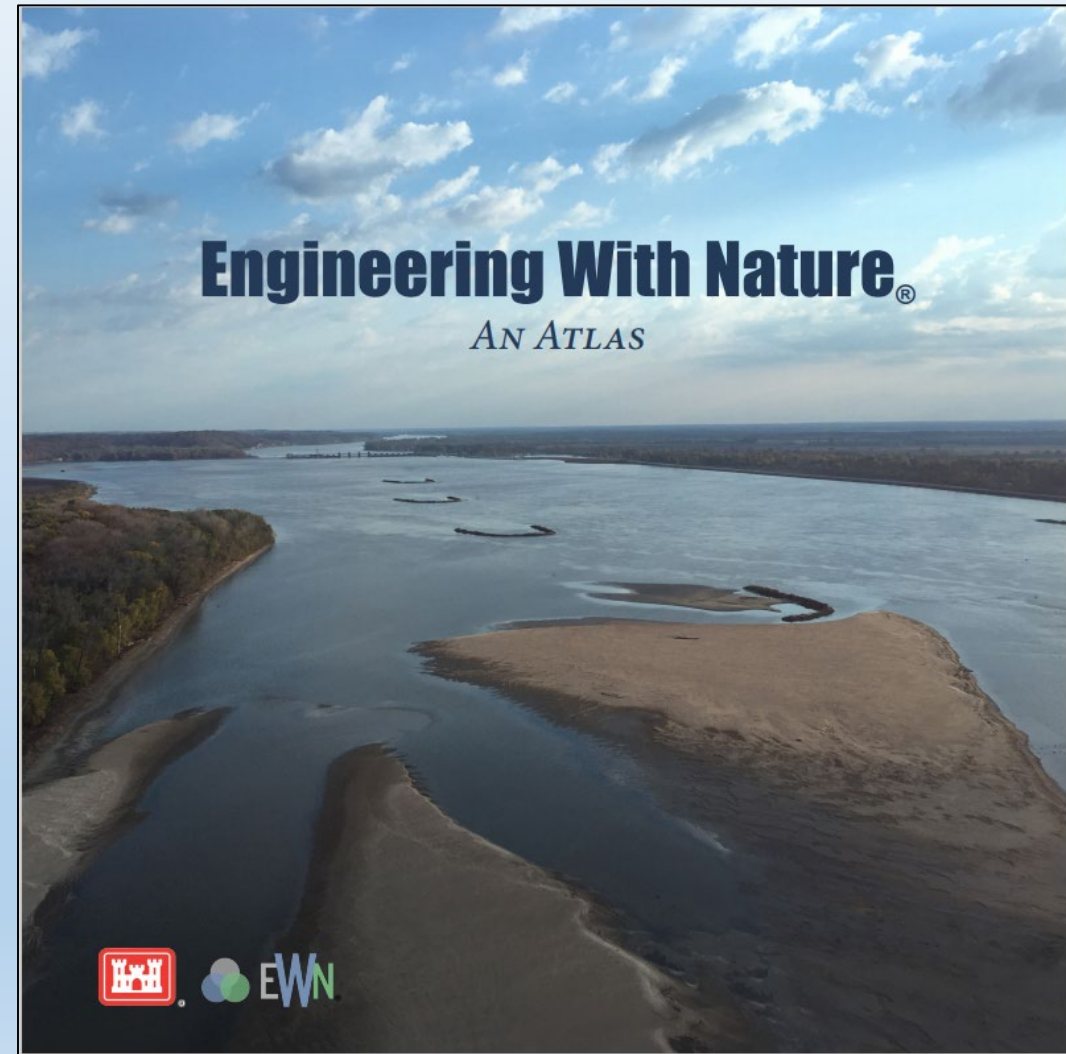
Long-term Changes

- More frequent, heavier precipitation events
 - Drainage issues could become more common, and shoreline structures should accommodate proper drainage
- More freeze/thaw cycles in winter
 - Prepare for more icing events, and potentially more issues with ice effecting shoreline structures (freeze/thaw frost wedging, damage to vegetation, etc.)
- Higher evapotranspiration in summer
 - Mixed results – more conducive to beach and sand bar building, but more wind and waves
- Conditions for lake-effect snow
 - Drainage issues during November/December melt events
- Seiche
 - Potentially more seiche events in confluence with late-season, high water periods



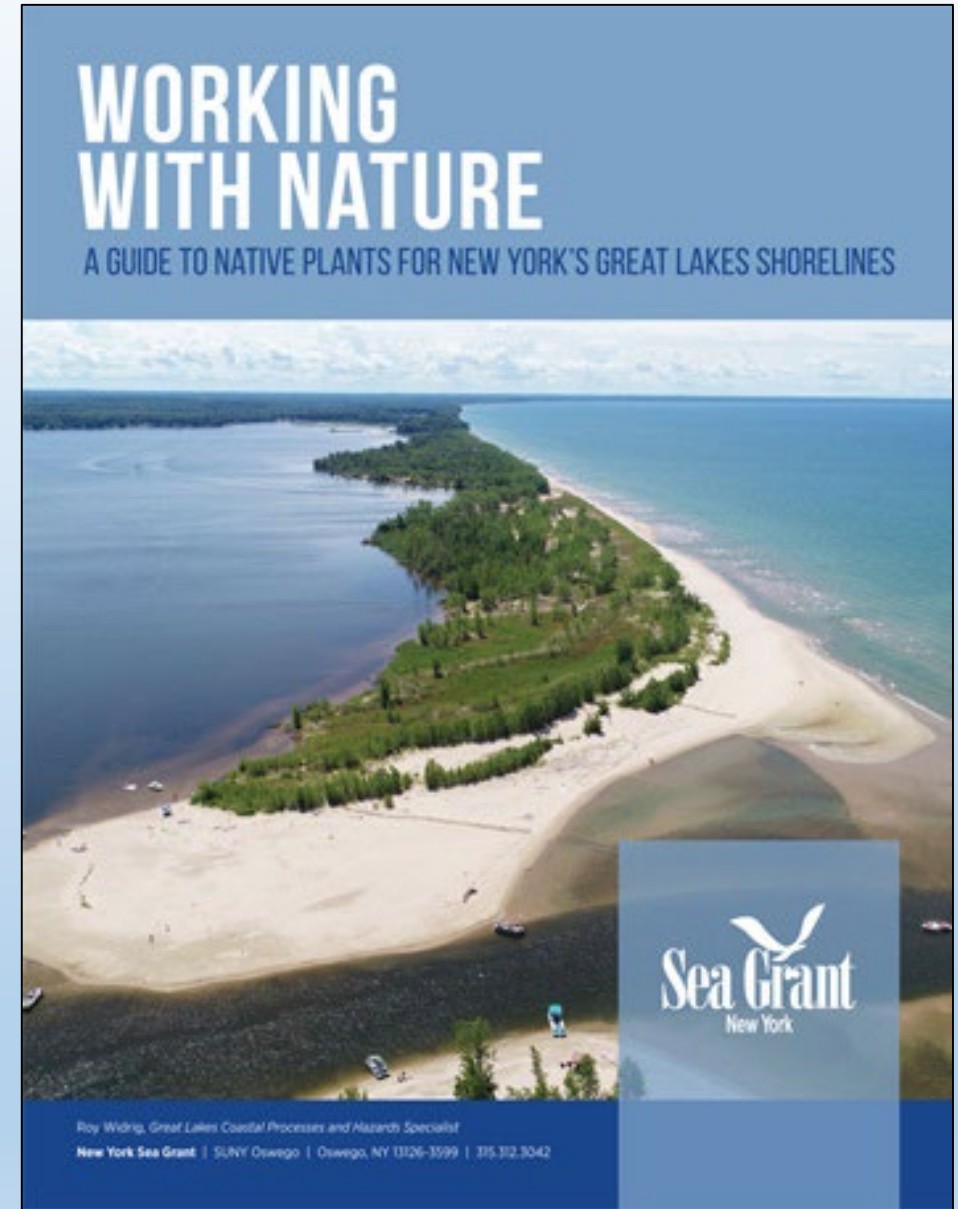
Resources for Contractors

Engineering and Design



Natural & Nature-based

- Many resources available from the organization represented today
- Feel free to contact speakers with specific questions and requests for resources



<https://seagrantsunysb.edu/Images/Uploads/PDFs/GreatLakes-ShorelinePlantsGuide.pdf>



Future Plans

- Looking to hold these meetings in-person, annually, throughout New York's Great Lakes Region
- Potential sub-regions include:
 - Erie-Chautauqua
 - Niagara-Orleans
 - Monroe-Wayne-Cayuga
 - Finger Lakes
 - Eastern Lake Ontario
 - St. Lawrence River

