Sea Grant
NEW YORK

Great Lakes 101: Lake Erie

A Joint Effort Between New York Sea Grant, New York State Department of Environmental Conservation, The City of Dunkirk, Chautauqua County, Lake Erie Watershed Protection Alliance, and the New York State Department of State

Introduction / Housekeeping

- **Agenda**
- 9:30 Welcome
- 9:40 Presentations
  - New York Sea Grant
  - NYSDEC Region 9
  - NYS Department of State
  - Chautauqua County Soil & Water
- **11:00 Lunch on Your Own**
- 12:00 Shoreline Tour (Be ready by 11:50)
- 2:30 Conclusion & Discussion
- 3:00 Adjourn

Purpose

- Increasingly frequent and powerful storms have been changing the Lake Erie shoreline
- Shoreline erosion, flooding, destruction of shoreline properties, drainage issues
- Today will provide an overview of coastal processes, and ways to adapt to shoreline changes

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 type, structures, wind, waves, water levels all factor into these processes
  - These are natural processes, but human influences have many different affects on these processes

Shoreline management affects these processes

- 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

Why these processes matter

- Conservation of these processes allows the shoreline to function normally, with minimal need for intervention
- Sediment in the nearshore zone is the fuel behind the conservation of Great Lakes shorelines, without the sediment moving freely – the system fails

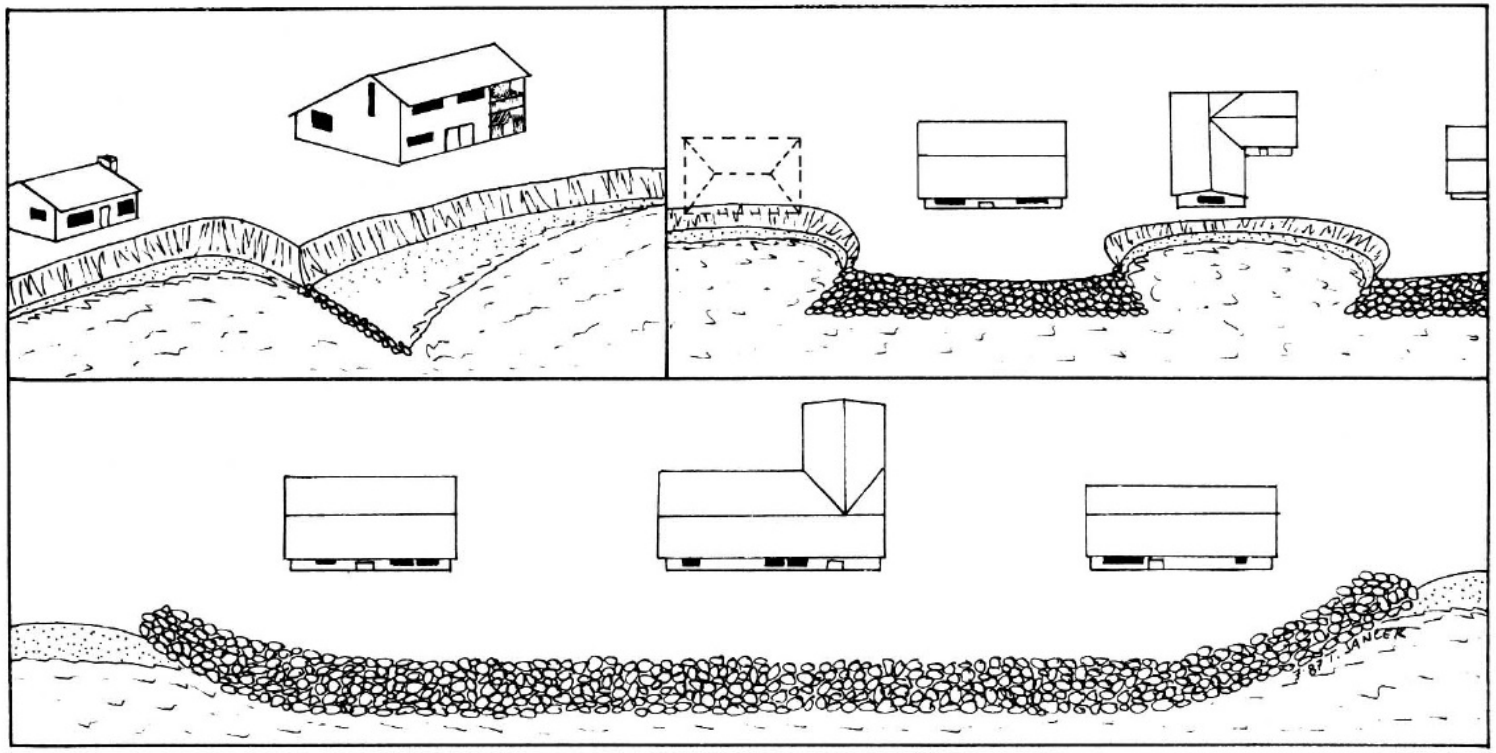


Figure 2. Attempts to control coastal erosion on a property-by-property piecemeal basis is often ineffective, with individual protective structures sometimes shifting erosion problems to adjacent properties or being damaged by continued erosion on adjacent properties. A proper erosion control approach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

Shoreline Types

- 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

- **Rocky/Shaley Beaches**
- Abundant, highly dynamic, ecologically important
- Concerns
- Higher erosion rates, more complicated coastal environment
- Important habitat areas – shorebirds, fish spawning (in-water)

Shoreline Types

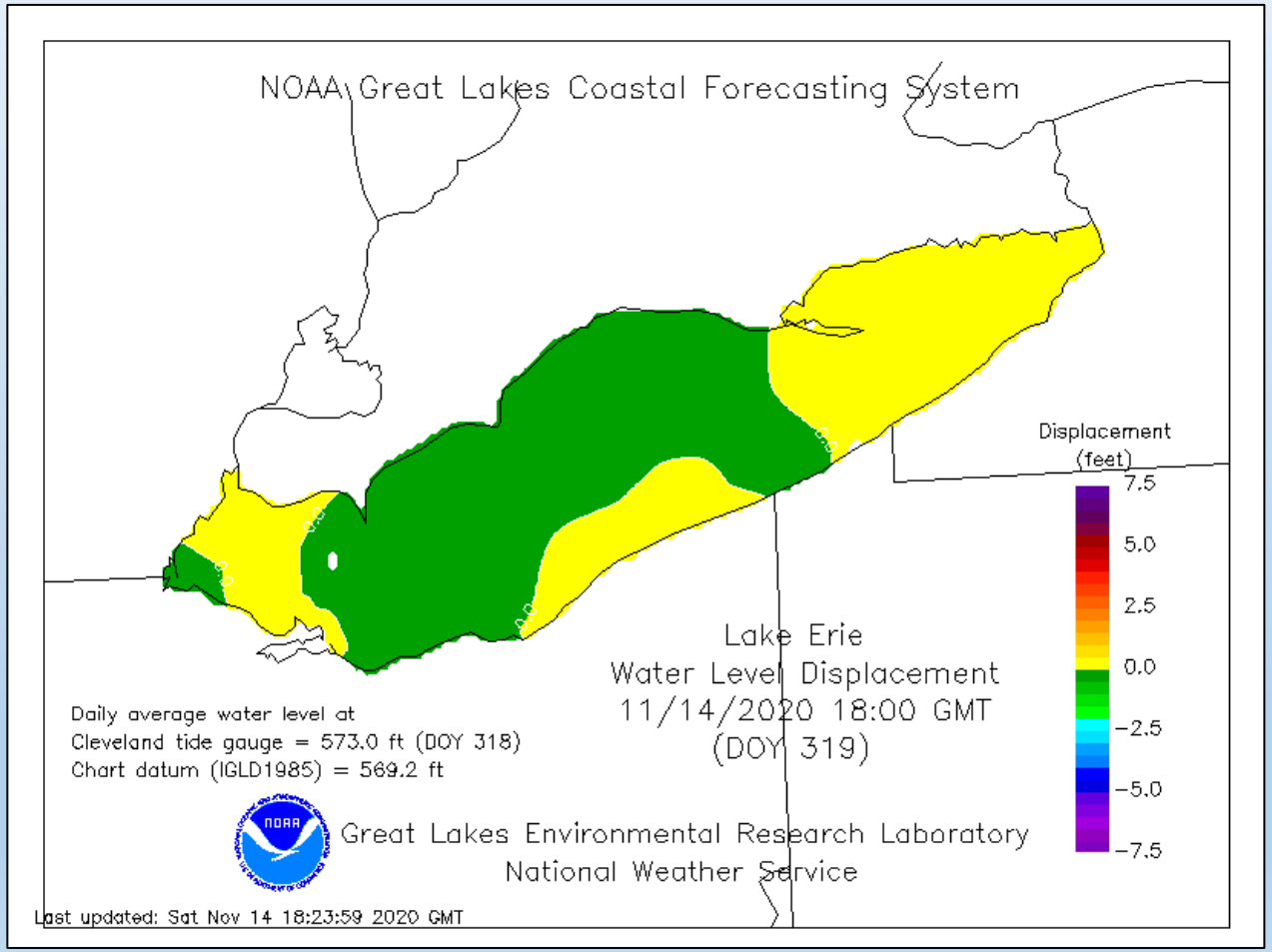
- **Sandy Beached and Dunes**
  - Not common, but integral to recreation locally
  - Mostly public, but some private properties along the Erie shoreline
- Concerns
  - **Extremely** important for sediment supply and accretion of coastal landforms
  - **Extremely** vulnerable to sediment loss, **extremely** important coastal habitats

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
  - Resource: “The Blufflet”

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?
  - Resource: Seiche Events in WNY
  - **Come to our October workshop in Evans!**



Lake & Shoreline Interaction

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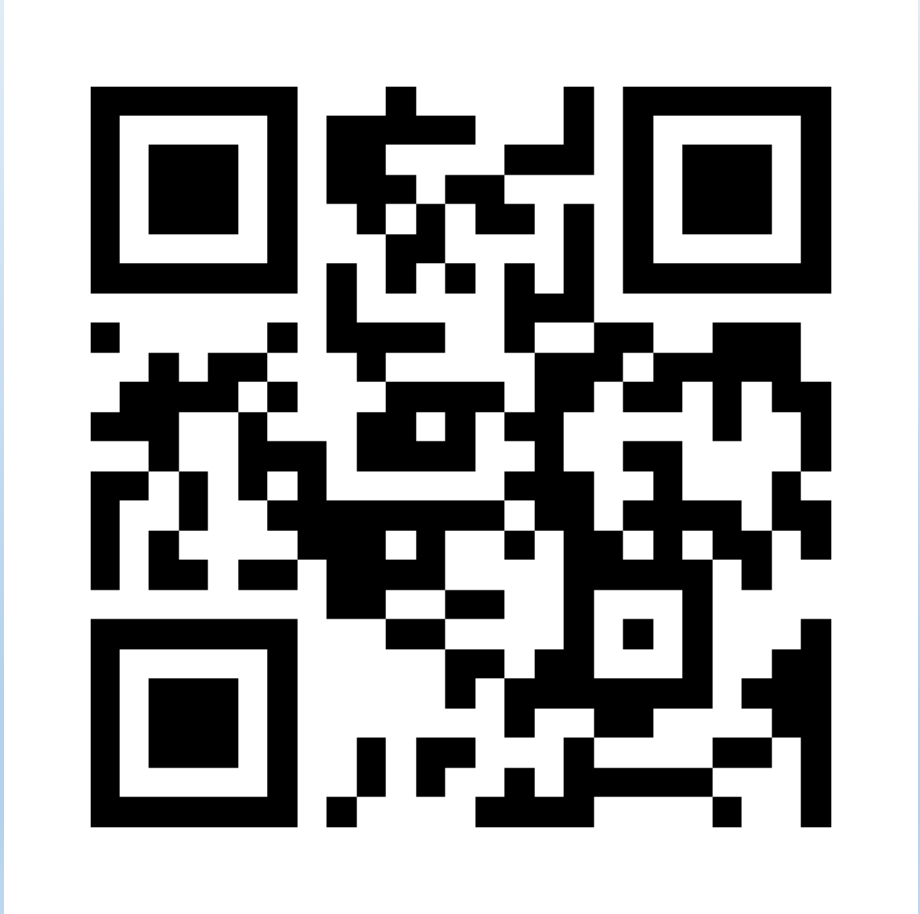
Long-term Changes

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 temperatures and 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

NYSG Assistance

- NYSG is available to walk residents through the process
  - Where to start
  - Contractor List
  - Shoreline Erosion Management, The Blufflet and Working with Nature guide
- Virtual Site Visits
  - Starting the process, smaller issues
- In-person Site Visits
  - Heavy erosion issues, brainstorming shoreline management options



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