Great Lakes and St. Lawrence Cities Initiative Presents:

Understanding Climate Change – Physical Changes in the Region Over the Next Century

Understanding Shoreline Behaviour and Erosion

John W. Johnston, Ph.D.
Shoreline erosion is a natural process

- Periods of erosion and deposition
- Source areas, transport pathways, accumulation zones
- Temporal and spatial perspectives
- Holistic - connected and dynamic (constantly changing)
- Shoreline behaves according to the setting and conditions
Geologists found patterns of shorelines

Superimposed Patterns

- **Decadal** (individual ridges)
- **Centennial** (groups of ridges)
- **Millennial** (sets of ridges)

Summary of Great Lakes Shoreline Research - Johnston and others (2014) [http://dx.doi.org/10.1144/SP388.22](http://dx.doi.org/10.1144/SP388.22)
Natural variation and Human influence

Lake Huron-Michigan (1918-2020) Water Level Gauge Data

Do you see any patterns?

Shoreline Behaviour (erosion) Elevation and Rate of change a concern

Year

Elevation above IGLD85 (m)
Climate Change and Human Activity

- Expect variability and extremes
  - Change in frequency and magnitude, intensify
  - Impact LL, sediment supply, waves, currents...
- Relatively high LL, trending upwards
  - Elevation and rates of change concerning
- Reduction in Sediment Supply
  - Dams in rivers, structures along shoreline
  - Human Behaviour impacts Shoreline Behaviour
  - Designate erosion areas, transport pathways, accumulation zones
- Coordinated effort, holistic approach
  - Think about your neighbor, account for short- and long-term, be flexible