

# GREAT LAKES COASTAL RESILIENCY

**Great Lakes Dredging Team**  
2019 Annual Meeting

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# Overview of Regional Coastal Resiliency Projects

## GLRI Great Lakes Hardened Shoreline Inventory

(NOAA lead, USACE and USGS support)

## GLRI Great Lakes Sediment Budget

(USACE lead, USGS and NOAA support)

## Proposed & Scoping: Section 729 Great Lakes Coastal Resiliency Study

(USACE & State CZM lead, NOAA, USGS, EPA, FEMA support)

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# Great Lakes Regional Sediment Budget Study

## Study Goal

- To develop a seamless sediment budget framework for the entire Great Lakes U.S. coastline, incorporating existing studies and streamlining the process for future sediment budget analyses
  - Locate sediment sources, sinks, and pathways
  - Increase of the understanding of coastal processes
  - Identify the impacts of harbor structures on the sediment budget

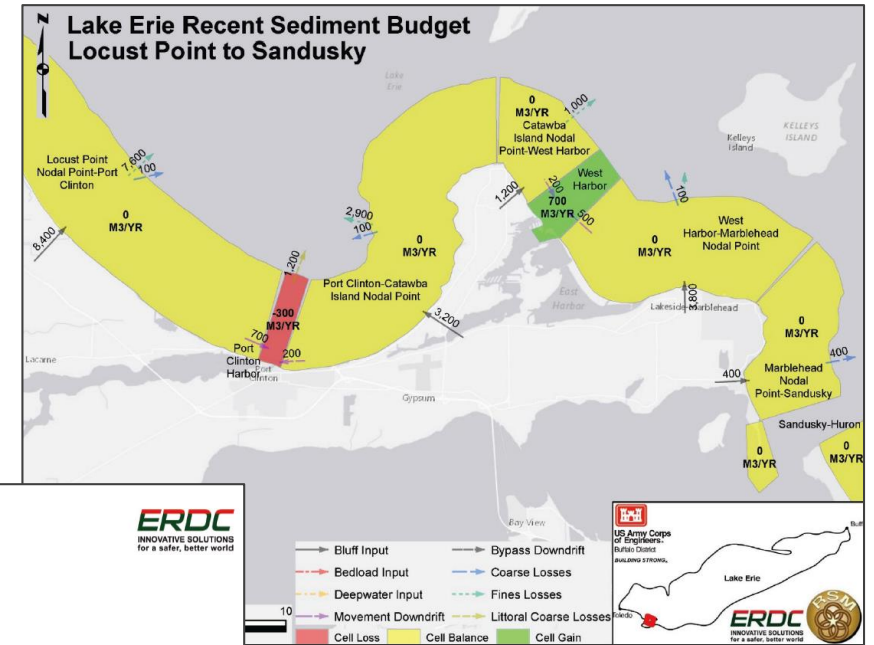
## USACE Approach

- Study conducted across three GL districts: Buffalo, Chicago, Detroit
- Technical/collaboration assistance by ERDC-CHL and JALBTCX
- Methodology based upon Cross et al. (2016) Lake Erie sediment budget analysis

## Partnerships

- Federal partners: NOAA and USGS

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ERDC/CHL TR-16-15

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Regional Sediment Management (RSM) Program  
**Historical Sediment Budget (1860s to Present) for the United States Shoreline of Lake Erie**  
Weston Cross, Andrew Morang, Ashley E. Frey, Michael C. Mohr, Shannon Chader, and Craig M. Forgette  
August 2016

Coastal and Hydraulics Laboratory

Approved for public release; distribution is unlimited.

Figure: Example sediment budget analysis output from Lake Erie Technical Report



# Great Lakes Regional Sediment Budget Study



- Data needed to fill gaps:
  - Previous shoreline study reports
  - Bluffline Data – Historical
  - Detailed Bluff Geology/Stratigraphy
  - Historic Harbor Details
  - Other Local Knowledge

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# Great Lakes Hardened Shoreline Inventory

## Study Goal

- Collect and deliver a new baseline hardened shoreline classification vector feature dataset
- Understand opportunities for littoral system restoration in an anthropomorphic system

## NOAA Deliverables

- GIS Data
  - Polyline vector data consisting of shoreline classification and associated tabular data in file geodatabase format
  - One file geodatabase per lake or connecting channel
  - Shoreline type, structure type, and structure condition
  - Primary and secondary structure type and condition
  - Metadata records
- Report
  - Methodology and source datasets
  - Data gap analysis
  - Statistical summaries for each lake and connecting channel

# Great Lakes Coastal Resiliency Study

## Study Goal

- To develop a coastal resiliency plan that *identifies vulnerable areas* and provides a risk-based decision framework to *inform effective management decisions*.

## USACE Approach

- Collaborative across districts: Buffalo, Chicago, Detroit
- Technical assistance by IWR, ERDC
- Inspired by North Atlantic Coast Comprehensive Study

## Partnerships

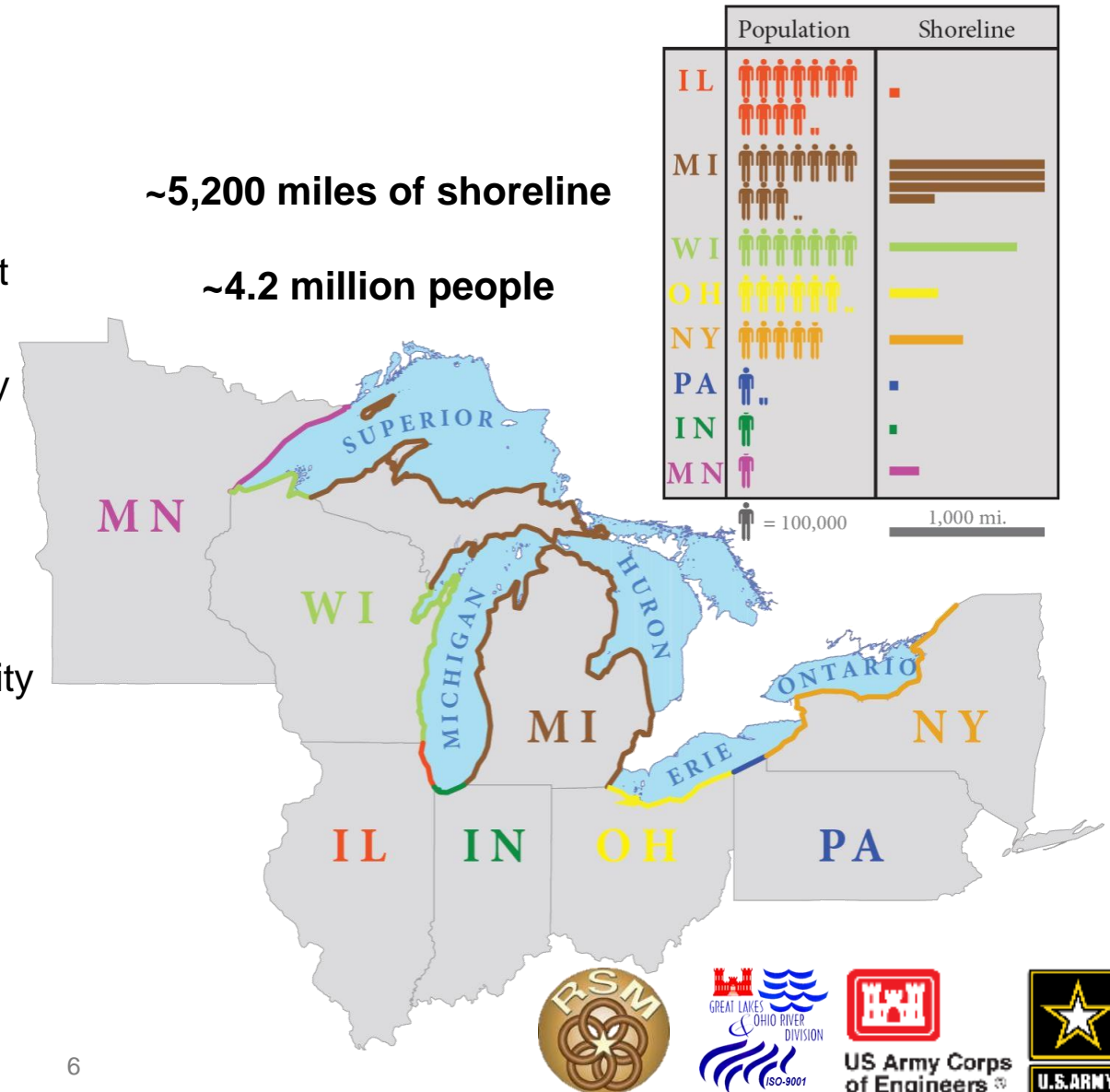
- Non-Fed Sponsors: eight Great Lakes states
- Federal partners: NOAA, USGS, USEPA

## Cost

- Section 729, WRDA 1986 Watershed Planning Authority
- Cost-shared 75% USACE / 25% non-federal
- 36-months / 4 fiscal years
- WIK performed by state Coastal Zone Management programs

~5,200 miles of shoreline

~4.2 million people



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# UNDERSTAND HAZARD, WAVE CLIMATE, DESIGN CONSIDERATIONS, WHAT YOU ARE PROTECTING

## Consider Wave Climate and Lake Levels

Open Coast | Steep Slope | Large Fetch | Large Waves | Sheltered Coast | Gentle Slope | Small Fetch | Small Waves

## Consider Geomorphology/Current Condition of Shoreline Protection

Highly erodible shoreline → Less erodible shoreline/hardened shoreline

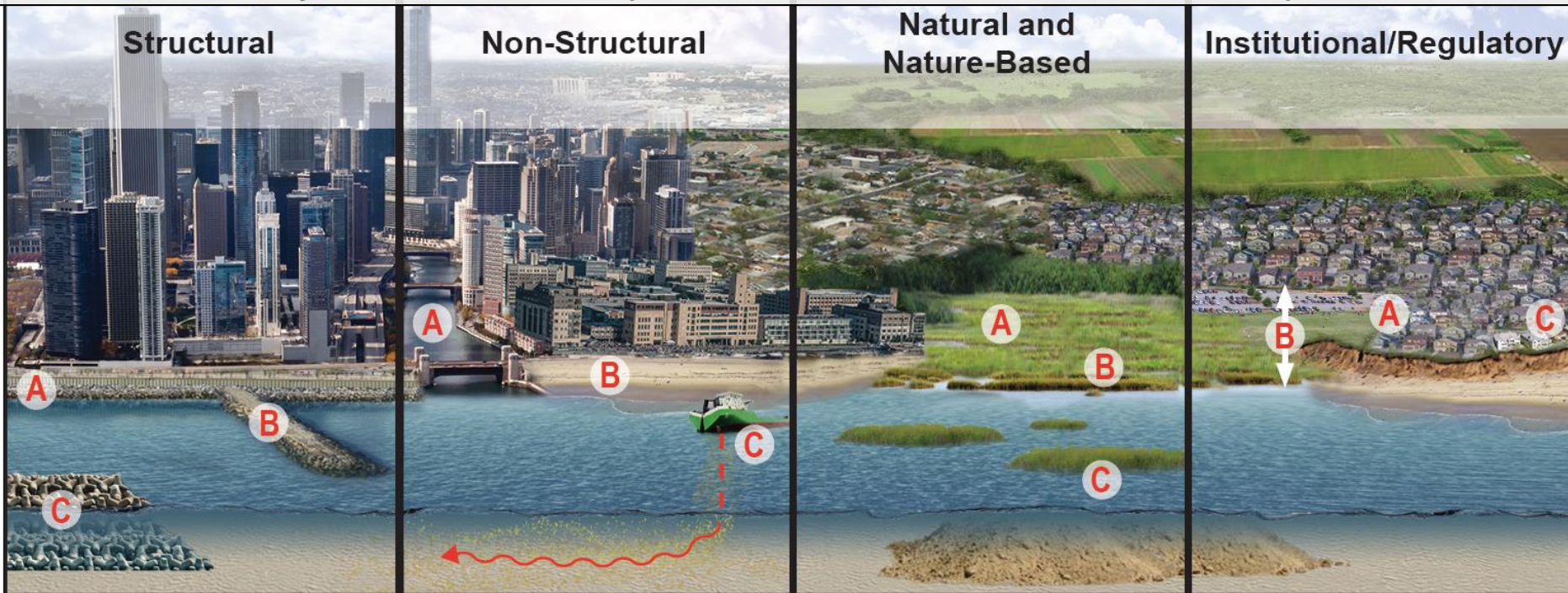
## Consider Potential consequences

Large populations, critical infrastructure → Low intensity development, nearshore & coastal habitats



Gray – Harder Techniques

Green – Softer Techniques



- A. Coastal Armoring
- B. Groins
- C. Breakwaters/Revetments

- A. Dredging
- B. Beach Nourishment
- C. Littoral Sediment Supply

- A. Conservation
- B. Wetland Creation
- C. Barrier Island Creation

- A. Land Use Planning
- B. Setbacks/Zoning
- C. Resilient Design Standards



# Questions?



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