

RSM In-Progress Review

Buffalo District

Lakes Erie and Ontario Regional Sediment Budgets

Weston Cross

30 August 2012

U.S. Army Corps of Engineers – Buffalo District

1776 Niagara Street

Buffalo, NY 14207



®



Regional Sediment Budget Lakes Erie and Ontario

Description/Challenge

- Develop comprehensive sediment budgets for
 - Southern shore of Lake Erie
 - Southern and Eastern shores of Lake Ontario from the Niagara River to the St. Lawrence River



US Army Corps
Of Engineers®
Buffalo District

BLUF: Creation of system wide sediment budget will allow for quicker analysis of proposed shoreline projects, better management of existing projects and easier communication with stakeholders

Regional Sediment Budget Lake Erie

Description/Challenge

- Historically, shoreline dominated by wide beaches
- Today – shoreline is sediment starved
- 28 main river mouths or harbors along U.S. Shore
 - Most modified around protecting navigation interests



Goals/Issues to Address

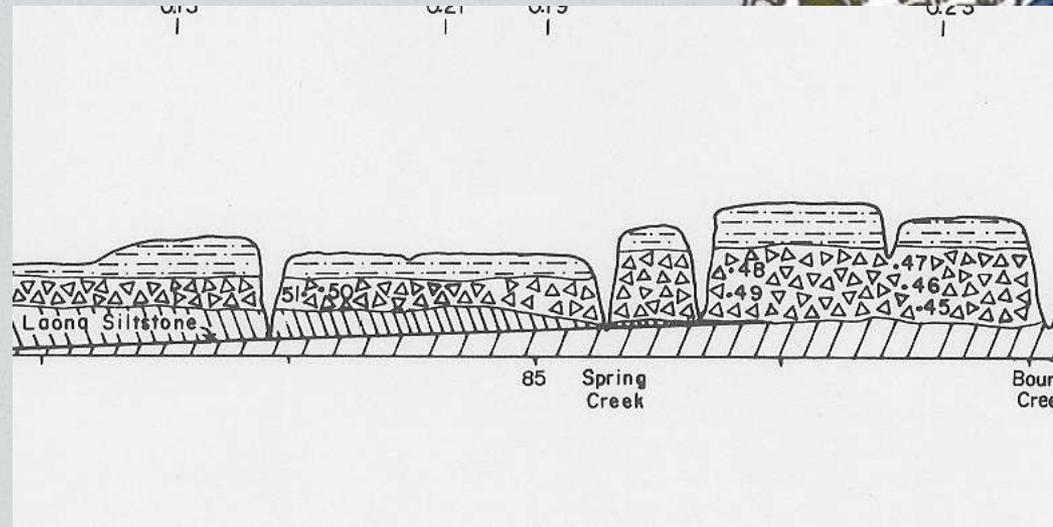
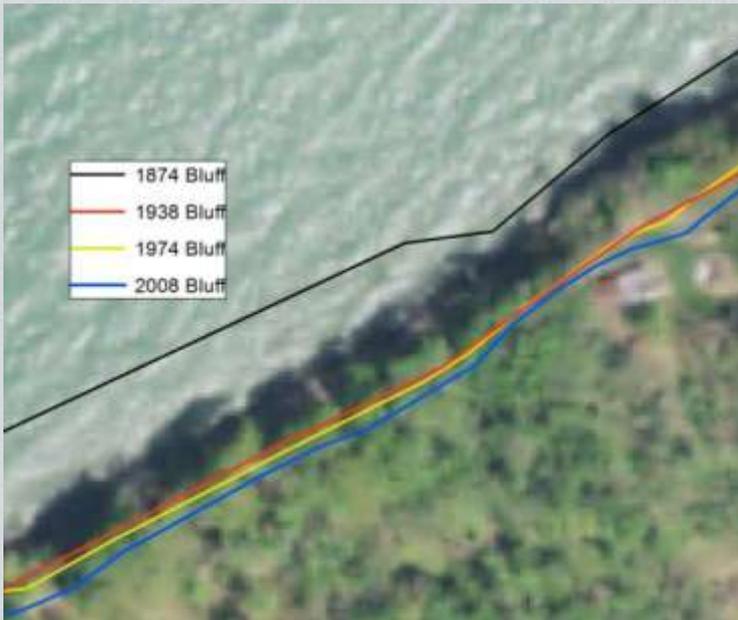
- Determine sediment sources/sinks for three time periods:
 - Undeveloped: 1860's-1930's
 - Mid Century: 1930's-1970's
 - Recent: 1970's - present
- Develop littoral cells/fluxes
- Compute and enter all data into SBAS



Regional Sediment Budget Lake Erie

Approach

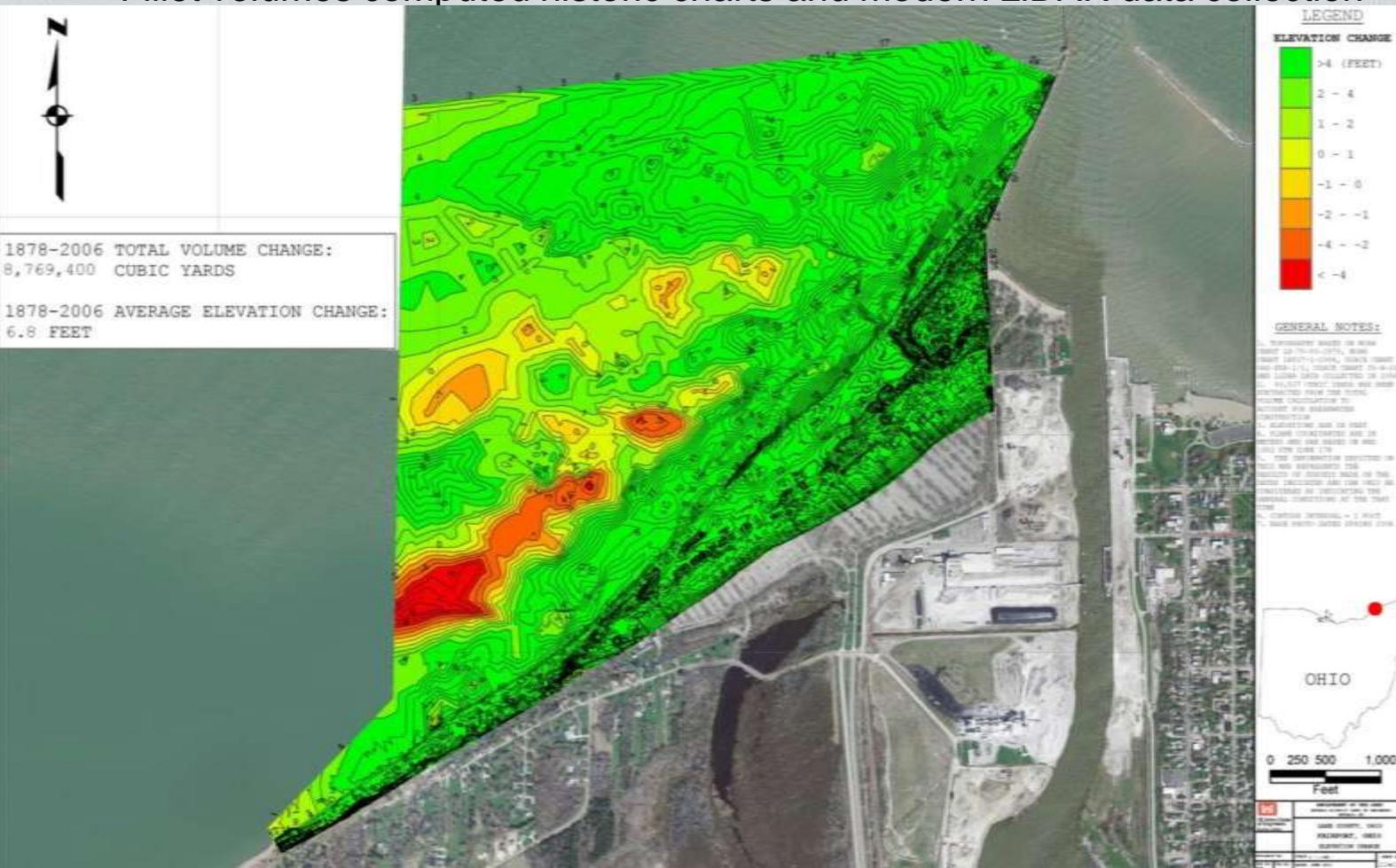
- Major sediment source: Bluff Erosion
 - Erosion computed based on linear recession rate and bluff stratigraphy



Regional Sediment Budget Lake Erie

Approach

- Major sediment sink: Fillets at Harbor Structures and losses to deep water
 - Fillet volumes computed historic charts and modern LiDAR data collection



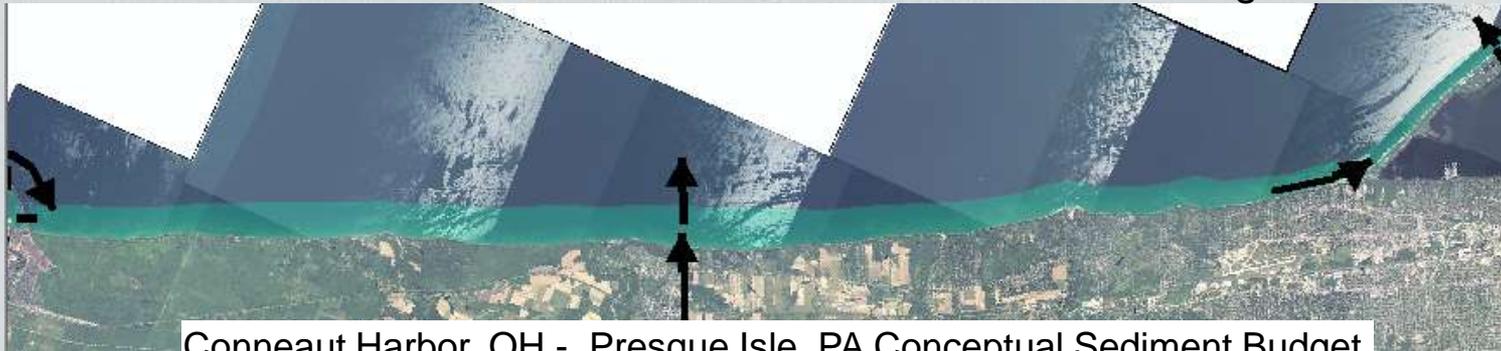
Regional Sediment Budget Lake Erie

Approach

- ERDC computed sediment input volumes from bluff erosion using historical data
- LRB determined fillet growth at major harbors and dredging history

Models, Tools, Databases, etc Used

- ArcGIS
- SBAS
- DSAS
- Harbor/shoreline development history
- Previous Sediment Budget Studies



Conneaut Harbor, OH - Presque Isle, PA Conceptual Sediment Budget

Benefits to O&M, FRM, Environmental

- Expand beneficial use of dredged materials in littoral system
- Reduce negative impacts of harbor structures on system
- Improve recreation resources and natural habitat



Regional Sediment Budget Lake Ontario

Description/Challenge

- Pre-1800's budget suggests great deal more sediment moving than today
- Today – hardening of shoreline has removed most sediment input



Armored Shoreline, Orleans Co., NY

Goals/Issues to Address

- Verify sediment budget presented by Baird, 2011
- Refine conceptual budget for Eastern Lake Ontario
- Develop littoral cells/fluxes
- Compute and enter all data into SBAS



Regional Sediment Budget Lakes Erie and Ontario

Opportunities to take action:

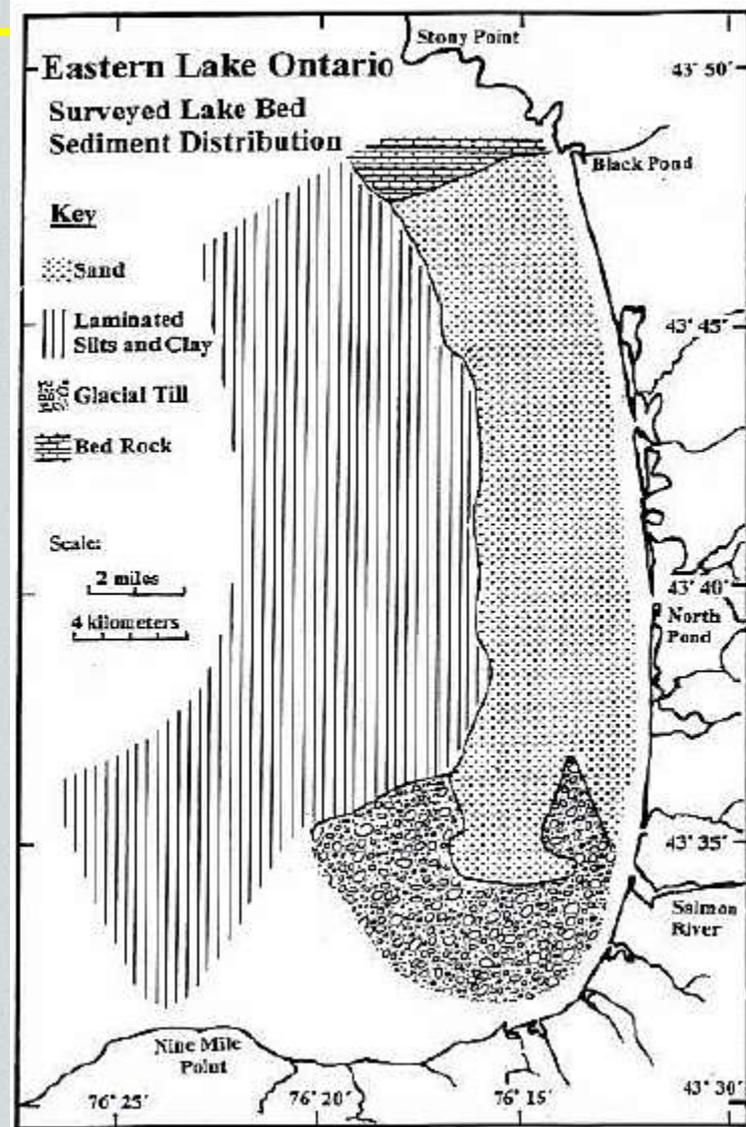
- Optimization of nourishment at Presque Isle State park
- Continued refinement of computation of harbor sediment accumulation
- Increased Beneficial Use of Dredged Material
 - Studies ongoing at Toledo/Maumee Bay
 - Ashtabula/Cleveland 204

Accomplishments

- Lake Erie Sediment Budget 90% complete
 - Awaiting entry into SBAS
- Baird's Lake Ontario sediment budget being reviewed and verified
 - Continued research into Eastern Lake Ontario System



US Army Corps
Of Engineers®
Buffalo District



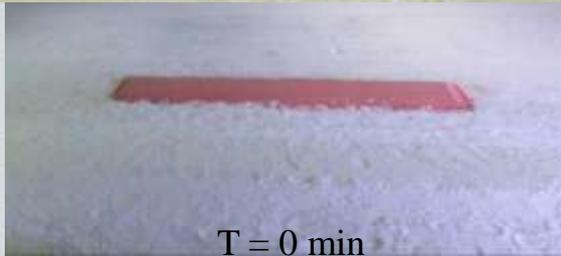
Buffalo District RSM Additional Studies

Nearshore Berm Placement Studies

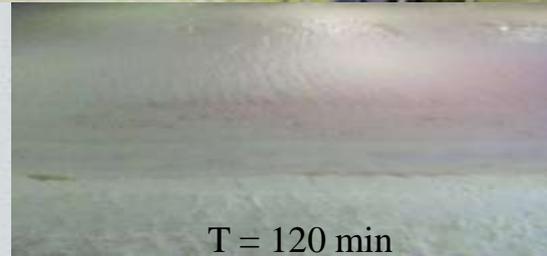
- Flume experiments carried out in LSTF at CHL to determine effects of placement depth on sediment transport
 - Simulate onshore, 4' and 11' depth placement
 - Comparison with real world conditions east of Fairport Harbor, OH
 - Application toward the benefits of nearshore placement of dredged material



US Army Corps
Of Engineers®
Buffalo District



T = 0 min



T = 120 min

Slide 9



Danger
No Hand Rail
Steep Surface
Deep Water

Questions?