



US Army Corps
of Engineers

Great Lakes Navigation System Breakwater Initiative



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Great Lakes Navigation System Breakwater Initiative

USACE is authorized to operate and maintain:

- ❖ 117 Harbors
- ❖ 610 Miles of Channels
- ❖ 104 Miles of Breakwaters
- ❖ 20 Dredged Material Disposal Facilities





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Navigation structures:

- ❖ Safeguard navigation from wave and ice
- ❖ Help maintain navigation channels
- ❖ Protect critical public infrastructure (buildings, roads, power plants, water and wastewater treatment)





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- ❖ Over 80% of coastal structures exceed 50 years of age
- ❖ 45% have never undergone a major rehabilitation
- ❖ Over 30% of structures have timber crib core sections; recent low water levels have accelerated deterioration of the wood





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- ❖ Limited federal funding forces difficult choices between federal channel dredging and structure repair
- ❖ Majority of harbor structures are unlikely to be repaired in the near future





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- ❖ Primary ranking metric is Federal harbor tonnage
- ❖ Federal harbors with < 1 M tons of shipments annually are at the greatest risk of not being maintained

54 Federal commercial harbors, only 28 exceed
1 M tons of annual cargo shipments

89 Federal harbors are almost completely excluded from
maintenance funding due to lack of commercial
shipping





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Impacts of insufficient maintenance:

- ❖ Continued deterioration of navigation
- ❖ Increased shipping costs if failures occur in commercial harbors
- ❖ Damages and replacement costs of harbor infrastructure far greater than the investment required to maintain harbor infrastructure
- ❖ Reduced protection of coastal assets, putting critical public infrastructure at risk





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Buffalo, NY





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Buffalo, NY





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Storm of December 2, 1985

- Sustained high southwesterly winds across Lake Erie produced water levels up to eight feet above the still water elevation and offshore waves up to 15 feet high
- Erosion and flooding reported along Lake Erie shore in New York State (west end of the lake), primarily south of Buffalo





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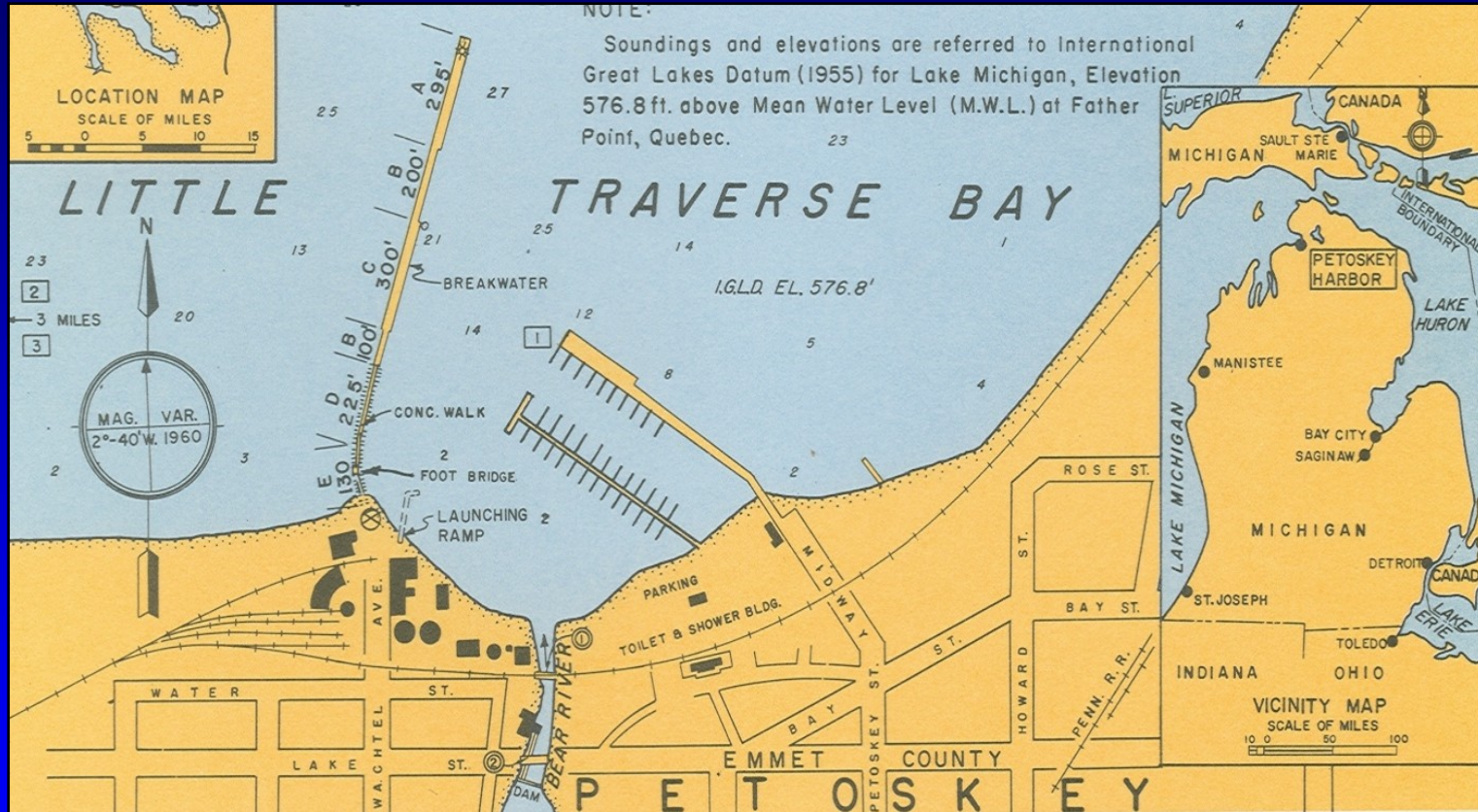
Storm of December 2, 1985

- **\$1.3 million in damage to homes and businesses south of the harbor (Buffalo News, 8 Dec 1985)**
- **Highest density of urban development behind the harbor structures suffered minimal or no damage**



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Petoskey, MI







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Petoskey, MI



09/15/2006







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Commercial Harbors:

- ❖ Established a team to develop consistent methods to assess harbor infrastructure condition and determine risks associated with the potential structure failure
- ❖ Use this information to prioritize limited federal funding in a manner that reduces risk to the Great Lakes navigation system





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Recreational Harbors:

- ❖ Initiate a dialogue with state and local officials regarding current condition of infrastructure and the projected risks posed by deferred maintenance
- ❖ Provide information regarding condition of navigation structures, as well as estimates for resource requirements for maintenance and repair





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Potential Options

- New study to redefine federal interest in harbors, i.e. for Flood Risk Management
- Earmarked funding
- Contributed funding





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Example of Contributed Funding

Leland and Arcadia, MI

- No FY07 funding for dredging recreational harbors
- Insufficient time to acquire permits to dredge using local funds prior to boating season
- Corps dredging using contributed funds would not require new permits, and dredging would be able to occur early in boating season
- Communities of Leland and Arcadia decided to pursue this course of action. Agreements were negotiated, coordinated and executed by 4 June 2007, and contracts awarded on 6 June 2007





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Contributed Funds

- May be more promising to use contributed funds to expand work at funded projects
- Process needs to start early, to allow communities time to weigh options and raise funds
- Corps and local communities did an exceptional job moving it forward
- Communities do not want to set a precedent by providing local funding to dredge Federal harbors





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Great Lakes Navigation System Breakwater Reliability Assessment

Future Work

Utilize Flood Risk Management approach for coastal modeling and economic analysis to determine Federal harbor areas at greatest risk, and of greatest value

- **Perform comprehensive inventory of public infrastructure elements protected by all Federal harbors in GLNS**
- **Collect data on value of infrastructural elements and economic impacts of storm damage**





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- Are we getting the information out to those affected?
 - Brochure, fact sheets
- How to better describe benefits?
- Alternative means to maintain benefits?



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Great Lakes Coastal Infrastructure: Critical Protection at Risk

This paper provides an overview of the vital role that coastal infrastructure plays in protecting urban waterfronts from storm surges, waves, and ice. It presents a strategy to prioritize limited federal funding and to begin a dialogue with local and state officials regarding potential options for non-federal interests to assume fiscal responsibility for these structures in the long-term.

The Great Lakes coastal shoreline includes some of the most beautiful, valuable, and vulnerable property in the Midwest and Northeast. Cities and towns in eight States have flourished along the shores of the Great Lakes because of their natural beauty and the value they bring to commerce, navigation, and recreation. Most of these coastal cities were established as ports, taking advantage of the Great Lakes as their primary mode of transporting goods, material, and people.

Over 130 coastal cities and towns around the Great Lakes have federal navigation projects that include channels for navigation and structures like breakwaters and piers. Although authorized to safeguard navigation activities in the federal harbors from waves and ice, these navigation structures also provide critical flood and storm protection for buildings, roads, and facilities that developed in their shadow along the urban waterfront. In some cases, urban waterfront development includes critical infrastructure for power generation, water supply, and wastewater treatment.



Federal funding for the maintenance of federal harbors is prioritized based on the national economic benefits of the harbor related to commercial navigation. Harbors that lack significant commercial navigation are not currently a high funding priority. Consequently, maintenance of recreational harbors and harbors with limited commercial traffic has been deferred.

Great Lakes Navigation System

The Great Lakes navigation system is a network of harbors, channels, locks, and dams that provides for interstate and international transportation of goods and materials (180 million tons of cargo in 2004).

The United States Great Lakes navigation system includes over 130 federal navigation projects with 610 miles of channels, 117 harbors, 104 miles of breakwaters, 20 dredged material disposal facilities, and the locks at Sault Sainte Marie, Michigan; Chicago, Illinois; and Buffalo, New York.

Most of the federal harbors in the Great Lakes were constructed between 1860 and 1940. At some of these harbors, commercial navigation has declined or ceased completely over the past 50 years. Recreation has become the major industry at many Great Lakes harbors, in some cases completely displacing industries that relied on commercial shipping. Currently, only 63 federal navigation projects on the Great Lakes support commercial navigation.

