Coastal Structures Risk Communication Eastern UP, Northern Lower Michigan Harbors

Dave Wright
Chief of Operations
Detroit District

Aug 27, 2013

US Army Corps of Engineers
BUILDING STRONG

Introduction and Agenda

Purpose:

Communicate the risk of breakwater and structure conditions to local stakeholders and navigation system users. With a focus on structure condition, function, and economic consequences of coastal structures on the Great Lakes.

Focus Topics:

1. Coastal Structure Risk Communication
2. Condition Assessment of Coastal Structures
3. Harbor Infrastructure Inventory Process
4. Next Steps and Open Discussion

Regional Risk Communication Meetings

Regional Meetings

#1	15 Aug2011
#2	8 Nov 2011
#3	18 Jan 2012
#4	18 Jul 2012
#5	30 Aug2012
#6	15 Oct 2012
#7	17 May 2013
#8	20 June 2013
#9	27 Aug 2013
#10	UP/N. WI (Sep 13)
#11	East Ont (Sep 13)

Coastal Structures

Great Lakes Navigation

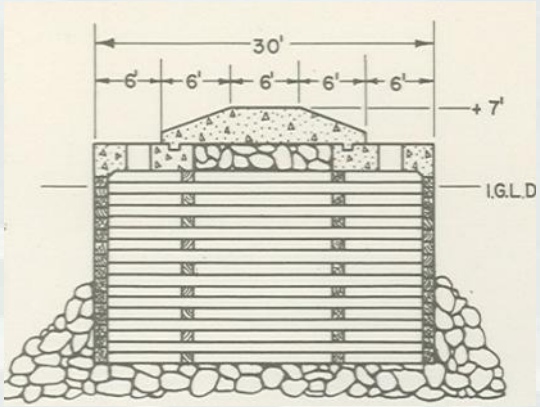
- 104+ miles of navigational structures on the Great Lakes
- Most built between 1860 and 1940
- Timber crib construction (typical)
- Low Lake water levels since the 1990's have accelerated deterioration

Typical Coastal Structures

Steel Sheet Pile Structures

Rubble Mound/Laid-Up Stone Structures

Other Components: safety (railings, walking surface, etc.)



Typical Wood Crib/ Concrete Cap Structures Cross-section

Structure Function/Consequences

Calumet Harbor, IL&IN

Contain and reduce shoaling in navigation channel

Milwaukee Harbor, WI

Protect navigation channel and shoreline infrastructure

St. Joseph Harbor, MI

Control wave climate within navigation channel and harbor

Coastal Structure Communication Objective

Program Objective: Communicate the risk of breakwater and structure conditions to local stakeholders and navigation system users

Process:

1. **Conduct Condition Assessments**
   - Commercial Harbors- Use detailed Breakwater Assessment Team (BAT) Evaluation
   - Recreational Harbors- Rely on expert elicitation
2. **Conduct Harbor Infrastructure Inventory on all structures**
3. **Prepare summary document** that conveys the current condition of the harbor infrastructure as well as the risk involved in the event of failure
4. **Share with stakeholders** in regional meetings

Harbor Infrastructure Inventory Process

- Gather information on critical infrastructure protected by federally maintained navigation structures
  - Review Documents:
    - Project Drawings
    - Harbor Fact Sheet
    - Aerial/Satellite Photography; Photo document critical infrastructure
  - Identify Critical Infrastructure to Visit
  - Research Identified Critical Infrastructure
- Site Visit Tasks
  - Met with Local Officials, Port Authority, Harbor Master, when available
  - Visit Identified Areas/Critical Infrastructure & Gather Information
- Post Site Visit Tasks
  - Create Report Following the Standard Report Template

Harbor Infrastructure Inventory Report Content

- **HARBOR LOCATION**
- **PROJECT DESCRIPTION**

  Authorization, harbor type (commercial or recreational), length of breakwater structures and channel
- **DATE OF SITE VISIT**
- **SUMMARY OF STRUCTURES**

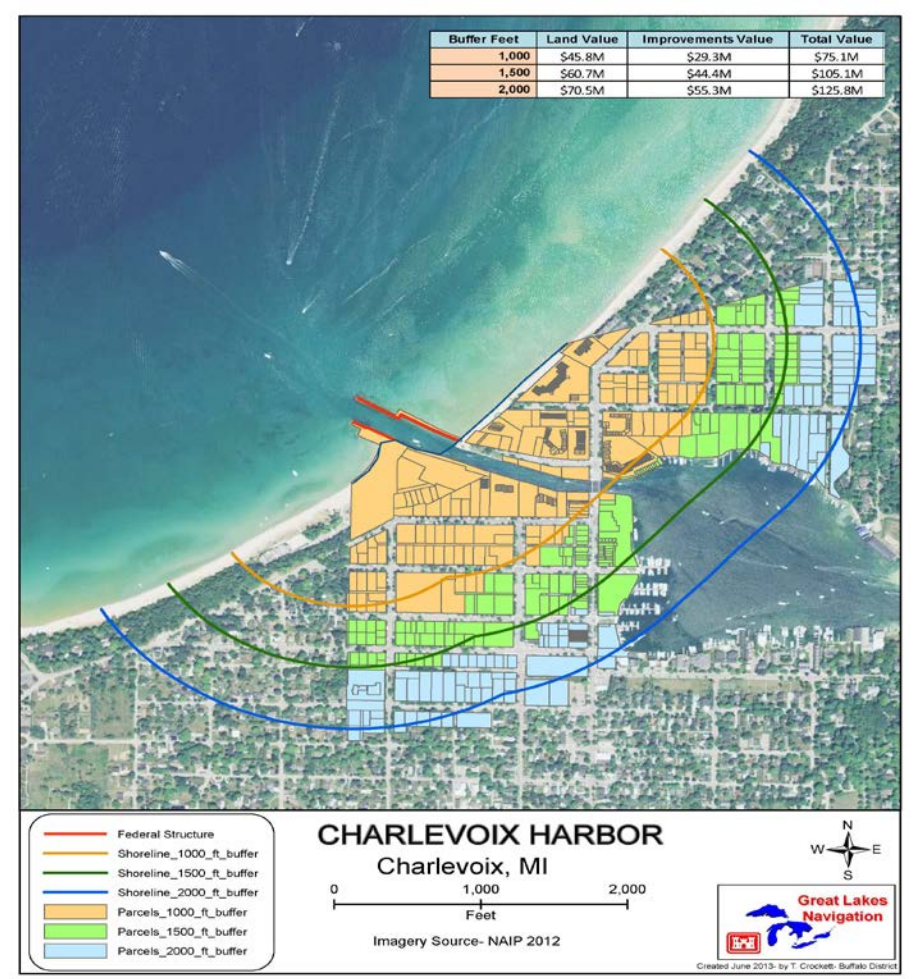
  Lists all structures and facilities that are believed to be protected by the federal navigation structures; also identify any other potential stakeholders
- **SUMMARY OF IMPACT**

  Summarizes any potential damage that could be experienced if the federal breakwater fails.
- **DESCRIPTION OF STRUCTURES**

  Aerial photo with all potential affected structures shown along with pictures and a brief description of each potentially affected structure

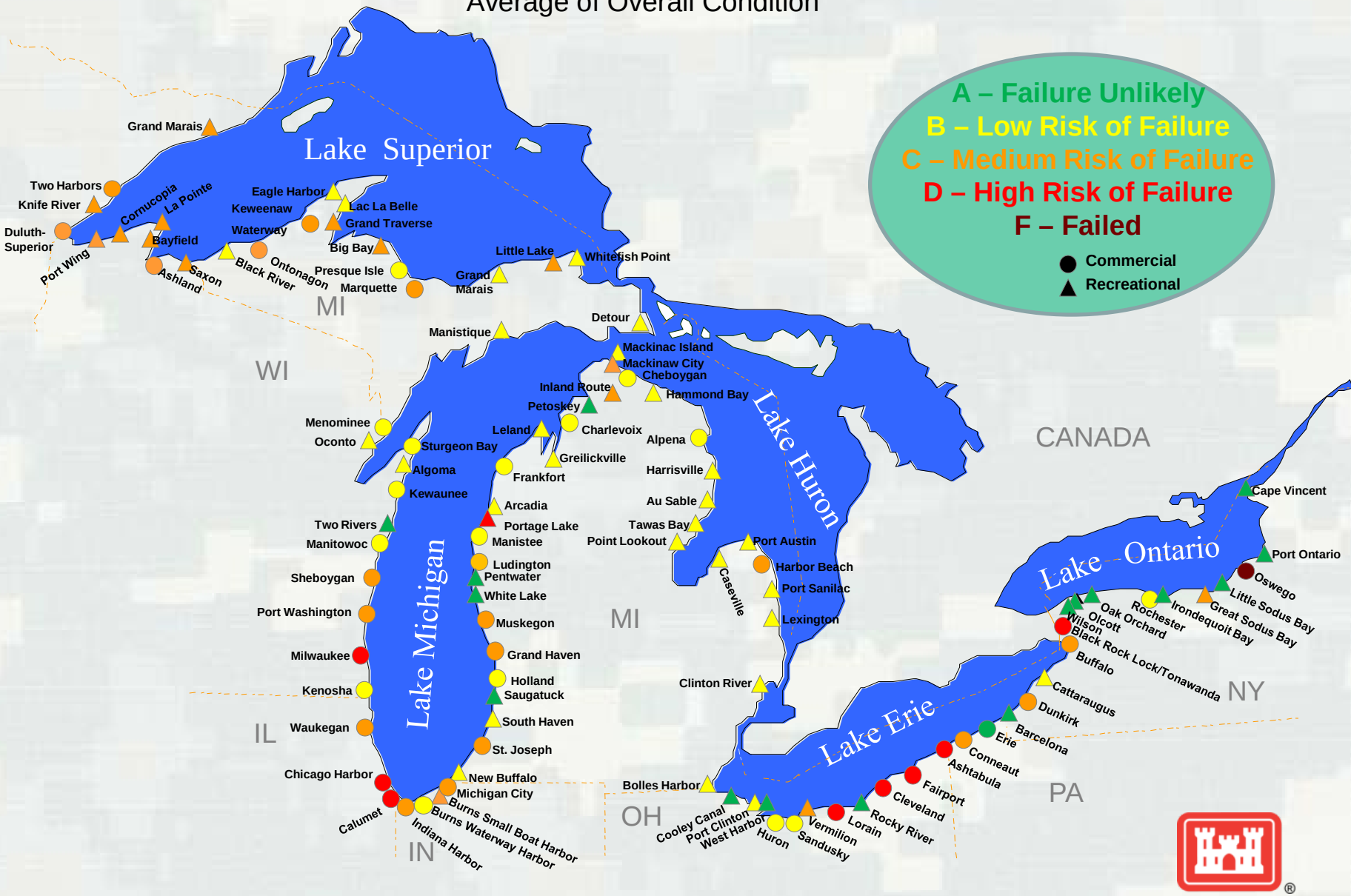
High Level Display of Potential Impact Areas

- Three potential impact areas were defined at 500 ft intervals
- Shows potential value of land and infrastructure within each “potential impact area” based on tax assessment data



Harbor Structure Condition Assessments

Average of Overall Condition



Harbors of "Eastern UP and Northern Lower Michigan"

Charlevoix Harbor:

B – Low Risk of Failure

Charlevoix Harbor:

North Pier.

North Pier, cracked concrete.

Charlevoix Harbor:

Overgrown vegetation, North Revetment.

South Pier walkway.

Charlevoix Harbor:

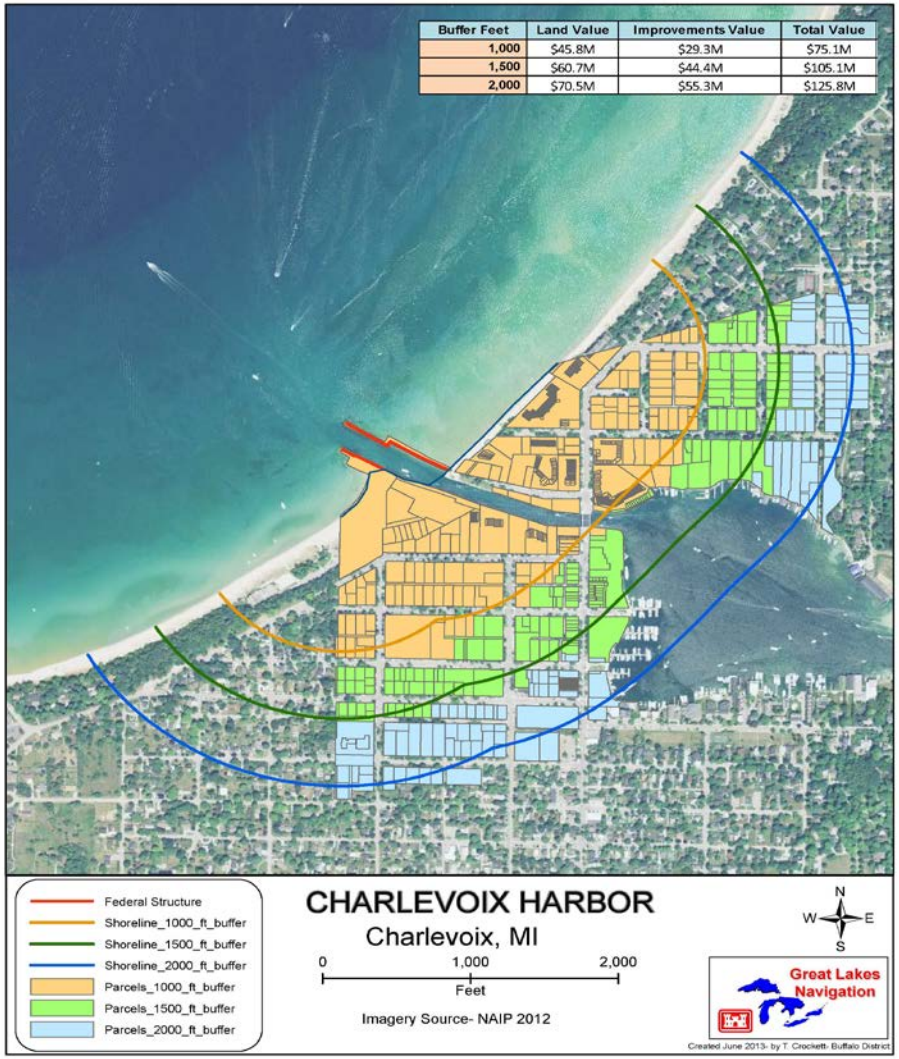
Infrastructure:

1. St. Marys Cement Plant
2. Charlevoix Water Plant
3. Michigan Beach Park
4. Charlevoix Fisheries Research Station
5. Condominiums
6. Restaurant and Inn
7. US 31 Bridge
8. Commercial Buildings
9. Beaver Island Ferry
10. East Park
11. Ward Brothers Marina
12. North Shore Houses
13. South Shore Houses and Condominiums
14. Belvedere Club
15. U.S. Coast Guard Station
16. Northwest Marina

Charlevoix Harbor

Potential Impact Areas

Buffer Feet	Land Value	Improv. Value	Total Assessed Value
1,000	$45.8M	$29.3M	$75.1M
1,500	$60.7M	$44.4M	$105.1M
2,000	$70.5M	$55.3M	$125.8M



Petoskey Harbor:

A – Unlikely Risk of Failure

Petoskey Harbor:

Petoskey Harbor Breakwater.

Petoskey Harbor:

Stone settlement.

Petoskey Harbor:

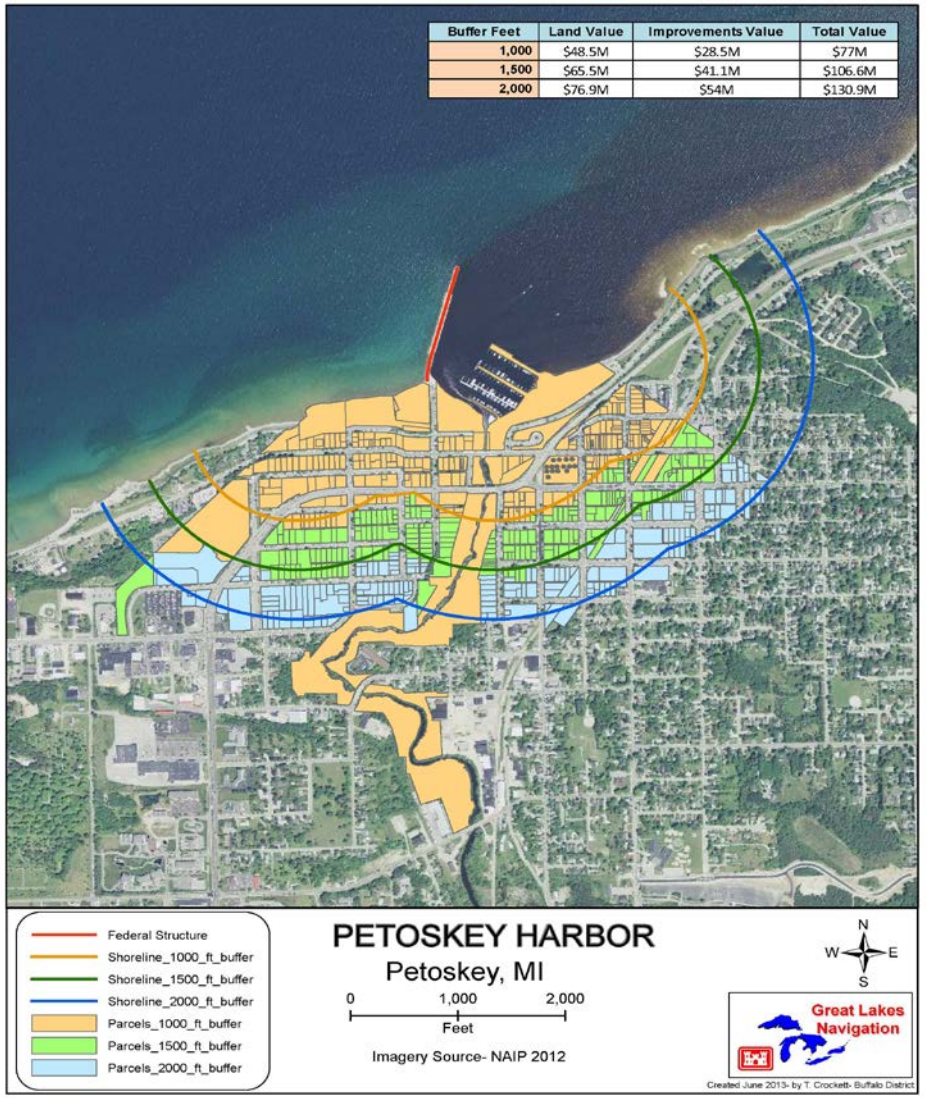
Infrastructure

1. Sunset Condominiums
2. Petoskey Festival Shelter and Park
3. Petoskey Police and Fire Departments
4. Petoskey Municipal Marina

Petoskey Harbor

Potential Impact Areas

Buffer Feet	Land Value	Improv. Value	Total Assessed Value
1,000	$48.5M	$28.5M	$77.0M
1,500	$65.5M	$41.1M	$106.6M
2,000	$76.9M	$54.0M	$130.9M



Hammond Bay Harbor:
B – Low Risk of Failure

Hammond Bay Harbor:

West Breakwater.

Lake-side cover stone alignment.

Hammond Bay Harbor:

Overgrowth on West Breakwater, Channel Side.

East Base, Tree Growth.

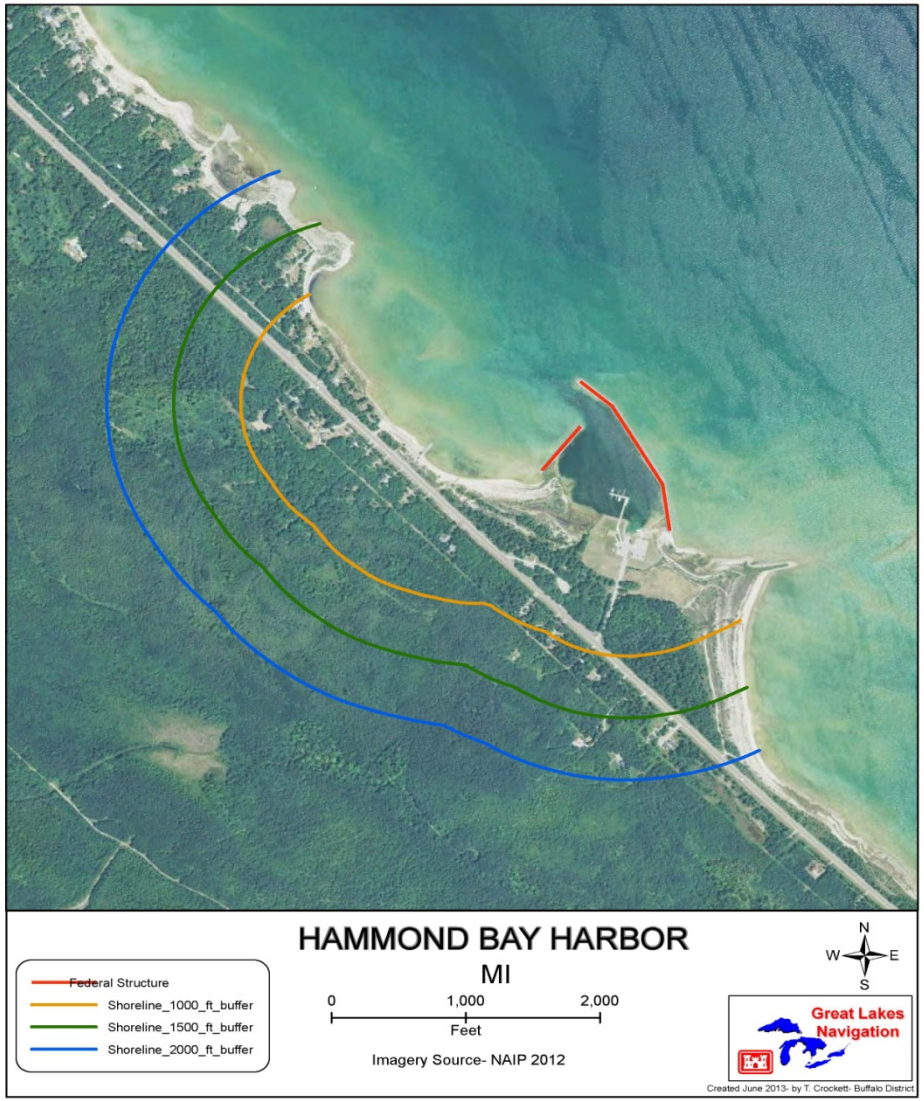
Hammond Bay Harbor:

Infrastructure:

1. Hammond Bay State Harbor
2. U.S. Fish and Wildlife Service

Hammond Bay Harbor

Potential Impact Areas



Cheboygan Harbor:
B – Low Risk of Failure

Cheboygan Harbor:

Walk and Railing, vegetation.

Lake-side cover stone.

Cheboygan Harbor:

Channel Side.

Typical crack in concrete walkway.

Cheboygan Harbor:

Infrastructure:

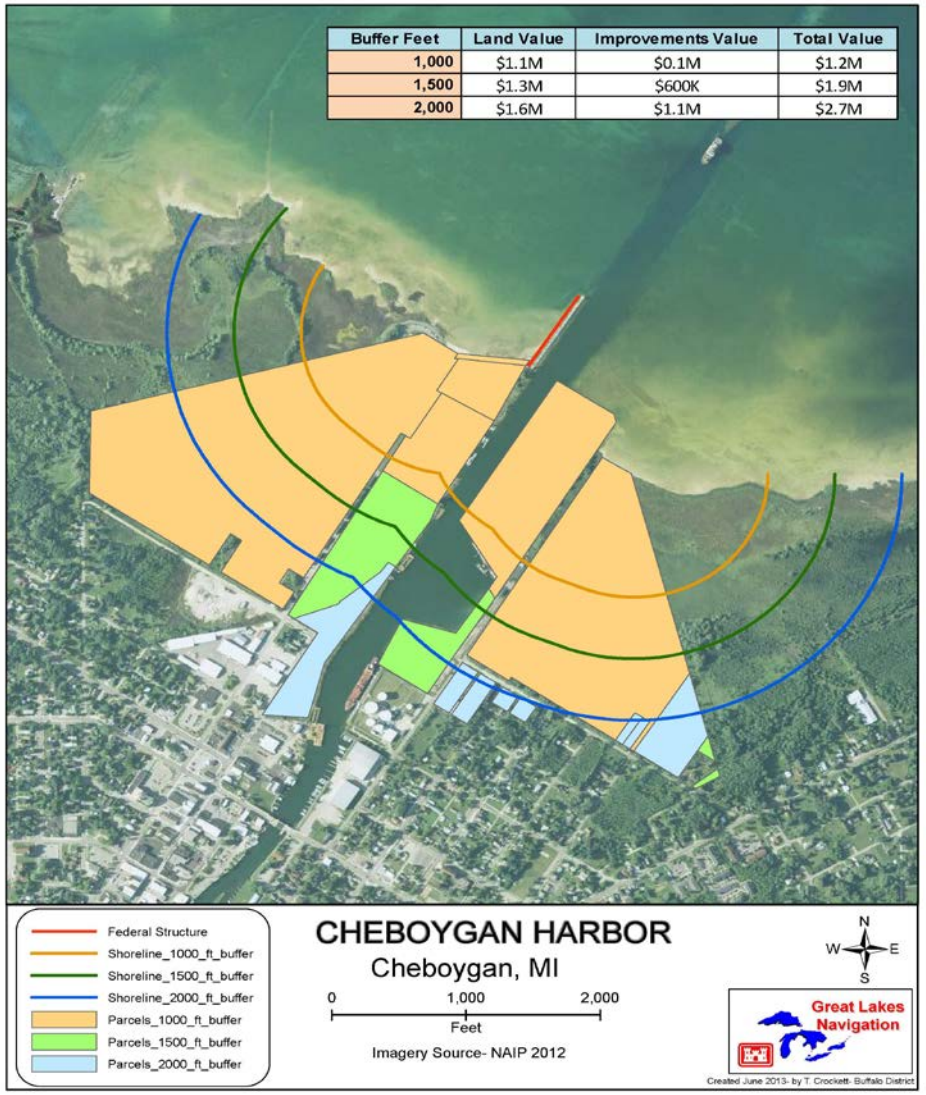
1. Cheboygan County Marina
2. Wastewater Treatment Plant
3. Durocher Marine
4. U.S. Oil Co.
5. U.S. Coast Guard
6. Gordon Turner Park

BUILDING STRONG®

Cheboygan Harbor:

Potential Impact Areas

Buffer Feet	Land Value	Improv. Value	Total Assessed Value
1,000	$1.1M	$0.1M	$1.2M
1,500	$1.3M	$0.6M	$1.9M
2,000	$1.6M	$1.1M	$2.7M



Mackinaw City Harbor:

C – Medium Risk of Failure

Mackinaw City Harbor:

Breakwater cover stone placement.

U.S. Coast Guard Light at tip of East Breakwater.

Mackinaw City Harbor:

Slope protection alignment.

U.S. Coast Guard Light
at tip of slope protection.

Mackinaw City Harbor:

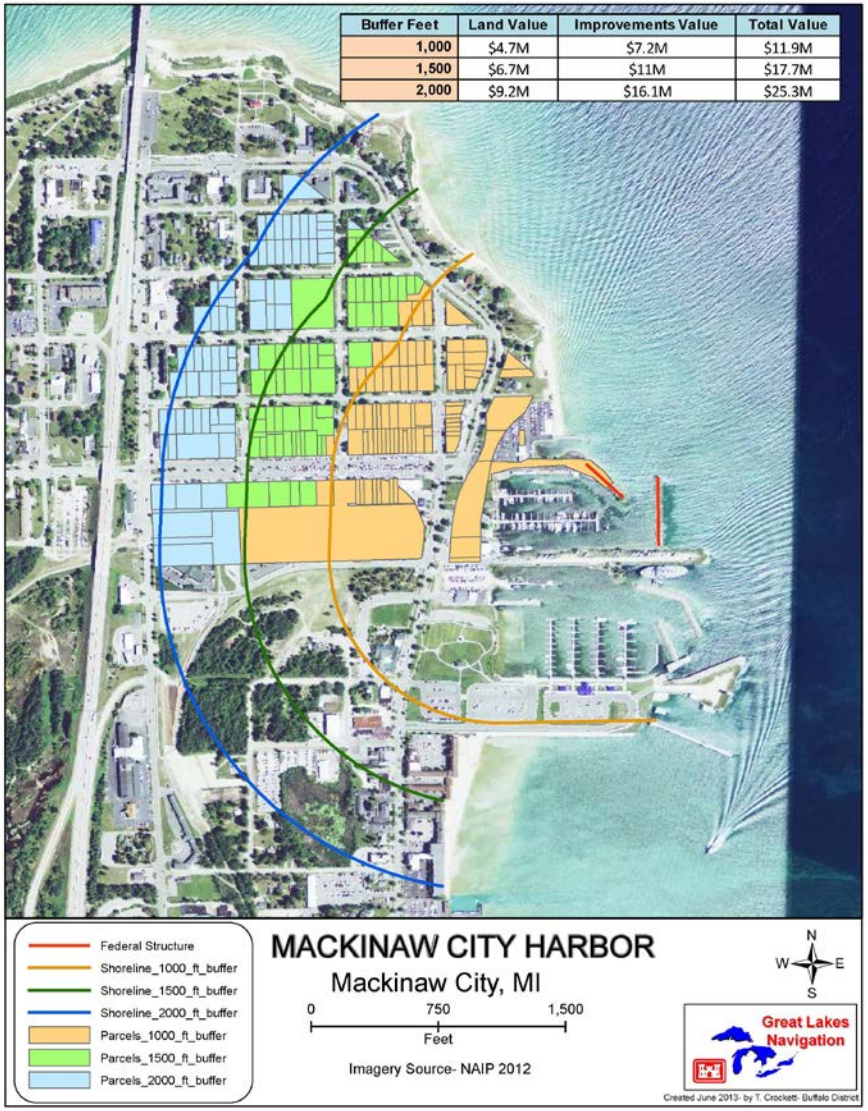
Infrastructure:

1. Icebreaker Mackinaw Maritime Museum
2. Shepler's Mackinaw Island Ferry Service
3. Shepler's Marine
4. Watatam Park

Mackinaw City Harbor:

Potential Impact Areas

Buffer Feet	Land Value	Improv. Value	Total Assessed Value
1,000	$4.7M	$7.2M	$11.9M
1,500	$6.7M	$11.0M	$17.7M
2,000	$9.2M	$16.1M	$25.3M



BUILDING STRONG®

Mackinac Island Harbor:

B – Low Risk of Failure

Mackinac Island Harbor:

West Breakwater – Looking Northwest.

West Breakwater – Looking Southeast

Mackinac Island Harbor:

East Breakwater - looking Southwest.

East Breakwater Extension - looking Northeast.

Mackinac Island Harbor:

Infrastructure:

1. Mackinac Island State Harbor
2. Private Ferry Services for passengers and freight

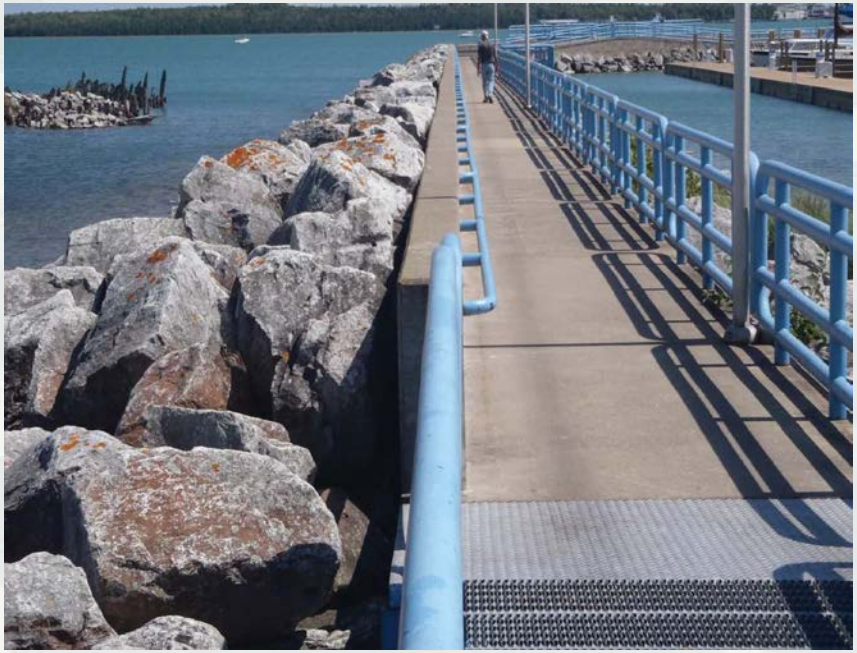
Mackinac Island Harbor:

Potential Impact Areas

Detour Harbor:

B – Low Risk of Failure

Detour Harbor:



North Breakwater.

East Breakwater.

Detour Harbor:

South Breakwater - looking Northeast.

South Breakwater - looking Southwest.

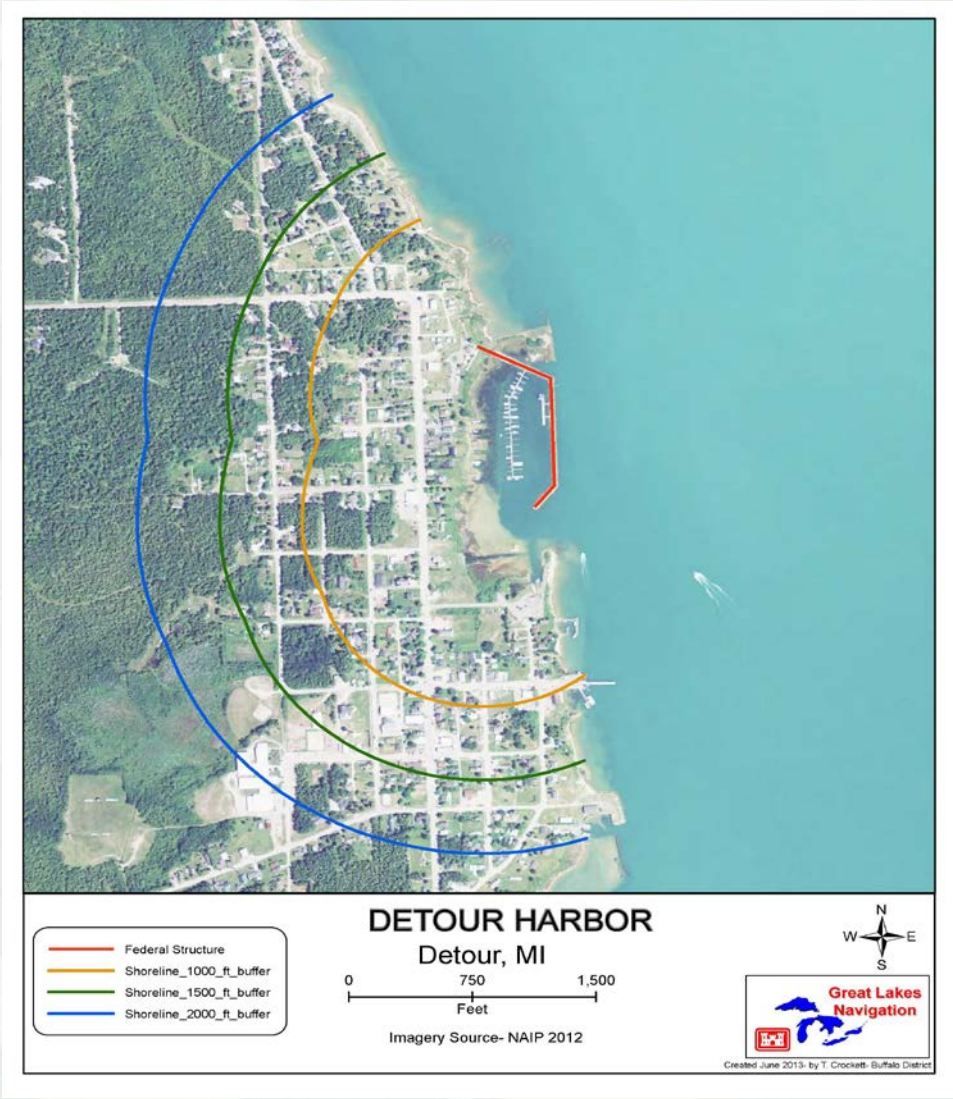
Detour Harbor:

Infrastructure:

1. Boat Launch
2. Residential Homes
3. Detour State Harbor Marina

Detour Harbor:

Potential Impact Areas



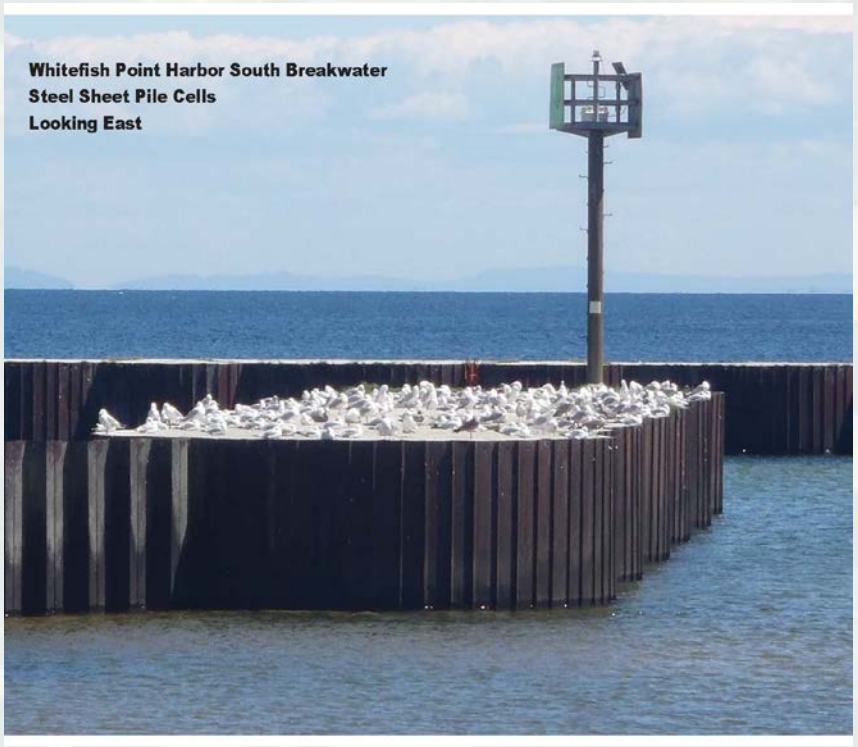
Whitefish Point Harbor:
B – Low Risk of Failure

Whitefish Point Harbor:

North Breakwater – looking South.

Interior Breakwater– looking Northwest.

Whitefish Point Harbor:



Whitefish Point Harbor:

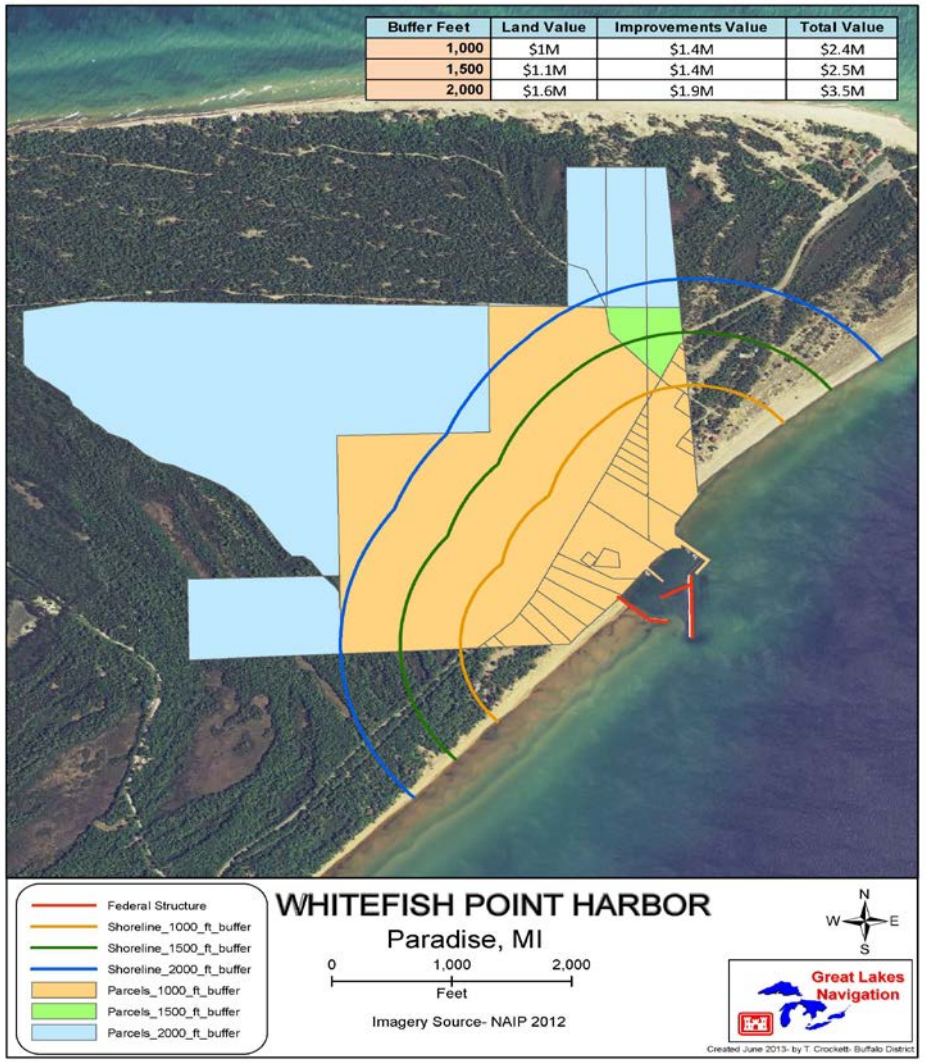
Infrastructure:

1. Commercial Fishery
2. MDNRE – Whitefish Point State Dock
3. Private Boat Slips

Whitefish Point Harbor:

Potential Impact Areas

Buffer Feet	Land Value	Improv. Value	Total Assessed Value
1,000	$1.0M	$1.4M	$2.4M
1,500	$1.1M	$1.4M	$2.5M
2,000	$1.6M	$1.9M	$3.5M



Little Lake Harbor:

C – Medium Risk of Failure

Little Lake Harbor:

East Breakwater – Section II.

West Breakwater– Section II.

Little Lake Harbor:

East Breakwater, Sheet Pile Cell.

East Breakwater.

Little Lake Harbor:

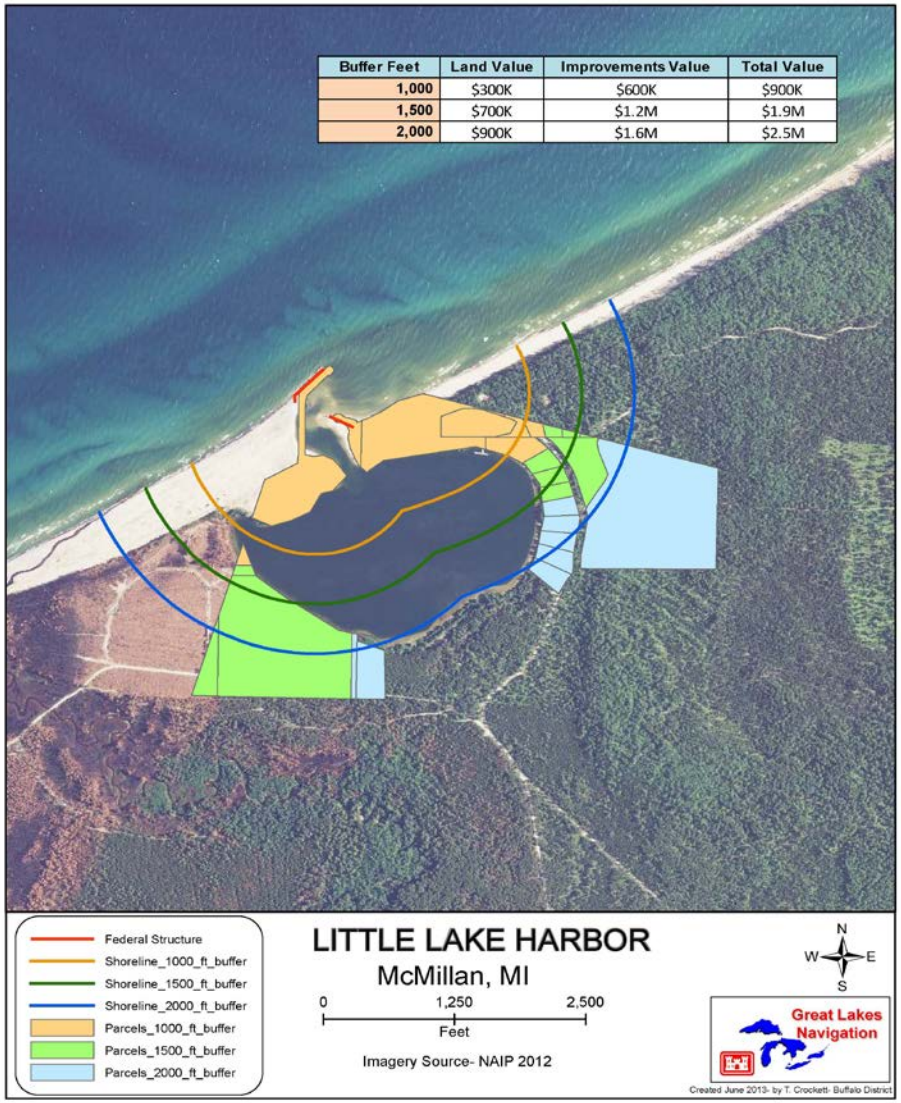
Infrastructure:

1. Luce County Road Commission Boat Launch
2. Public Dock

Little Lake Harbor:

Potential Impact Areas

Buffer Feet	Land Value	Improv. Value	Total Assessed Value
1,000	$300K	$600K	$900K
1,500	$700K	$1.2M	$1.9M
2,000	$900K	$1.6M	$2.5M



Grand Marais Harbor:

B – Low Risk of Failure

Grand Marias Harbor:

West Breakwater – Steel Sheet Pile Cell Type II.

West Breakwater – Section B.

Grand Marais Harbor:

West Breakwater, Section C.

East Breakwater – Section E.

Grand Marais Harbor:

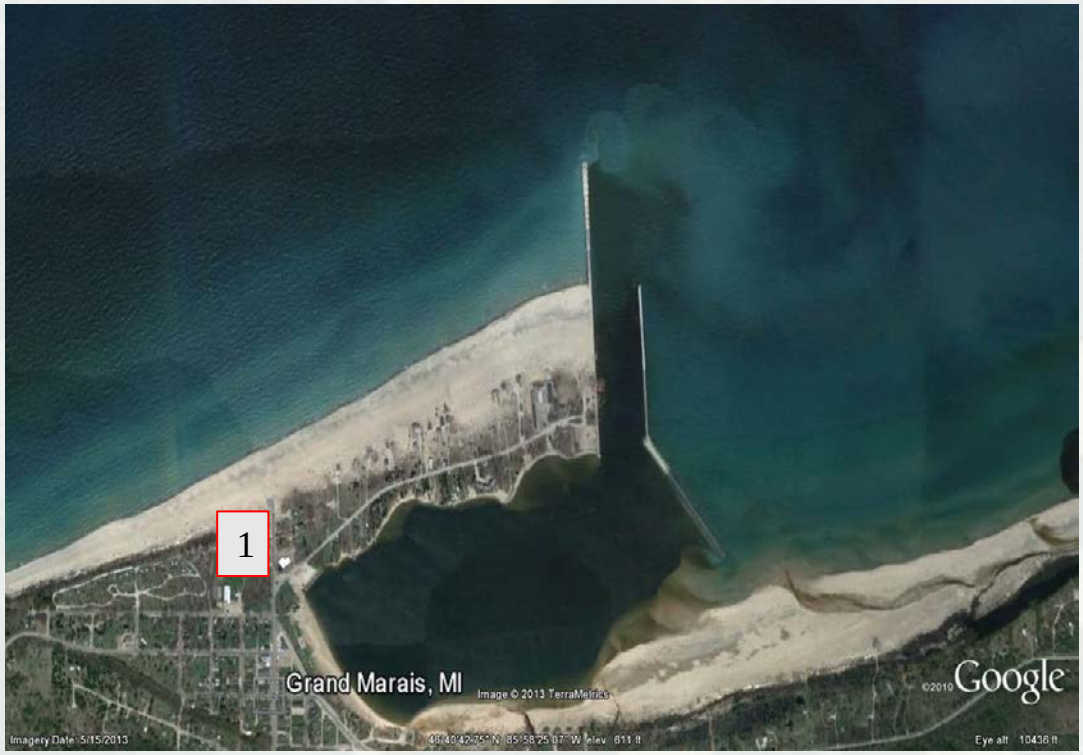
East Breakwater, Section B.

East Breakwater – Section 2012 Reconstruction.

Grand Marais Harbor:

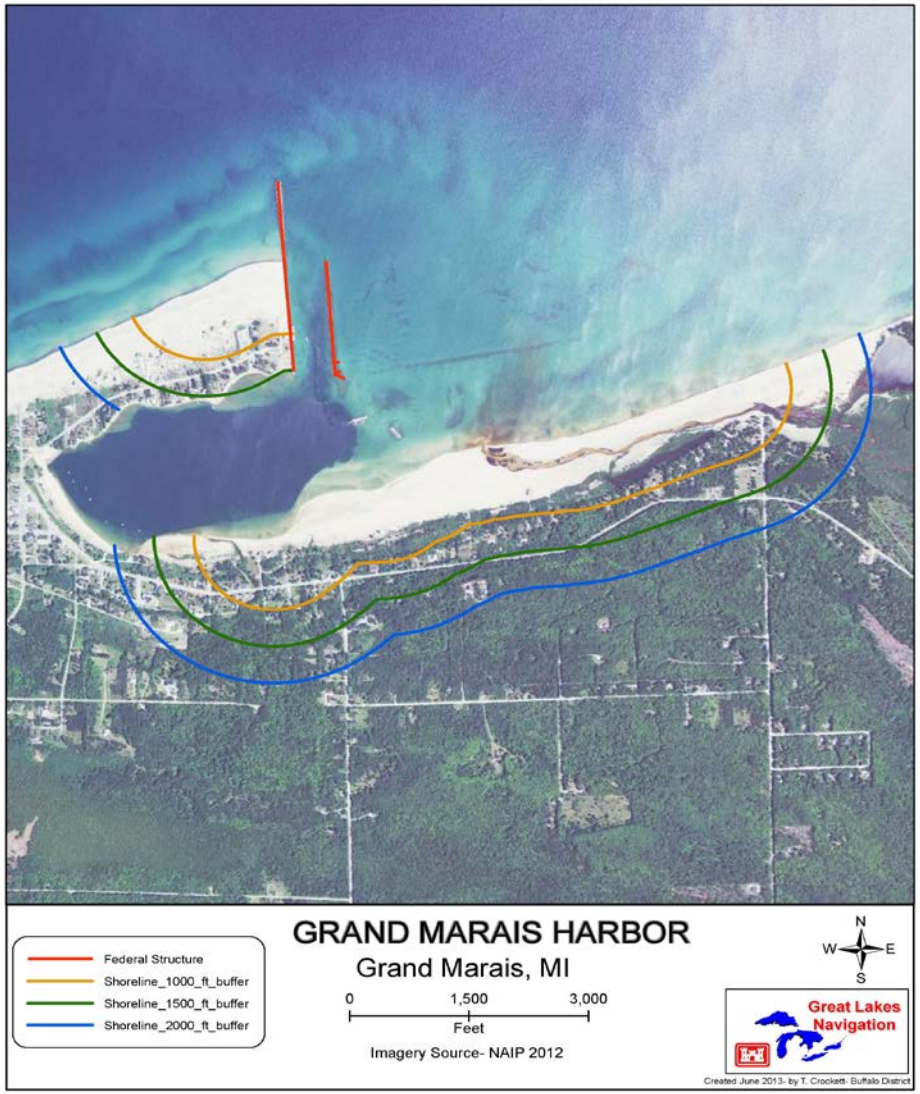
Infrastructure:

1. Grand Marais – Burt Township Marina



Grand Marias Harbor:

Potential Impact Areas



Manistique Harbor:

B – Low Risk of Failure

Manistique Harbor:

West Breakwater – Section A.

West Breakwater – Section B.

Manistique Harbor:

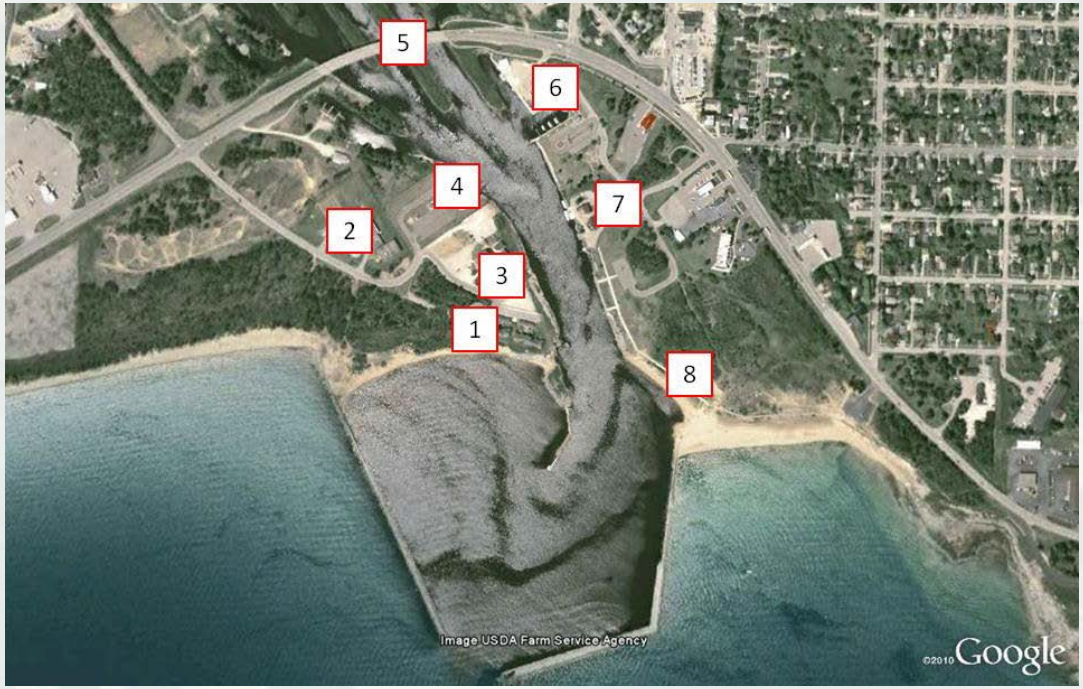
East Breakwater, Section C.

East Breakwater – Sections E and F.

Manistique Harbor:

Infrastructure:

1. Residential
2. Wastewater Treatment Plant
3. Waterfront Business
4. Boat Launch
5. US-2 Highway Bridge
6. Manistique Municipal Marina
7. Municipal Park
8. Recreational Path



Manistique Harbor:

Potential Impact Areas

What Can Be Done?

- Federal Funding
  - ▶ Funding request through the Federal Budget process each fiscal year
    - Contract structural repair
    - Government floating plant repair
- Local Funding
  - ▶ Mechanisms in place to accept local funding
- Transfer to State/Local Entity
  - ▶ Section 216 Process

Visit our website for more information:

www.lre.usace.army.mil/Missions/GreatLakesNavigation.aspx

DETROIT DISTRICT

US Army Corps of Engineers

Search Detroit District

ABOUT | BUSINESS WITH US | MISSIONS | LOCATIONS | CAREERS | MEDIA | LIBRARY | CONTACT

HOME > MISSIONS > GREAT LAKES NAVIGATION

Great Lakes Navigation System

The Great Lakes navigation system is a continuous 27-foot deep draft waterway that extends from the western end of Lake Superior at Duluth, MN to the Gulf of St. Lawrence on the Atlantic Ocean, a distance of over 2,400 miles. This bi-national resource is composed of the five Great Lakes, the connecting channels of the Great Lakes, the St Lawrence River and the Gulf of St. Lawrence. The U.S. portion of the system includes 140 harbors (60 commercial; 80 recreational), two operational locks, 104 miles of breakwaters and jetties, and over 600 miles of maintained navigation channels. In addition, the GLNS is connected to several other shallow draft waterways (Illinois Waterway, New York State Barge Canal, etc.) to form an important waterborne transportation network, reaching deep into the continent.

Contact GLNAVIGATION@USACE.ARMY.MIL to submit comments or questions related to the U.S. Army Corps of Engineers' role in Great Lakes navigation.

Great Lakes Navigation System

Contact Us

To submit comments or questions related to the U.S. Army Corps of Engineers' role in Great Lakes navigation, send email to GLNAVIGATION@usace.army.mil

Navigation Info

Great Lakes Harbors Information: Click for Great Lakes Harbors Fact Sheets and Fully Functional Harbor Maps.

Structure Risk Communication Meeting: The U.S. Army Corps of Engineers Great Lakes Navigation Team is in the process of planning a series of regional meetings to initiate a dialogue with state and local officials to inform them of the current condition of coastal infrastructure and the

Budgetary and Dredging Info

Fiscal Year 2014 President's Budget

FY14 Budget Summary - for the Great Lakes Navigation Business Line (Operations & Maintenance)
FY14 President's Budget - Detailed Spreadsheet

Fiscal Year 2013 President's Budget

FY13 President's Budget - Detailed Spreadsheet

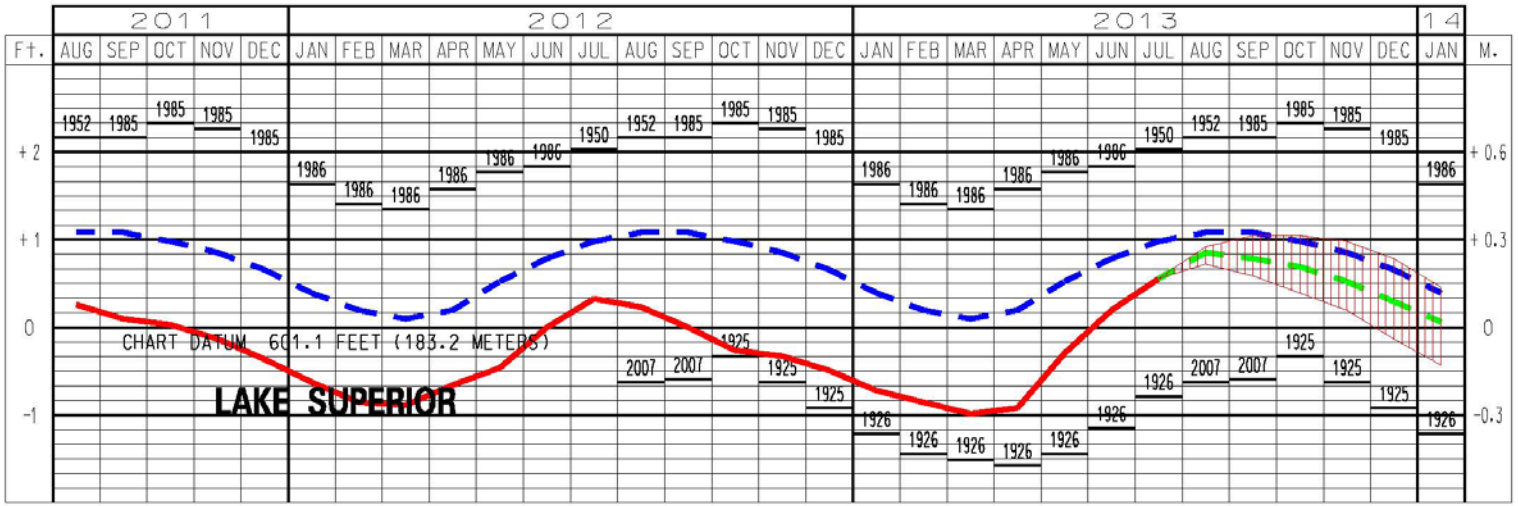
Other Navigation Info

Great Lakes Navigation Informational Pamphlets

Great Lakes Navigation System brochure (PDF) - The Great Lakes Navigation System brochure gives information on the navigation system,

Questions?

LAKE SUPERIOR WATER LEVELS – AUGUST 2013



LEGEND

LAKE LEVELS

RECORDED

PROJECTED

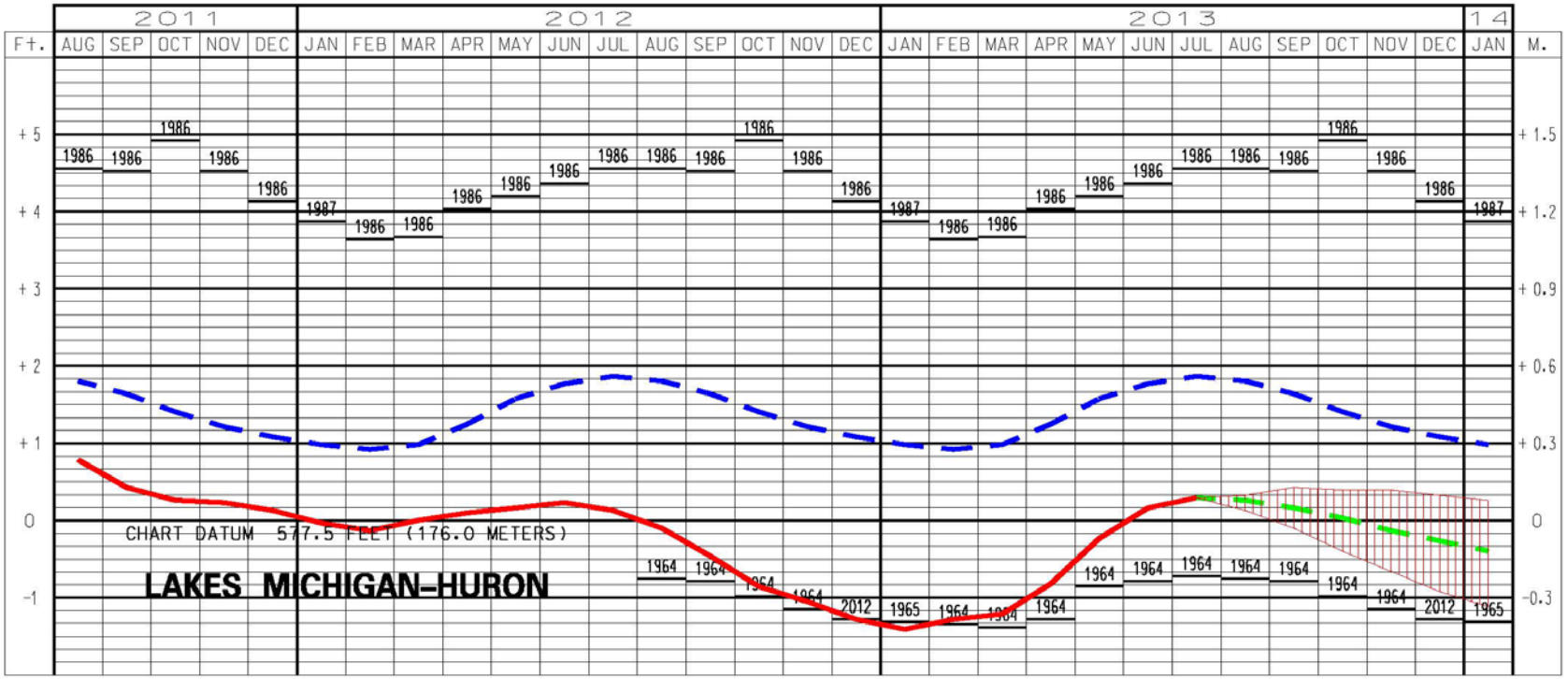
AVERAGE **

MAXIMUM ** 1985 1985 1973 1973

MINIMUM ** 1936 1934 1926 1934

** Average, Maximum and Minimum for period 1918-2012

LAKES MICHIGAN–HURON WATER LEVELS – AUGUST 2013



LEGEND

LAKE LEVELS

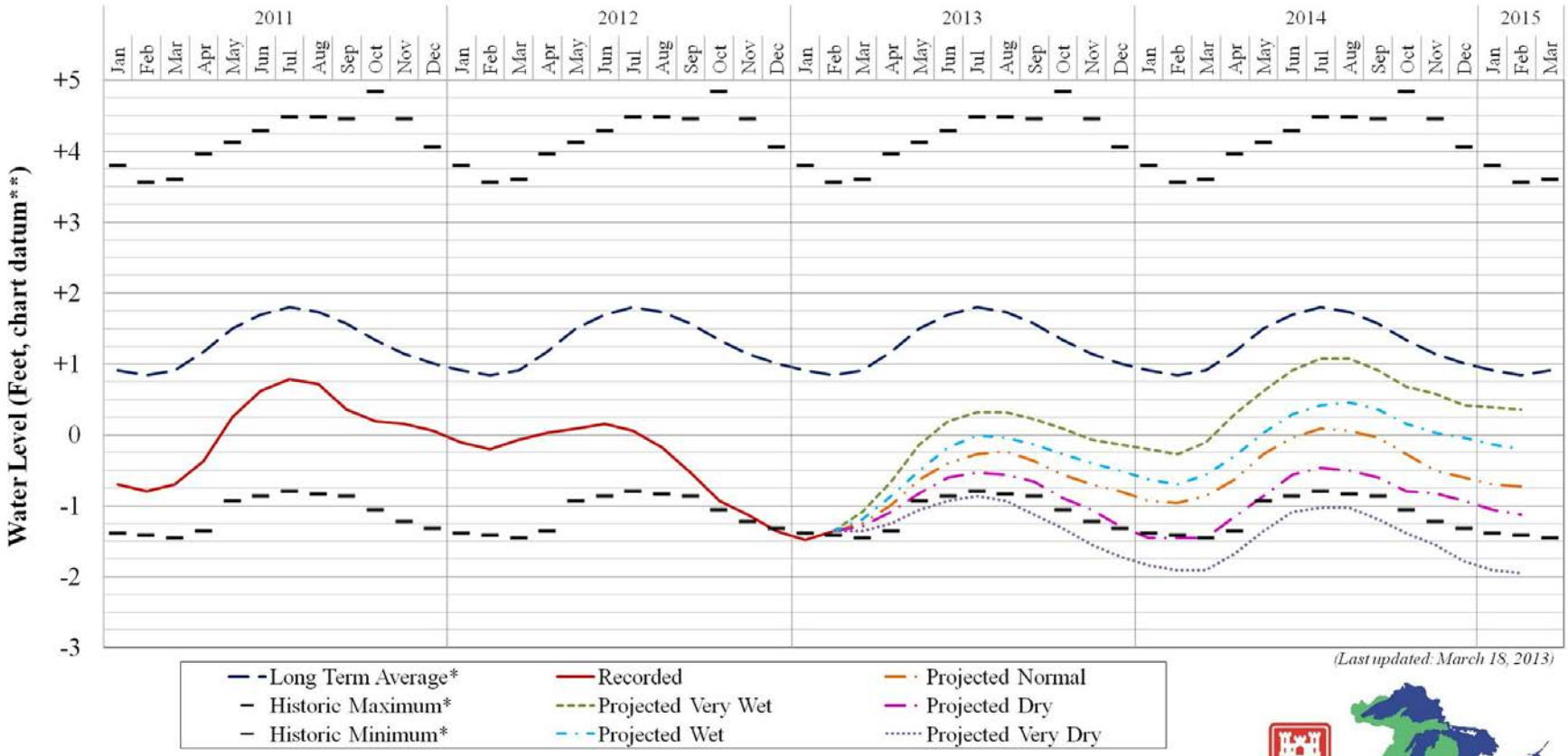
RECORDED

PROJECTED

AVERAGE **				
MAXIMUM **	1985	1985	1973	1973
MINIMUM **	1936	1934	1926	1934

** Average, Maximum and Minimum for period 1918-2012

2-Year Simulation of Lake Michigan-Huron Water Levels Under Varying Water Supplies

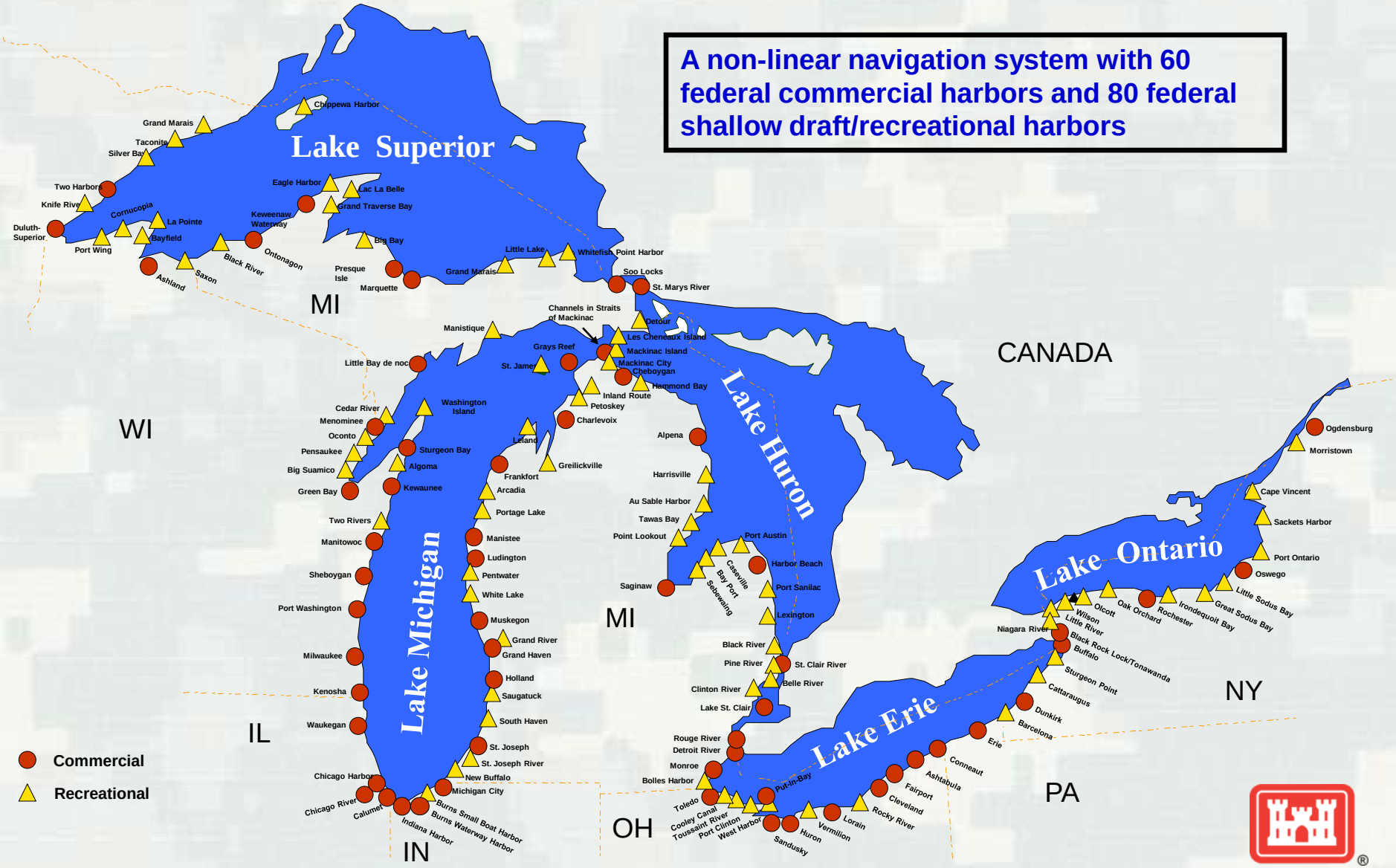


(Last updated: March 18, 2013)

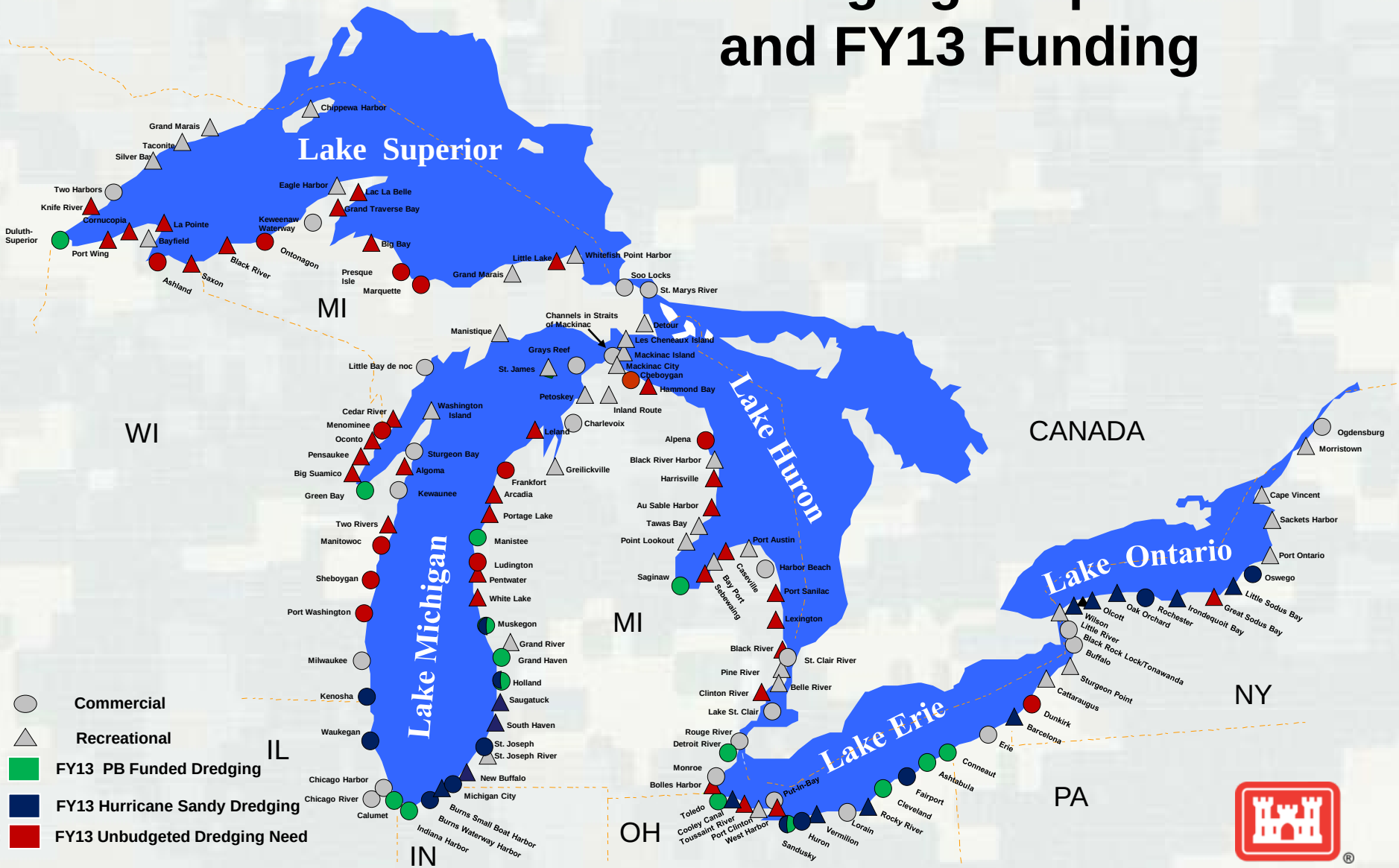
* The Long Term Average, Historic Maximum, and Historic Minimum are from the official period of record for Great Lakes water levels, 1918 to 2012.
** Water levels are referenced to feet above (+) or below (-) chart datum. Chart datum for Lake Michigan-Huron is 577.5 ft, IGLD 1985.

US Army Corps of Engineers
Detroit District

Federal Harbors on the Great Lakes



FY13 Dredging Requirements and FY13 Funding



BUILDING STRONG®

FY14 Dredging Funding

BUILDING STRONG®