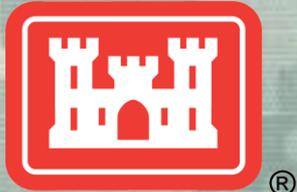


Coastal Structures Risk Communication Southern Lake Michigan Harbors

Dave Wright
Chief of Operations
Detroit District

October 15, 2012



®

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



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



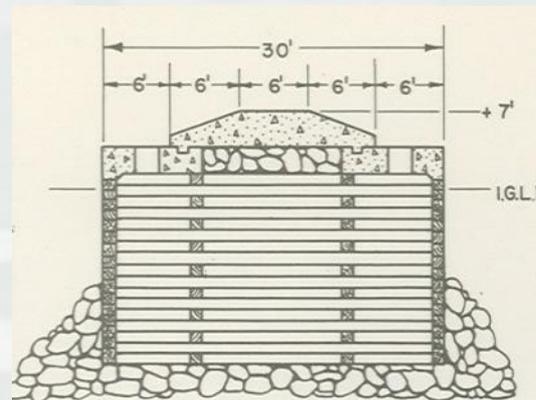
Steel Sheet
Pile
Structures



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

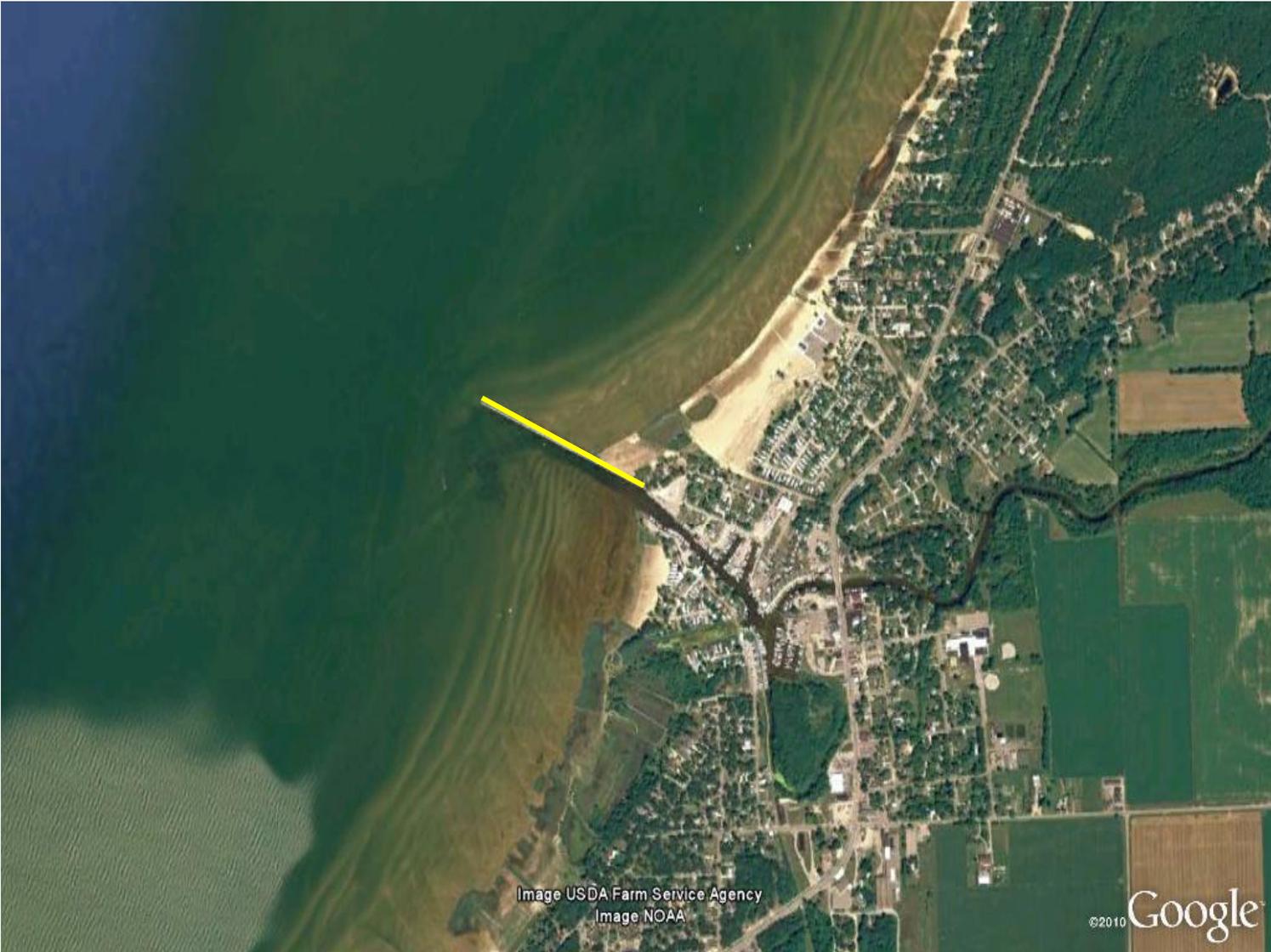
Average of Overall Condition



Harbors of Southeast Michigan



Caseville Harbor:
B – Low Risk of Failure



Caseville Harbor



DING STRONG®

Caseville Harbor

Bent railing due to ice and wave action.



Caseville Harbor



Breakwater is
functioning as
designed



BUILDING STRONG®

Caseville Harbor:

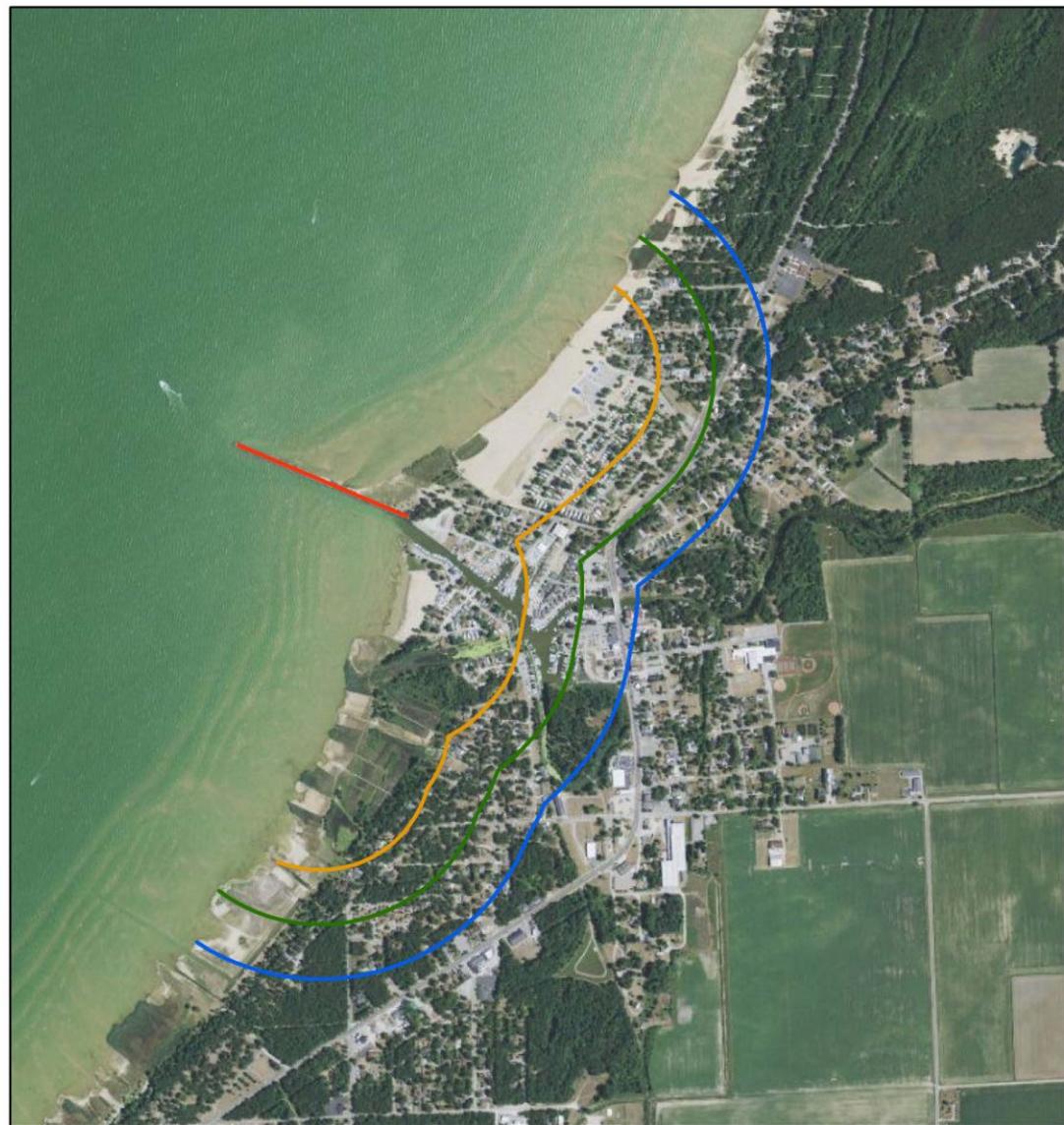
No reaches at Caseville are rated below A & B risk level

Infrastructure:

1. Huron Yacht Club
2. Hoy's Saginaw Bay Marina
3. Caseville Municipal Harbor
4. Caseville Marina & Resort
5. Mariner's Cove Marina

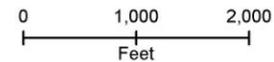


Caseville Harbor: Potential Impact Areas



-  Federal Structure
-  Shoreline_1000_ft_buffer
-  Shoreline_1500_ft_buffer
-  Shoreline_2000_ft_buffer

CASEVILLE HARBOR Caseville, MI



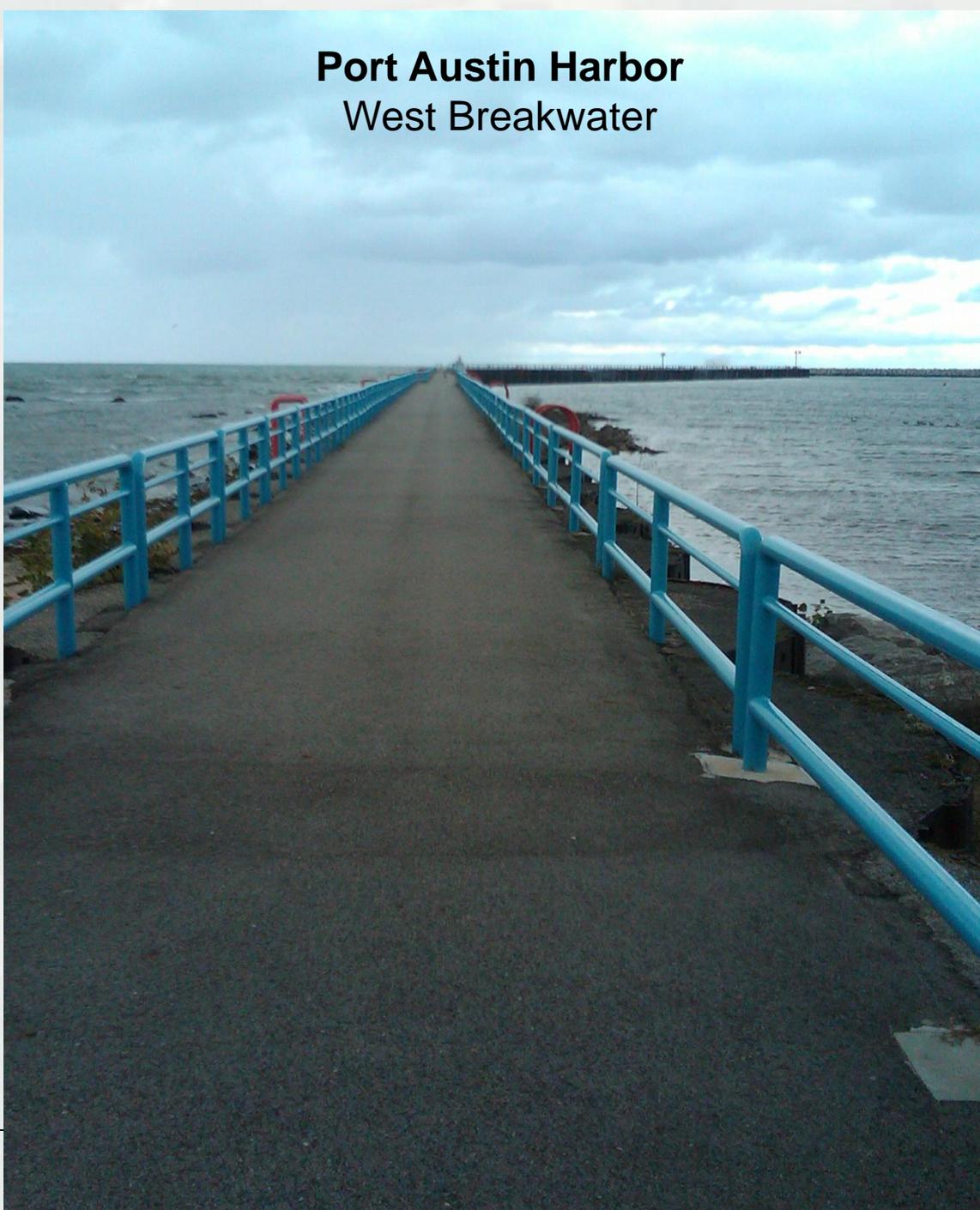
Imagery Source- NAIP 2012



Port Austin Harbor: B – Low Risk of Failure



Port Austin Harbor West Breakwater



BUILDING STRONG®

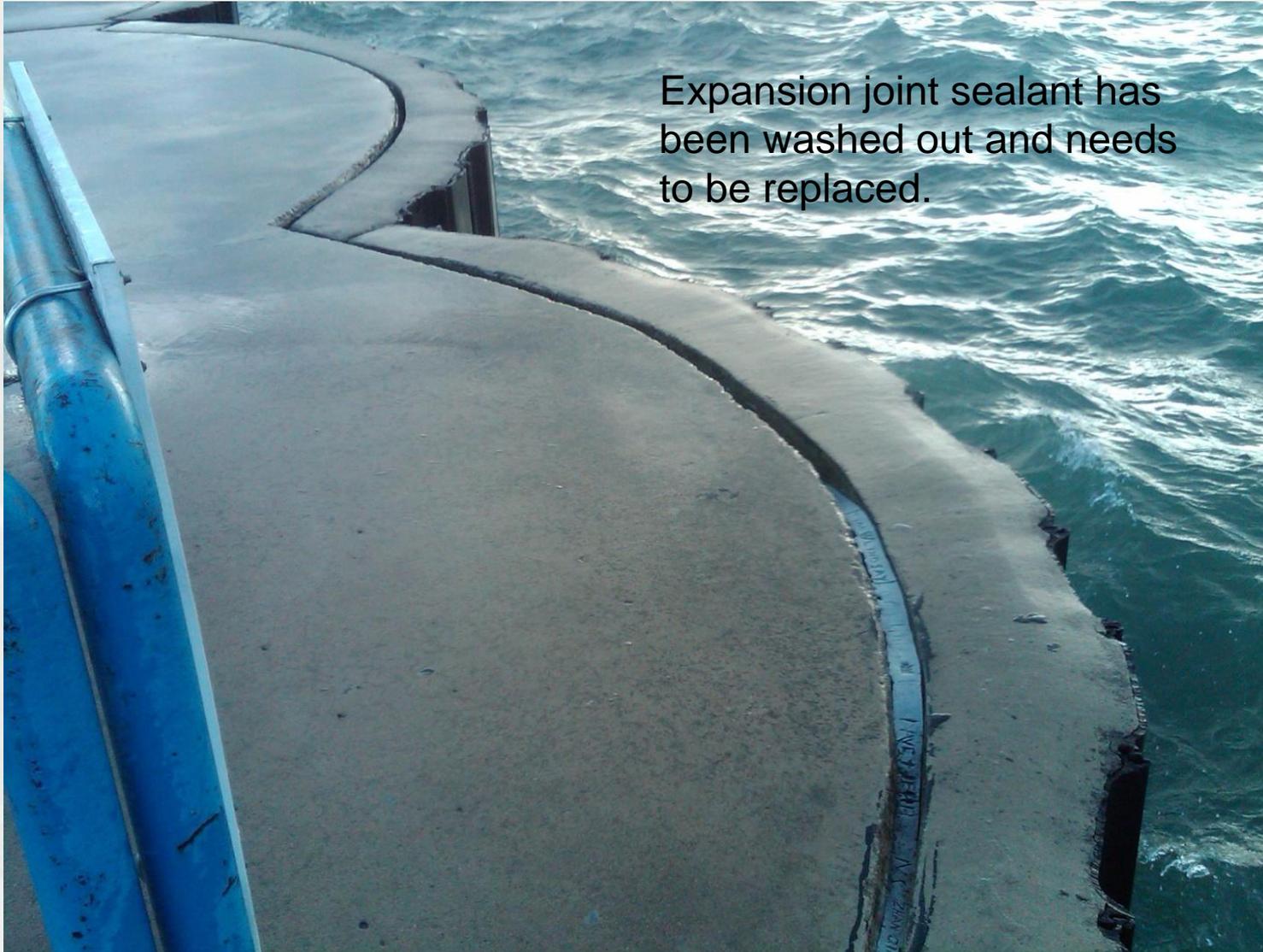
Port Austin Harbor

West Breakwater



BUILDING STRONG®

Port Austin Harbor West Breakwater

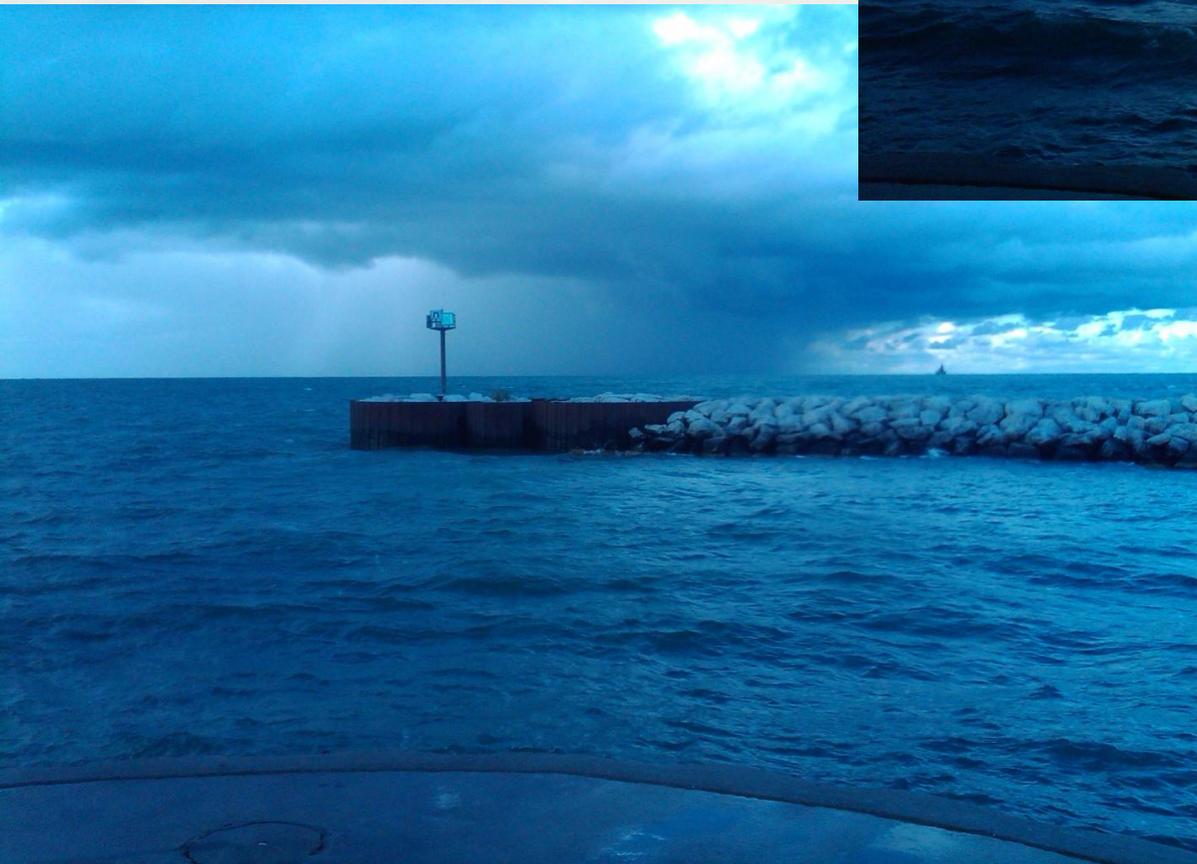


Expansion joint sealant has been washed out and needs to be replaced.



Port Austin: East Breakwater

Structure is in alignment and does not require any repair work



BUILDING STRONG®

Port Austin Harbor:

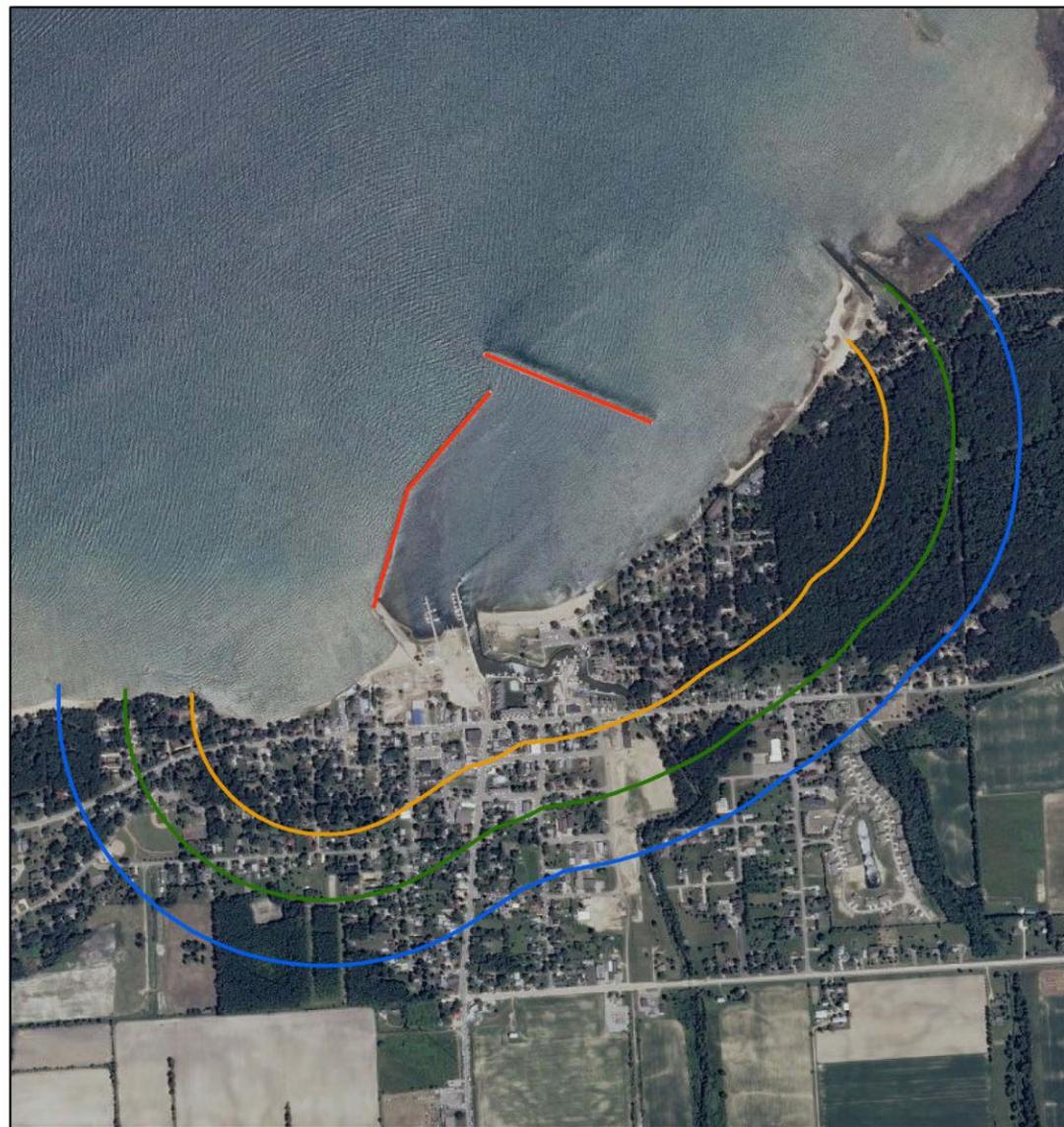
No reaches at Port Austin are rated below A & B risk level

Infrastructure:

1. Michigan Department of Natural Resources (MDNR) Marina
2. M&D Marine
3. Bird Creek County Park
4. Fishing Charters
5. Port Austin Water Treatment Plant
6. Harbour Pointe Condominiums/Marina

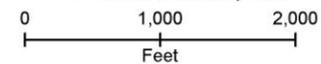


Port Austin Harbor: Potential Impact Areas



-  Federal Structure
-  Shoreline_1000_ft_buffer
-  Shoreline_1500_ft_buffer
-  Shoreline_2000_ft_buffer

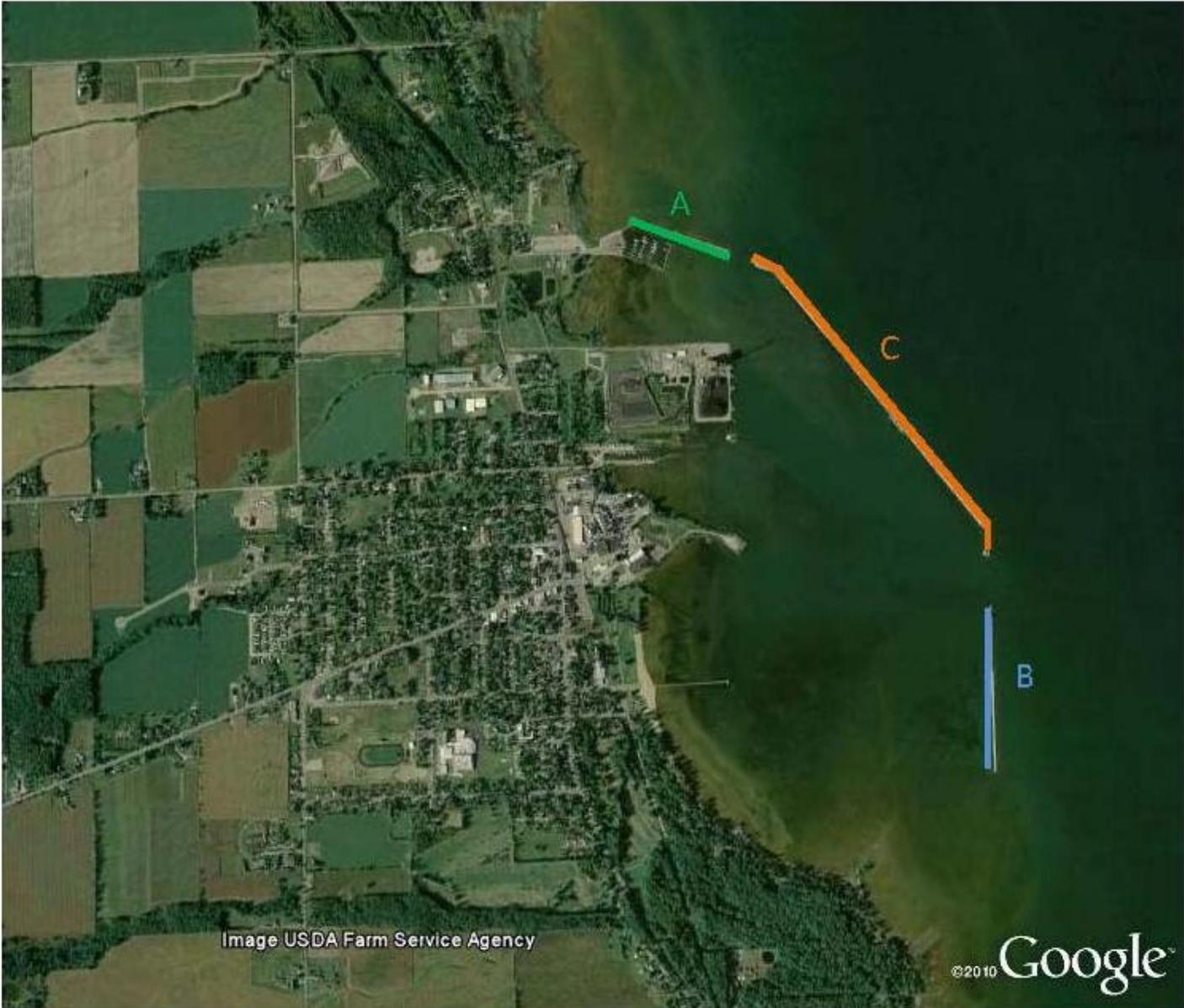
PORT AUSTIN HARBOR Port Austin, MI



Imagery Source- NAIP 2010



Harbor Beach Harbor: C – Medium Risk of Failure



BUILDING STRONG®



Harbor Beach:
Parapet portions that have
lost portions of the concrete
cap



Harbor Beach:

Parapet portions that have lost portions of the concrete cap



Harbor Beach:

Cap surface is cracking and spalled on harbor side of structure



Harbor Beach: Damage to concrete parapet wall at navigation light





Harbor Beach:
Some loss of design slope
of scour stone



Harbor Beach Harbor:

\$6.2M estimated cost to upgrade 'C' rated structures to an acceptable level of risk (Level B)

Infrastructure:

1. DTE Harbor Beach Power Plant
2. Harbor Beach Marina
3. Coast Guard Station
4. Harbor Beach Municipal Water Treatment Plant
5. Dow Agro Services, LLC
6. Sensient Chemical Plant
7. Public Park
8. Harbor Beach Resort Association
9. Harbor Beach Municipal Water Water Treatment Plant
10. Offshore Marina



Harbor Beach Harbor: Potential Impact Areas



Port Sanilac Harbor:
B – Low Risk of Failure



Port Sanilac Harbor

North breakwater (section C looking SE)



Port Sanilac Harbor

North breakwater

Safety railings need scraping and painting & ice has damaged safety ladders – need repair



Port Sanilac Harbor

South breakwater



Port Sanilac Harbor
South breakwater



Settlement of section B



Port Sanilac Harbor:

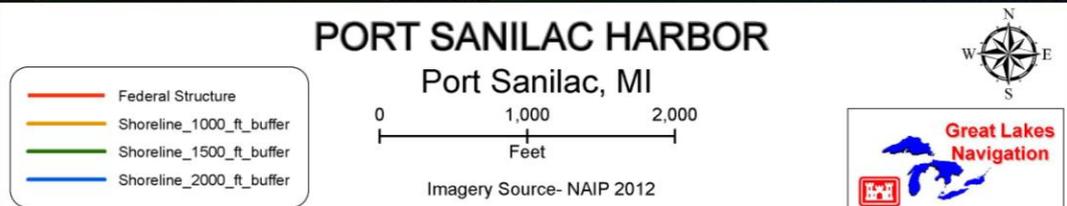
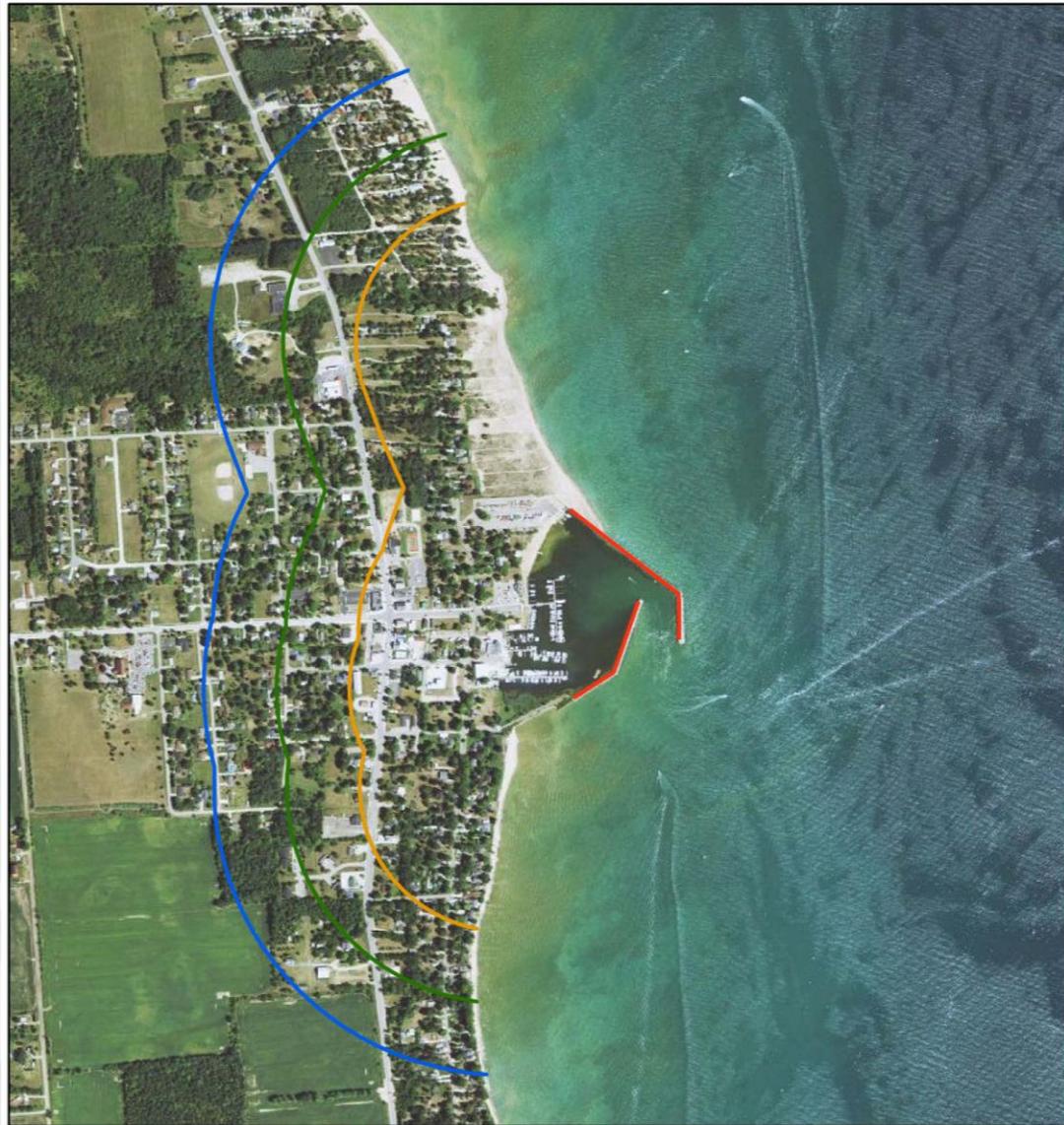
No reaches at Port Sanilac are rated below A & B risk level

Infrastructure:

1. Port Sanilac Municipal Harbor
2. Port Sanilac Marina
3. Bark Shanty Marina
4. Boat Storage Shed
5. Port Sanilac Marina Administration Building
6. Public Park
7. Port Sanilac Municipal Harbor Administration Building
8. Rental House
9. Boat Launch
10. Bark Shanty Marina & Sailing Club



Port Sanilac Harbor: Potential Impact Areas



Lexington Harbor:
B – Low Risk of Failure



Lexington Harbor -- North breakwater





Lexington Harbor

North breakwater shoaling

- Settling of channel side cover stone
 - Spalling and broken concrete edges on the concrete walkway
-



Lexington Harbor

South breakwater; Rated in good condition



Lexington Harbor:

Overall structure rating of 'B' -- Portion of North breakwater rated 'C'

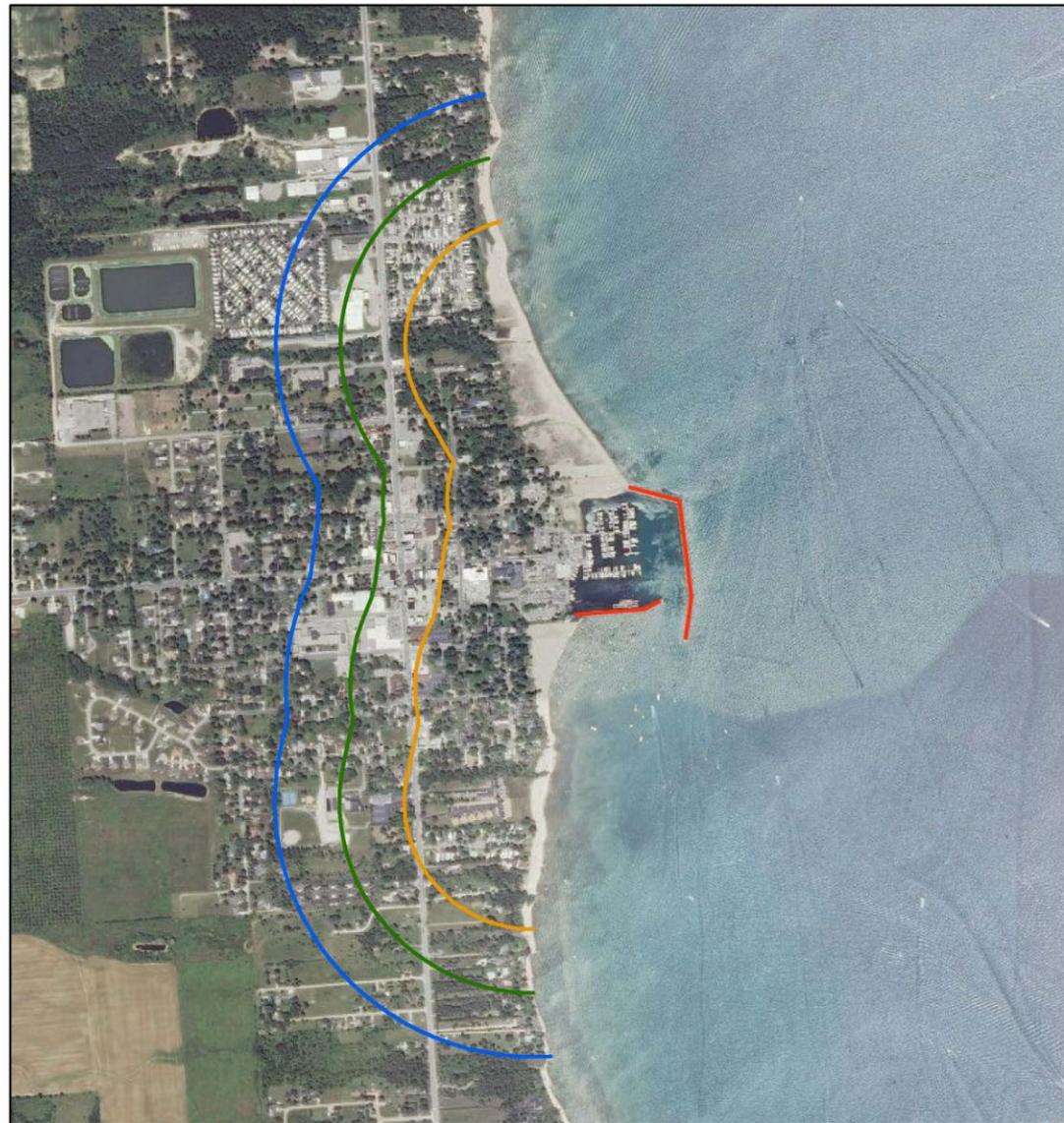


Infrastructure:

1. Lexington Charter Boat and Kayak Rentals LLC
2. Olford's Marina Inc
3. Coconuts' Café
4. Michigan Department of Natural Resources Marina
5. Patrick Tierney Park
6. Lexington Municipal Mobile Home Park
7. Village of Lexington Lowlift Pump Station

Lexington Harbor:

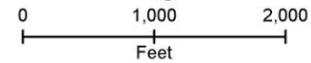
Potential Impact Areas



-  Federal Structure
-  Shoreline_1000_ft_buffer
-  Shoreline_1500_ft_buffer
-  Shoreline_2000_ft_buffer

LEXINGTON HARBOR

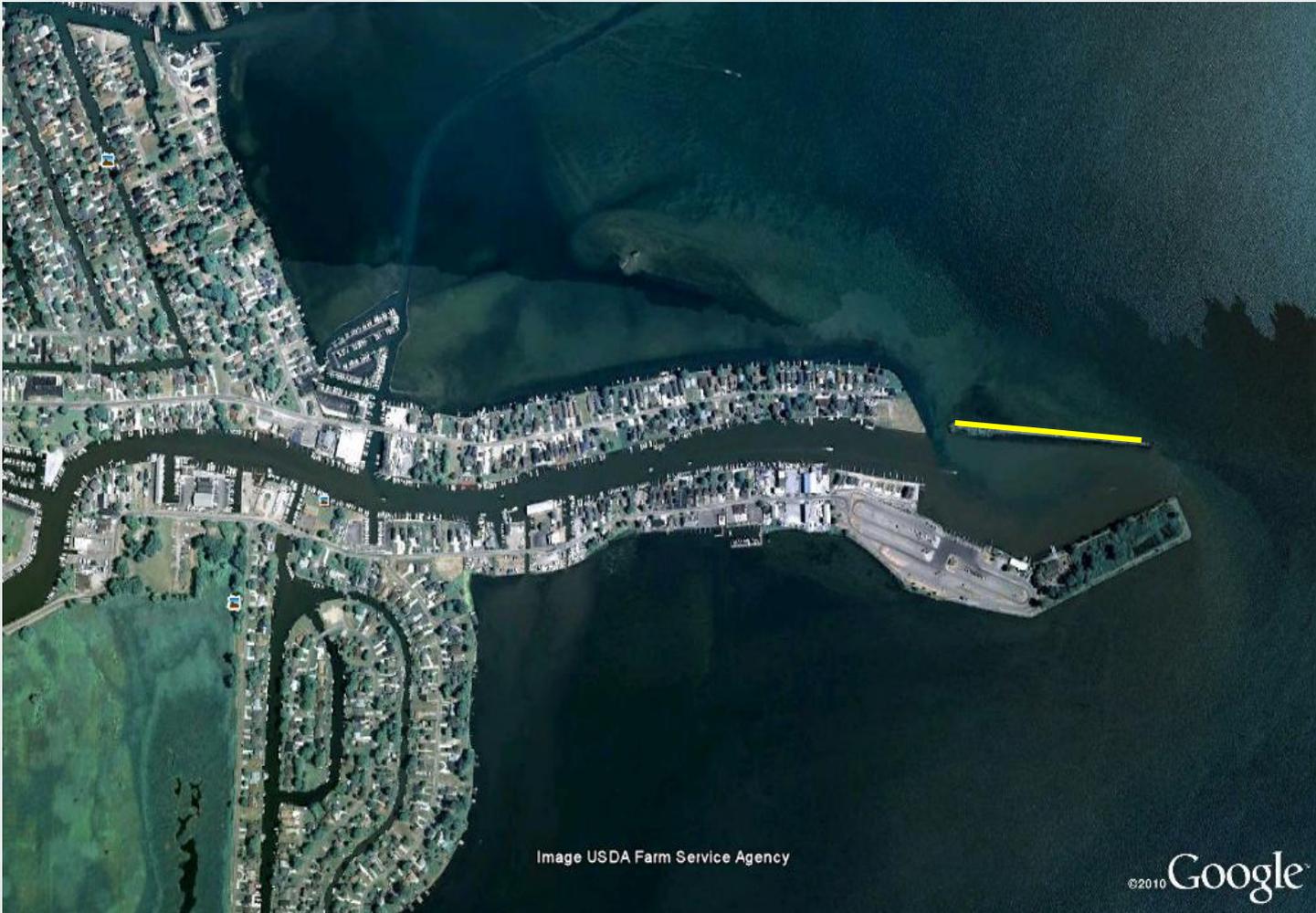
Lexington, MI



Imagery Source- NAIP 2010



Clinton River Harbor:
B – Low Risk of Failure



Clinton River Harbor



Clinton River Harbor



Settlement and stone alignment are in good condition

Landward end of breakwater



Clinton River Harbor:

No reaches at Clinton River are rated below A & B risk level

Infrastructure:

1. MDNRE Property – Harley Ensign Memorial Access Site
2. Macomb County Sheriff Marine Division Headquarters
3. Residential Condominiums – Venetian Pointe Estates
4. Boca Grande Marina
5. Huron Pointe Yacht Club

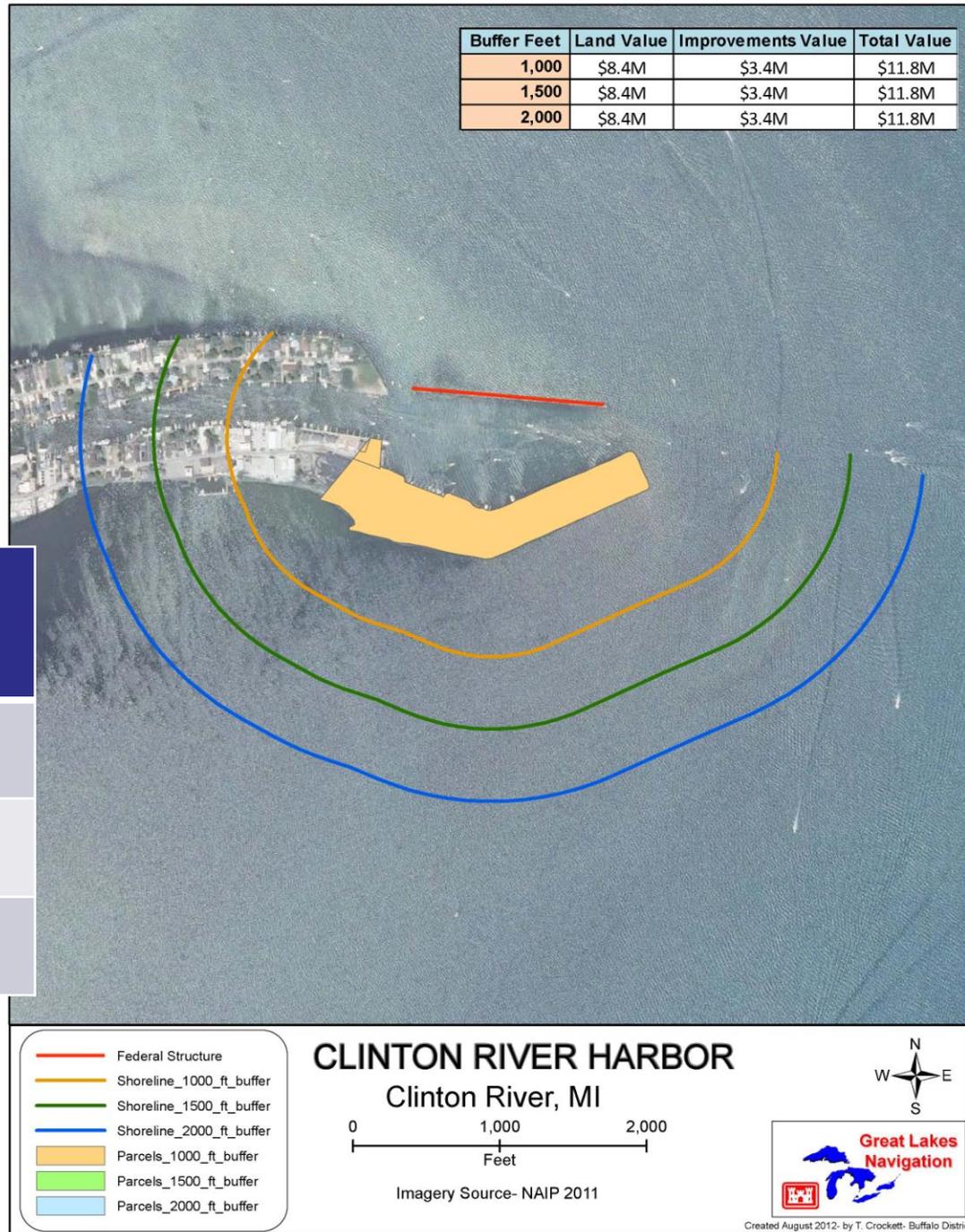


Clinton River Harbor:

Potential Impact Areas

Buffer Feet	Land Value	Improvements Value	Total Value
1,000	\$8.4M	\$3.4M	\$11.8M
1,500	\$8.4M	\$3.4M	\$11.8M
2,000	\$8.4M	\$3.4M	\$11.8M

Buffer Feet	Land Value	Improv. Value	Total Assessed Value
1,000	\$8.4M	\$3.4M	\$11.8M
1,500	\$8.4M	\$3.4M	\$11.8M
2,000	\$8.4M	\$3.4M	\$11.8M



Bolles Harbor:

B – Low Risk of Failure



Bolles Harbor:

- Slight settling of armor stone (loss of armor interlock)
- Over-growth of vegetation



Bolles Harbor:



Bolles Harbor:

No reaches at Bolles Harbor are rated below A & B risk level



Infrastructure:

1. Flying Eagle Marina
2. Trout's Yacht Basin
3. Other People's Money Club
4. Monroe Boat Club
5. Harbor Marine
6. Erie Party Shoppe & Docks
7. LaPlaisance Creek Marina
8. Bolles Harbor Confined Disposal Facility (CDF)

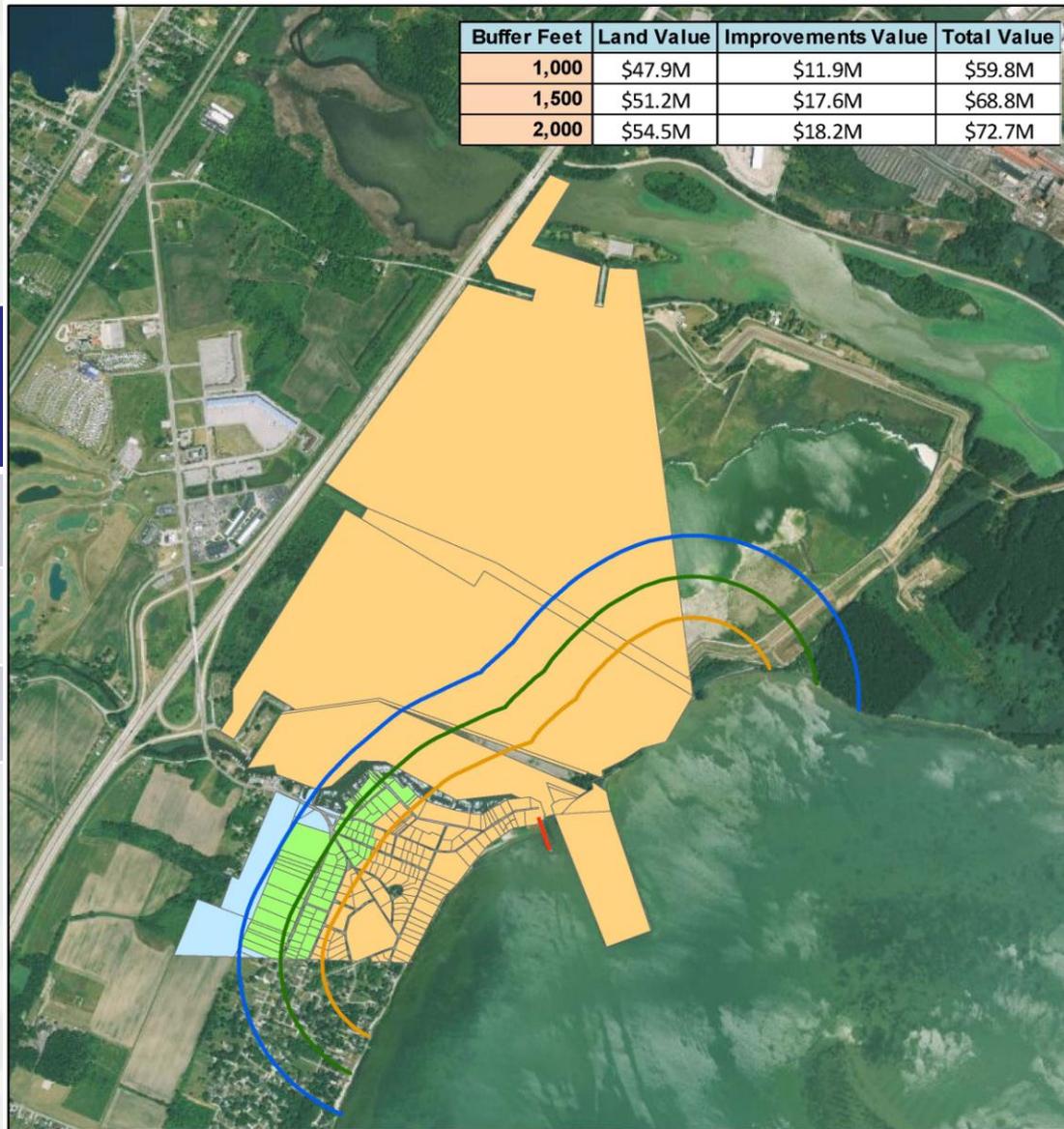


Bolles Harbor:

Potential Impact Areas

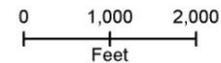
Buffer Feet	Land Value	Improvements Value	Total Value
1,000	\$47.9M	\$11.9M	\$59.8M
1,500	\$51.2M	\$17.6M	\$68.8M
2,000	\$54.5M	\$18.2M	\$72.7M

Buffer Feet	Land Value	Improv .Value	Total Assessed Value
1,000	\$47.9M	\$11.9M	\$59.8M
1,500	\$51.2M	\$17.6M	\$68.8M
2,000	\$54.5M	\$18.2M	\$72.7M



- Federal Structure
- Shoreline_1000_ft_buffer
- Shoreline_1500_ft_buffer
- Shoreline_2000_ft_buffer
- Parcels_2000_ft_buffer
- Parcels_1500_ft_buffer
- Parcels_1000_ft_buffer

BOLLES HARBOR
Monroe Township, MI



Imagery Source- NAIP 2012



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/greatlakes/navigation



US Army Corps of Engineers
Detroit District

BUILDING STRONG.

DETROIT DISTRICT NEWSROOM WHO WE ARE MISSIONS HISTORY **KIDS CORNER**

HOW DO I...
» Contact the Corps?
» Find a Recreation Area?
» Obtain a Permit?
» Find Project Information?
» Get a Job with the Corps?
» Contract with the Corps?
» Find a Local Corps Office?
» Find Corps Publications?
» Find a Corps Map?
» Topics A to Z
» FAQ
» Site Map
» Printable Version
» Login

Search [Detroit Home Page / Great Lakes Information /](#)
Great Lakes Navigation

[Ask the Corps](#)

Detroit Home
News & Events
Who We Are
What We Do
Where We Are
Business Information Center
Projects and Studies
Great Lakes Information
Employment
Corps Kids
Contact Us

[facebook](#) [flickr](#)

[twitter](#)

US Army Corps of Engineers
RECOVERY SITE

Soo Locks
Info and Webcam

Duluth/Superior
Harbor Webcam

Great Lakes
Water Levels

Great Lakes Navigation System (GLNS)


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.

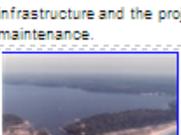
CLICK HERE TO BE ADDED TO OUR STAKEHOLDER MAILING LIST OR TO PROVIDE COMMENTS ON GREAT LAKES NAVIGATION SYSTEM HARBORS/PROJECTS

CONTACT GLNAVIGATION@USACE.ARMY.MIL TO SUBMIT COMMENTS OR QUESTIONS RELATED TO THE U.S. ARMY CORPS OF ENGINEERS' ROLE IN GREAT LAKES NAVIGATION

Quick Links


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 projected risks posed by deferred maintenance.


Great Lakes Navigation Stakeholder Meetings: All are welcome to join us for our Great Lakes Navigation Stakeholder Meetings. [Click here for information on](#)

Short Cuts

 **Fiscal Year 2013 President's Budget (3)**
[FY13 President's Budget - Detailed Spreadsheet \(PDF 20.26 KB\)](#)
This spreadsheet contains the summary of funding related to the Great Lakes Navigation System for fiscal year 2013.
[Press Release - FY13 President's Budget for Great Lakes Navigation \(PDF 31.61 KB\)](#)
[Great Lakes Navigation System Overview Presentation \(PDF 2.01 MB\)](#)
A presentation focusing on the Great Lakes region current workload, as given to Congressional Staffers on February 14, 2012 in Washington DC.

 **Fiscal Years 2012 & 2013 Dredging (4)**
[FY 2012 Dredging Projects \(PDF 232.04 KB\)](#)
A figure depicting the Great Lakes Harbors that have been funded for dredging in FY 2012.
[FY 2013 Dredging Projects \(PDF 228.20 KB\)](#)
A figure depicting the Great Lakes Harbors that have been funded under the President's Budget for dredging in FY 2013.
[Dredging Funding Trends from 2007-2013 \(PDF 41.27 KB\)](#)
Chart detailing the amount of dredging funding received for Great Lakes harbors over the past 7 years.
[Dredging Backlog growth through 2017 \(PDF 26.61 KB\)](#)
Graph depicting the estimated dredging backlog from 1985



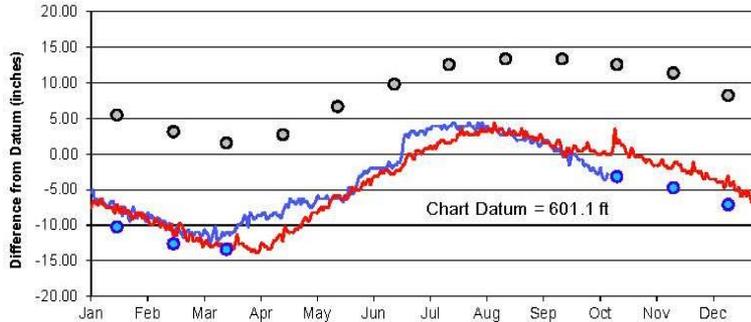
Questions?



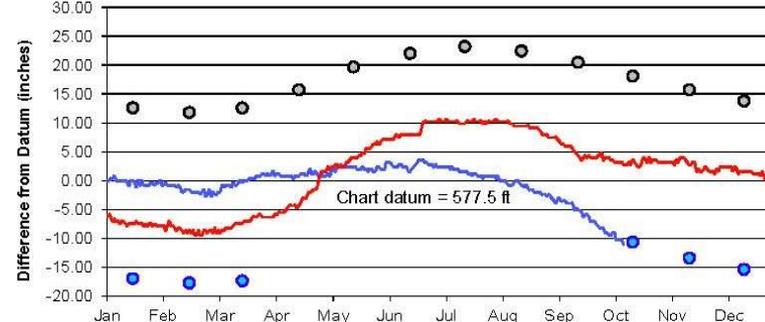
Great Lakes Water Levels

(updated 10/11/2012)

Lake Superior



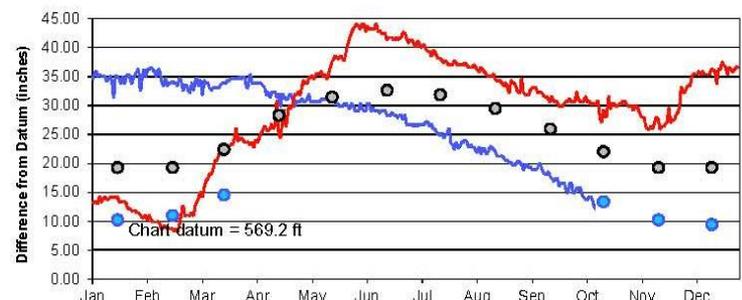
Lake Michigan-Huron



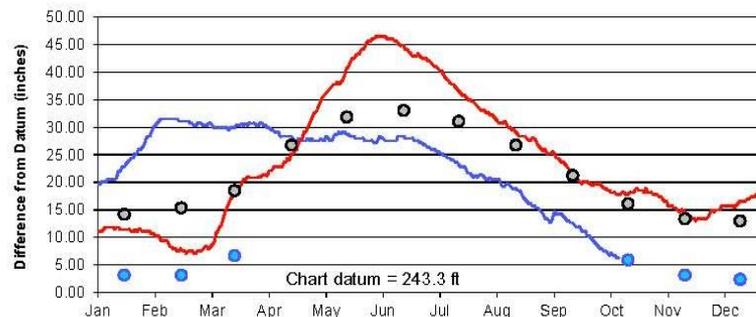
Lake St. Clair



Lake Erie



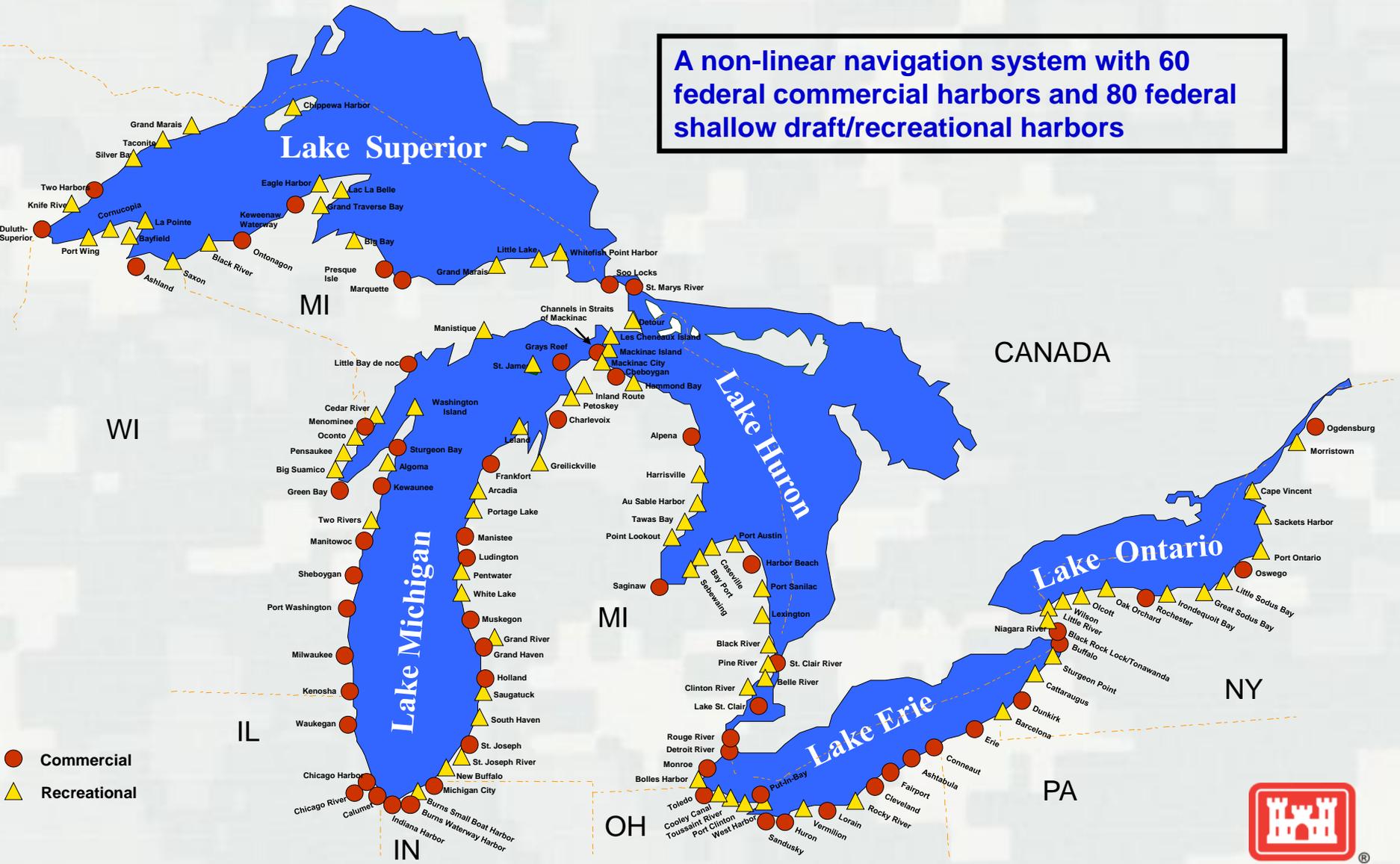
Lake Ontario



U.S. Army Corps of Engineers
 Detroit District
<http://www.lre.usace.army.mil>

Federal Harbors on the Great Lakes

A non-linear navigation system with 60 federal commercial harbors and 80 federal shallow draft/recreational harbors



- Commercial
- ▲ Recreational



FY12 Dredging Projects



FY13 Dredging Requirements

