

A 10-YEAR OUTLOOK ON DREDGE DEMANDS OF U.S. PORTS & HARBORS ON THE GREAT LAKES

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Great Lakes

Photo Credit: Jeff Schmaltz, MODIS Rapid Response Team, NASA/GSFC



PRESENTATION OUTLINE

1. INTRODUCTION
2. STUDY POPULATION OF PORTS & HARBORS
3. DEFINING DREDGE DEMAND
4. METHODOLOGY
5. FINDINGS
6. DISCUSSION

Grand Traverse Bay, MI

Photo Credit: USACE, ERDC, Great Lakes Oblique Imagery

INTRODUCTION

Study of Dredging Demands of US Ports & Harbors of the Great Lakes (US GLPH)

Purpose:

Project and summarize potential dredging needs for use by the Great Lakes dredging community.

Intended to provide the dredging community with high level information regarding dredge needs and types on the Great Lakes over the next ten years.



Dunkirk Harbor, NY



Cornucopia Harbor, WI

STUDY POPULATION OF U.S. PORTS & HARBORS OF THE GREAT LAKES (BY THE NUMBERS)

5,280 mi

8,500

Kilometers of Shoreline
Along the U.S. Great Lakes

171

Total No. of US GLPH
Facilities Evaluated

140

Total No. of Federal Harbors

117

Portion of US GLPH
evaluated that include a
Federal Project

5,439 cu. mi

22,671

Volume of Water in Cubic
Kilometers in the Great
Lakes (at Low Water Datum)

54

Portion of US GLPH that do
not include a federal project

STUDY POPULATION



Study included US GLPH
from Grand Marais
Harbor, MN to Cape
Vincent Harbor, NY



Types of harbor facilities include: (1) ports, defined by a town or city having a harbor that is supporting a commercial use or (2) harbor facilities characterized by a protected body of water primarily supporting a recreational use

From Where to Where?

RAMBOLL

Great Lakes

Photo Credit: Jeff Schmaltz, MODIS Rapid Response Team, NASA/GSFC



US GLPH
DIVIDED INTO
TWO GROUPS:

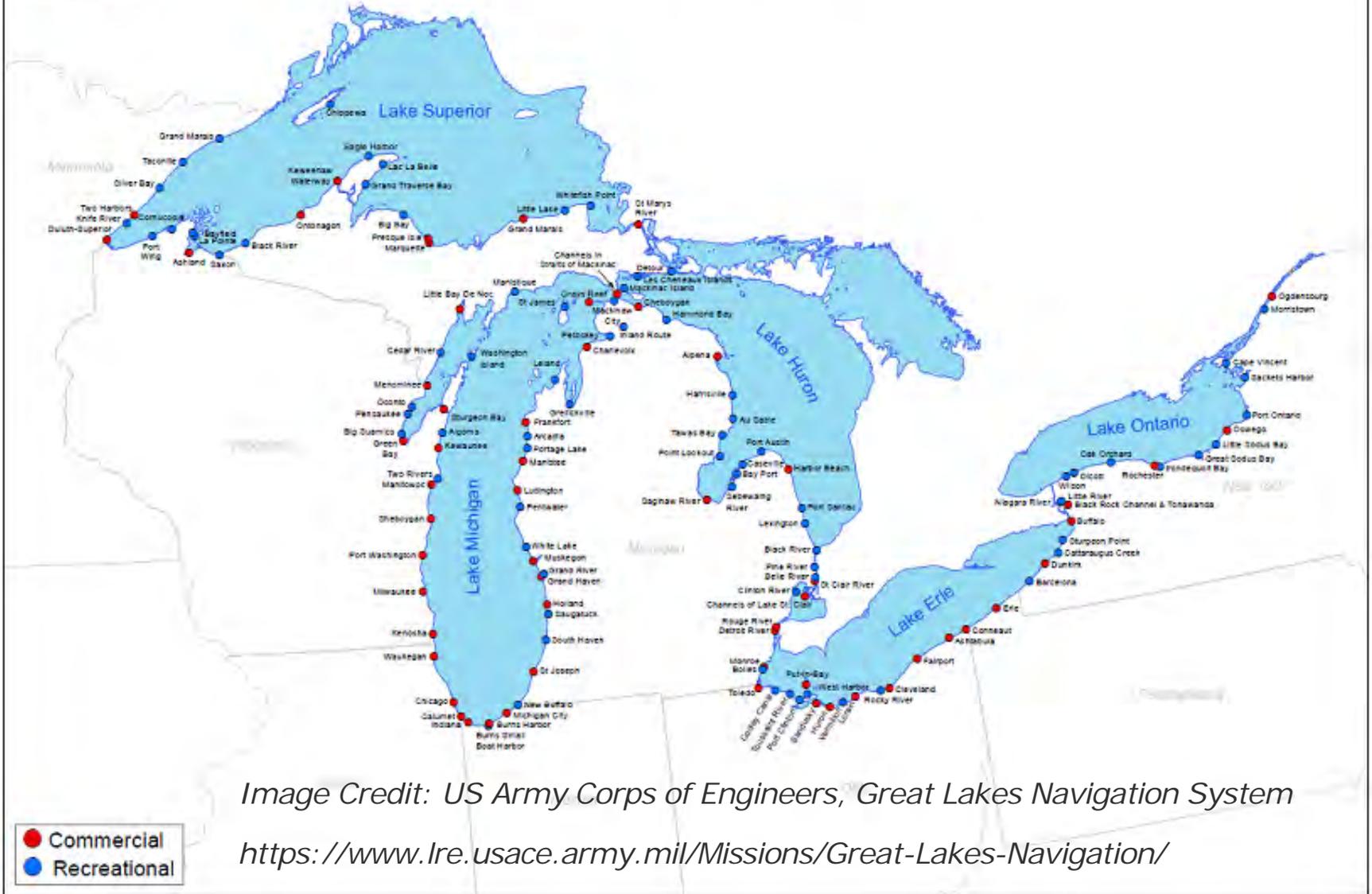
Federal
Harbors
(Shown Here)

Non-Federal
Harbors



US Army Corps
of Engineers

Federal Harbors on the Great Lakes

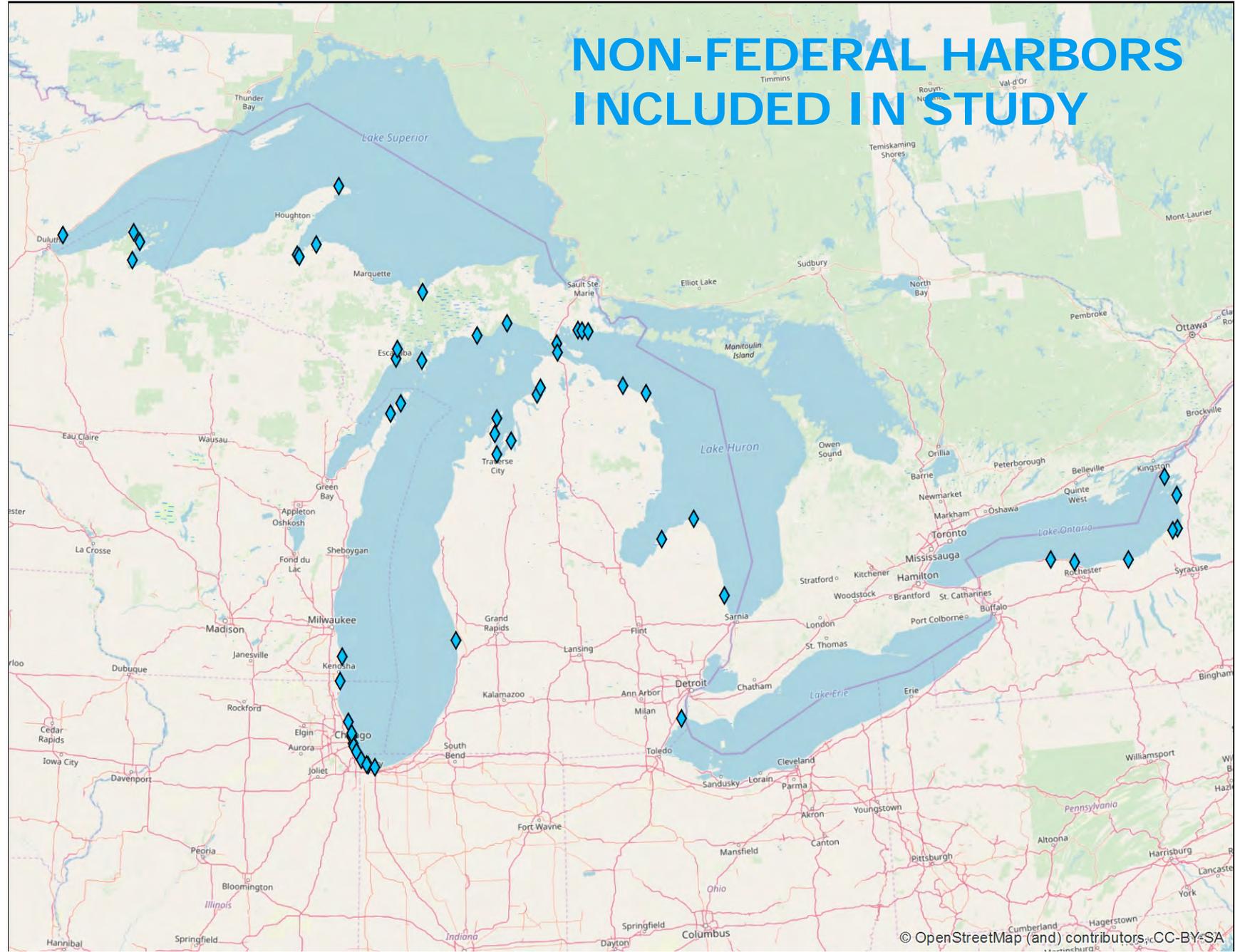


**US GLPH
DIVIDED INTO
TWO GROUPS:**

**Federal
Harbors**

**Non-Federal
Harbors
(Shown Here)**

**NON-FEDERAL HARBORS
INCLUDED IN STUDY**



STUDY POPULATION – HARBOR BOUNDARIES

For **federal harbors** containing a navigational channel, the inland extent of the federal project defined the **boundary** for the study.

For **non-federal harbors**, the study area **boundary** generally encompassed the harbor foot print within any natural or manmade protection structures. If a river was present discharging to the harbor, the first bridge upstream was typically used as the horizontal limit.

DEFINING: TOTAL DREDGE DEMAND

Maintenance
Dredging



Environmental
Dredging



Improvement
Dredging

= Total Dredge Demand

EXAMPLE – ESTIMATION OF MAINTENANCE DREDGE WITHIN FEDERAL HARBOR – ALGOMA HARBOR, WI



US Army Corps of Engineers

CONTRACT DREDGING REPORT, DETROIT DISTRICT, OPERATIONS OFFICE

As of: 09-Oct-2018

FY	START	COMPLETION	CUBIC YARDS	CONTRACT AMOUNT	CONTRACTOR CONTRACT NUMBER	DREDGE AREA	PLACEMENT AREA
Algoma Harbor							
1993	9/3/1993	9/27/1993	17,100	\$168,266	RYBA DACW35-93-C-0042	15+00-109+00	UPLAND PLACEMENT AREA 2.3 MI S OF HARBOR ADJACENT TO HIGHWAY 42
1964	7/16/1963	8/1/1963	8,675	\$12,322	GOVT/WINNECONNE		
1957	7/1/1957	8/5/1957	19,760	\$18,600	GOVT/WINNECONNE		



US Army Corps of Engineers

Algoma Harbor, WI



Harbor Features

- Located on the west shore of Lake Michigan, about 68 miles from Green Bay via Sturgeon Bay Harbor and the Lake Michigan Ship Canal and about 115 miles north of Milwaukee
- Authorization: Rivers & Harbors Act of 3 Mar 1871
- Recreational Harbor
- Project depth of 14 feet
- 1,102 foot long north pier and a 1,530 foot long south breakwater
- 2,000 feet of maintained channel
- Dredged material placed in an upland site provided by local stakeholders on an as-needed basis
- Major stakeholder: Lafond Fisheries

Project Requirements

- Harbor channels require infrequent dredging
- Last dredged in 1993; community performed minimal dredging in 2012, but harbor access remains constricted
- Maintenance dredging currently required
- Breakwater repairs required; deterioration of the timber crib and loss of fill stone created holes in the structure allowing waves and sediment to flow through the structure into the navigation channel
- Corps completed a study in 2017 to determine possible solutions to the sediment issues in the harbor



Consequences of Not Maintaining the Project

- Loss of local jobs
- Loss of recreational navigation and 30-40 charter fishing operations in the area
- Based on a recent University of Wisconsin Extension Economic Study, the harbor generates over \$3M annually for the Algoma community

Transportation Importance

- This project primarily serves charter fishing and recreational navigation interests.
- Algoma is a Harbor of Refuge.
- The local community has established significant infrastructure around the harbor facilities that generates income from harbor users and visitors to the area.



Est. Fed. Dredge				
Est. Fed. Dredge Frequency (Yrs)	Quantity per Dredge (CY)	Last Fed. Dredge (Yr)	Est. Fed. Dredge Quantity (CY) (2020-2030)	Disposal
30	18,000	1993	18,000	Upland

ESTIMATION OF MAINTENANCE DREDGING

Non-Federal Areas Adjacent to Federal Channels and Harbors

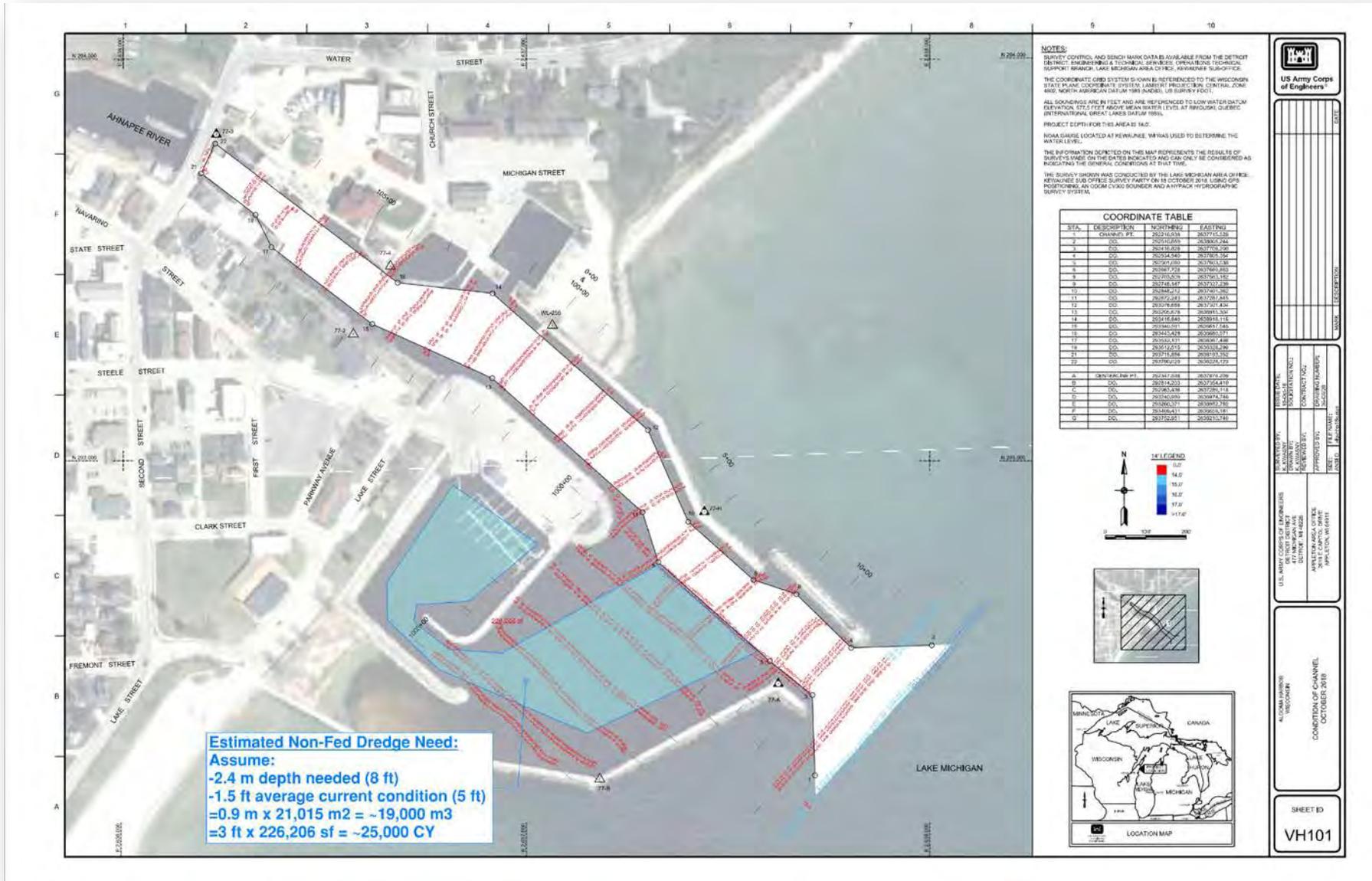
Utilized USACE hydrographic surveys (where available)

Visually identified specific harbor uses
(boat launches, marinas, transient docking, etc)

Calculating area and average cut depth

Internet search of municipal and state sources was used in some instance to obtain information regarding harbor dredge need.

EXAMPLE – ESTIMATION OF MAINTENANCE DREDGE IN NON-FEDERAL AREA ADJACENT TO FEDERAL CHANNELS AND HARBORS - ALGOMA



ESTIMATION OF MAINTENANCE DREDGING – NON-FEDERAL HARBORS

Internet search of municipal and state sources of public information were performed, including state permits, and mapping resources were used to develop an understanding of the harbor history and use.

In most cases, assumptions based on professional experience were made to develop the non-federal quantity. For these quantities, an order of magnitude estimate of one of the following quantities was applied: 0, 100, 1,000, 10,000, or 50,000 cubic meters.

ESTIMATION OF ENVIRONMENTAL DREDGING

- Primary source used – USEPA Great Lakes National Program Office (GLNPO) public data and agency communications

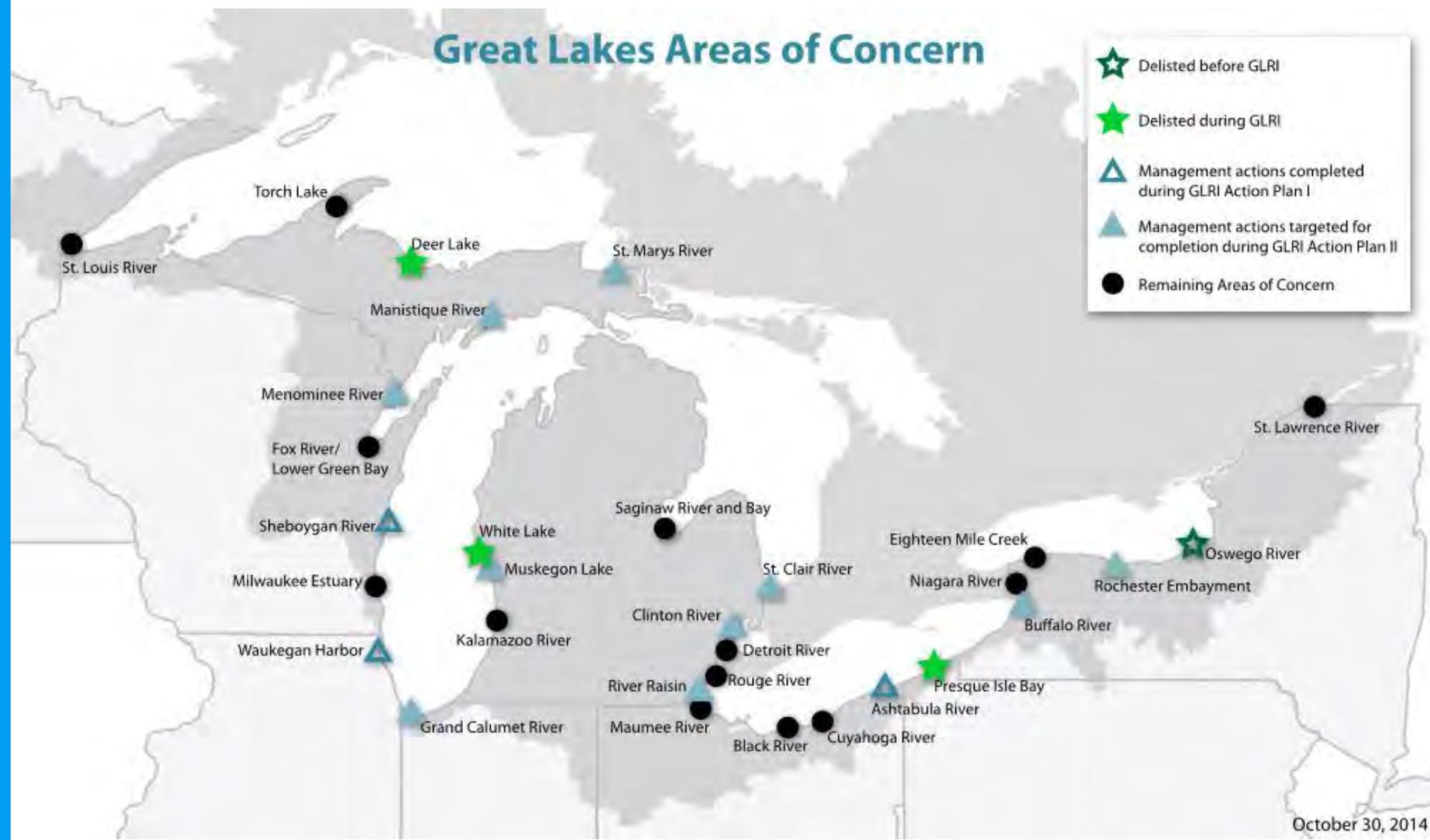


Image Credit: US Environmental Protection Agency, Great Lakes Areas of Concerns

<https://www.epa.gov/great-lakes-aocs/great-lakes-aocs-status-map>

EXAMPLE – ESTIMATION OF ENVIRONMENTAL DREDGE – DULUTH / SUPERIOR

Assume ~9 St. Louis River AOC projects within Duluth/Superior Study Area.

Assume 917K M³ (1.2M CY) per AOC Contaminated Sediment Management Plan

Assume 50% is dredged and 50% is capped.

Assume 75% will be addressed between 2020 and 2030.

Quantity Calc:

$$920,000 \times 0.5 \times 0.75 = \mathbf{344,000 \text{ M}^3}$$

(450,000 CY)

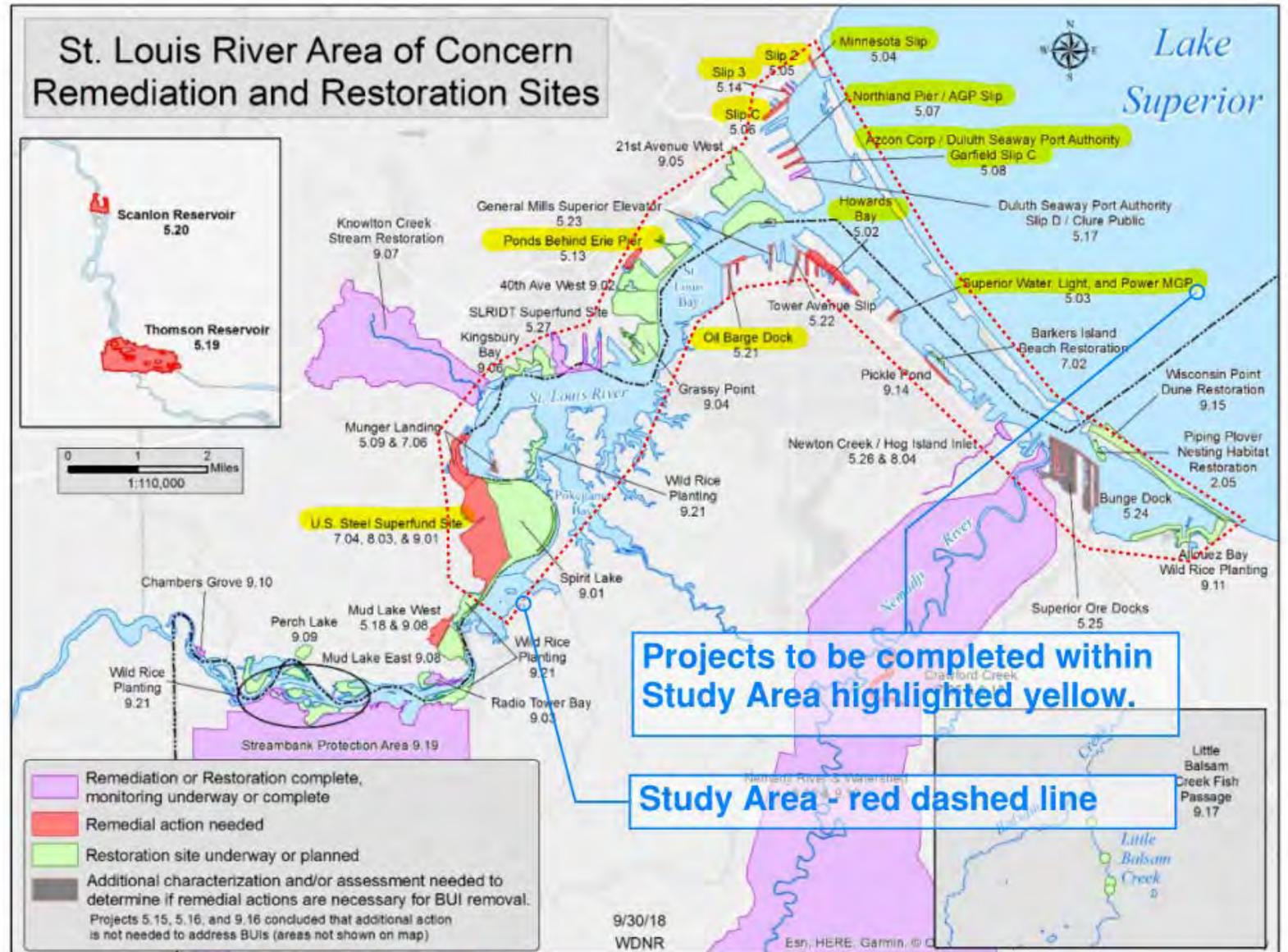


FIGURE ES-2 FROM SLRAOC 2018 REMEDIAL ACTION PLAN

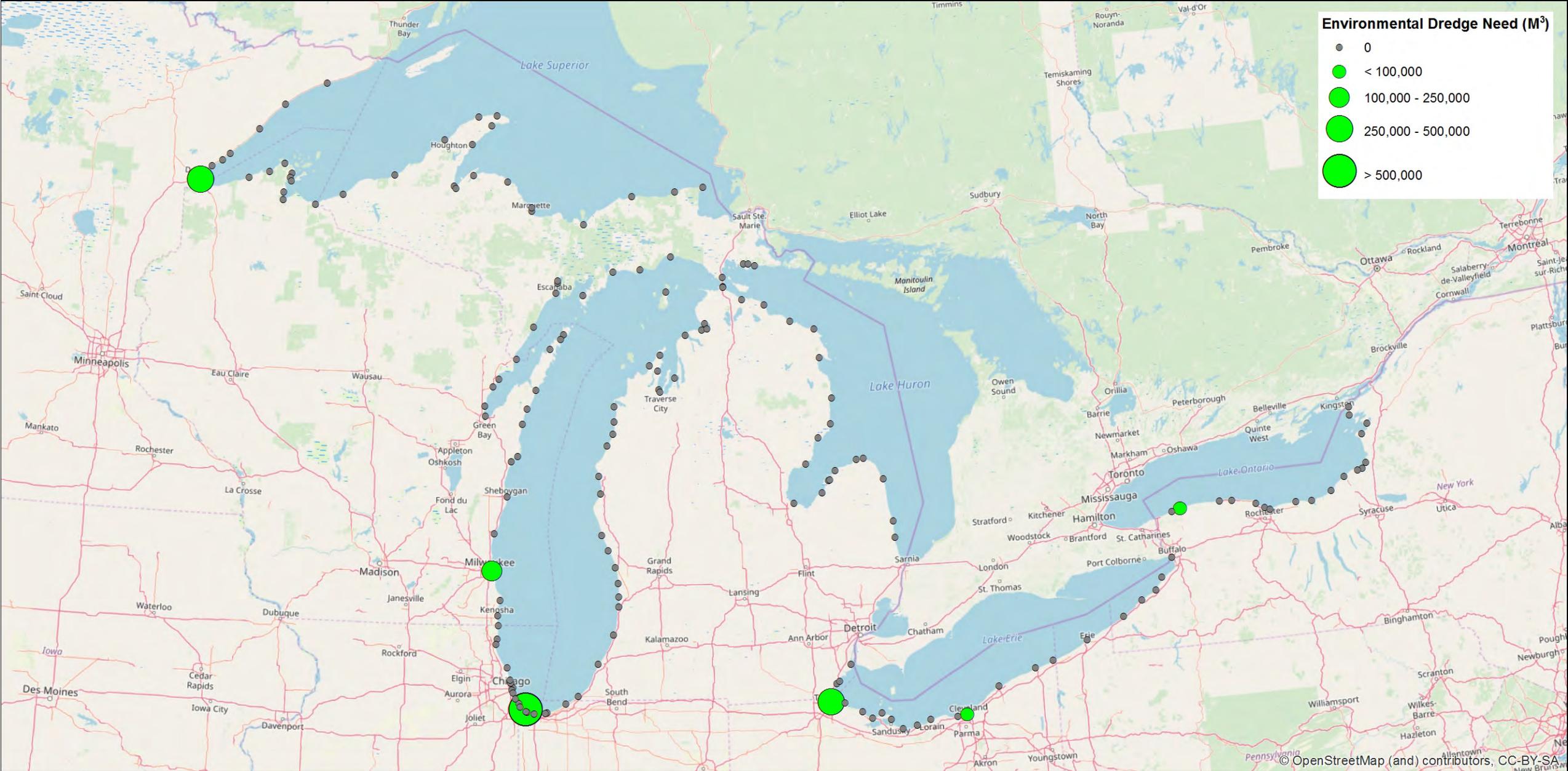
FINDINGS

TOTAL ESTIMATED 10-YEAR DREDGE DEMAND BY FEDERAL & NON-FEDERAL HARBORS

<i>Type of Harbor</i>	<i>No. of US GLPH</i>	<i>Maintenance Dredging (Federal)</i>	<i>Maintenance Dredging (Non-Federal)</i>	<i>Environmental Dredging</i>	<i>Improvement Dredging</i>
		Dredge Quantities Expressed as Volume in Thousand Cubic Meters (Cubic Yards)			
Federal Harbors	117	26,390 (34,522)	720 (943)	2,362 (3,090)	--
Non-Federal Harbors	54	NA	260 (341)	0	--
Total	171	26,390 (34,522)	980 (1,284)	2,362 (3,090)	--

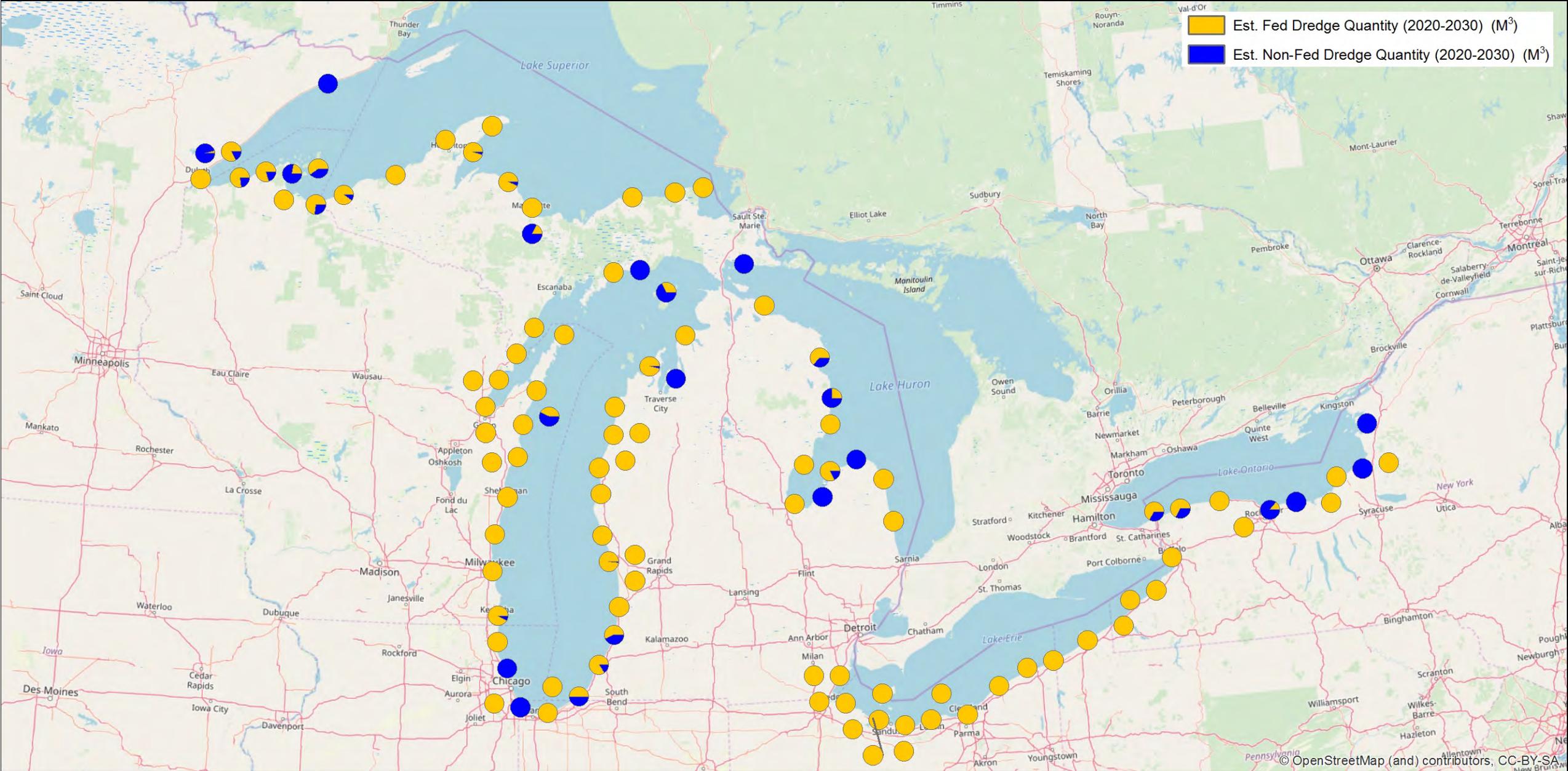
TOTAL ESTIMATED 10-YEAR DREDGE DEMAND BY LAKE

<i>Lake</i>	<i>No. of USGLPH</i>	<i>Maintenance Dredging (Federal)</i>	<i>Maintenance Dredging (Non-Federal)</i>	<i>Environmental Dredging</i>	<i>Improvement Dredging</i>
		Dredge Quantities Expressed as Volume in Thousand Cubic Meters (Cubic Yards)			
Superior	33	1,668 (2,181)	339 (444)	344 (450)	--
Michigan	72	6,400 (8,374)	499 (654)	1,598 (2,090)	--
Huron	25	2,161 (2,826)	102 (134)	0	--
Erie	23	14,879 (19,463)	8 (10)	359 (470)	--
Ontario	18	1,282 (1,677)	32 (42)	61 (80)	--
Total	171	26,390 (34,521)	980 (1,284)	2,362 (3,090)	--



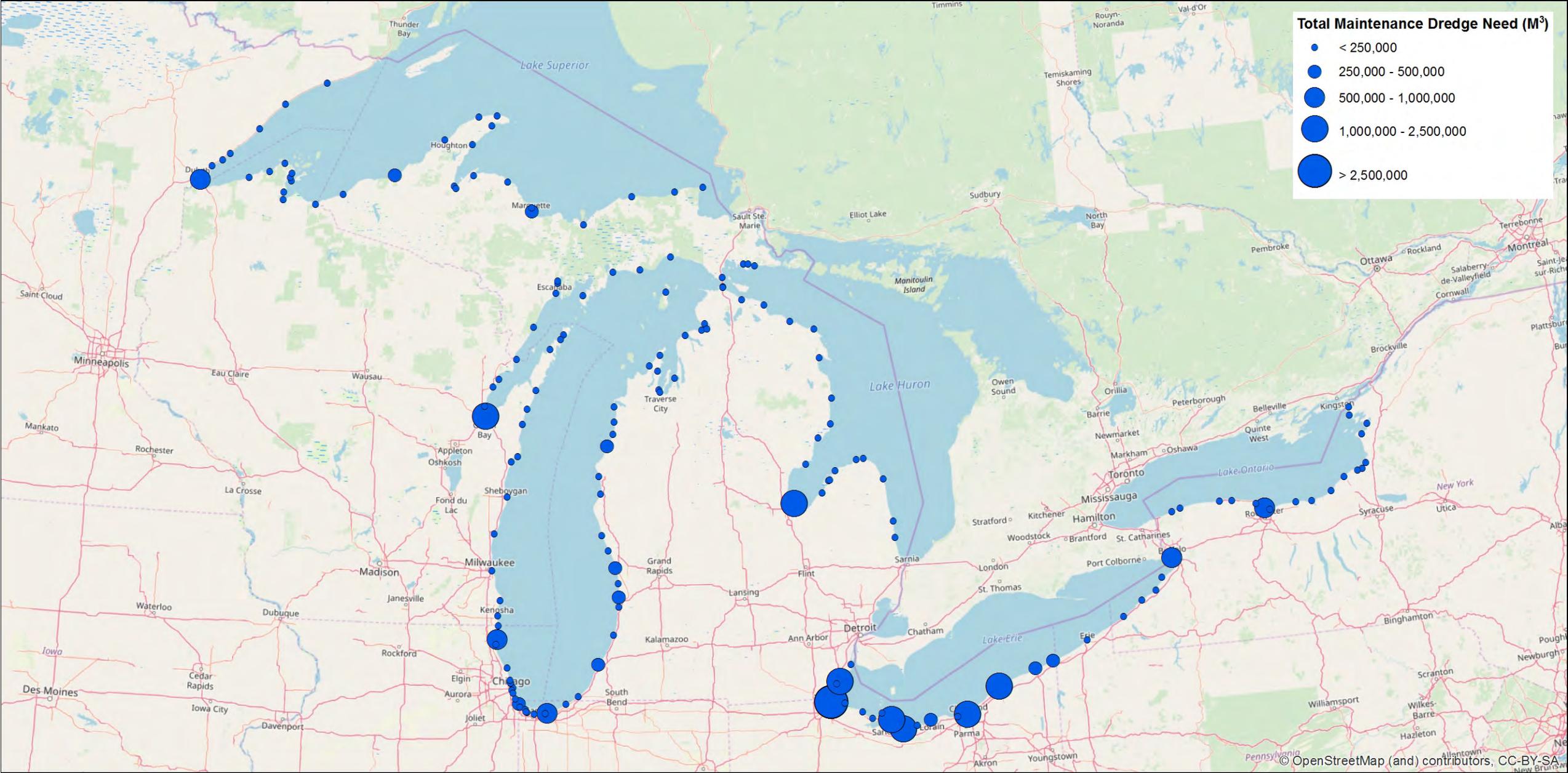
ENVIRONMENTAL DREDGE NEED (2020-2030)

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FED./NON-FED. MAINTENANCE DREDGE NEED (2020-2030)

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TOTAL MAINTENANCE DREDGE NEED (2020-2030)

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DISCUSSION TOPICS

1. FUTURE UPDATES AND IMPROVEMENTS OF ESTIMATED TOTAL DREDGE DEMAND
2. IMPROVEMENT DREDGING ESTIMATION
3. DREDGED MATERIAL MANAGEMENT
4. OTHERS?

THANK YOU!

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