

# Superior Slips Remediation

Virtual Public Meeting

April 11, 2024



PERSPECTIVE MAP OF THE CITY OF

## SUPERIOR, WIS.

PUBL. & COPYRIGHTED BY AMERICAN PUBLISHING CO. MILWAUKEE, WIS.

91-681500

G4124,59A3 1890 .A6

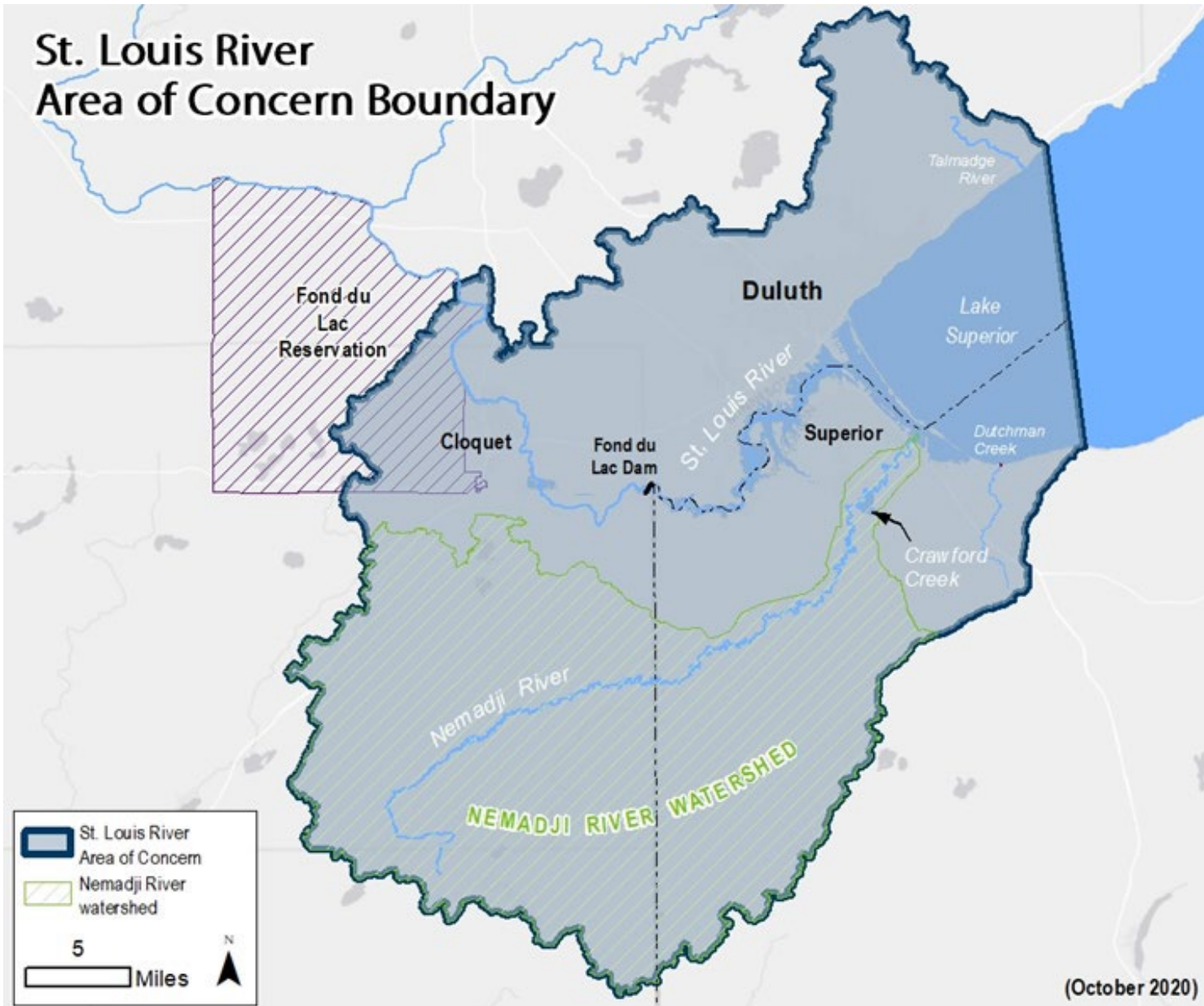
WISCONSIN DEPARTMENT OF NATURAL RESOURCES | [DNR.WI.GOV](http://DNR.WI.GOV)

# What is an Area of Concern?

- An Area of Concern (AOC) refers to a location in the Great Lakes region that has experienced significant environmental degradation. These areas suffer significant environmental damage, impacting aquatic life and water quality.
- Historically, the Great Lakes and their tributaries have been central to trade and industry, leading to pollution and habitat loss over time. Improper waste disposal and unchecked land practices worsened the situation.
- AOCs represent the most severely affected sites, requiring targeted efforts for restoration and cleanup to remove each Beneficial Use Impairment (BUI).
- The Great Lakes Restoration Initiative (GLRI) was initiated in 2010 to accelerate these efforts to protect the Great Lakes.



## St. Louis River Area of Concern Boundary



# St Louis River Area of Concern

The SLRAOC encompasses the final 39 miles of the river, stretching from Cloquet to the Duluth/Superior Harbor, including the Nemadji River watershed and a section of Lake Superior.

This area is marked by a contrast between the upper estuary's natural landscapes and the lower estuary's urban and industrial development, culminating in the heavily trafficked Duluth–Superior Harbor.

Designated as an Area of Concern in 1987 due to environmental issues, the SLRAOC is a critical focus for restoration and protection efforts within the Great Lakes region.

St. Louis River, the largest U.S. tributary to Lake Superior drains 3,634 square miles, entering the southwestern corner of the lake between Duluth, Minnesota, and Superior, Wisconsin. The river flows 179 miles through three distinct areas:

- coarse soils, glacial till and outwash deposits at its headwaters;
- a deep, narrow gorge at Jay Cooke State Park; and
- red clay deposits in its lower reaches.

# Beneficial Use Impairments

- 1. Fish consumption advisories**
2. Degraded fish and wildlife populations  
*(BUI removed Jan. 2023)*
3. Fish tumors or other deformities  
*(BUI removed Feb. 2019)*
- 4. Degradation of benthos**
- 5. Restrictions on dredging activities**
6. Excessive loading of nutrients and sediments  
*(BUI removed April 2020)*
7. Beach closings and body contact
8. Degradation of aesthetics  
*(BUI removed Aug. 2014)*
9. Loss of fish and wildlife habitat



Red text means impairment is due to sediment quality

# ST. LOUIS RIVER AOC Remediation Sites

## Management Action/Project Sites

5.## Project No.

█ Remedial action proposed

█ Remedial action complete, monitoring of effectiveness underway or complete

--- State Boundary

█ Navigation channel

0 0.5 1 Miles

Projects 5.15, 5.16, 5.18, 5.24, 5.25, 5.28, and 9.16 concluded that additional action is not needed to address BUIs (not shown on map)

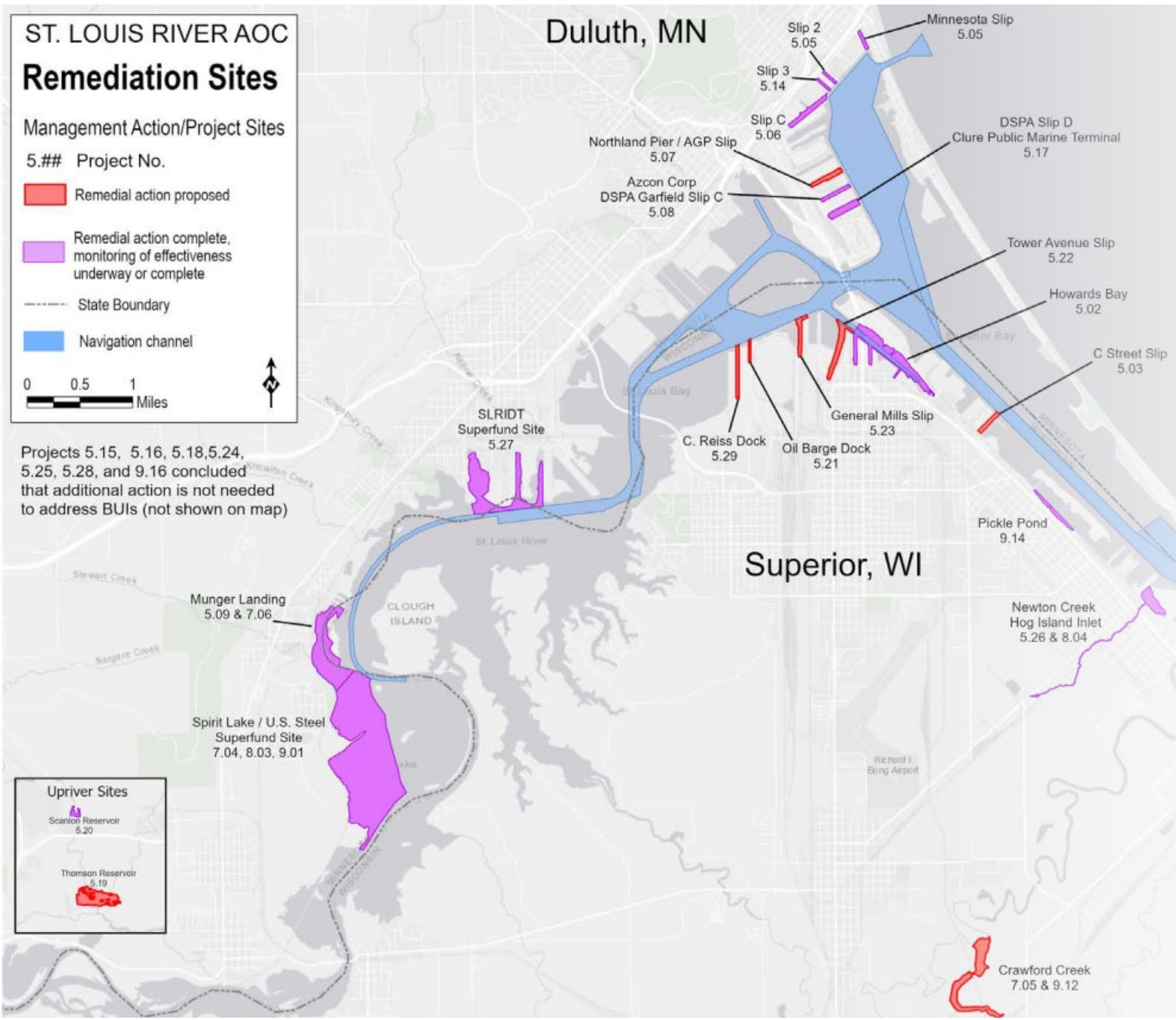
### Upriver Sites

Scanlon Reservoir  
5.20

Thomson Reservoir  
5.19

Duluth, MN

Superior, WI



# Sediment Remediation Sites

Contaminated sediments impair uses of the St. Louis River

- Increased cost for dredging & management of dredged material
- Mercury & PCBs in fish people eat
- Degraded benthic community

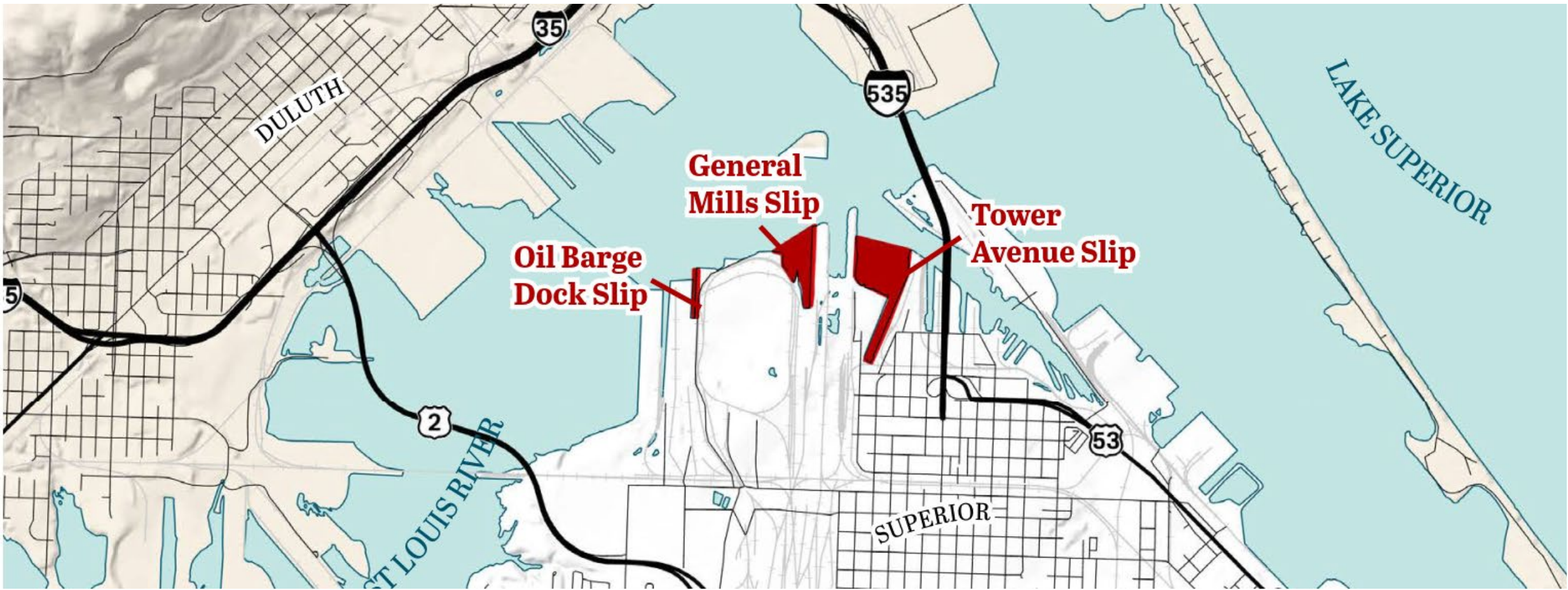
Sediment remediation at select sites are among the last remaining actions to necessary to restore the river

## Management Actions:

5.21 - Oil Barge Dock

5.23 - General Mills

5.22 - Tower Avenue



## Superior Slips Location

The Oil Barge Dock Slip, General Mills Slip, and Tower Avenue Slip are all located north of downtown Superior.

# Complex History of Land Use & Releases

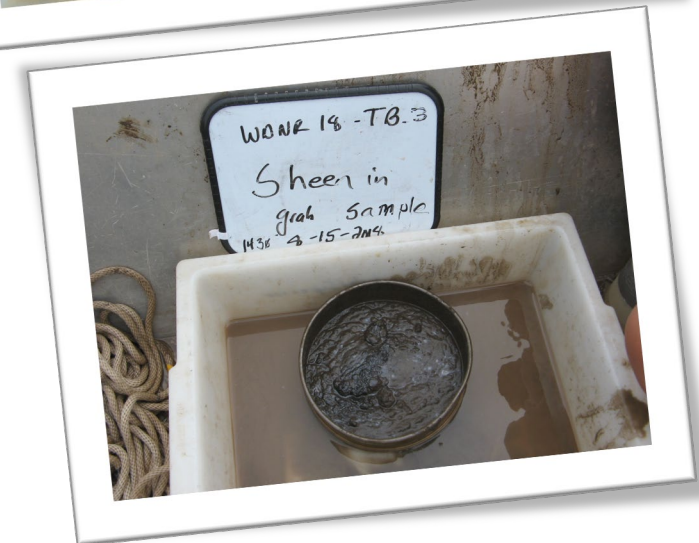
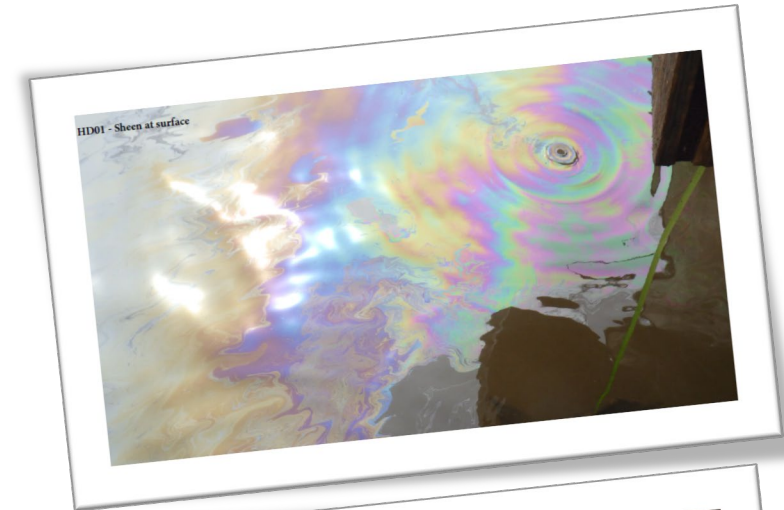


- Major petroleum storage/ distribution (> 70-million gallons)
- Major coal storage/distribution (> 15-million tons)
- Steel Mill, Coke Ovens, Foundries
- Industrial Waste Disposal
- Electric Generating Station
- Machining Facilities, Boiler Works
- Railyards and Railroad Repair
- Grain Terminals – Ships



# Petroleum Handling and Storage Operations

## Indications of Petroleum Impacts





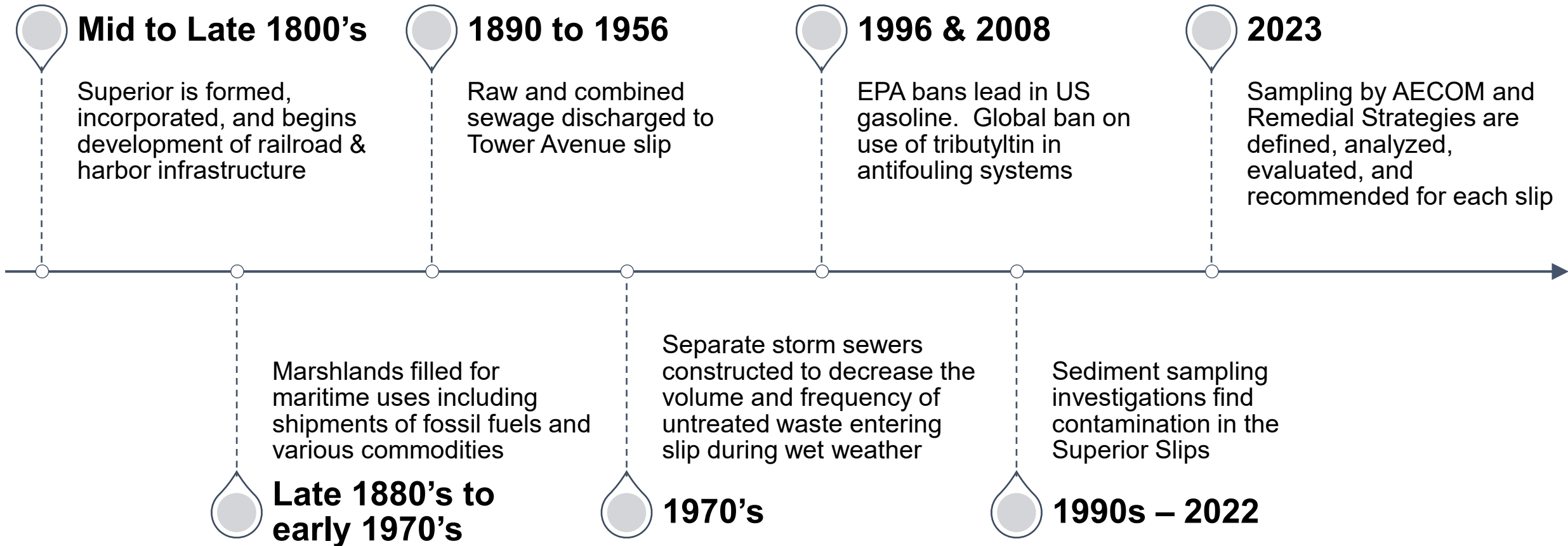
# Maritime activities



Screenshots of MN PBS Working Waterfront

Hull scraping, sanding and painting of an ocean-going vessel in a Superior slip

# History of Superior Slips (Contamination & Investigation Timeline)



# Contaminants Summary

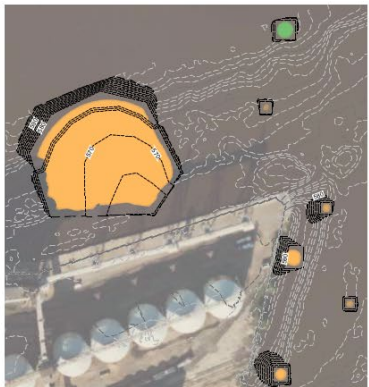
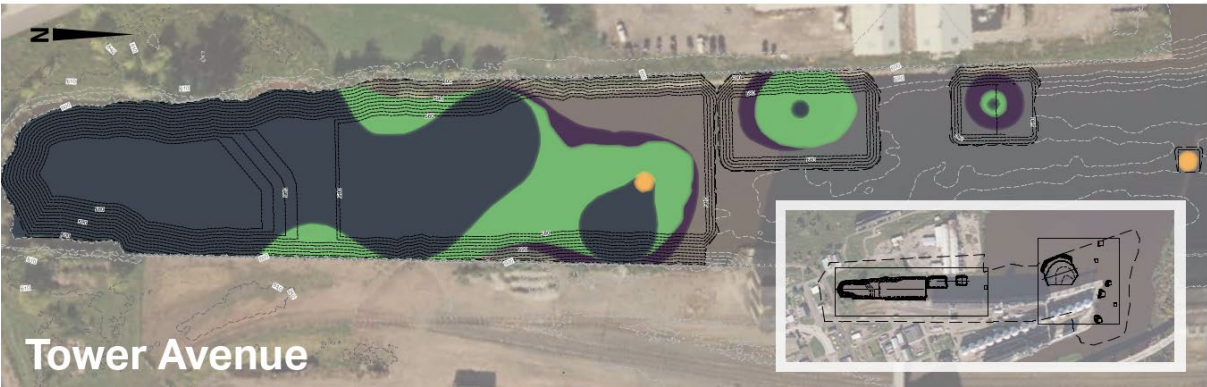
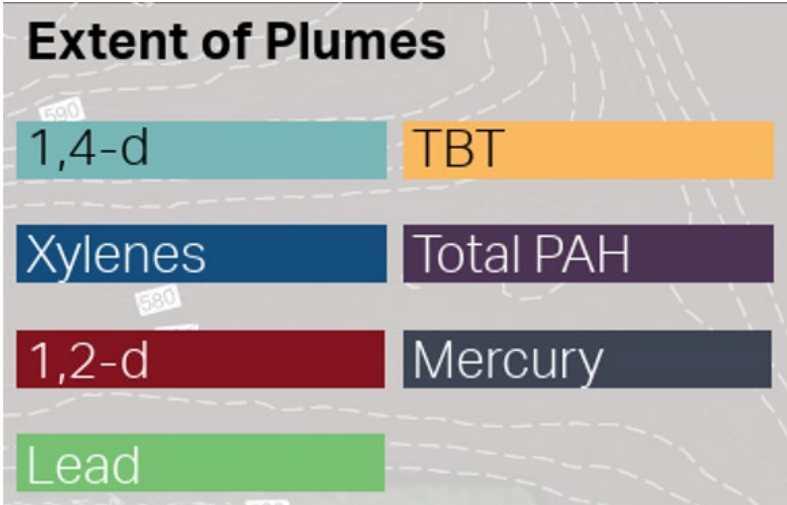
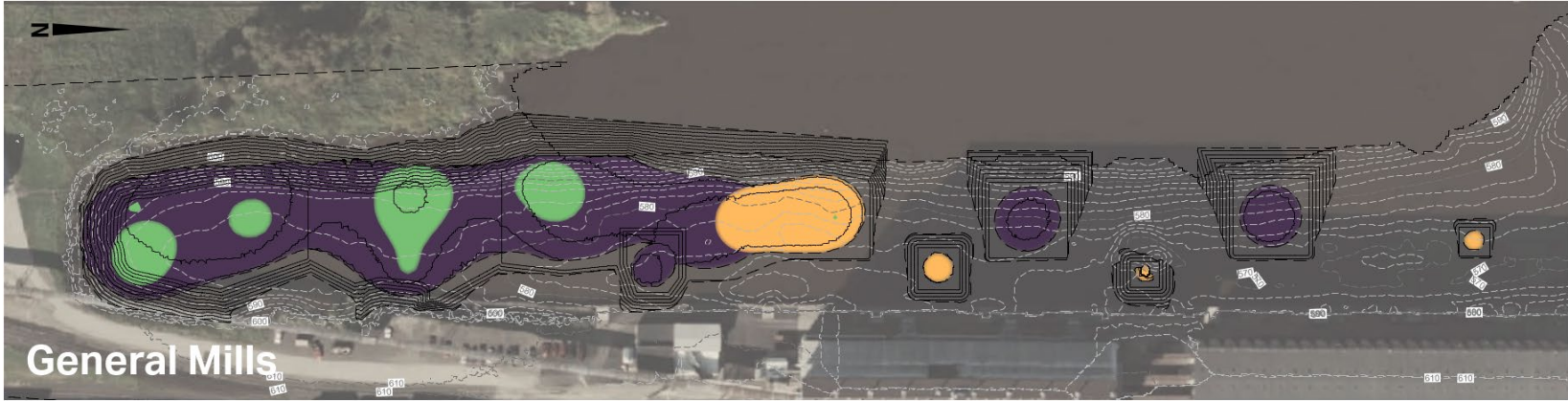
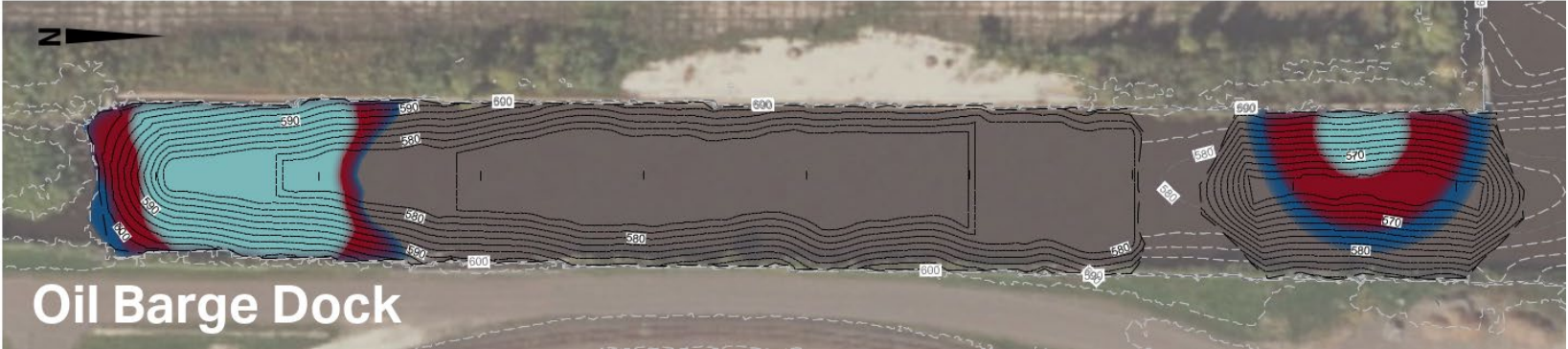
---

Investigations of Slips have found high concentrations of the following contaminants:

- **Metals** - Arsenic, lead, and mercury
- **Dioxins** - biproducts of industrial processes
- **Polycyclic aromatic hydrocarbons** - PAHs occur in fossil fuels
- **Volatile organic compounds** - VOCs highly reactive and can pose a risk to human health as well as atmospheric pollution
- **Semi-volatile organic compounds** - SVOC examples are oil-based products, pesticides and fire retardants
- **Tributyltin** - TBT is a common antifouling agent formerly used in marine paints which is highly toxic to marine life
- High concentrations of **coal particles** in excess of risk-based cleanup goals
- Observations of petroleum and measured toxicity to benthic organisms

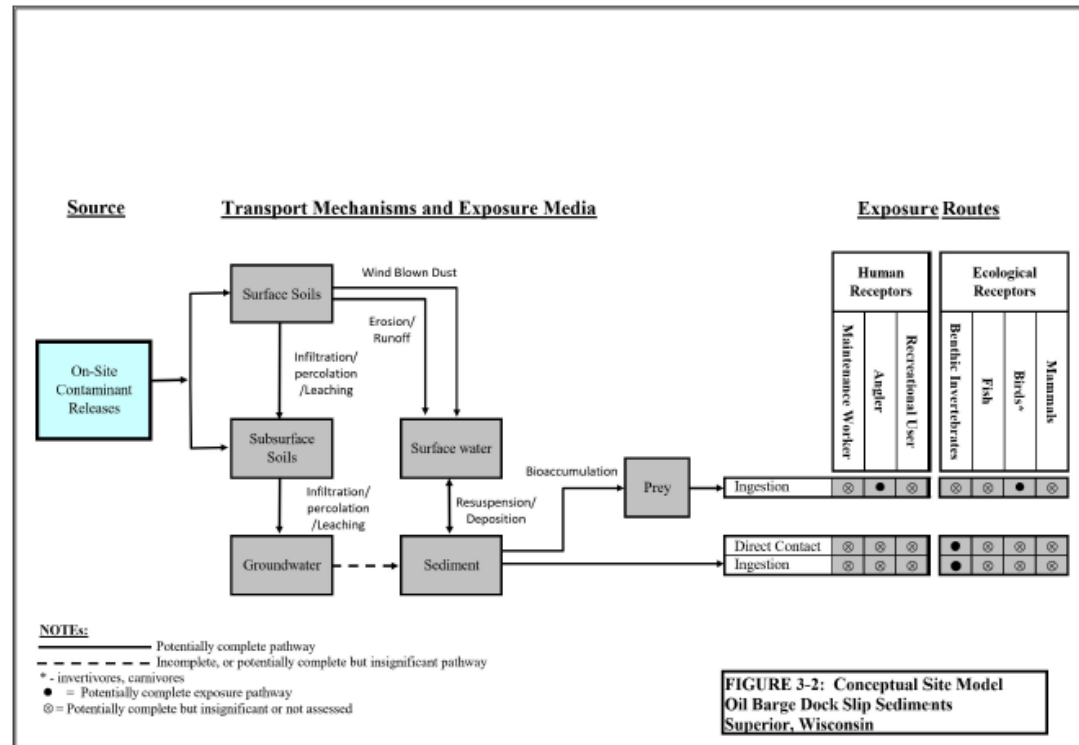
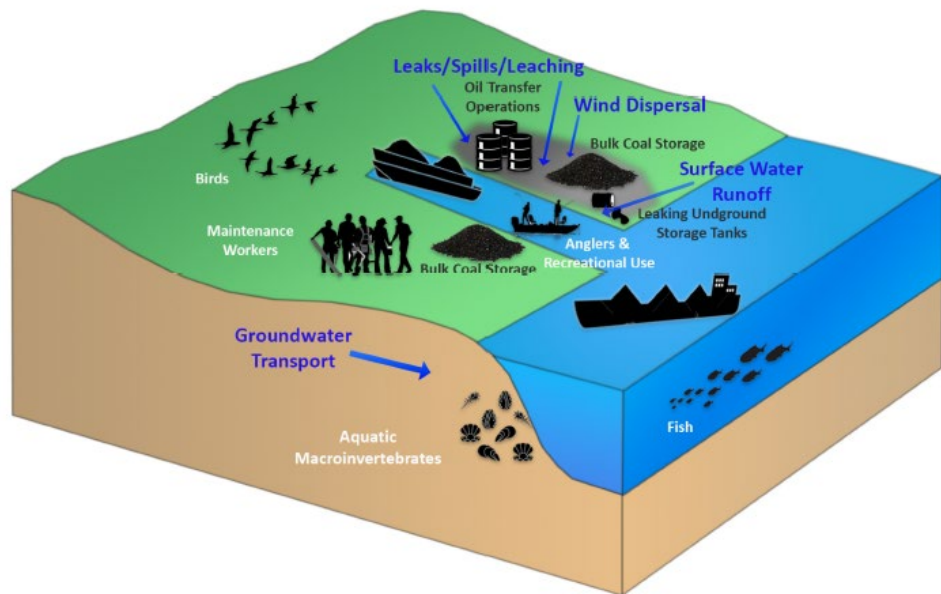
# Contaminants

Contaminants with the greatest human health and ecological risk have been identified as focus areas.



# Conceptual Site Models

## Transport mechanisms, Exposure Media, and Receptors



# Developed Cleanup Objectives and Criteria

## Remedial Action Objectives

- Reduce sediment concentrations of constituents of concern (COCs) to minimize or eliminate risks.
- Reduce or eliminate the degree and extent of COCs in the Slip that necessitate special handling procedures during dredging or dredged material disposal.
- Minimize or eliminate the potential for contaminated sediment within the Oil Barge Dock Slip to act as a source of contamination in the St. Louis River Estuary beyond the slip.

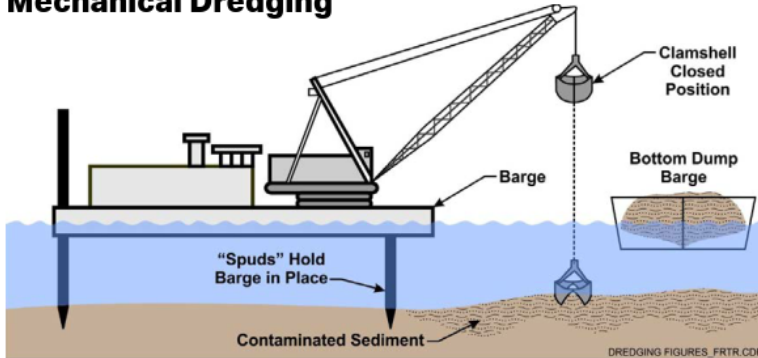
*List above is example from the Oil Barge Dock*

## Preliminary Remediation Goals

- Generally, sediment quality midpoint effect concentrations
- Consistency with other GLLA project in SLRAOC
- Industrial direct contact soil standards as surrogate for dredging restrictions for disposal

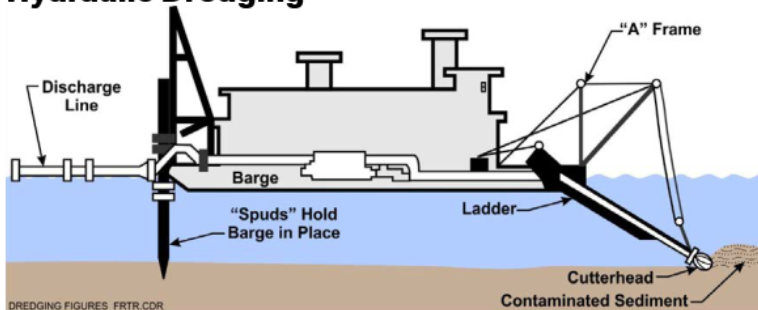
# Remediation Options

## Mechanical Dredging

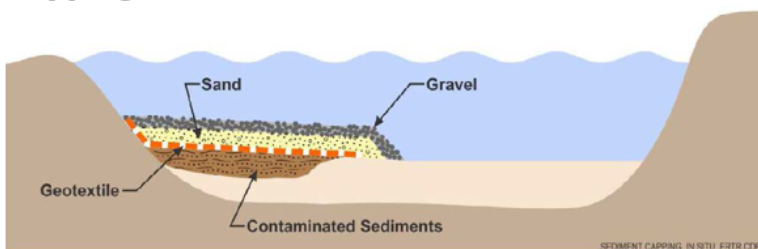


Dredge Graphics Courtesy of FRTR

## Hydraulic Dredging



## Capping



### Remediation Option

### Description

### Pros

### Cons

#### Mechanical Dredging

Uses machines to suck up and remove contaminated mud and sediment from riverbeds

- Efficient sediment removal
- Facilitates deeper waterways accommodating larger ships
- Restore and nourish eroded beaches and provide natural defense against coastal erosion
- Mitigates floods, protecting property and lives
- In some cases, revives aquatic habitats

- Temporarily impedes river access and recreational activities
- Challenging debris handling
- Requires significant dilution water for sediment transport
- Possible residual contamination

#### Hydraulic Dredging

Uses water pressure to push and scoop up sediment from the riverbed

- Lower cost due to reduced labor and capital investment
- Less energy and emissions
- Direct transport to processing plant

- Disposal Challenges
- Risk of coastal erosion

#### Capping

Involves covering contaminated sediment with a layer of clean material (sand or gravel) to contain contaminated sediment

- Isolates contaminants
- Minimal disruption to aquatic habitats

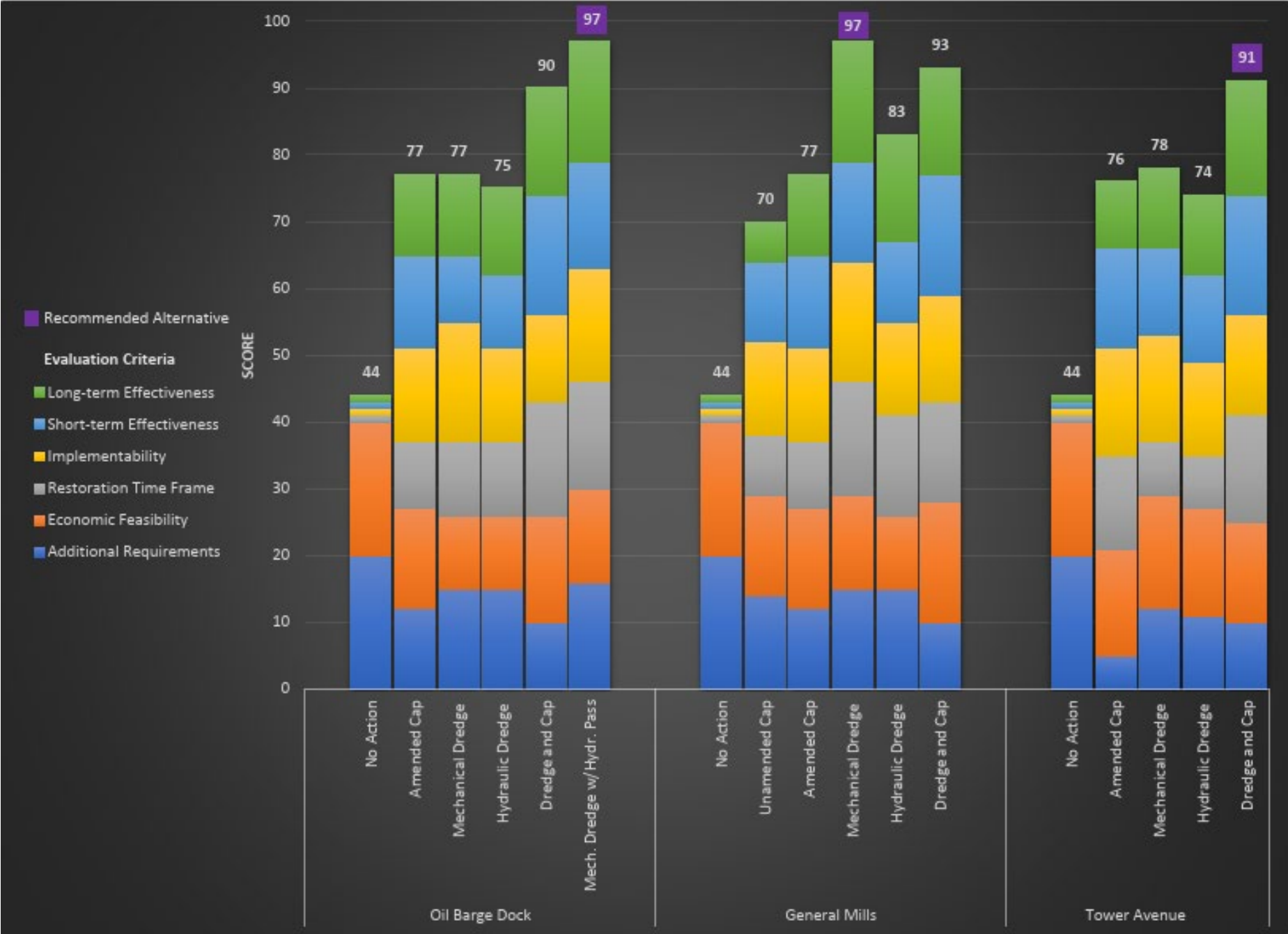
- If not well designed, contaminants may migrate over time.
- Waterway use is restricted
- Future liability for contamination

# Evaluating Remediation Options




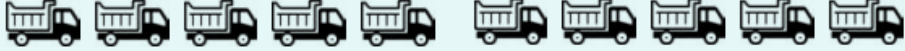

Dredging of the Superior Slips is a targeted environmental remediation effort aimed at addressing various BUIs that affect water quality and ecosystem health.

Alternatives were evaluated against criteria including technical feasibility and financial feasibility.

The chart to the right shows how each alternative was chosen based on 6 evaluation criteria.





Slip	Recommended Alternative	Sediment Volume (Cubic Yards)	Number of Truck Loads <i>Each symbol represents 500 truck loads of sediment</i>	Estimated Cost
Oil Barge Dock	Mechanical Dredging followed by Hydraulic Dredging	19,731	1,900 	\$6,916,606
General Mills	Mechanical Dredging	67,571	5,200  	\$15,751,387
Tower Avenue	Mechanical Dredging & Capping	102,235	7,900  	\$21,650,357
<b>Total:</b>		<b>189,537</b>		<b>\$44,318,350</b>

## Proposed Remedies

Upon analyzing and evaluating various remediation options, **mechanical dredging** was selected as the main remedy for all three slips.

This achieves the goal of removing the maximum amount of contamination possible while limiting its spread.

Further precautions will also be put in place to minimize the mobility of suspended sediment outside of the project area.

# How much sediment is being dredged?

The clean-up of the three slips will remove an estimated 189,537 cubic yards of sediment from the project area. That's 145,000 Olympic-sized swimming pools!

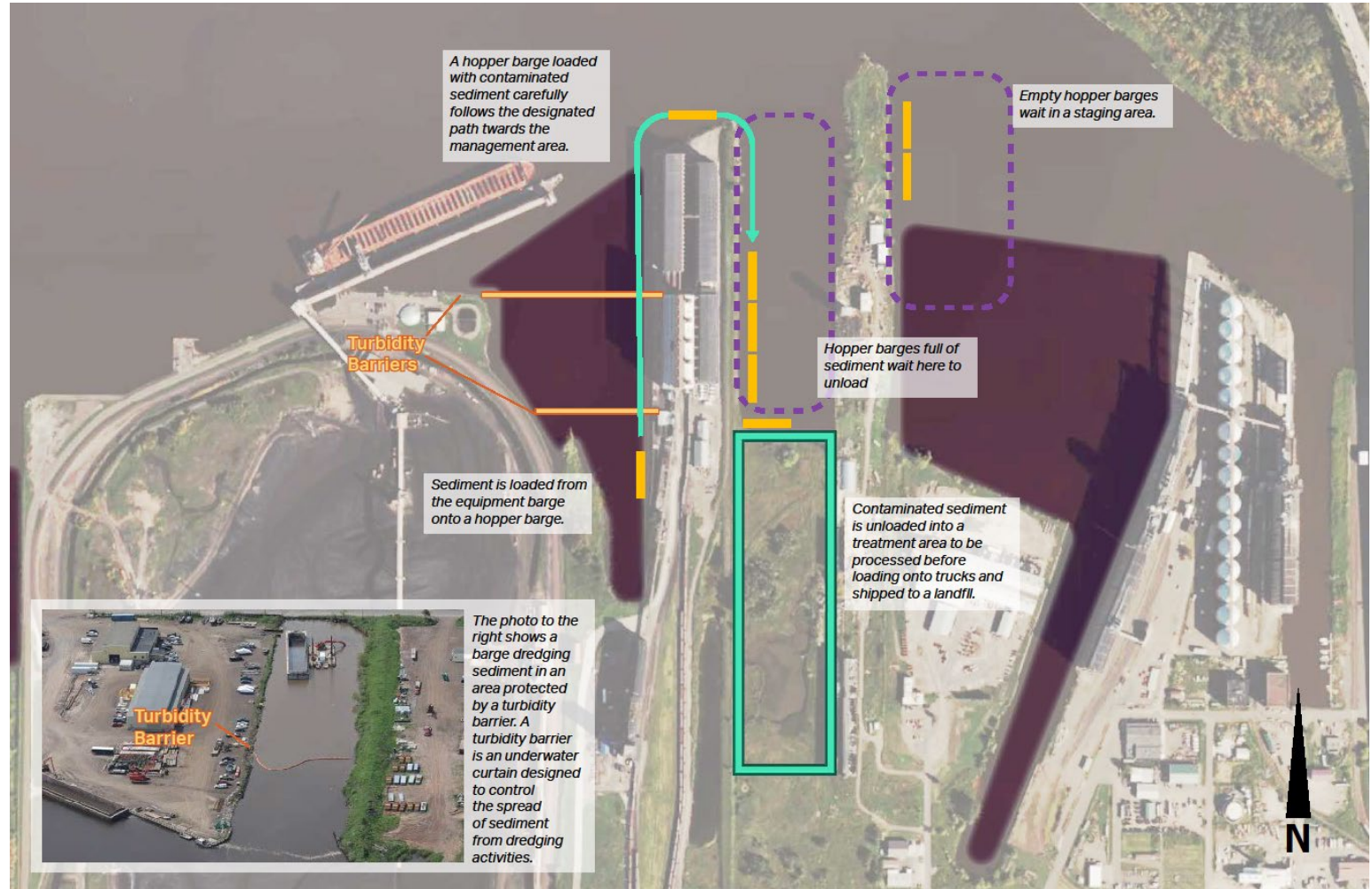
# How could the work be done?

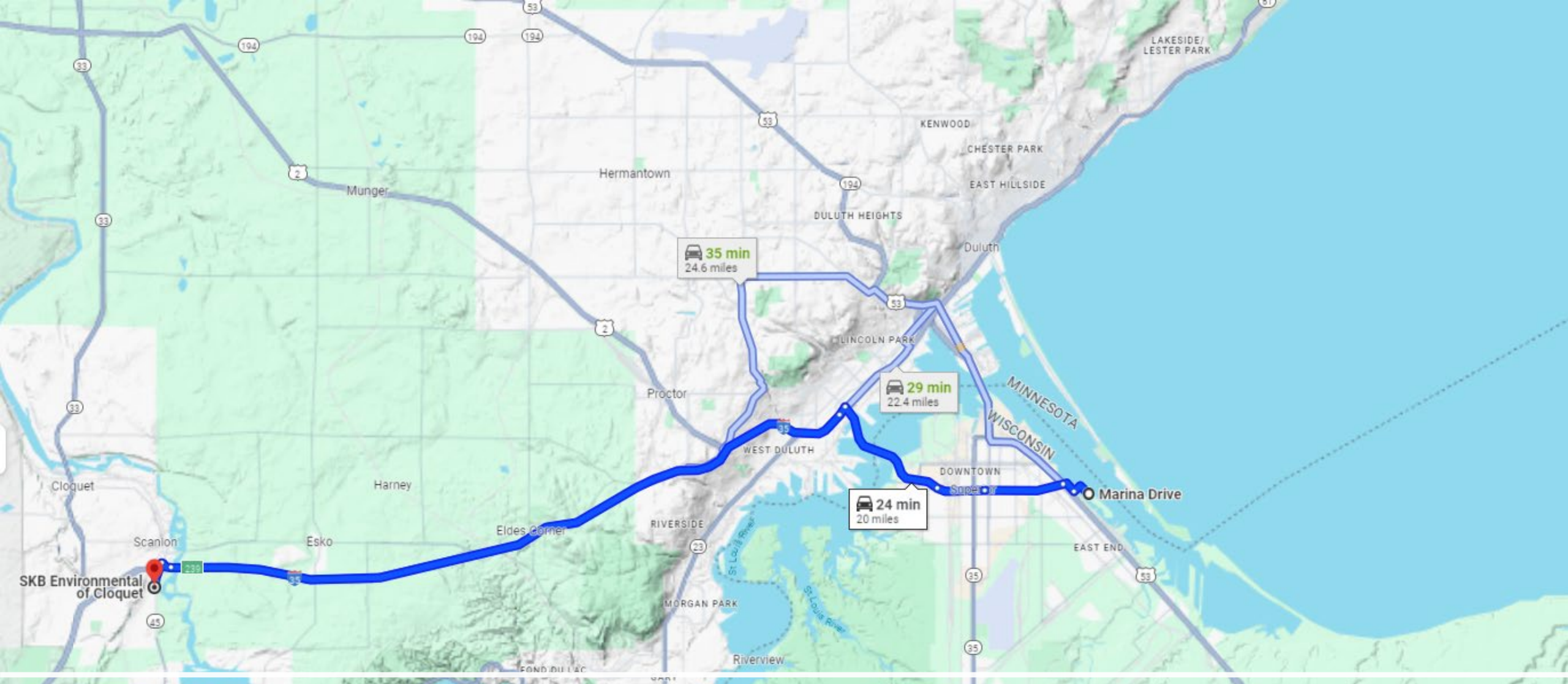
Contaminated sediment will be dried and stabilized.

A sediment management area may be located between the Tower Avenue and General Mills Slips to process and treat removed sediment - Exact locations to be confirmed.

Several options for treatment are being considered, contaminated sediment will be dried and stabilized prior to being taken to a landfill.

Barges of dredged material will travel to the Navigation Channel to offload contaminated sediment into the management area.





## Potential Truck Route



# PROJECT OUTCOMES



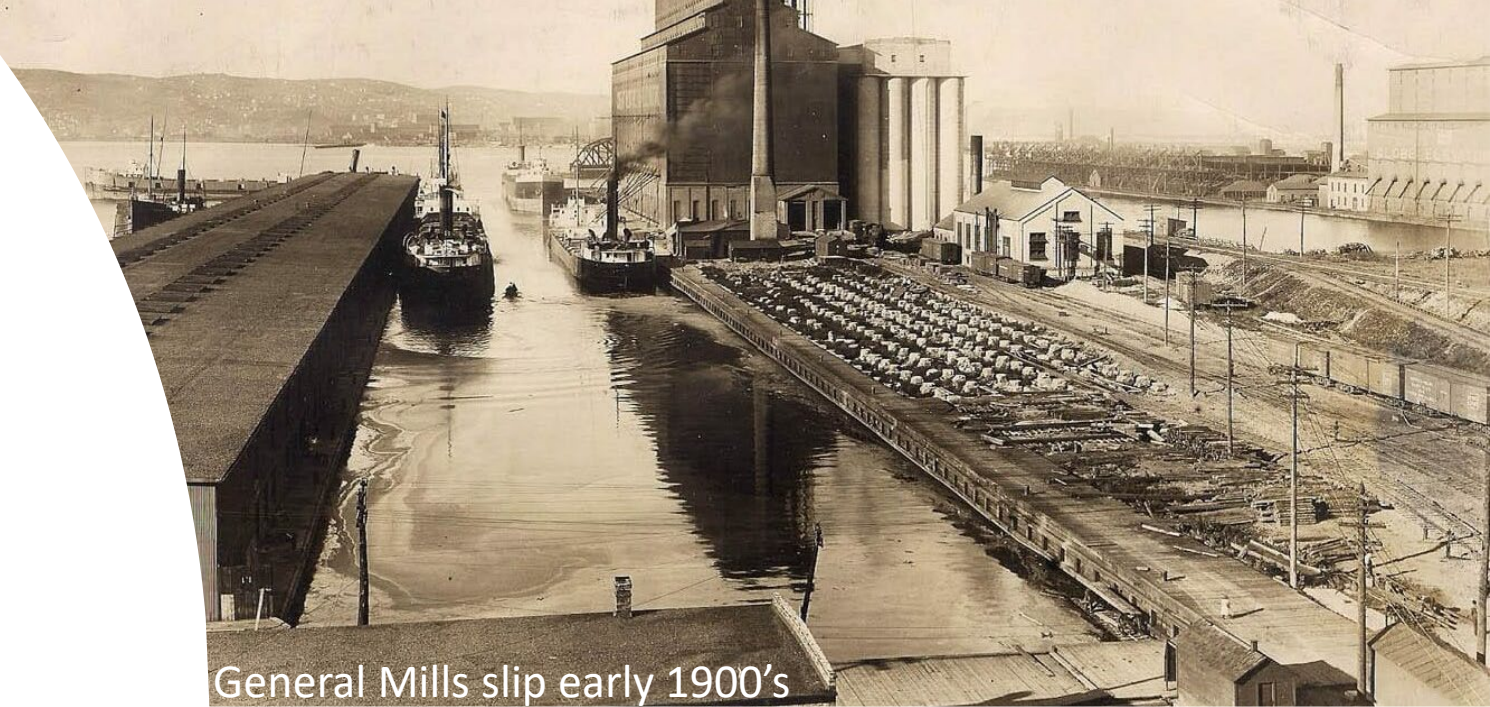
# Improved Water Quality

The remediation process will reduce pollutants affecting fish and wildlife consumption but also revitalizes the benthic layer, improving habitats and promoting biodiversity. By removing restrictions on dredging contaminated sediments, restrictions will be lifted and the risk of harmful substance exposure will diminish resulting in cleaner water and enhanced public health. Together, through state and local collaboration and public involvement, balance to aquatic ecosystems will be restored.

## Addresses impaired uses

## Progress on three management actions for AOC delisting

## Investment in waterfront



General Mills slip early 1900's



General Mills slip 2022

# What's next for the Superior Slips?



Ongoing  
Project partner recruitment



2024  
Preliminary design Investigations



2024 to 2025  
Remedy selection and design



2026 to 2027  
Remedial construction (estimated)



2028 & Beyond  
Operation and maintenance of any engineering controls  
(e.g. caps)

# We want to hear from you!

How to comment (Until - June 7, 2024):

**Complete the questionnaire**

<https://dnr.wisconsin.gov/topic/GreatLakes/SuperiorSediment>

**Email us**

[DNRRRSuperiorSlips@wisconsin.gov](mailto:DNRRRSuperiorSlips@wisconsin.gov)

**Or both** 😊



# CONNECT WITH US

---

## Superior Slips

[DNRRRSuperiorSlips@wisconsin.gov](mailto:DNRRRSuperiorSlips@wisconsin.gov)



@WIDNR



@WI\_DNR



/WIDNRTV



"WILD WISCONSIN:  
OFF THE RECORD"