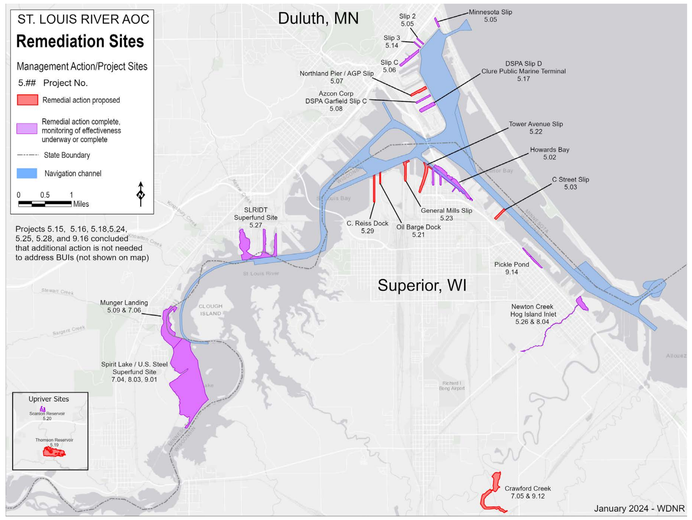
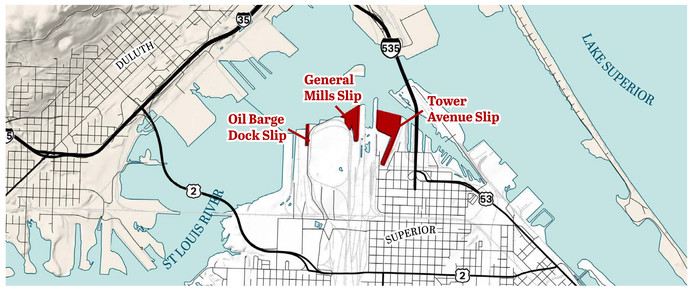
Cleaning up Contaminated Sediments in the Superior Slips

St. Louis River Area of Concern

Author: Joe Graham, Wisconsin Department of Natural Resources (DNR)
Coauthors: Brian Mastin, Alison Bitel, Josh Loomis, Reece Frederick, Devin Kamperschroer, Kim Elias (AECOM)



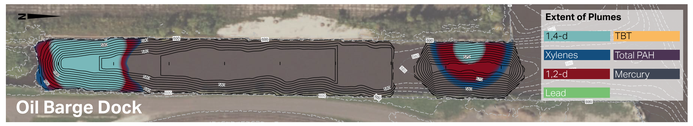


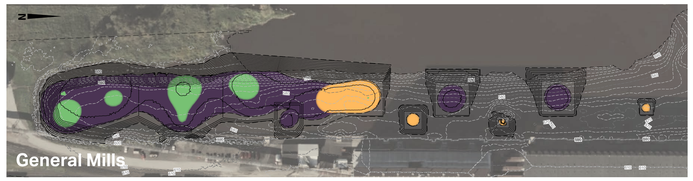
The Superior Slips

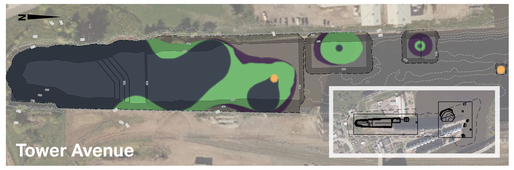
Historic habitat destruction and discharges of toxic pollution have led the EPA to designate the St Louis River estuary as an Area of Concern (AOC). The implementation of major environmental regulations starting in the mid-twentieth century have improved conditions, but these laws don't address ongoing impacts from legacy contamination. AOCs focus on widespread cleanup and restoration efforts and strive to remove each Beneficial Use Impairment (BUI) recognized within the AOC. The Great Lakes Restoration Initiative (GLRI) was initiated in 2010 to accelerate these efforts to protect the Great Lakes and repair each AOC.

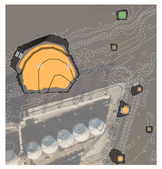
After sampling of sediments within the Superior Slips, the Wisconsin Department of Natural Resources, working in collaboration with its consultant AECOM and the EPA, has proposed activities to address sediment contamination within these three slips to improve sediment quality and ultimately restore the beneficial uses of the St. Louis River. The DNR will host an informational meeting online in April 2024 to allow members of the public to ask questions and give input on the recommended cleanup approaches. More information on how to attend, or other ways to engage with the project is located on the bottom right of this poster.

Investigations of the General Mills, Tower Avenue and Oil Barge Dock Slips have found high concentrations of toxic metals (arsenic, lead, and mercury), dioxins (biproducts of industrial processes), polycyclic aromatic hydrocarbons (PAHs occur in fossil fuels), volatile organic compounds (VOCs are 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), and high concentrations of coal particles in excess of risk-based cleanup goals. The contaminants found to pose the greatest human health and ecological risk were identified as focus areas. These focus areas are outlined for each Slip in the figures below.



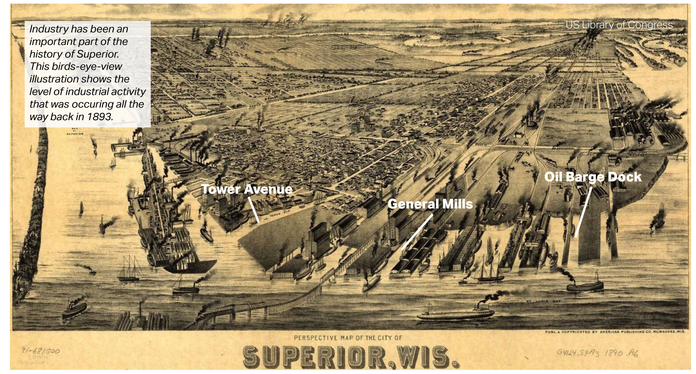






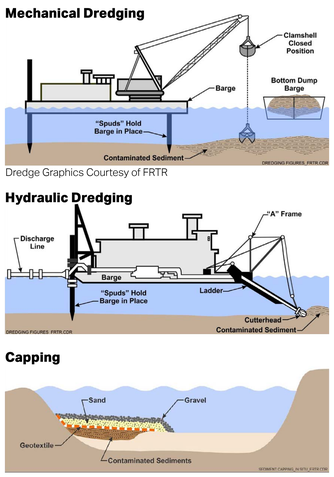
Timeline

Mid to Late 1800's – Superior is formed, incorporated, and begins development of railroad & harbor infrastructure
Late 1880's to early 1970's – Marshlands filled for maritime uses including shipments of fossil fuels and various commodities
1890 to 1956 – Raw and combined sewage discharged to Tower Avenue slip
1970's – Separate storm sewers constructed to decrease the volume and frequency of untreated waste entering slip during wet weather
1996 & 2008 – EPA bans lead in US gasoline. Global ban on use of tributyltin in antifouling systems
1990s – 2022 - Sediment sampling investigations find contamination in the Superior Slips
2023 –Sampling by AECOM and Remedial Strategies are defined, analyzed, evaluated, and recommended for each slip
2024 – Planned - Public Informational Webinar early April. Seeking input on remediation and dredged material management
2026 to 2027 – Remedial Construction (forecasted – dates may vary)
2028 & beyond – Operation and maintenance of any engineering controls (e.g., caps)



What Are Our Options?

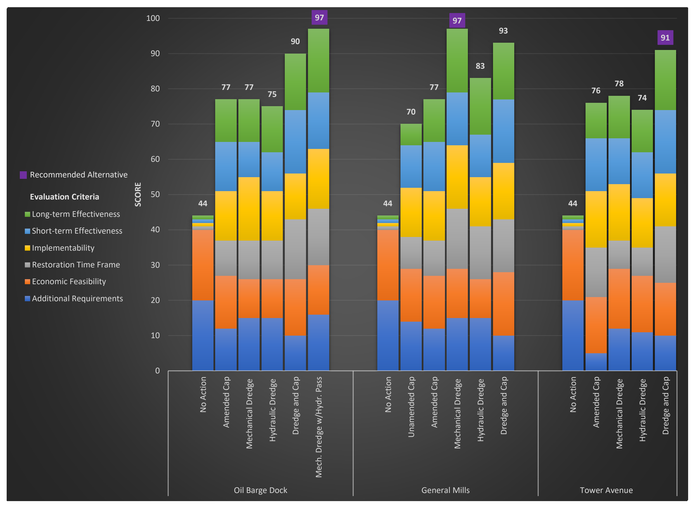
During the process of identifying cleanup options, alternatives were discussed and screened. The alternatives were evaluated against criteria including technical feasibility (i.e., long-term effectiveness, short-term effectiveness, restoration time frame and implementability), economic feasibility and other considerations. A scoring system was developed to compare alternatives for each evaluation criteria. In this assessment, all criteria are equally weighted, and a total score was used for identification of a recommended alternative. See the graph to the right for the scoring outcome. The highest score wins!



Dredge Graphics Courtesy of FRTR

Slip	Recommended Alternative	Sediment Volume (Cubic Yards)	Number of Truck Loads *Each symbol represents 500 truck loads of sediment*	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
	Total:	**189,537**		**$44,318,350**

Comprehensive Analysis of Alternatives



The two threshold criteria: (1) Overall Protectiveness of Public Health and the Environment and (2) Compliance with Applicable, Relevant and Appropriate Requirements are pass/fail and not included in numeric scoring. Options that did not meet either threshold criteria were not included in the comparative analysis. For example, the monitored natural recovery alternative does not address beneficial use restrictions in a reasonable timeframe and was excluded. Exception, the "No Action" alternative is included for baseline comparison only.

Removing Contaminated Sediment

Contaminated sediment will be removed from each slip by their selected remedy. Mechanical dredging was selected as the main remedy for all three slips. The goal is to remove the maximum amount of contamination as possible without spreading it further. Other precautions, such as turbidity barriers, will be put in place to minimize the mobility of suspended sediment outside of the project area.

A sediment management area may be located between the Tower Avenue and General Mills Slips to process and treat removed sediment from all three Slips. Barges containing dredged material will travel outside of the project area into the Navigation Channel to offload contaminated sediment into the management area. Several options for treatment of the contaminated sediment are being considered. Generally, the contaminated sediment will be dried and stabilized prior to being taken to a landfill. The actual locations for sediment management will be determined during the design of the selected remedies.

How Much Sediment Will Be Removed?

The clean-up of the three slips will remove an estimated 189,537 cubic yards of sediment from the project area. This would be enough sediment to fill the SS Meteor on Barkers Island (pictured to right) 25 times.

We Want to Hear from You!

A Public Informational Webinar will be held this April where project staff will provide additional information, answer any questions, and receive input from members of the public. If you are interested in attending, or would like to visit the project website, please scan the QR code to the right.