



Munger Landing Sediment Remediation

Request for Great Lakes Legacy Act Partnership Agreement

St. Louis River Area of Concern

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EXECUTIVE SUMMARY

The Munger Landing remedial site (Site) is located east of the Smithville neighborhood in Duluth, Minnesota, and is within the St. Louis River (SLR) Area of Concern (AOC). The remedial footprint consists of approximately 38 acres of open water and wetlands, is bounded to the west by the shoreline of the St. Louis River Estuary (Estuary), to the north by the Spirit Lake Marina, and to the east by an unnamed island owned by the Bureau of Land Management (BLM). The southern boundary of the remedial footprint does not extend past the southern extent of the BLM island. Approximately six acres of the project footprint is located in Wisconsin, with the remainder located in Minnesota. The Stewart Creek wetland, located to the west of the Lake Superior and Mississippi Railroad (LSMRR) tracks, is also within the remedial footprint. The wetland is hydraulically connected to the Estuary through an opening in the LSMRR track embankment where a steel railroad bridge spans Stewart Creek.

Site investigations conducted from 2014 to 2020 identified sediment contaminated with cadmium, copper, lead, mercury, nickel, zinc, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and dioxin/furans, with PCBs and dioxin/furans identified as the primary contaminants of concern (COCs). PCBs likely originated from a former electrical apparatus repair facility which serviced, among other components, transformers containing PCBs. At least a portion of the dioxin/furan contamination likely originated from the electrical apparatus repair facility as well as other former source areas which discharged into the Estuary upstream of the Site. Contaminated sediment was generally identified throughout the Site and is considered to present a high likelihood of significant effects to benthic invertebrates. The

levels of contaminants also present a risk to human health for people swimming, wading, or eating fish. The St Louis River has fish consumption advisories for mercury and PCBs.

Funding to complete a Focused Feasibility Study (FFS) for Munger Landing was obtained through the United States Environmental Protection Agency (USEPA), Great Lakes Restoration Initiative (GLRI) and by state funding through the Minnesota Legacy Fund. The FFS compiled site data and screened potential remedial alternatives. Following completion of the FFS and with stakeholder input, the Minnesota Pollution Control Agency (MPCA) selected a full dredge with offsite disposal as the remedial action for the Site. The USEPA, MPCA, Wisconsin Department of Natural Resources (WDNR), and the US Army Corps of Engineers (USACE) Detroit District are developing the remedial design for the selected remedy. The proposed project includes dredging, dewatering, and disposing of approximately 100,000 cubic yards of contaminated sediment, including approximately 1,000 cubic yards of Toxic Substances Control Act (TSCA)-regulated sediment; placement of dredge residual cover over the entire remedial footprint; placement of a biomedium cover over the dredge residual cover within approximately eight acres identified as critical habitat; and upland improvements requested by the City of Duluth. The biomedium cover for habitat restoration and upland improvements that include a kayak launch area and sidewalk are a result of project stakeholder and permitting feedback received to mitigate project impacts.

The MPCA is requesting Great Lakes Legacy Act (GLLA) Category 2 funding for the remediation of contaminated sediments at the Site. This project would contribute to the achievement of

general and specific objectives of the Great Lakes Water Quality Agreement Annex I and the Great Lakes Restoration Initiative Action Plan III.

The proposed project will directly address the restrictions on the dredging beneficial use impairment (BUI) as well as contribute to the removal of the following BUIs: fish consumption advisories, degradation of benthos, beach closings and body contact restrictions, and loss of fish and wildlife habitat as identified in the SLR AOC Remedial Action Plan (RAP), the FFS Addendum, and the Minnesota Decision Summary (MDS) for the Site. The total estimated cost for this project is \$32,119,915. The MPCA and other non-federal sponsors are requesting \$20,235,546 in GLLA funds and will match this request with \$11,884,369 of public and private funds.

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PROJECT DESCRIPTION NARRATIVE

PART I - PROJECT TITLE

Munger Landing Sediment Remediation

PART II – OBJECTIVES

The Munger Landing sediment remediation project is listed as Management Action 5.09 for the Restrictions on Dredging BUI and Management Action 7.06 for the Beach Closings and Body Contact Restrictions BUI in the SLR AOC RAP. Remedial action at Munger Landing will help achieve the primary focus of the remaining “on the ground” management actions, which are the remediation of contaminated sediments and habitat restoration.

Project Remedial Action Objectives (RAOs) developed by the MPCA for Munger Landing are:

1. Minimize or remove human exposure to sediments with COCs above sediment cleanup goals;
2. Minimize or remove exposure of the benthic organisms to contaminated sediments above sediment cleanup goals;
3. Preserve water depth to enable the current and/or planned use of the Site;
4. Minimize or remove exposure to sediment contaminants that bioaccumulate in the food chain and contribute to fish consumption advisories; and
5. Preserve or enhance aquatic habitat, if conditions allow, in a manner that contributes to the removal of BUIs.

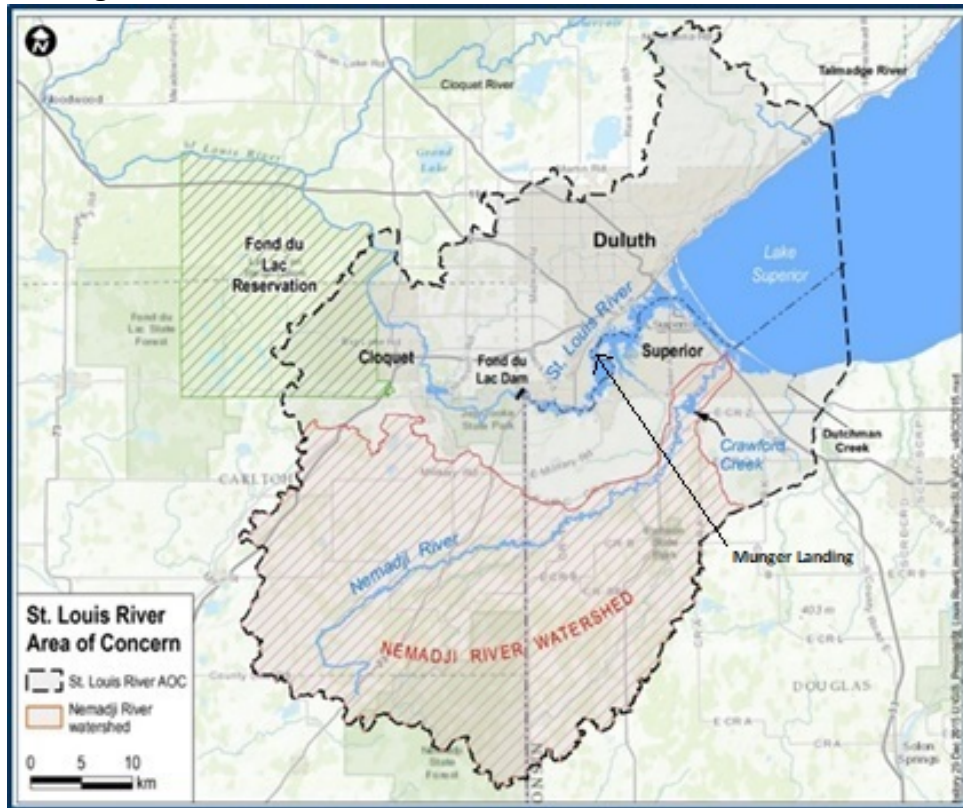
PART III – JUSTIFICATION

The Great Lakes Water Quality Agreement (GLWQA), signed in 1972, is a non-regulatory agreement between the U.S. and Canada to “restore and maintain the chemical, physical and biological integrity of the Great Lakes Basin Ecosystem.” In 1987, an amendment to the GLWQA established the concept of “Areas of Concern” as a means to increase accountability for implementation of the programs and practices described in the GLWQA. Forty-three geographic areas around the Great Lakes Basin, including the St. Louis River, were identified as the most severely impacted and established as AOCs.

The SLR AOC consists of the lower 39 miles of the SLR from Cloquet, Minnesota, to the Duluth-Superior Harbor, and its watershed; the Nemadji River watershed; and the western portion of Lake Superior from the Dutchman Creek watershed in Wisconsin, to the Talmadge Creek watershed in Minnesota (Figure 1). The SLR is the largest U.S. tributary to Lake Superior. The lower estuary empties into the Duluth-Superior Harbor, the largest freshwater seaport in North America. It serves as a geographic boundary for Wisconsin and Minnesota and provides regional shipping access to Lake Superior.

Human development along the SLR over the past 130 years has contaminated sediments in the Estuary. The MPCA and WDNR developed Sediment Assessment Areas to evaluate and prioritize remediation and restoration activities in the SLR AOC.

Figure 1: St. Louis River Area of Concern



Contaminated sediments have been identified and characterized through several studies that included the collection and analysis of sediments and biota samples throughout the AOC. Nine Beneficial Use Impairments (BUIs) have been identified in the SLR AOC including: degradation of bottom-feeding invertebrate communities, increased incidence of fish tumors and other abnormalities, fish consumption advisories, and restrictions on dredging. The MPCA and WDNR are working to implement a comprehensive long-term plan developed in the SLR AOC RAP to restore habitat and remove BUIs in the SLR AOC. Many of the BUIs in the AOC are linked to the presence of contaminated sediment. Some sediment-derived contaminants also appear suspended in the water column and are carried by the SLR into Lake Superior.

As identified in the SLR AOC RAP, FFS Addendum, and the MDS, Munger Landing is potentially contributing to five impairments in the SLR AOC:

1. Restrictions on dredging;
2. Fish consumption advisory;
3. Degradation of the benthos environment
4. Beach closings and body contact restrictions; and
5. Loss of fish and wildlife habitat

As recommended by the SLR AOC RAP, areas that are contributing to river and harbor sediment impairments should be addressed through remedial activities. Removing or isolating the contaminated sediments from the surface water/sediment interface will also help reduce the transfer of toxins to the impaired waters of the SLR.

3.1 SITE BACKGROUND

Historically, the area surrounding Munger Landing has undergone several physical modifications since European settlement of the area. During the late 19th and early 20th centuries, the Duluth/Superior region experienced a dramatic rise in population as the region began to utilize local resources, including vast forests, iron ore, and the natural harbor (the Duluth-Superior Harbor) located on Lake Superior. Construction of the Soo Locks at the eastern outlet of Lake Superior near Sault Ste. Marie, Michigan, in 1855 and the introduction of dredging in the Duluth-Superior Harbor in the mid-1800s, contributed significantly to the port's growth and establishment as a primary shipping harbor. Thriving industries within the region

included forest products, smelting, grain milling and transport, and the transport of iron ore, coal, and limestone. Many of these industries were concentrated in the Duluth-Superior Harbor at Rice's Point in Minnesota and on Connor's Point and Howard's Bay in Wisconsin. Some of these industries are still present and operating within the harbor today.

Historical maps, aerial photographs, and drawings were reviewed for the Site as part of the 2015 Remedial Investigation (RI; Bay West, 2015). The historical documentation provides a background of site use and is summarized below.

The 1861 Hearing survey map depicts the Site as part of the main channel of the SLR. The BLM island, located east of the site, appears longer and narrower than its present-day arrangement, with the Duluth Harbor present further east to northeast of the Site. The LSMRR tracks are depicted west of the Site, paralleling the shoreline, in Merritt's 1889 sectional map. The 1902 Frank's Atlas map depicts similar features with the addition of what appears to be residential development to the west and northwest of the Site. The 1935 Wellbanks map shows the present-day BLM island as larger and wider than depicted in the 1861 survey. A navigational channel appears to have been dredged to the east of the island and the main channel of the SLR no longer travels through the site. The McDougall-Duluth Company shipyard is visible to the north of the site where the Spirit Lake Marina exists today. Additional residential development is visible to the northwest, west, and southwest of the site. In the 1954 United States Geological Survey (USGS) topographic map, the depicted water depth at the Site outside of the former river channel is approximately three feet with depths within the former river channel marked as

25 feet. The BLM island appears similar in size and shape to its present orientation. A 1961 aerial appears to show the development of the Smithville wastewater treatment plant at the eastern end of Clyde Avenue, which is reported to have existed from 1961 to 1979.

3.2 CURRENT CONDITIONS

The project site is located upstream of the inner Duluth harbor at the eastern end of Clyde Avenue in the Smithville neighborhood of Duluth Minnesota. The Site is located within the boundaries of the SLR AOC, as shown on Figure 1. The site is bounded by the former LSMRR tracks, which presently operate as a scenic railroad, to the west, Spirit Lake Marina to the north, and the BLM island to the east (Figure 2). Approximately 2.2 acres of the remedial footprint is located west of the LSMRR tracks within the Stewart Creek wetland. Snively Creek discharges to the Stewart Creek wetland along the wetland's western extent. The Stewart Creek wetland is hydraulically connected to the St. Louis River Estuary through an opening in the LSMRR track embankment where a steel railroad bridge spans Stewart Creek. The remaining remedial footprint consists of open water in the St. Louis River Estuary. The site footprint is approximately 3,200 feet in length and 750 feet in width.

The Munger Landing public water access area consists of an upper and lower parking lot. The LSMRR tracks divide the upper and lower parking lot, while an abandoned railroad track owned by Burlington Northern borders the upper parking lot to the west. A boat launch, owned by the City of Duluth and operated by the Minnesota Department of Natural Resources, is located at the eastern extent of Clyde Avenue within the lower parking lot. A fishing pier extends into the Estuary east of the lower parking lot and north of the boat launch.

Figure 2: Munger Landing Remedial Footprint (left) and Public Water Access Area (right)



Sediment characterization of the Site from 2014 to 2020 identified sediment contaminated with cadmium, copper, lead, mercury, nickel, zinc, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and dioxin/furans, with PCBs and dioxin/furans identified as the primary COCs. Maximum PCB and dioxin/furan concentrations at the site are 247,000 micrograms per kilogram ($\mu\text{g}/\text{kg}$) and 292 nanograms Toxicity Equivalence per kilogram ($\text{ng TEQ}/\text{kg}$), respectively. Contaminated sediment was generally identified throughout the site and is considered to present a high likelihood of significant effects to benthic invertebrates. COCs above cleanup levels (CULs) were generally found to range from zero to approximately two feet below the sediment surface. Sediment investigations conducted in 2019 and 2020 identified the source area of PCB contamination to be adjacent to a former sewer outfall located south of the present-day boat launch. TSCA-level PCB contamination in soil was also found near the vicinity

of the former outfall. A significant source of the PCB contamination likely originated from an electrical repair facility located upstream of the Stewart Creek wetland, adjacent to Snively Creek. A Great Lakes Legacy Act remedial investigation in 2020 identified TSCA-level PCBs in sediment adjacent to Snively Creek; however, PCB concentrations in Snively Creek sediment do not appear to warrant remedial action. The source area adjacent to Snively Creek is expected to be excavated in late 2021 under a separate project agreement between the EPA and ViacomCBS.

Table 1: Munger Landing Sediment Concentration Summary

Contaminant of Concern	Level 1 SQT	SQT Midpoint	Level 2 SQT	Units	Number of Samples	Samples > Level 1 SQT	Samples > SQT Midpoint	Samples > Level 2 SQT	Maximum Conc. Detected
Cadmium	0.99	3.0	5.0	mg/kg	149	40	1	0	3.1
Chromium	43	76	110	mg/kg	149	18	0	0	63.1
Copper	32	91	150	mg/kg	149	61	2	0	140
Lead	36	83	130	mg/kg	149	69	33	12	260
Nickel	23	36	49	mg/kg	149	80	21	3	58.9
Zinc	120	290	460	mg/kg	149	74	32	13	832
Mercury	0.18	0.64	1.1	mg/kg	189	51	6	4	8.0
PCB	60	370	680	ug/Kg	345	173	85	62	247,000
Total PAH 13	1600	12300	23000	ug/Kg	130	48	9	4	137,600
PCDD/F	0.85	11.175	21.5	ng/Kg	236	157	74	57	292

Bold text indicates contaminant is a primary COC.

The Minnesota Department of Health (MDH) placed fish consumption advisories for mercury and PCBs for the water bodies that comprise the SLR AOC. Removing the advisories is one of the primary objectives identified in the SLR AOC RAP. Researchers from USEPA’s Office of Research and Development (ORD) developed Biota-Sediment Accumulation Factor models for various fish species in the St. Louis River Estuary. A high-resolution model for yellow perch at

Munger Landing was developed in response to the accumulation of PCBs in fish tissue at the Site. The BSAF model predicted, and field sampling confirmed, that PCBs in fish tissue collected at Munger Landing are well above those observed from fish at reference locations. As part of their pre-construction assessment in 2018 to 2019, young of year perch and gamefish of edible size were collected at the site and analyzed for PCBs and mercury. Concentrations of PCBs and mercury in the fish tissue exceeded levels for safe fish consumption, with concentrations from yellow perch composite samples ranging from 7.3 to 9,240 µg/kg Total PCBs and from 0.002 to 1.13 ng TEQ/kg for dioxins/furans.

Other biological testing has confirmed uptake of Site contaminants in benthic tissue. In 2016 sediments from the Site were evaluated for toxicity and bioaccumulation of chemicals toward several species of benthic invertebrates. Sediment samples were collected from a total of nine sites. The following tests were conducted: a 10-day Sediment Toxicity Test with *Hyalella azteca*, a 10-day Sediment Toxicity Test with *Chironomis dilutes*, and a 28-day Bioaccumulation Test with *Lumbriculus variegatus*. Four sediment samples were used in the *L. Variegatus* bioaccumulation test and all four tissue samples contained concentrations of dioxins greater than the control sample. Two of the samples ranked in the top five highest concentrations for all compiled dioxin/furan *L. variegatus* bioaccumulation samples in the SLR AOC.

No physical barriers currently exist limiting contact between site users and the TSCA-level PCB contamination adjacent to the public boat launch and the fishing pier. Signs warning of the presence of contaminated sediments and advising against swimming and wading were posted

near the boat launch in 2018; however, swimming and wading has been observed in the area since this time. Beginning construction during the 2022 field season is necessary to limit impacts to human health and to permanently address the contaminated sediments at Munger Landing for future site users.

3.3 PROJECT OBJECTIVES

As identified in Section 1 of the SLR AOC RAP, management actions for Munger Landing have been identified for the Restrictions on Dredging BUI and the Beach Closings and Body Contact Restrictions BUI. The FFS Addendum and the MDS also indicated that contaminated sediment at Munger Landing is also contributing to the Fish Consumption Advisories BUI, the Degradation of Benthos BUI, and the Loss of Fish and Wildlife Habitat BUI. Remediating the contaminated sediments at Munger Landing will also help reduce the transfer of COCs from sediment to the water of the Estuary.

The proposed remedial action for Munger Landing is intended to meet each of the RAOs listed in Part II.

1. Minimize or remove human exposure to contaminated sediments with COCs above sediment cleanup goals;
 - Dredging of contaminated sediments will reduce human exposure to contamination from swimming and wading. Dredging will remove contaminated sediment adjacent to the boat launch area where these activities have been observed. The remedial target for sediment removal is based on ecological risk

and will be protective of human health as the sediment cleanup level is more protective than the site-specific human health risk-based values.

2. Minimize or remove exposure of the benthic organisms to contaminated sediments above sediment cleanup goals;
 - A primary objective of the proposed remedial action is to eliminate or reduce exposure of contaminated sediments to benthic organisms and other aquatic biota by dredging of contaminated sediments. Dredging will result in a reduction of contaminant mass, contaminant volume, and contaminant concentrations throughout the site. Additionally, a thin layer of clean cover will be placed post-dredging to reduce the potential for long-term risks to benthic organisms from dredging residuals. This layer will also provide a clean layer for recolonization by benthic organisms.
3. Minimize or remove exposure to sediment contaminants that bioaccumulate in the food chain and contribute to fish consumption advisories;
 - The selected remedial alternative involves dredging and removal of bioaccumulative contaminants at the site. The overall net reduction in PCBs and dioxins/furans in sediment will result in lower levels of bioaccumulation and over time result in decreasing fish tissue concentrations for these contaminants.
4. Preserve or enhance aquatic habitat, if conditions allow, in a manner that contributes to the removal of beneficial use impairments (BUIs);
 - The remedial design will preserve aquatic habitat by restoring approximately eight acres of high-quality habitat within the 38-acre remedial footprint.

5. Preserve water depth to enable the current and/or planned use of the Site.
 - The proposed remedial action is a full dredge with offsite disposal, which will preserve and expand deep water habitat at the site.

PART IV - APPROACH AND METHODS

4.1 REMEDIAL INVESTIGATION, FEASIBILITY STUDY, AND ALTERNATIVES SCREENING

A RI was completed in 2015 to collect new and supplement existing information regarding the sediment quality at the Site, including chemical and physical site data. The primary objectives of the RI were to: provide sediment characterization of the Site for incorporation into the SLR AOC sediment database; determine the nature and extent of contaminated sediments; evaluate contaminant concentrations and geochemical data/metrics using Sediment Quality Guidelines (SQGs) to refine the current list of COCs; develop a preliminary Conceptual Site Model (CSM) that evaluates contaminant fate and transport, and provides a comparison between SLR AOC-specific risk-based screening values and existing conditions to identify unacceptable risks to human health and/or the environment; identify data gaps and provide recommendations for additional investigation sufficient to support development of remedial alternatives through a FFS.

A revised FFS for the Site was completed in 2018. The revised 2018 FFS provided a summary of current site conditions; a discussion of remedial action objectives (RAOs); and the identification, screening, evaluation, and comparison of potential remedial alternatives. Remedial alternatives were further refined in collaboration with the WDNR in a 2019 FFS Addendum.

The alternatives were evaluated and compared using the remedy selection criteria outlined in the FFS, and in general accordance with USEPA guidelines for feasibility studies (USEPA, 1990).

The remedy selection criteria were based on:

- Overall protection of human health and the environment;
- Compliance with applicable or relevant and appropriate requirements (ARARs);
- Long-term effectiveness and permanence;
- Reduction of toxicity, mobility or volume through treatment;
- Short-term effectiveness;
- Implementability; and
- Cost.

The following alternatives were evaluated in the 2018 FFS and the 2019 FFS Addendum:

Alternative 1: No Action

The no-action alternative would not achieve the remedial objectives.

Alternative 2: Monitored Natural Recovery and Institutional Controls

This alternative would not include any treatment or removal of contaminated sediment but would provide for 30 years of monitoring and controls on the use of the Munger Landing site.

Alternative 3: Enhanced Monitored Natural Recovery with Thin-Layer Sand Cover

This alternative would consist of applying a thin layer, 0.15 meters (6 inches), of sand material directly on top of the sediment surface in the remedial footprint. Monitoring of sediment chemical concentrations, sediment toxicity, and bioaccumulation of COCs in aquatic life would be conducted until sufficient contaminant sequestration, degradation, transformation, or other natural recovery processes reduce risks to acceptable levels. Extensive long-term monitoring is required, and repairs may be necessary in the future.

Alternative 4: Dredge and Off-site Disposal

This alternative would consist of the complete removal of COCs within the established remedial areas and subsequent off-site disposal of contaminated sediment. Following dredging, a 0.15-meter (0.5-foot) layer of clean sand would be placed throughout the dredged areas to provide benthic habitat and serve as a dredge residual cover. Dredging would be conducted to a defined dredge prism neat line using best management practices to control and reduce contaminated dredge residuals. No long-term monitoring of COCs is required under this alternative.

Alternative 5: Hotspot Dredge, Offsite Disposal, and Enhanced MNR with Thin-Layer Sand Cover

This alternative would consist of removal of sediments with COCs exceeding the CULs within the 7.4-acre contamination hotspot identified within the remedial footprint, combined with a thin-layer sand cover applied to the entire remedial footprint. Monitoring of sediment chemical

concentrations, sediment toxicity, and bioaccumulation of COCs in aquatic life would be conducted until sufficient contaminant sequestration, degradation, transformation, or other natural recovery processes reduce risks to acceptable levels.

4.2 CLEAN-UP ALTERNATIVE SELECTION

Based on information provided in the FFS, FFS Addendum, and on input from the WDNR, the City of Duluth, Fond du Lac Band of Lake Superior Chippewa, the USEPA Great Lakes National Program Office (GLNPO), and other stakeholders, the MPCA staff selected **Alternative 4-Dredge and Off-Site Disposal** as the preferred remedy at the Site.

Some of the primary reasons for selecting Alternative 4 are summarized below.

- Alternative 4 is protective of human health and the environment and achieves the remedial objectives (reducing human health risks, removing exposure to sediment contaminants that bioaccumulate in the food chain, removing exposure to benthic organisms to contaminated sediments, and enhancing or preserving aquatic habitat).
- Alternative 4 provides the highest achievement of long-term effectiveness and permanence, as all contaminated sediments exceeding CULs would be removed.
- Alternative 4 maximizes the amount of open water and preserves depth by removing and disposing of the contaminated sediments offsite. This will preserve and improve habitat for fish and aquatic wildlife.

- Primary stakeholders, technical advisors, and adjacent landowners support Alternative 4, which will remove the BUIs and allow for planned future uses of the land adjacent to Munger Landing.
- Alternative 4 will maximize the environmental outcomes from the use of State of Minnesota Bonding dollars and the Great Lakes Legacy Act funding.

4.3 PARTNERSHIP RECRUITMENT

The MPCA documented the past ownership and land uses near Munger Landing from the late 1800s to the present. Following the initial review, no potential project partners were identified.

In 2015 a former electrical repair facility, located approximately 1,700 feet west of the Site, was redeveloped for residential use. PCB-contaminated soil was encountered while excavating and grading the site. A sediment investigation conducted by the MPCA and the USEPA later identified PCB-contaminated sediment in Snively Creek and within the Estuary near a former sanitary sewer outfall that discharged wastewater originating from the repair facility. The MPCA shared the investigation results and summary reports with ViacomCBS, the corporate successor to Westinghouse which operated the repair facility. ViacomCBS has since become actively involved in the Munger Landing investigation and remedial design and is also leading efforts to further investigate and remediate a source area adjacent to the former electrical repair facility near Snively Creek.

The MPCA is also working closely with the WDNR on the project design as the in-water remedial footprint extends into Wisconsin waters. Non-federal partnership negotiations are ongoing between the MPCA, WDNR, and ViacomCBS. In addition to a strong partnership with the potential for multiple non-federal sponsors that have successfully completed other GLRI-funded projects, the proposed project is highly likely to succeed due to a proven and effective remedy that consists of a full dredge with offsite disposal. The proposed project's ongoing design and permitting is on schedule to award a contract and begin construction in 2022.

4.4 REMEDIAL DESIGN, ENVIRONMENTAL REVIEW, AND PERMITTING

Locating an adequate upland area to dewater dredged sediment was a constraint during the remedial design. The initial design assumed onsite dewatering within Smithville Park, an undeveloped park owned by the City of Duluth west of Munger Landing. The Smithville Park dewatering area was limited in extent and consisted of forested and wetland areas adjacent to Stewart Creek. The Value Engineering (VE) team evaluated the feasibility of dewatering sediment on site in Smithville Park during the VE study in March 2021. The VE team determined that the on-site space available was not sufficient for dewatering of the sediment in two field seasons. Extending the project beyond two field seasons would have added cost for a third mobilization and closed the Munger Landing public water access for at least three years. The Project Delivery Team (PDT) determined closure of the public water access at Munger Landing beyond two years would not be accepted by project stakeholders or the public. The PDT identified Hallett Dock 7 as a suitable offsite dewatering area that would reduce on site impacts and allow construction to be completed within two field seasons. Hallett Dock 7 is an industrial

dock located approximately 2.5 miles downstream of the Site. Moving sediment dewatering offsite will allow for unrestricted space for equipment laydown, material storage, sediment dewatering, and water treatment while also reducing on site impacts such as tree clearing and temporary wetland filling at Smithville Park as well as excess traffic, noise, and lighting that may affect area residents. The design assumes sediment will be transported to Hallett Dock 7 either by barge or using hydraulic methods. Both options will be permitted for approval to give the selected contractor flexibility during construction.

The components of the selected design alternative include the following steps:

- (1) Dredge approximately 100,000 cubic yards of contaminated sediments exceeding CULs using mechanical or hydraulic methods in the wet;
- (2) Dewater the sediment using Geotubes by hydraulically pumping, or transporting the sediment by barge, to a dewatering pad at Hallett Dock 7;
- (3) Dispose of dewatered sediment at a landfill;
- (4) Treat decanted water at an onsite treatment facility and discharge it back into the SLR;
- (5) Construct a 15 centimeter (0.5 foot) residual cover within the remedial footprint using sediment dredged from the Duluth-Superior Harbor navigational channel;
- (6) Restore habitat in approximately eight acres of the remedial footprint by restoring the existing bathymetry with navigational dredged material capped with a 15 centimeter (0.5 foot) fine-grain, organic-rich, biomedium cover to provide fish spawning habitat and facilitate aquatic revegetation.

(7) Revegetate and restore upland areas that are disturbed during the project.

Restoring habitat to pre-construction conditions at Munger Landing with a biomedium cover is an innovative solution to dredging areas that are considering high-quality muskellunge spawning areas. Unlike other fish, muskellunge prefer spawning in areas with fine-grained sediment and dead and decaying vegetation. The project proposes to source the biomedium from Perch Lake, a separate GLRI-eligible habitat restoration project that will remove clean sediment to expand deep-water habitat.

Environmental review and permitting for the Site began with the completion of the 50% design in June 2021. It is anticipated that permitting will be complete in December 2021, with the exception of state and municipal permits that the contractor will be required to obtain.

PART V - IMPACT ASSESSMENT

The 2020 SLR AOC RAP identifies the remediation of contaminated sediments at Munger Landing as Management Action 5.09 under Restrictions on Dredging BUI and as Management Action 7.06 under Beach Closings and Body Contact Restrictions. Cleanup of contaminated sites identified in the SLR AOC RAP, such as Munger Landing, will also contribute to the removal of the Fish Consumption Advisories BUI and the Degradation of Benthos BUI. Habitat improvements included as part of the remedial action will also support the Loss of Fish and Wildlife Habitat BUI.

PART VI - STAKEHOLDER INVOLVEMENT

Stakeholder meetings involving the Minnesota Department of Natural Resources, BLM, WDNR, City of Duluth, USACE, LSMRR, Fond du Lac band of Lake Superior Chippewa, USEPA, and other stakeholders have generally occurred annually since 2017. A public meeting presenting the remedial alternatives to obtain public input was held in August 2019. Five letters were received from the public following the August 2019 public meeting, all of which supported the selected remedy of a full dredge with offsite disposal.

To date, communications about the project have been distributed through MPCA and EPA GLNPO websites, Facebook, Twitter, and through the St. Louis River Alliance (SLRA) Facebook page. The SLRA is a community advisory group for the SLR AOC that can widely distribute project information and press releases. Public notices and other information have also been distributed through the SLR AOC GovDelivery list.

In coordination with the Illinois-Indiana Sea Grant, an outreach team has been assembled to lead project messaging and identify pertinent groups, clubs, and environmental justice areas that may be impacted by the project. Groups identified to date include the Morgan Park/Smithville Community Club, the Riverside Community Club, Friends of West Duluth Parks and Trails, Northland Paddlers Alliance, Twin Ports Walleye Association, Lake Superior Muskies, and the SLRA. The outreach team will coordinate with the EPA on their community involvement contract to ensure consistent and timely messaging to the identified parties.

PART VII - TIMELINE

Sediment Contamination Identified	2012
GLNPO Funded Assessment	2014-2015
100-year Flood	June 2012
Past Ownership and Land Use Review	2013
Remedial Investigation	2015
Feasibility Study	2017-2018
GLNPO Sampling (in Wisconsin and tributary creeks)	2018
FFS Addendum	2019
Partnership Recruitment with EPA	2017-2021
Stakeholder Process and Remedy Selection	2017-2019
Initiate GLLA Remedial Action PA Application	August 2021
Archeological Survey	2018-2020
Initiate Remedial Design	April 2020
Design Development	2020-2021
Permitting/Regulatory	July-December 2021
Finalize Plans and Specs (post permit)	December 2021
Initiate Construction	June 2022

PART VIII – BUDGET

The 50% design cost estimate for the selected remedy is approximately \$31,304,915. The MPCA and other non-federal sponsors are requesting \$19,722,096 in GLLA funds and will match this request with \$11,582,819 using a combination of public and private funds. The project cost reflects the difficulty of completing a shallow dredge within a large footprint that includes shallow water and wetland conditions with limited on-site upland work areas. Other project benefits, necessitate by stakeholder and permitting feedback, also contribute to the project cost and ultimately the long-term benefit of users, which include habitat restoration and facility improvements at the Munger Landing public water access area.

Table 2: 50% Design Cost Estimate

Description	Unit	Estimated Unit Cost	Est. Quantity	Corrected Estimate
Construction Costs				
Mobilization/Demobilization	Lump Sum	\$2,500,100	1	\$2,500,100
Construction	Lump Sum	\$23,852,000	1	\$23,852,000
			Subtotal	\$26,352,100
Contingency	15%	\$3,952,815	1	\$3,952,815
			Sub Total	\$3,952,815
		Construction	Total	\$30,304,915
Planning, Engineering & Design	Lump Sum	\$500,000	1	\$500,000
Tribal Monitoring	Lump Sum	\$75,000	1	\$75,000
Real Estate	Lump Sum	\$540,000	1	\$540,000
CONREP/Oversight	Lump Sum	\$300,000	1	\$300,000
Construction Management	Lump Sum	\$300,000	1	\$300,000
Maintenance and Monitoring	Lump Sum	\$100,000	1	\$100,000
			Subtotal	\$1,815,000
		Non-Construction	Total	\$1,815,000
		Total Project Cost		\$32,119,915

PART IX – ST. LOUIS RIVER AREA OF CONCERN DOCUMENTATION

Munger Landing is located wholly within the SLR AOC. Management Actions 5.09 and 7.06 in the USEPA-approved SLR AOC RAP indicates that contaminated sediments at Munger Landing should be remediated to achieve BUI 5 and BUI 7 removal as well as contribute to the removal of three other BUIs impacting the SLR AOC.

CONCLUSION

Historic industrial use in the SLR AOC has led to the presence of contaminated sediments at Munger Landing. Remedial action is needed to aid in the removal of the following BUIs identified in the SLR AOC RAP, the FFS Addendum, and the MDS:

- Restrictions on dredging;
- Fish consumption advisory;
- Degradation of the benthos environment
- Beach closings and body contact restrictions; and
- Loss of fish and wildlife habitat

Various assessments of the sediment from the 2014 to 2020 have found PAH, metals, PCB and dioxin/furan contamination in the sediment throughout the site. The contaminated sediment is generally found from zero to approximately two feet below the existing sediment surface.

TSCA-level sediment is located at the public boat launch with no physical barriers existing between site users and the TSCA-level contaminated sediment. Beginning construction during the 2022 field season is necessary to limit impacts to human health and to permanently address the contaminated sediments at Munger Landing for future site users.

The 50% design cost estimate for the selected remedy is approximately \$32,119,915. The MPCA and other non-federal sponsors will contribute \$11,884,369 of public and private funds to

match the requested \$20,235,546 in GLLA funds. Long-term Monitoring and Maintenance of the project after construction will be the responsibility of the MPCA.

Munger Landing is a priority site for sediment remediation in the SLR AOC. Cost-sharing discussions are ongoing between the MPCA, WDNR, and ViacomCBS for the non-federal sponsor share of the project. The proposed project is highly likely to succeed due to: (1) the potential for multiple non-federal sponsors that have successfully completed other GLRI-funded projects, (2) the employment of a proven and reliable remedial action, and (3) ongoing project permitting and design that will allow construction to commence during the 2022 field season. Successful implementation of this project will improve the sediment and water quality of the Estuary and allow for unrestricted use of Munger Landing, which is a popular public water access point in the City of Duluth. The MPCA and other non-federal sponsors are eager to move forward with the implementation of the selected remedial action at Munger Landing, pending execution of the GLLA Project Agreement.

APPENDICES

Appendix A - Remedial Investigation, 2015

Appendix B - Focused Feasibility Study, 2018

Appendix C - FFS Addendum, 2019

Appendix D - Minnesota Decision Summary, 2020

Appendix E - Site Characterization Report, 2019

Appendix F - Upland and Sediment Investigation Summary Report, 2020

Appendix G - Soil and Sediment Investigation Summary Report, 2021

Appendix H - St. Louis River Area of Concern Remedial Action Plan, 2020

Appendix I - Value Engineering Report, 2021

Appendix J - Bench Scale Treatability Study Report, 2020

Appendix K - Archeological Survey, 2020

Appendix L - Source Control Memo, 2021

Appendix M – PCB and dioxin/furan heat maps