

## **Water Quality Monitoring Proposal**

### **Water Column Mercury at Duluth Superior Harbor Dredging and Placement Sites**

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**Prepared by Matt Steiger and Joe Graham**

#### **Background**

The United States Army Corps of Engineers (USACE) is working with AOC partners on a pilot project for open water placement of dredge material to restore aquatic habitats. The 3-year pilot for placement of dredge material from Wisconsin and Minnesota is taking place in the 21<sup>st</sup> Avenue West embayment, near the state line. USACE, Minnesota, and other entities are monitoring various parameters during the pilot; however, most of these efforts are associated with physical and biological parameters. Monitoring of chemical parameters is limited and no one is looking at impacts on water column mercury concentrations.

#### **Purpose**

The purpose of this project is to evaluate water column mercury concentrations at dredging and dredge material placement sites in Duluth-Superior Harbor. This information is critical for informing decisions about open water placement of dredge material in the harbor and the selection of locations for habitat restoration for delisting beneficial use impairments (BUIs) in the St Louis River AOC. The proposed sample set will provide a measure of mercury levels associated with dredging/placement activities and will enable a comparison of mercury levels between the dredging and placement site with areas of no activity. This is important because if dredge material is used to restore habitat it must not increase mercury availability and potentially impede BUI removal for fish consumption advisories.

#### **Problem**

In 2011 USACE evaluated harbor sediments for their suitability for open water disposal. The 2011 sediment elutriate test used a detection level (DL) of 0.2 ug/L (200 ng/L) for mercury. All results were reported as < 0.2 ug/L. This detection level is not sensitive enough for evaluating compliance with water quality standards. The level of concern (standard) for mercury is 1.3 ng/L based on the wildlife criterion. The USACE detection level significantly exceeded Wisconsin's level of concern. USACE has only committed to employing silt curtains/turbidity barriers at the placement site during the first year of the pilot, which makes monitoring in 2013 important if we want to evaluate the effectiveness of the BMP for protecting water quality standards. If we find that the barrier is effective we can use these data to support a request that silt curtains be used for all phases of the pilot project.

#### **Sample Timing and Locations**

Two sample events with six sample sites are proposed for a total of 18 water samples. Dredging in Duluth-Superior Harbor will begin mid-August and last until November 2013. One sample event would be scheduled when dredging/placement operations are underway, with a second sample scheduled after placement activities and prior to removal of the silt curtain. Specific sample locations will be determined when dredging operations begin, but are proposed as:

- 1 Upstream of dredging and placement activity
- 1 Dredging site
- 1 Placement/discharge area
- 1 Downstream of dredging and placement activity
- 1 Equipment blank
- 1 Field duplicate

**Parameters**

Mercury samples will be collected using EPA method 1669 and sent to the WI State Lab of Hygiene for analysis. The following parameters will be monitored:

- Total Mercury (THg) (EPA 1631 - CVAFS)
- Methyl mercury (MeHg) (EPA 1631 – CVAFS)
- Total Suspended Solids
- Turbidity

Parameters taken in the field will include dissolved oxygen, pH, temperature, and conductivity.

**Budget**

<u>Category</u>	<u>Item</u>	<u>Unit Cost</u>	<u>Qty</u>	<u>Subtotal</u>	<u>Total</u>
Travel	Mileage (150 miles per sampling effort)	\$0.72	300	\$216	
	Meals (lunch for 2 people)	\$20	3	\$60	<b>\$384</b>
Lab	Total Mercury (THg) by CVAFS	\$105.03	12	\$1260.36	
	Methyl mercury (MeHg) by CVAFS	\$178.75	12	\$2145.00	
	Suspended Solids	\$18.80	12	\$225.60	
	Turbidity	\$10.00	12	\$120.00	
	Field Test Data Entry	\$6.36	12	\$76.32	
	<b>Sample Subtotal</b>		<b>\$318.94</b>		
Shipping	Per Sample Cooler, (FedEx or Spee Dee Delivery)	\$20	2	\$30	<b>\$60</b>
<b>TOTAL</b>					<b>\$4271.28</b>