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# DRAFT Operable Unit 1 Manistique River Area of Concern Sediment Remediation: Environmental Assessment

## National Oceanic and Atmospheric Administration

Manistique River Area of Concern
Schoolcraft County, Michigan

File No.: 761/14001.SAR
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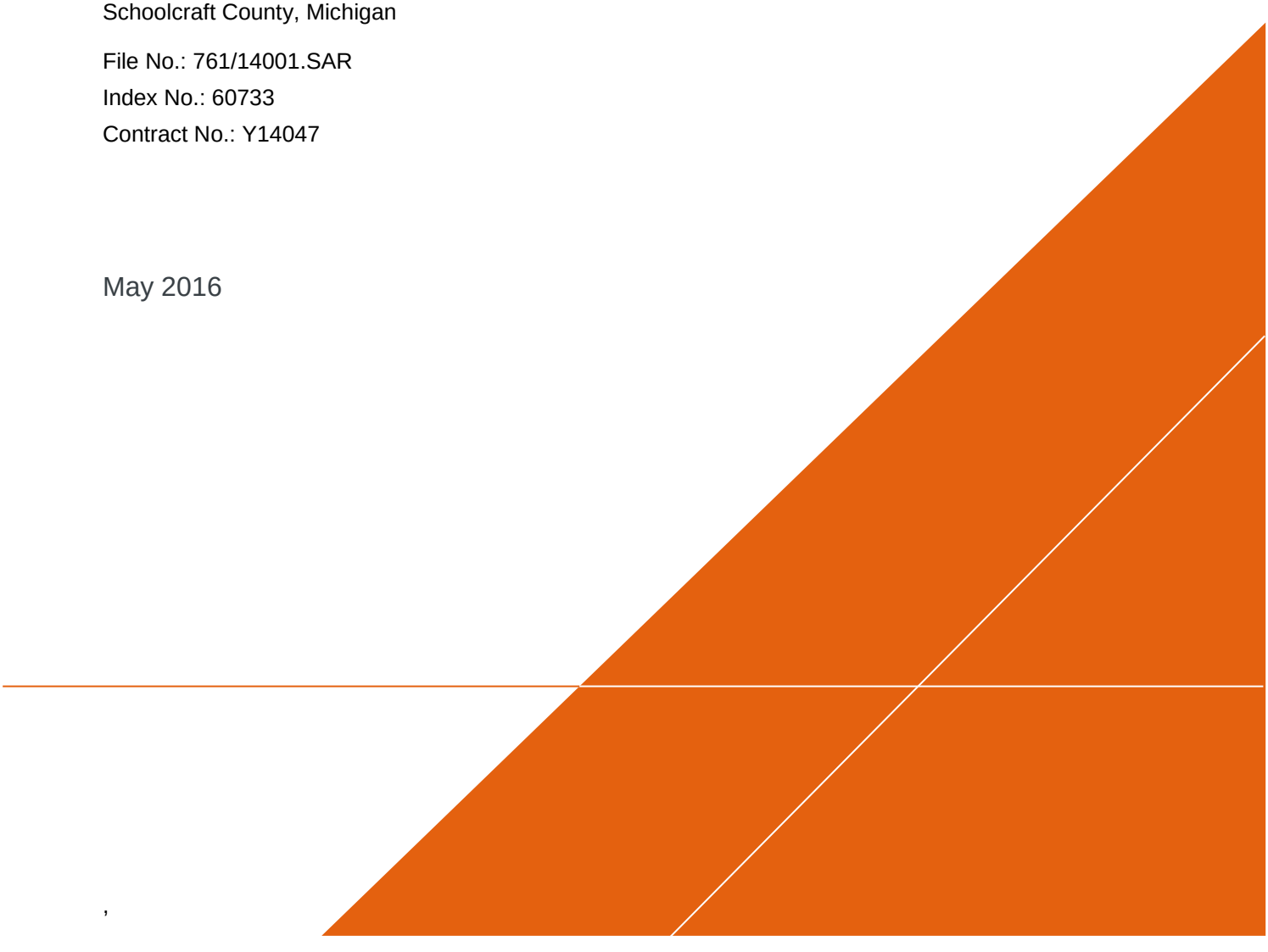

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# EXECUTIVE SUMMARY

**Project:** Operable Unit 1: Manistique River Area of Concern

**Sponsor:** National Oceanic and Atmospheric Administration (NOAA) Restoration Center and State of Michigan Department of Technology, Management and Budget

**Location:** Manistique River, Schoolcraft County, Michigan

**Proposed Action:**

The NMFS is proposing to remove approximately 5,400 cubic yards (cy) sediments containing PCBs from the Manistique River Area of Concern (AOC) which are assumed to be the cause of elevated concentrations of PCBs in fish, and which present a human health consumption risk (resulting in the fish consumption "Beneficial Use Impairment" or "BUI"). The Proposed Action will be implemented with the expectation of ultimately removing the fish consumption BUI from OU1 by removing PCB contaminated sediments with concentrations greater than 1 mg/kg.

The value of 1 mg/kg was determined based on an evaluation by the United States Protection Agency (EPA) in 2013. The evaluation by EPA identified a 0.2 milligram per kilogram (mg/kg) OU1-wide average for total PCBs in sediment as necessary for removal of the fish consumption BUI, thereby establishing a preliminary remedial goal of 0.2 mg/kg for OU1 as a surface weighted average PCB concentration. Spatial modeling predicts that a preliminary remedial action level (PRAL) of 1 mg/kg PCBs in sediment, applied as a target for remedial action, is likely to achieve this goal and ultimately result in the removal of the fish consumption BUI. (EA and Foth, 2013b).

In order to delist the Manistique River as an AOC, a Remedial Action Objective (RAO) was established for the entire site. The overall RAO for the site is to remove the Manistique River AOC BUIs. The only BUI currently applicable to OU1 is the removal of the restriction on fish consumption. The elevated concentrations of PCBs in fish, which present a human health consumption risk, are believed to be largely derived from sediments containing PCBs.

The proposed action for OU1 consists of the following components:

- Removal and disposal of sediment with polychlorinated biphenyl (PCB) concentrations greater than 1 milligram/kilogram (mg/kg);
- Placement of a 6-inch thick sand cover over sediments with residual PCBs greater than 1 mg/kg per the residuals management plan; and
- Institutional control (i.e., listing site in MiWaters database and records provided to the City of Manistique).

**Purpose and Need:**

The purpose of the OU1 proposed action is the removal of contaminated sediments within the AOC. This would allow for the removal of the Manistique River's designation as an AOC (NOAA, 2016). This will benefit various fish species and help to return the environment to a healthy state, securing a future of

fishing, boating, and other pastimes throughout the region. In addition, the proposed action is expected to have positive economic implications to the local economy (NOAA, 2016).

**Summary:**

This Draft EA has been prepared to evaluate the potential environmental impacts of the Proposed Action and its alternatives, including potential direct, indirect and cumulative environmental impacts, as required by the National Environmental Policy Act (NEPA). *See* 15 C.F.R. §§ 4321 *et seq. See also* Council on Environmental Quality regulations at 40 C.F.R § 1500 *et seq.* Two alternatives are considered in detail in this EA: 1) the Proposed Action-Dredging and Excavation with Trucked Landfill Disposal; and 2) No Action. Environmental elements analyzed under the Proposed Action and No Action Alternative include physical characteristics, water quality, air quality and noise, sediment quality, aquatic habitat and species, terrestrial habitat and species, threatened and endangered species, recreation, socioeconomics and environmental justice, historical, archaeological and cultural resources, public health and safety, coastal zone, and traffic and transportation.

Environmental Consequences

Direct and Indirect Impacts: The Proposed Action would result in minor, adverse short-term, direct and indirect construction-related environmental impacts to water quality, air quality and noise, aquatic habitat and species, terrestrial habitat and species, recreation, coastal zone, and traffic and transportation in the project area (see Chapter 5 and Table 5.1, below). While no major long-term adverse environmental impacts are expected to result from implementation of the Proposed Action, coordination and implementation of best management practices will occur to mitigate and potential impacts.

Cumulative Impacts: The potential for cumulative effects to occur was analyzed by reviewing past, present, and reasonably foreseeable future actions in the vicinity of the area associated with the Proposed Action and the No Action Alternative. Cumulative impacts can result from individually minor but collectively major actions taking place over a period of time.

No other operations or construction related to Manistique River restoration projects would be occurring near the project location within an overlapping timeframe. Noise from the existing operations associated with the City of Manistique Wastewater Treatment Plant, the marina, and general boating in the area would remain relatively the same when the proposed project activities occur. Therefore, while an increase in overall noise levels in the area would occur as a result, these impacts would be temporary (approximately three months) and short in duration and would not result in a significant, cumulative increase in the level of noise within the study area from existing uses and activities and the proposed action.

Past activities in the AOC have resulted in a beneficial impact on the aquatic environment, resulting in the removal of BUIs relative to degradation of benthos and loss of fish and wildlife habitat.

Completion of remedial activities in OU1 is expected to remove a majority of the PCB contaminated sediment (including woody debris). Areas with residual PCBs with concentrations greater than 1 mg/kg following the completion of dredging will be covered with a sand residuals cover. The Proposed Action to remove the sediments containing PCBs from the Manistique River AOC is anticipated to ultimately provide for the removal/delisting of the Fish Consumption BUI, thereby resulting in the ultimate cleanup

and restoration of the Manistique River AOC and providing overall long-term benefits to water quality and fish and wildlife resources in the project area.

**Issues to be Resolved:**

None identified.

# 1 INTRODUCTION AND PROJECT BACKGROUND

The Manistique River was designated as an Area of Concern (AOC) by the International Joint Commission, the Great Lakes National Program Office (GLNPO) and the State of Michigan, and is subject to beneficial use impairments (BUIs) under the 1987 Great Lakes Water Quality Agreement (GLWQA; as amended in 2012) due to the presence of polychlorinated biphenyls (PCBs). The GLWQA is a commitment between the United States and Canada to restore and protect the waters of the Great Lakes. The AOC is divided into seven zones, numbered Zone 1 through Zone 7. Operable Unit 1 (OU1) of the Manistique River is comprised of Zones 2, 3 and 4 of the AOC (Figure 1). The Manistique River AOC, located in Michigan's Upper Peninsula, in Schoolcraft County, is an approximate 1.7-mile stretch of the Manistique River that extends from the Manistique Papers Inc. (MPI) dam in the City of Manistique (city) to the mouth of the harbor at Lake Michigan (Figures 1 and 2).

This portion of the river has undergone significant alterations over the last century, with construction of artificial islands, building of harbor breakwaters, and construction of a damn and flume. As described in the Conceptual Site Model (CSM; EA and Foth, 2013a), the AOC has received historical discharges from industrial operations along the river, resulting in the contamination of sediments with PCBs in the river. Wood slabs and sawdust/wood chips from previous saw milling operations were discarded into the Manistique River, and much of this woody material is still located in the river.

The purpose of the program is to remediate OU1 by removing sediments containing PCBs with levels greater than 1 milligram per kilogram (mg/kg) in Zones 3 and 4. Zone 3 is the North Bay, which includes the West Bay and contains the highest detected concentration of PCBs. Zone 4 is a private marina, which is a small embayment where elevated PCBs in sediments have been detected in past studies (EA & Foth 2013). These zones (3 and 4) comprise the project's area of potential effect. Therefore, the remainder of this document focuses solely on those zones. According to the OU1 Feasibility Study (FS), remedial actions were completed by various parties, between 1993 and 2000. These actions included temporary sediment covers, environmental dredging, and offsite disposal. However, while post-remedial action monitoring indicated that the actions were successful in reducing PCB bioaccumulation in some fish, subsequent monitoring indicated that PCB concentrations in several fish species remained above Lake Michigan reference values, and that several areas with PCB-contaminated sediments continued to be potential ongoing sources of PCBs (EA & Foth 2013).

The Great Lakes Region Initiative (GLRI) was launched in 2010 to accelerate efforts to protect and restore the Great Lakes, and federal agencies use the GLRI resources and funds to strategically target the biggest threats to the Great Lakes ecosystem and to accelerate progress toward achieving long-term goals, with major focus on the following actions:

- Cleaning up Great Lakes AOCs
- Preventing and controlling invasive species
- Reducing nutrient runoff that contributes to harmful/nuisance algal blooms
- Restoring habitat to protect native species (GLRI, 2016)

The National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) is utilizing GLRI funds to study, design and clean up the Manistique River's AOCs (NOAA, 2016), and therefore, this action is subject to a review of environmental consequences in accordance with the NEPA. This Environmental Assessment (EA) has been prepared by Arcadis, on behalf of the National Oceanic and Atmospheric Administration (NOAA), under contract with the State of Michigan Department of Technology, Management, and Budget (DTMB) and the Michigan Department of Environmental Quality (MDEQ), in order to assess the potential for environmental and/or human consequences that may result from the proposed action.

# 2 PURPOSE AND NEED

**Proposed Action:** The NMFS is proposing to remove sediments containing PCBs from the Manistique River AOC which are assumed to be the cause of elevated concentrations of PCBs in fish, and which present a human health consumption risk (resulting in the fish consumption "Beneficial Use Impairment" or "BUI"). The Proposed Action will be implemented with the expectation of ultimately removing the fish consumption BUI from OU1 by removing PCB contaminated sediments with concentrations greater than 1 mg/kg.

The value of 1 mg/kg was determined based on an evaluation by EPA in 2013. The evaluation by EPA identified a 0.2 milligram per kilogram (mg/kg) OU1-wide average for total PCBs in sediment as necessary for removal of the fish consumption BUI, thereby establishing a preliminary remedial goal of 0.2 mg/kg for OU1 as a surface weighted average PCB concentration. Spatial modeling predicts that a preliminary remedial action level (PRAL) of 1 mg/kg PCBs in sediment, applied as a target for remedial action, is likely to achieve this goal and ultimately result in the removal of the fish consumption BUI. (EA and Foth, 2013b)

In order to delist the Manistique River as an AOC, a Remedial Action Objective (RAO) was established for the entire site. The overall RAO for the site is to remove the Manistique River AOC BUIs. The only BUI currently applicable to OU1 is the removal of the restriction on fish consumption. The elevated concentrations of PCBs in fish, which present a human health consumption risk, are believed to be largely derived from sediments containing PCBs.

**Purpose and Need:** The purpose of the OU1 proposed action is the removal of contaminated sediments within the AOC. This would allow for the removal of the Manistique River's designation as an AOC (NOAA, 2016). This will benefit various fish species and help to return the environment to a healthy state, securing a future of fishing, boating, and other pastimes throughout the region. In addition, the proposed action is expected to have positive economic implications to the local economy (NOAA, 2016).

# 3 SUMMARY OF OU1 FEASIBILITY STUDY

## 3.1 OU1 Feasibility Study

This section summarizes the alternatives evaluated in OU1 Part Two Feasibility Study (EA and Foth, 2013b) and documents the selection of feasible alternatives to be considered. These alternatives are evaluated for NEPA purposes in chapter 4.

### 3.1.1 Feasibility Study Alternatives Considered

This section provides a summary of the remedial alternatives that were considered in the OU1 Feasibility Study (FS) (EA and Foth, 2013b) for the proposed action. The alternatives were evaluated utilizing the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) guidance (1988). The final alternative selected was determined to be reasonable and able to meet the purpose and need of this project. The alternatives considered are summarized below.

#### 3.1.1.1 FS Alternative 1 - No Action

Under this alternative, no action would be taken at the site. Under the No Action alternative, no remediation activities and no monitoring activities would be performed within OU1. Natural recovery and source control would be relied on to reduce PCBs in sediment and fish to acceptable levels, but levels would not be monitored over time. The No Action Alternative (status quo) is used as the baseline for comparison when evaluating the impacts of the proposed action and the other alternatives considered. This alternative will be the baseline alternative for the NEPA evaluations.

#### 3.1.1.2 FS Alternative 2 – Dredging and Excavation with Trucked Landfill Disposal

Under this alternative, all sediments with concentrations greater than 1 mg/kg total PCBs would be removed via mechanical dredging and transported by truck to a permitted disposal facility. Sediments containing greater than 50 mg/kg total PCBs would be handled separately and disposed of at an approved Toxic Substances Control Act (TSCA) facility. All sediment would be dewatered and amended, as necessary, prior to transport.

#### 3.1.1.3 FS Alternative 3 – Dredging and Particle Separation with Trucked Landfill Disposal

Under this alternative, all sediments with concentrations greater than 1 mg/kg total PCBs would be removed via mechanical dredging. The sediments would be transported to a sediment processing facility where any debris and coarse-grained materials would be separated out for potential reuse. Remaining sediment would be transported by truck to a permitted disposal facility. Sediments containing greater than 50 mg/mg total PCBs would be handled separately and disposed of at an approved TSCA facility. All sediment would be dewatered and amended, as necessary, prior to transport.

#### 3.1.1.4 FS Alternative 4 – Dredging with a Combination of Barged Confined Disposal Facility (CDF) Disposal and Trucked Landfill Disposal

Under this alternative, all sediments with concentrations greater than 1 mg/kg total PCBs would be removed via mechanical dredging and placed on barges for disposal in a CDF. Sediments containing greater than 50 mg/mg total PCBs would be handled separately and disposed of at an approved TSCA facility. All sediment would be dewatered and amended, as necessary, prior to transport.

#### 3.1.1.5 FS Alternative 5 – Partial Dredging and Capping

Under this alternative, all sediments with concentrations greater than 2 mg/kg total PCBs would be removed via mechanical dredging and transported by truck to an appropriate disposal facility. Sediments containing greater than 50 mg/mg total PCBs would be handled separately and disposed of at an approved TSCA facility. All sediment would be dewatered and amended, as necessary, prior to transport. Remaining sediment with PCB concentrations greater than 1 mg/kg would be covered with a reactive cap.

### 3.1.2 Feasibility Study Screening Criteria and Conclusions

The screening criteria used in the OU1 Feasibility Study were as follows:

- Ability to achieve RAOs: This criterion refers to the ability of a remedial alternative to achieve the RAO for the site (remove the BUI).

- Compliance with permits and regulatory requirements and NEPA compatibility: This criterion evaluates an alternative's ability to meet all appropriate federal, state, and local regulations and permitting requirements and approvals. Potential regulatory authorizations and most substantive requirements are likely to be associated with waste characterization and disposal; work in open water, in navigable waters, and along shorelines; discharge of water resulting from remediation processes; state historical society and endangered species review; and completion of NEPA requirements.

- Long-term effectiveness and permanence: This criterion evaluates the adequacy of the alternative to protect human health and the environment while meeting and maintaining compliance with the RAO over the long term. This includes evaluation of the timeframe required to meet the RAO, the amount of residual contamination anticipated to be left in-place, the reliability of long-term controls, and the potential for transport of contaminated sediment following the remedial action.

- Short-term effectiveness: This criterion evaluates the risks that would be expected to arise in the short term (i.e., during construction). Potential risks to workers and the community during implementation of the alternative are considered, along with potential negative short-term environmental impacts.

- Implementability and constructability: This criterion evaluates the implementability of the alternative, including constructability, ease of implementation, availability of materials and workers, and reliability.

- Cost: This criterion considers administrative, engineering, and capital costs for each alternative, as appropriate.

- State, Stakeholder, and community acceptance: This criterion considers the extent to which a given alternative is potentially acceptable to the state, project stakeholders, and the local community. It is assumed that acceptance of this criterion will be achieved once the project partners agree on the preferred remedial alternative, and the public has an opportunity to provide feedback on the alternative.

A table summarizing the ranking of the alternatives against these screening criteria considered in the OU1 Feasibility Study is provided in Appendix A.

## 3.2 Selected Remedy

The selected remedy for OU1 consists of the following components:

- Removal and disposal of sediment with polychlorinated biphenyl (PCB) concentrations greater than 1 milligram/kilogram (mg/kg);
- Placement of a 6-inch thick sand cover over sediments with residual PCBs greater than 1 mg/kg per the residuals management plan; and
- Institutional control (i.e., listing site in MiWaters database and records provided to the City of Manistique).

FS Alternative 2 was determined to be the selected remedy from the list of FS alternatives described above for several reasons, including all sediment containing PCBs above the PRAL are removed, resulting in a higher likelihood of achieving permitting and public acceptance, relative ease of implementability, and that it is the second lowest cost alternative. As such, FS Alternative 2 has been carried forward for further evaluation and the Proposed Action for purposes of NEPA compliance.

Implementation of the Proposed Action is designed to be performance-based. The final bid documents will prescribe requirements that the contractor must meet, and the contractor will be responsible for providing the final plans for meeting all of the design requirements. As such, details regarding the removal method, final erosion control components, turbidity control components, wastewater treatment, cover placement techniques and other details are not identified in this document and will not be available until a final contractor is selected. The components of the selected remedy are described in more detail in Section 4.

# 4 ALTERNATIVES

This section provides a summary of the proposed action and the reasonable alternatives that NOAA and MDEQ have identified for evaluation under NEPA. NEPA requires that any Federal agency proposing a major action consider reasonable alternatives to the proposed action. The evaluation of alternatives under NEPA assists in ensuring that any unnecessary impacts are avoided through an assessment of alternative ways to achieve the underlying purpose of the project that may result in less environmental harm.

To warrant detailed evaluation (Section 5), an alternative must be reasonable and meet the project's Purpose and Need (Section 2). Screening criteria are used to determine whether an alternative is reasonable. The following discussion identifies the screening criteria that were used to evaluate the range of alternatives in order to identify reasonable alternative and those alternatives that are not reasonable. Alternatives that were considered during the OU1 Feasibility Study but were determined to be unreasonable, based on the application of the screening criteria, are not evaluated in detail in this EA.

## 4.1 Alternatives Eliminated from Further Consideration

Based on a review of the alternatives included in the Feasibility Study relative to the criteria identified in Section 3.2.1, the following alternative were eliminated from further consideration and evaluation of environmental consequences in this EA. The screening of these alternatives relative to the criteria in Section 3.2.1, resulted in the determination that Alternative 2 was considered to be the most feasible and therefore, was brought forward for evaluation as the Proposed Action in the EA. FS Alternatives 3 through 5 (described below in Sections 4.1.1. through 4.1.3) were eliminated from further consideration on the basis of a comparative evaluation of effectiveness, implementability, and cost.

- Alternative 3 – This alternative was eliminated due to concern associated with the volume of OU1 sediments in consideration of the cost effectiveness associated with particle separation. With smaller volumes of dredged material, the cost effectiveness of particle separation greatly decreases.
- Alternative 4 – This alternative was screened out due to the high cost and uncertainties associated with the implementability of cross-lake transport of materials.
- Alternative 5 – This alternative was screened out as leaves contaminated sediments in place, the potential for erosion of/damage to the cap, challenges associated with the permitting of a cap, and the long-term monitoring that would be required.

The main difference between these alternatives is the disposal method; FS Alternative 5 considers placement of a reactive cap. FS Alternative 2 was determined to be the most cost effective option to achieve the desired endpoint in a reasonable timeframe in consideration of implementability for the following reasons

- It had the second lowest cost of all alternatives (with no action being the lowest cost).
- It is highly implementable and targets removal and disposal of all materials exceeding 1.0 mg/kg.
- It is highly likely to receive permitting and public acceptance.

The comparative evaluation of FS alternatives is included in Appendix A.

### 4.1.1 Dredging and Particle Separation with Trucked Landfill Disposal

Under this alternative, all sediments with concentrations greater than 1 mg/kg total PCBs would be removed via mechanical dredging. The sediments would be transported to a sediment processing facility where any debris and coarse-grained materials would be separated out for potential reuse. Remaining sediment would be transported by truck to a permitted disposal facility. Sediments containing greater than 50 mg/mg total PCBs would be handled separately and disposed of at an approved TSCA facility. All sediment would be dewatered and amended, as necessary, prior to transport.

### 4.1.2 Dredging with a Combination of Barged CDF Disposal and Trucked Landfill Disposal

Under this alternative, all sediments with concentrations greater than 1 mg/kg total PCBs would be removed via mechanical dredging and placed on barges for disposal in a CDF. Sediments containing greater than 50 mg/mg total PCBs would be handled separately and disposed of at an approved TSCA facility. All sediment would be dewatered and amended, as necessary, prior to transport.

### 4.1.3 Partial Dredging and Capping

Under this alternative, all sediments with concentrations greater than 2 mg/kg total PCBs would be removed via mechanical dredging and transported by truck to an appropriate disposal facility. Sediments containing greater than 50 mg/mg total PCBs would be handled separately and disposed of at an approved TSCA facility. All sediment would be dewatered and amended, as necessary, prior to transport. Remaining sediment with PCB concentrations greater than 1 mg/kg would be covered with a reactive cap.

## 4.2 Alternatives Evaluated

### 4.2.1 No Action

Under this alternative, no action would be taken at the site. Under the No Action alternative, no remediation activities and no monitoring activities would be performed within OU1. Natural recovery and source control would be relied on to reduce PCBs in sediment and fish to acceptable levels, but levels would not be monitored over time. The No Action Alternative (status quo) is used as the baseline for comparison when evaluating the impacts of the proposed action and the other alternatives considered. This alternative will be the baseline alternative for the NEPA evaluations.

### 4.2.2 Alternative 2 – Dredging and Excavation with Trucked Landfill Disposal

Under this alternative, all sediments with concentrations greater than 1 mg/kg total PCBs would be removed and transported by truck to a permitted disposal facility. Sediments containing greater than 50 mg/kg total PCBs would be handled separately and disposed of at an approved TSCA facility. As illustrated on Figure 3, all sediment would be dewatered and amended, as necessary, prior to transport. The areas with concentrations greater than 1 mg/kg, the removal areas target depth, and potential TSCA removal areas are shown on Figures 4 through 7. The upland areas where dewatering and processing of the dredged material would occur are shown on Figure 2.

### 4.2.2.1 Project Description

The following sections detail the various elements of the proposed action.

#### *4.2.2.1.1 Sediment Removal, Transport, and Disposal*

Sediment with PCB concentrations > 1 mg/kg will be removed from the Manistique River OU1. The options associated with sediment removal include:

- Removal via hydraulic dredging
- Removal via mechanical dredging

Each zone within OU1 has been divided into smaller dredge management units (DMUs) to facilitate removal of sediments. The size of the DMUs have been determined based on site configuration and constructability considerations. Removal will target sediment with PCB concentrations greater than 1 mg/kg based on previously completed sediment core sampling. Debris removal will be completed as necessary prior to and/or during removal. Following the removal of sediments from each DMU, confirmation sediment samples will be collected, and a residuals management plan will be implemented as described in Section 4.2.2.1.2.

Sediments removed from the river bottom will be dewatered, stabilized with an additive (e.g., Portland cement, as necessary) and trucked off-site for disposal at a permitted disposal facility. Water removed from the sediments will be pre-treated and transported to the City of Manistique Wastewater Treatment Plant, where it will be further treated and discharged into the Manistique River under the plant's existing NPDES permit.

During removal, appropriate engineering controls (e.g., turbidity curtains) will be in place and water quality monitoring will be performed to mitigate potential environmental impacts. The storm water culvert between Zones 3 and 4 would be managed to prevent sediment transport between zones during remedial activities.

**Hydraulic Dredging Method**

Hydraulic dredges can include cutterhead, hydraulic auger, and pipeline plain suction. Hydraulic dredges typically have high removal rates, since they can operate continuously, unless maintenance or repairs are needed. They are typically used when the location of the processing or disposal facility is in close proximity to the project area, since dredged material is usually pumped to the facility and hydraulic dredging results in dredged material with high water content. This requires greater settling time or treatment prior to discharge. Removed material may then be stabilized via amendment (e.g., Portland cement) for transport and disposal. Hydraulic dredges generally do not work well in areas with large amounts of debris; as such materials block or clog the dredge intake.

**Mechanical Dredging Method**

Mechanical dredges can include dipper or clamshell dredges. Generally, after dredge material is mechanically excavated and placed into a receiving container or scow, water associated with the sediments is decanted (or discharged) at the site of dredging and the scow is transported from the dredge site to an off loading area for transport to a processing facility, where it is stabilized (as needed) for disposal. Stabilization typically involves the addition of an amendment (e.g., Portland cement), so that

material is “solidified,” to facilitate transport for disposal. Mechanical dredges are operationally well suited to handle debris that may be dispersed within the sediment removal areas.

**Turbidity Curtain and Sheen Control**

During implementation, the contractor would be required to install a turbidity curtain system to isolate the work area from surrounding waters. Absorbent booms will be installed as a component of the turbidity control system.

#### *4.2.2.1.2 Cover Placement and Residuals Management Plan*

As identified above, confirmation sampling will be conducted following the completion of sediment removal. If, following the first round of confirmation sampling, the SWAC within the DMU is less than 1 mg/kg, the remedial action within the DMU will be considered complete.

In instances where confirmation sampling indicates residual PCBs greater than 1 mg/kg, an additional dredge pass will be completed within the DMU (where feasible; e.g., soft sediments greater than 6 inches thick). Following the additional dredge pass, additional confirmation samples will be collected. If, following the additional dredge pass, confirmation sampling indicates the SWAC within the DMU is less than 1 mg/kg, the remedial action within the DMU will be considered complete. If the confirmation sampling indicates that the SWAC is still greater than 1 mg/kg, a second additional dredge pass will be performed (if feasible). If, after this final dredge pass, the SWAC is greater than 1 mg/kg, a 6-inch sand cover will be placed over that DMU.

In one location within OU1, sediments with PCB concentrations greater than 50 mg/kg will remain in place at a depth of 7 feet below the sediment surface due to difficulties associated with removing sediment at that depth. At this DMU, two feet of sediment will be removed, and a cover of clean sand one-foot in thickness will be placed over the sediment.

#### *4.2.2.1.3 Institutional Control*

Given the potential for PCBs to remain in place under a sand cover once the remedy is complete, this site will be included in the MDEQ database (i.e., MiWaters) maintained under the MDEQ permitting program that identifies sites with contamination. Appropriate mapping and information designating the presence of such contamination can be made available in this database and shared with other appropriate parties including the City of Manistique.

# 5 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

In accordance with NEPA, a draft EA is prepared to determine if any significant environmental consequences are likely to result from a proposed action. If the draft EA does not identify significant adverse impacts, a Finding of No Significant Impact (FONSI) will be prepared to document the decision maker's (Lead Agency) determination and to approve the proposed action. If at any time during preparation of the draft EA it appears that significant adverse impacts would result from the proposed action, the agency would halt development of the draft EA and begin preparation of an Environmental Impact Statement (EIS), in order to more thoroughly evaluate the potential adverse impacts and potential ways to reduce or mitigate those impacts.

The following definitions are used to characterize the nature of the various impacts evaluated within this EA document.

Short-term or long-term impacts. These characteristics are determined on a case-by-case basis and do not refer to any rigid time period. In general, short-term impacts are those that would occur only with respect to a particular activity or for a finite period. Long-term impacts are those that are more likely to be persistent and chronic.

Direct or indirect impacts. A direct impact is caused by a proposed action and occurs contemporaneously at or near the location of the action. An indirect impact is caused by a proposed action and might occur later in time or be farther removed in distance but still be a reasonably foreseeable outcome of the action. For example, a direct impact of erosion on a stream might include sediment-laden waters in the vicinity of the action, whereas an indirect impact of the same erosion might lead to lack of spawning and result in lowered reproduction rates of indigenous fish downstream.

Minor, moderate, or major impacts. These relative terms are used to characterize the magnitude of an impact. Minor impacts are generally those that might be perceptible but, in their context, are not amenable to measurement because of their relatively minor character. Moderate impacts are those that are more perceptible and, typically, more amenable to quantification or measurement. Major impacts are those that, in their context and due to their intensity (severity), have the potential to meet the thresholds for significance set forth in CEQ regulations (40 CFR 1508.27) and, thus, warrant heightened attention and examination for potential means for mitigation to fulfill the requirements of NEPA.

Adverse or beneficial impacts. An adverse impact is one having adverse, unfavorable, or undesirable outcomes on the man-made or natural environment. A beneficial impact is one having positive outcomes on the man-made or natural environment. A single act might result in adverse impacts on one environmental resource and beneficial impacts on another resource.

Cumulative impacts. Council on Environmental Quality (CEQ) regulations implementing NEPA define cumulative impacts as the “impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions.” (40 CFR 1508.7) Cumulative impacts can result from individually minor but collectively

significant actions taking place over a period of time within a geographic area. In addition to NEPA, NMFS must comply with other Federal statutes and requirements such as Executive Order 12866 and the Regulatory Flexibility Act. This document comprehensively analyzes the alternatives considered for all these requirements.

Sections 5.1 through 5.12 describe the affected environment and evaluate the magnitude (minor, moderate or major) of direct and indirect environmental consequences, in the short term and long term associated with various considerations of the proposed action. Section 5.13 assesses the cumulative effects of the proposed action.

## 5.1 Physical Characteristics

### 5.1.1 Affected Environment

Zone 3 (**Figure 1**) consists of North Bay and West Bay. North Bay ranges from 100 to 200 feet wide and is approximately 500 feet long. Water depths range from shallow at the northern border of the bay to approximately nine or ten feet in its center channel. West Bay is approximately 75 feet wide and 500 feet long, including the bend. Both bays are located immediately adjacent to industrial areas to the north. West Bay abuts a small forested area, and Route 2 crosses over the mouth of North Bay.

Zone 4 (**Figure 1**) consists of a 150-foot-wide, 500-foot-long bay that is currently used as a private marina. The marina is shallow, with typical water depths ranging from approximately four to five feet. The City of Manistique Wastewater Treatment Plant (WWTP) is located immediately adjacent, to the south of Zone 4. Zone 4 is connected to Zone 3 through a culvert under Route 2, just south of the bend in West Bay. Zone 4 is bordered by Route 2 to the north and by forested or open ground associated with commercial properties to the west and east (EA and Foth, 2013a).

The substrate of the river bottom consists of naturally deposited materials and disposed woody debris material overlying limestone bedrock. Woody material is abundant in the sediment and takes numerous forms, including deposits of unconsolidated fine particles, sawdust, wood chips, boards, and small branches (CH2M HILL, 2012). Zone 3 contains a wide variety of substrate types, ranging from areas containing a high percentage of gravel and sand in the northern portion of North Bay to finer-grained silts and clays in West Bay and near the connection to the river. Zone 3 contains areas dominated by larger woody debris. Zone 4 is comprised of a mix of silt and sand combined with fine-grained woody debris. (EA and Foth, 2013a).

### 5.1.2 Environmental Impacts

Completion of remedial activities in OU1 is expected to remove a majority of the PCB contaminated sediment (including wood debris present on the river bottom) from the river. Areas with residual PCBs with concentrations greater than 1 mg/kg following the completion of dredging will be covered with a sand residuals cover. Areas deepened as part of removal activities will act as a sediment sink and will naturally fill in overtime with non-contaminated sediments.

Therefore, under the Proposed Action there will be minor, short-term, adverse, direct and indirect impacts to the physical environment due to the removal and disturbance of bottom sediments as well as the ground in upland staging areas. However, there will also be minor to moderate, long-term, beneficial direct and indirect impacts to the physical environment by reducing the amount of PCB contaminated sediments and by removing woody debris from historic milling operations.

Under the no action alternative, the existing environment remains the same and no new impacts would result from the selection the no action alternative. The conditions described in Section 4.2.1 would continue.

## 5.2 Water Quality

### 5.2.1 Affected Environment

Generally, the water quality of the Manistique River system is excellent, and undisturbed, as the waters originate from surface water runoff and/or ground-fed springs. Because there are no industries or human settlements in the upper watershed, degradation of the quality of the water is minimal until the river reaches the City of Manistique. Therefore, the chemical parameters of the watershed vary from the upper to the lower portions, and from subwatershed to subwatershed. Thermal degradation results from the various dams located within the watershed. (MDNR Manistique River Assessment, 2004). OU1 is located within the lower portion of the watershed. Therefore, water quality in the Manistique River AOC is generally poor due to contamination of sediments with PCBs, as well as the presence of woody debris throughout the AOC. The designation of the AOC indicates that it contains waters in which the environmental quality is degraded and beneficial uses of the water or biota are adversely affected. The largest and most publically known pollution issue within the Manistique River watershed is the presence of PCBs and heavy metals in the lower 1.5 mile reach of the river (MDNR Manistique River Assessment, 2004).

### 5.2.2 Environmental Impacts

Monitoring will be conducted during the dredging operations to assess the effectiveness of the turbidity barriers. During debris and sediment removal activities, sediments will be resuspended and eventually resettled within the water column, which is anticipated to result in a temporary increase in particulates and PCBs in the water column in the immediate area. Turbidity controls and other BMPs (slowing dredge operations, etc.) will be used to mitigate the effects of sediment resuspension outside of the work area. During dredging operations, turbidity will be monitored at a minimum of daily at an upstream and downstream location proximal to active work being performed. If elevated turbidity readings are observed outside the work zone, corrective action measures (e.g., slowing or stopping operations, inspecting/repairing turbidity controls, etc.) will be implemented to address this issue and reduce impacts to the site. The storm water culvert between Zones 3 and 4 would be managed to prevent sediment transport between zones during remedial activities.

Cover placement will also result in an increase in (clean) water-borne particulates. In the short term, during dredging, project activities will negatively impact the water quality by potentially increasing total particulates and PCBs within the water column in the work area. Impacts outside of the work area are

expected to be minimal. Following the removal of the contaminated sediments, clean material will naturally backfill the excavated area, and the water column will be exposed to a lesser concentration of PCBs, which is anticipated to improve water quality in the long term.

Water removed from the sediments will be pre-treated and piped to the City of Manistique Wastewater Treatment Plant, where it will be discharged under the Plant's existing permit pursuant to the requirements of the Clean Water Act.

Therefore, under the Proposed Action there will be minor, short-term, adverse, direct and indirect impacts to water quality due to the resuspension of sediments containing PCBs during removal activities and the resuspension of clean sediments during cover placement. However, there will also be minor to moderate, long-term, beneficial direct and indirect impacts to water quality by reducing the amount of PCB contaminated sediments that the water column is exposed to.

Under the no action alternative, the existing environment remains the same and no new impacts would result from the selection the no action alternative. The conditions described in Section 4.2.1 would continue.

## 5.3 Air Quality & Noise

### 5.3.1 Affected Environment

Existing air quality within Schoolcraft County is considered to be good based on 2014 air trend data collected by EPA (USEPA, 2015). No sensitive air quality or noise receptors (e.g., residences, hospitals, day cares, parks) are present in the immediate area.

### 5.3.2 Environmental Impacts

Effects on air quality may arise from the generation of dust during the transport and staging of the contaminated sediments and mixing of stabilization agents. Proposed project activities have the potential to impact air quality due to emissions of criteria pollutants, odors and air toxics from the dredging process itself or from the project-related combustion sources, (i.e., carbon monoxide emissions from equipment used for the completion of project activities can increase the level of pollutants in the air and negatively impact the air quality). In order to mitigate air quality impacts, all equipment will be required to meet emissions standards, and odor and dust control measures will be implemented to control dust generated during staging and transport of contaminated sediments. Additionally, an air monitoring program will be implemented during construction activities to monitor any impacts and implement any mitigation measures, as necessary.

The increase in construction equipment in the area will cause a minor increase in overall noise levels. However, the work is being conducted adjacent to industrial properties, including the City of Manistique WWTP, and the relative increase in noise levels is expected to be minimal and temporary.

Therefore, under the Proposed Action there will be minor, short-term, adverse, direct and indirect impacts due to the noise of construction equipment and the by the emission of some airborne pollutants during the construction period.

Under the no action alternative, the existing environment remains the same and no new impacts would result from the selection the no action alternative. The conditions described in Section 4.2.1 would continue.

## 5.4 Sediment Quality

### 5.4.1 Affected Environment

Sediment sampling was conducted from 2001 through 2012 (EA and Foth, 2013a). Results of the sampling indicate that areas located within Zones 3 and 4 are comprised of sediments with PCB concentrations greater than 1mg/kg. However, a portion of sediments in the project area have been identified as hazardous, as they meet the TSCA disposal level of 50 mg/kg. A total of 5,400 cubic yards (cy) of material will be removed from Zones 3 and 4, including 550 cy of TSCA material.

### 5.4.2 Environmental Impacts

Sediments contaminated with PCBs will be removed, and all sediments identified as TSCA sediments will be removed and handled separately from other sediments removed as part of the proposed action. Resuspension controls will be in place during remedial activities in order to limit transport of the sediments out of the project area. As noted in Section 4.2, various best management practices and controls will be implemented to minimize impacts during removal of contaminated sediments. Sediment removal activities within TSCA removal areas will be performed with mobile turbidity controls. In these TSCA removal areas, the turbidity controls will be maintained closely around the perimeter of the specific removal area to limit the potential for the transport of suspended materials. As work is completed in any one TSCA removal area, suspended materials will be allowed to resettle prior to removing turbidity controls. Monitoring will also be conducted during remedial activities to document that resuspended sediments are contained within the project area. Following the completion of dredging, sediment quality in OU1 is expected to improve due to the removal of PCB-containing sediment from the river.

Therefore, under the Proposed Action there will be minor, short-term, adverse, direct and indirect impacts to sediment quality due to resuspension in the water column of contaminated sediments during construction activities. However, under the Proposed Action there will also be minor to moderate, long-term, beneficial direct and indirect impacts to the sediment quality in the area by removing PCB contaminated sediments.

Under the no action alternative, the existing environment remains the same and no new impacts would result from the selection the no action alternative. The conditions described in Section 4.2.1 would continue.

## 5.5 Aquatic Habitat and Species

### 5.5.1 Affected Environment

#### 5.5.1.1 Benthic Macroinvertebrates

In the original 1987 Remedial Action Plan (RAP), a Degradation of Benthos BUI in the Manistique River AOC was identified primarily due to the presence of deposited wood fibers and organic waste from the saw and paper mill operations, and chemical and sanitary waste from the City of Manistique (MDEQ, 2006). The State of Michigan has provided official *Guidance for Delisting Michigan's Great Lakes Areas of Concern*. Based on the criteria associated with this guidance document, in 2006 MDEQ determined that the Manistique River AOC had met the statewide restoration criteria for the Degradation of Benthos BUI. Therefore, MDEQ recommended, based on a review of data from past remediation activities and events, and input from EPA, the Manistique River Public Advisory Council (PAC), the public, and the Manistique City Council that the Degradation of Benthos BUI be removed from the list of impairments in the Manistique River AOC (MDEQ, 2006). The removal of this BUI was subsequently approved by EPA. According to the Manistique River Assessment, in the fall of 1999, staff of the Great Lakes and Environmental Assessment Section (GLEAS) of MDEQ conducted qualitative biological surveys on the Manistique River. Macroinvertebrate sampling indicated that the presence of macroinvertebrates was "acceptable" and habitat was rated "fair" to "good" (MDNR Manistique River Assessment – 2004). Generally, aquatic invertebrate survey data are minimal or lacking throughout much of the watershed and a complete inventory of the aquatic invertebrate community is needed to further document problem areas ((MDNR Manistique River Assessment, 2004). Benthic communities (if any) present in OU1 would be consistent with that of highly disturbed areas but may be limited in diversity. Based on limited data available from historic benthic assessments, no benthic macroinvertebrates were identified in Zone 3 (MDNR, 1987). Similar results would be expected in Zone 4 due to the PCB contamination and presence of woody material.

#### 5.5.1.2 Fish

Walleye, yellow perch, lake sturgeon, brook trout, lake whitefish, muskellunge, and introduced salmon species are among the many kinds of fish in the Great Lakes (NWF, 2016). Brook trout, splake, walleye, lake trout, rainbow trout, and brown trout, are known to occur in the Schoolcraft County portion of the Manistique River (MDNR, date unknown). The aquatic habitat in OU1 is of low quality due to the contaminated sediments. Fish consumption advisories are in place because of the levels of PCBs in the sediment and resulting bioaccumulation of these contaminants in fish.

### 5.5.2 Environmental Impacts

Dredging would physically remove the less mobile components of the local benthic community in the project area and potentially impact those organisms proximal to the dredge zone as sediments disturbed during dredging resettle. Dredging creates an area that would be conducive to benthic organism colonization following the removal of contaminated sediments within the affected area. Recolonization by marine fauna could occur within a relatively short period of time, but is dependent upon the availability of

nearby communities, which serve as a source of recruitment organisms. The process can be a factor of both distance and seasonality, as certain taxa only reproduce at specific times of the year. Disturbance caused by dredging may temporarily increase the level of PCBs in the water column, and cause aquatic species to relocate from the work area until the work is complete. Placement of a cover will also temporarily increase water column particulates. In addition, turbidity could increase during dredging, potentially causing ambient DO concentrations to decrease below levels required to support marine life. Such a decrease, although unlikely, if it occurred, would be expected to be short in duration and not be expected to significantly affect locations beyond the dredge area. Additionally, potential impacts would be minimized through the application of BMPs. The project activities will have minor, temporary impacts to the aquatic habitat; however, the proposed remedial activities will benefit the project area in the long term.

Therefore, under the Proposed Action there will be minor, short-term, adverse, direct and indirect impacts to aquatic habitat and species due to disturbance and adverse impacts to water quality during construction activities. However, the Proposed Action will provide minor to moderate, long-term, beneficial, direct, and indirect impacts to aquatic habitat and species by removing PCB contaminated sediments and woody debris from the aquatic environment in the project area.

Under the no action alternative, the existing environment remains the same and no new impacts would result from the selection the no action alternative. The conditions described in Section 4.2.1 would continue.

## 5.6 Terrestrial Habitat and Species

### 5.6.1 Affected Environment

The Great Lakes region is important for many species of migratory and resident birds, particularly waterfowl, birds that nest in colonies, and neotropical migrants, including bald eagle, northern harrier, common loon, double-crested cormorant, common tern, bobolink, least bittern, common merganser, and the endangered Kirtland's warbler. Many mammals live in the Great Lakes region, including the gray wolf, Canada lynx, little brown bat, beaver, moose, river otter, and coyote (NWF, 2016). The areas proposed for potential upland staging and support areas for dredging are located in a commercial/industrial area with limited wildlife habitat. These areas are nearly entirely developed and industrial facility buildings, parking areas, and paved roadways comprise the area. This leaves little in the way of natural wildlife habitat for utilization by wildlife species, although some of these areas are comprised of tree cover. Wildlife species associated with urban environments may be present in industrial/developed areas in the vicinity of the project including, but not limited to: Norway rat, raccoon, Canada goose, and American crow.

### 5.6.2 Environmental Impacts

Throughout the dredging program, the Contractor will provide upland staging and support areas for their use in performing activities associated with removal of sediments. Access to these areas may require minimal tree removal, however, it is anticipated that the Contractor will primarily use areas void of tree cover, and only use areas where trees exist if necessary. Following project completion, the upland areas will be restored to pre-project conditions, excluding replanting of any trees removed. Impacts to wildlife

individuals unable to escape or flee the path of heavy machinery could occur during project activities. However, this is not expected since it is unlikely that wildlife individuals would utilize affected areas for the duration of active work, and the industrial and developed nature of the waterways and the surrounding area provide limited natural habitat for wildlife species. Impacts are anticipated to be limited in scope and duration, and a significant disruption to species population numbers or to the balance of wildlife communities are not anticipated to occur. The short-term impacts will include the temporary loss of upland habitat; however, in the long term, the habitat will be restored and potentially enhanced by the elimination of weedy or invasive species and planting of native species during upland restoration. Impacts to wildlife are expected to be negligible.

Therefore, under the Proposed Action there will be minor, short-term, adverse, direct and indirect impacts to terrestrial habitat and species due to temporary loss of upland habitat and disturbance during construction activities.

Under the no action alternative, the existing environment remains the same and no new impacts would result from the selection the no action alternative. The conditions described in Section 4.2.1 would continue.

## 5.7 Threatened and Endangered Species

### 5.7.1 Affected Environment

According to the United States Fish and Wildlife Service (USFWS), federally-listed protected (threatened and endangered, and/or critical habitat) species in Schoolcraft County include the following:

- Canada Lynx (threatened)
- Gray Wolf (endangered)
- Northern Long-Eared Bat (threatened)
- Kirtland's Warbler (endangered)
- Piping Plover (endangered; critical habitat)
- Rufa Red Knot (threatened)
- Dwarf Lake Iris (threatened)
- Houghton's Goldenrod (threatened)
- Pitcher's Thistle (threatened)

While these species are typically found along the Great Lakes in both beach habitats or forested areas, they are widespread and are rarely found in the proposed action area.

### 5.7.2 Environmental Impacts

Proposed construction activities are not expected to have any effect on federally listed species or critical habitat in Schoolcraft County, Michigan. It is not anticipated that the aforementioned listed species would be encountered within the project area, as the project area does not provide the habitat for these species.

As such, the proposed project is anticipated to have no effect on federally listed endangered or threatened species.

The bald eagle is no longer listed under the federal Endangered Species Act; however, it is still protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. Bald eagles forage along the shoreline in the vicinity of the AOC, but are not known to nest in the immediate area (MDNR, 1987). No adverse impacts are anticipated to occur to bald eagles. Instead, it is anticipated that there may be a minor to moderate long-term benefit to bald eagles at the local population level resulting from improved aquatic habitat and increased fish prey species that would populate the uncontaminated waters of the Manistique River.

Therefore, under the Proposed Action there will be no adverse impacts to threatened and endangered species.

Under the no action alternative, the existing environment remains the same and no new impacts would result from the selection the no action alternative. The conditions described in Section 4.2.1 would continue.

## 5.8 Recreation

### 5.8.1 Affected Environment

There are no public beaches located in the Manistique River AOC. A Beach Closing BUI addressed potential bodily contact restrictions in the Manistique River due to historical direct discharges of stormwater and untreated waste from the City of Manistique's wastewater treatment plant (MDEQ, 2011). Since the introduction of the Beach Closing BUI, the City of Manistique completed the required Combined Sewer Outflow (CSO) separation projects and conducted weekly *E. coli* sampling, the results of which were consistent with the guidance criteria for removal of the BUI. The BUI was removed by EPA in 2010 (MDEQ, 2011). Recreational activities within the project area consist primarily of boating. A private marina is located in Zone 4 where boats dock and travel in and out of the area on a consistent basis.

### 5.8.2 Environmental Impacts

Dredging of the Manistique River will not occur within the USACE navigational channel and therefore, it is anticipated that recreational boating activities will not generally be impeded as a result of the project activities. The in-water dredge and associated equipment will be mobilized and demobilized to and from the dredging locations by using the navigational channel. . Some short-term interference to recreational boating could occur during dredging and transportation of dredged material to the upland placement site. However, these conflicts are expected to be an inconvenience rather than an impact to recreational activity. Dredging within Zone 4 will require removal of select docks to facilitate removal of sediments. Potential adverse effects of the Proposed Action will consist of limited access to the marina area, noise, and aesthetic effects from the sediment removal activities. Any adverse effects on the recreational use of the project area, however, are anticipated to be temporary and minor in nature.

Therefore, under the Proposed Action there will be minor, short-term, adverse, direct and indirect impacts to recreation due to limited access to the marina and minor impacts to aesthetics during construction activities.

Under the no action alternative, the existing environment remains the same and no new impacts would result from the selection the no action alternative. The conditions described in Section 4.2.1 would continue.

## 5.9 Socioeconomics and Environmental Justice

### 5.9.1 Affected Environment

According to the EPA Environmental Justice (EJ) Screening Tool, no environmental justice communities are located within a one-mile radius of the anticipated dredging areas. The population within a one-mile radius of the anticipated dredging areas, as reported by the United States Census in 2010, was 2,473 and the minority population was 346, which accounts for 14 percent of the total area population (USEPA, 2015).

### 5.9.2 Environmental Impacts

No permanent increases in population or displacement of residents or businesses within the study area are anticipated to result from the proposed project. In addition, no permanent increase in employment is expected to result from the proposed project. Therefore, this analysis focuses on temporary construction-related affects that may occur to residential populations and businesses located in close proximity to the proposed project. Jobs may be provided to the local community during the active construction period associated with the project activities. Project activities would not result in the permanent direct displacement of industries, residences, or commercial businesses nor would it result in the development of new industries, residential units or commercial space. Therefore, the proposed project is not expected to have a significant adverse impact on socioeconomic conditions. However, the impacts of removing the BUI from the project area and delisting the Manistique River AOC would have several potential long-term positive impacts. Property values along the Manistique River AOC have the potential to increase once the AOC is delisted. Additionally, once the fish consumption advisory is removed, recreational and commercial fishing and tourism in the area may increase.

Therefore, under the Proposed Action there will be no adverse impacts to socioeconomics and environmental justice communities in the area.

Under the no action alternative, the existing environment remains the same and no new impacts would result from the selection the no action alternative. The conditions described in Section 4.2.1 would continue.

## 5.10 Historical, Archaeological, and Cultural Resources

### 5.10.1 Affected Environment

The National Register of Historic Places (NRHP) was searched for properties that may be eligible for listing on the NRHP. No properties in the immediate vicinity of the project area are included in the NRHP. Additionally, available shipwrecks maps from the Michigan Underwater Preserves Council were reviewed. There are no known historic shipwrecks in the vicinity of the project area.

### 5.10.2 Environmental Impacts

The areas of disturbance within the study area do not contain any historical, architectural or archaeological significant resources. Therefore, under the Proposed Action there will be no adverse impacts to historic, archeological, or cultural resources.

Under the no action alternative, the existing environment remains the same and no new impacts would result from the selection the no action alternative. The conditions described in Section 4.2.1 would continue.

## 5.11 Public Health and Safety

### 5.11.1 Affected Environment

Fish consumption advisories are currently in place on the Manistique River as specified by the Michigan Department of Community Heath based on increased PCB levels in fish tissue The consumption advisory is in effect for nine species of fish including bluegill, carp, catfish, largemouth bass, rock bass, smallmouth bass, suckers, sunfish, and walleye. Fish contamination was identified as one of the primary impaired uses in the Manistique River AOC (MDNR, 1987). As such, there is currently a consumption advisory for fish throughout the AOC (MDEQ, 2009). According to MDEQs Stage 2 Remedial Action Plan for the Manistique River AOC (MDEQ, 2011), the fish consumption BUI will be considered restored when:

- A comparison study of fish tissue contaminant levels demonstrates that there is no statistically significant difference in fish tissue concentrations of contaminants causing fish consumption advisories in the Manistique River AOC compared to a control site.

OR, if a comparison study is not feasible because of the lack of a suitable control site:

- Trend data (if available) for fish with consumption advisories show similar trends to other appropriate Great Lakes trend sites.

### 5.11.2 Environmental Impacts

The objective of the Proposed Action is to support the criteria for restoration of the fish consumption BUI and formal delisting. Therefore, under the Proposed Action there will be no adverse impacts to public health and safety. However, it is expected that the Proposed Action will reduce the risk of PCB-related health concerns and will have long-term benefits to public health.

Under the no action alternative, the existing environment remains the same and no new impacts would result from the selection the no action alternative. The conditions described in Section 4.2.1 would continue.

## 5.12 Coastal Zone

### 5.12.1 Affected Environment

The Michigan Coastal Zone Management (CZM) Program, housed in the Office of the Great Lakes, promotes wise management of the cultural and natural resources of Michigan's Great Lakes coast. The program supports healthy and productive coastal ecosystems, resilient coastal communities, and vibrant and sustainable coastal communities.

Michigan's CZM Program was established in 1978 as a state/federal partnership with NOAA. The CZM Program focuses on three central goals:

- Improving the administration of existing state shoreline statutes (e.g. Shorelands Act, Submerged Land Act, Sand Dunes Act and Wetlands Act)
- Providing substantial technical and financial assistance to local partners for creative coastal projects
- Improving governmental coordination to reduce delays, duplication and conflicts in coastal management decision making.

The CZM Program consists of five focus areas, including public access, water quality, coastal habitat, coastal hazards and coastal community development (MDEQ, 2016).

Michigan’s coastal boundary generally extends approximately 1,000 feet inland from the ordinary high water mark. The boundary extends farther inland in some locations to encompass important coastal features such as coastal wetlands, drowned river mouths, bays, dunes and natural areas (MDEQ, 2016). The proposed project is located in the coastal zone (as defined by the Michigan Coastal Management Program). Project consistency with the goals and focus areas of the CZM Program is made a part of the USACE/MDEQ Joint Permit Application for Work in Inland Lakes and Streams, Great Lakes, Wetlands, Floodplains, Dams, High Risk Erosion Areas and Critical Dune Areas.

### 5.12.2 Environmental Impacts

In general, the proposed project would be consistent with the enforceable policies of the Michigan CZM Program. Project consistency with the CZM Program will be officially determined during review of applications for permits required for implementation of the proposed action.

Therefore, under the Proposed Action there will be a potential for minor, short-term, adverse, direct and indirect impacts to the Coastal Zone due to disturbance of the physical environment and adverse impacts to water quality during construction activities. However, the Proposed Action will provide minor to moderate, long-term, beneficial, direct and indirect benefits to the Coastal Zone by providing environmental benefits through removing PCB contaminated sediments and woody debris.

Under the no action alternative, the existing environment remains the same and no new impacts would result from the selection the no action alternative. The conditions described in Section 4.2.1 would continue.

## 5.13 Traffic and Transportation

### 5.13.1 Affected Environment

The road network within the adjacent upland area and immediately adjacent the anticipated upland support areas consists of local roads – Harbor View Drive, Traders Point Drive, and Mackinac Trail, all of which intersect West Lakeshore Drive (U.S. Highway 2) within the project area. Harbor View Drive and Traders Point Drive intersect West Lake Shore Drive opposite each other. Turning movements from Harbor View Drive and Traders Point Drive onto West Lake Shore Drive are controlled by stop signs. The immediate area is not densely developed and does not appear to contribute a significant amount of traffic to the local road network.

### 5.13.2 Environmental Impacts

Access to and from the upland support areas would be via access roads from Harbor View Drive and West Lakeshore Drive (U.S.Highway 2). The additional traffic from construction work vehicles and trucks transporting dewatered dredged material to an upland disposal site represents a very minor, temporary increase in vehicular traffic on the local road network. The same is true for trucks transporting clean cover material. This increase would be short-term in nature and the magnitude and context of the impact is not expected to be significant nor result in adverse, unavoidable impacts on traffic and the transportation network serving the project area.

Therefore, under the Proposed Action there will be minor, short-term, adverse, direct and indirect impacts to traffic and transportation due to additional traffic from construction work vehicles and trucks transporting material off-site.

Under the no action alternative, the existing environment remains the same and no new impacts would result from the selection the no action alternative. The conditions described in Section 4.2.1 would continue.

## 5.14 Summary of Environmental Impacts

A summary of environmental impacts is provided in Table 5-1.

## Table 5-1 Summary of Adverse Environmental Impacts and Measures to Reduce Impacts of the Selected Remedy

| Impact Category | Degree of Adverse Impact | | | | | | Comment |
|---|---|---|---|---|---|---|---|
| | No Action | | | Remove PCBs >1.0 mg/kg with Off-Site Disposal (inc. residuals mgmt.) | | | |
| | Major | Moderate | Minor | Major | Moderate | Minor | |
| Physical Characteristics | | | | | | X | Removal of sediments under the proposed project is expected to remove a majority of the PCB contaminated sediment, including woody debris from the project area. The removal of contaminated sediments and debris will ultimately create long-term beneficial impacts to the aquatic and human environment. Areas with residual PCBs greater than 1 mg/kg following completion of dredging will be covered with a sand cover. Areas deepened as part of removal activities will act as a sediment sink and naturally fill in over time with clean material. Impacts to the physical characteristics resulting from removal of contaminated sediments and debris would generally be positive. Therefore, only minor and temporary adverse impacts to the aquatic environment as a result of equipment presence and operations are anticipated during the removal activities. No impacts would occur under the No Action Alternative. |
| Water Quality | | | | | | X | Water quality in the Manistique River AOC is generally poor due to the contamination of sediments with PCBs as well as the presence of woody debris. Monitoring will be conducted during the dredging operations to assess the effectiveness of turbidity controls that will be in place during work activities. During debris and sediment removal activities, sediments will be resuspended and resettle within the water column, which is anticipated to result in a temporary increase in particulates and PCBs in the water column in the immediate area. Cover placement will also result in an increase in (clean) water-borne particulates. Impacts during implementation of the prosed project are expected to be minimal and temporary. Placement of a cover and natural deposition of clean material are expected to improve water quality in the long term. No impacts would occur under the No Action Alternative. |

| Impact Category | Degree of Adverse Impact | | | | | | Comment |
|---|---|---|---|---|---|---|---|
| | No Action | | | Remove PCBs >1.0 mg/kg with Off-Site Disposal (inc. residuals mgmt.) | | | |
| | Major | Moderate | Minor | Major | Moderate | Minor | |
| Air Quality and Noise | | | | | | X | Effects on air quality may arise from the generation of dust or emissions of criteria pollutants, odors and air toxics during implementation of the proposed project. To mitigate air quality impacts, all equipment will be required to meet emission standards or odor and dust control measures will be implemented along with an air monitoring program during construction activities. The increase in construction equipment in the area will cause a minor increase in overall noise levels, however work in being conducted adjacent to active industrial properties and the City of Manistique WWTP. Over impacts to air quality and noise associated with the proposed action are expected to be minimal and short term. No impacts would occur under the No Action Alternative. |
| Sediment Quality | | | | | | X | Sediments contaminated with PCBs will be removed from the project area under the proposed alternative. Resuspension controls will be in place to limit transport of sediments out of the project area during work activities. Monitoring will be conducted during remedial activities to document the impact of sediment removal activities. Following the completion of dredging, sediment quality is expected to improve in the project area due to the removal of PCB-containing sediment from the river. This would ultimately be a positive and long-term impact. Adverse impacts anticipated as a result of removal operations would be minor and temporary. No impacts would occur under the No Action Alternative. |
| Aquatic Habitat and Species | | | | | | X | The proposed action would affect benthic macroinvertebrates and fish in the project area. Dredging would physically remove the less mobile components of the local benthic community, however, the resulting “clean” surface would create an environment conducive to benthic recolonization, ultimately providing a long-term positive impact. It is anticipated that any fish would relocate from the project area. Temporary increases in water column PCB and dissolved oxygen levels may occur. The project activities will have minor, temporary adverse impacts to the aquatic habitat, however, the proposed remedial activities will benefit the project area in the long term. No impacts would occur under the No Action Alternative. |

| Impact Category | Degree of Adverse Impact | | | | | | Comment |
|---|---|---|---|---|---|---|---|
| | No Action | | | Remove PCBs >1.0 mg/kg with Off-Site Disposal (inc. residuals mgmt.) | | | |
| | Major | Moderate | Minor | Major | Moderate | Minor | |
| Terrestrial Habitat and Species | | | | | | X | Land-based areas will be used to provide upland staging and support areas for the proposed project. It is anticipated that areas already void of tree cover will be used for such purposes. It is not expected that wildlife would be significantly impacted during active work. Short-term impacts will include the temporary loss of upland habitat; however, in the long term, the habitat will be restored and potentially enhanced by the elimination of weedy or invasive species. No impacts would occur under the No Action Alternative. |
| Threatened and Endangered Species | | | | | | | Threatened and endangered (T&E) species and/or critical habitat areas are not expected to be located or encountered within the project area, as the project area does not provide the habitat for such species. As such, the proposed action as well as the No Action alternatives are anticipated to have no impacts on T&E species. |
| Recreation | | | | | | X | Short-term interference and inconvenience to recreational boating may occur during dredging and transportation of dredged material to the upland placement site. Removal in Zone 4 will require removal of select docks to facilitate removal of sediment. Potential adverse effects will consist of limited access to the marina area, noise, and aesthetic impacts. Any adverse effects on the recreational use of the project area, however, are anticipated to be temporary and minor in nature. No impacts would occur under the No Action Alternative. |
| Socioeconomics and Environmental Justice | | | | | | | No environmental justice communities are located within a one-mile radius of the anticipated dredging areas. No permanent increases in population, displacement of residents or businesses or increase in employment is expected as a result of the proposed project. Therefore, no adverse impacts to socioeconomics or environmental justice communities are anticipated as a result of the project. Temporary jobs may be provided and the impact of removing the BUI from the project area may increase recreational and commercial fishing and tourism in the area in the long term. No impacts would occur under the No Action Alternative. |
| Historical, Archaeological and Cultural Resources | | | | | | | The project area does not contain any historical, architectural or archaeological significant resources. No adverse impacts are anticipated under either alternative. |

| Impact Category | Degree of Adverse Impact | | | | | | Comment |
|---|---|---|---|---|---|---|---|
| | No Action | | | Remove PCBs >1.0 mg/kg with Off-Site Disposal (inc. residuals mgmt.) | | | |
| | Major | Moderate | Minor | Major | Moderate | Minor | |
| Public Health and Safety | | | | | | | Implementation of the proposed project is expected to result in a reduction of PCB levels in fish over time, which will reduce the risk of PCB-related health concerns and have long-term benefits to public health. Therefore, no adverse impacts are anticipated to result from the proposed removal of contaminated sediments and debris. No impacts would occur under the No Action Alternative. |
| Coastal Zone | | | | | | X | The proposed project is located within the Coastal Zone (as defined by the Michigan Coastal Management Program). The proposed project would be performed consistent with the Coastal Zone Management Program. The physical presence of the project location within the Coastal Zone lends itself to the potential for minimal adverse, but temporary impacts to the physical environment resulting from sediment and debris removal activities, including dredging and temporary resuspension of sediments. However, in the long term, this will result in an environmental benefit. The project will not impact coastal wetlands, drowned river mouths, bays, dunes and natural areas. Project consistency with the CZM Program will be determined during the permitting process. No impacts would occur under the No Action Alternative. |
| Traffic and Transportation | | | | | | X | The additional traffic from construction work vehicles and trucks transporting dewatered dredged material to an upland disposal site represents a very minor, temporary increase in vehicular traffic on the local road network. The same is true for trucks transporting clean cover material to the site. This increase would be short-term in nature and the magnitude and context of the impact is not expected to be significant nor result in adverse, unavoidable impacts on traffic and the transportation network serving the project area. No impacts would occur under the No Action Alternative. |

## 5.15 Cumulative Effects

No other operations or construction related to Manistique River restoration projects would be occurring near the project location within an overlapping timeframe. Noise from the existing operations associated with the City of Manistique Wastewater Treatment Plant, the marina, and general boating in the area would remain relatively the same when the proposed project activities occur. Therefore, while an increase in overall noise levels in the area would occur as a result, these impacts would be temporary

(approximately three months) and short in duration and would not result in a significant, cumulative increase in the level of noise within the study area from existing uses and activities and the proposed action.

Past activities in the AOC have resulted in a beneficial impact on the aquatic environment, resulting in the removal of BUIs relative to degradation of benthos and loss of fish and wildlife habitat

Completion of remedial activities in OU1 is expected to remove a majority of the PCB contaminated sediment (including wood debris). Areas with residual PCBs with concentrations greater than 1 mg/kg following the completion of dredging will be covered with a sand residuals cover. The Proposed Alternative to remove the sediments containing PCBs from the Manistique River AOC is anticipated to ultimately provide for the removal/delisting of the Fish Consumption BUI, thereby resulting in the ultimate cleanup and restoration of the Manistique River AOC. A FONSI is included as Appendix B documenting that the no significant adverse impacts have been identified as a part of the evaluation contained herein.

# 6 APPLICABLE LAWS AND REGULATIONS

The proposed work in the Manistique River AOC has been reviewed in accordance with all applicable federal, state, and local regulations and will be conducted in accordance with permits and requirements associated with the applicable laws and regulations.

## 6.1 Section 401 and Section 404 of the Clean Water Act

The Clean Water Act (CWA) governs pollution control and water quality of the nation's waterways. Section 401 of the CWA states that any federal action that includes discharge to wetlands or waters within federal jurisdiction must obtain state certification of compliance with state water quality standards. Section 401 states that individual states can review and approve, condition, or deny all federal permits or licenses that might result in a discharge to state waters, including wetlands. Section 404 of the CWA establishes a permit program administered by U.S. Army Corps of Engineers (USACE) to regulate discharge or placement of dredged or fill material into waters of the United States, including wetlands. All proposed project activities will comply with CWA requirements, including obtaining any necessary permits.

## 6.2 Endangered Species Act (ESA), 16 U.S.C. 1531 *et seq.*

The ESA requires all federal agencies, in consultation with the Departments of the Interior (U.S. Fish and Wildlife Service) and Commerce (National Marine Fisheries Service), to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species, or result in the destruction or adverse modification of the critical habitat of such species.

Federally listed endangered, threatened, and candidate species in the vicinity of the Manistique River are listed in Section 5.7.1.

## 6.3 Section 10 of the Rivers and Harbors Act

The Rivers and Harbors Act regulates all activities within navigable waterways. Section 10 of the Act prohibits unauthorized obstruction or alteration of navigable waters and designates USACE with the authority to regulate discharges of fill and other materials into such waters. Sediment dredging, capping, filling, and dewatering within waters of the United States may be necessary for the removal or confinement of PCBs in the Manistique River AOC. Significant adverse impacts from these activities are not anticipated.

## 6.4 Section 106 of the National Historic Preservation Act

Section 106 of the National Historic Preservation Act requires federal agencies, or federally funded entities, to consider the impacts of their projects or undertakings on historic properties or religiously or culturally important tribal sites. An undertaking is defined as any project, activity, or program that can result in changes in the character or use of historic properties or religiously or culturally important tribal sites located in the area of potential effects. The project, activity, or program must be under the direct or indirect jurisdiction of a federal agency, or licensed or assisted by a federal agency.

## 6.5 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act provides protection for bald and golden eagles by prohibiting, except under certain conditions, the taking, possession, and commerce of such birds. Section 668a of the Bald and Golden Eagle Protection Act authorizes the Secretary of the Interior to permit the taking, possession, and transportation of eagles upon a determination that such taking, possession, or transportation is compatible with the preservation of the bald eagle or the golden eagle. Because both bald and golden eagles are known to occur in the vicinity of the Manistique River AOC, coordination with USFWS and MDNR on the presence and potential effect on bald and golden eagles in the project area will be conducted before undertaking remediation activities.

## 6.6 Migratory Bird Treaty Act

The Migratory Bird Treaty Act implements four international treaties involving protection of migratory birds, including all marine birds. The Migratory Bird Treaty Act prohibits actions to pursue, hunt, take, capture, kill, possess, offer for sale, sell, offer to purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird or any part, nest, or egg of such bird (16 U.S. Code 703). The proposed remediation activities would not result in the taking, killing, or possession of any migratory birds.

## 6.7 National Environmental Policy Act

National Environmental Policy Act (NEPA) establishes a national environmental policy and provides a framework for environmental planning and decision-making by federal agencies. Federal agencies must conduct a complete environmental review prior to undertaking a major federal action, which will significantly affect environmental resources. Under NEPA, federal agencies are required to complete this environmental review by preparing either an environmental assessment or environmental impact statement, which assess the potential and significance of environmental impacts from alternative courses of action.

## 6.8 Toxic Substances Control Act (TSCA) - 40 C.F.R. 761

The PCB Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions establish the prohibitions and requirements for the manufacturing, processing, distribution in commerce, use, disposal, storage, and marking of PCBs and PCB items. Subpart D Section 761.61 establishes the chemical requirements for the storage and disposal of PCB remediation waste that would apply to the remediation activities to remove the PCB contamination in the Manistique River AOC. This section specifically requires that sediment dredged or excavated from waters of the United States be managed in accordance with the CWA Section 404 and Rivers and Harbors Act Section 10 permits issued by USACE. Materials containing PCB concentrations greater than 50 ppm are subject to specific disposal requirements under TSCA.

## 6.9 Resource Conservation and Recovery Act – 40 GFR 257-258, 260-270

Resource Conservation and Recovery Act (RCRA) is the principal law governing the disposal of solid and hazardous wastes. Parts 257-258 set standards for land disposal facilities for nonhazardous waste. Parts 260 through 270 regulate the transport, storage, treatment, and disposal of hazardous wastes generated by remediation activities and regulate the construction, design, monitoring, operation, and closure of hazardous waste facilities. The transport, storage, treatment, and disposal of the potentially hazardous and non-hazardous waste removed from the Manistique River AOC will be subject to these requirements.

## 6.10 National Resources and Environmental Policy Act

The Natural Resources and Environmental Protection Act is Michigan State's principal law governing the protection of the environment and natural resources of the state. The Act regulates the discharge of certain substances into the environment and the use of certain lands, waters, and other natural resources. The relevant portions of this act are described below. All remedial actions undertaken will comply with relevant provisions of this Act.

- Obtain Part 303, Wetlands Permit
- Obtain Part 323, Shorelands Protection and Management Permit
- Obtain Part 325, Great Lakes Submerged Logs Recovery Permit
- Obtain Part 327, Great Lakes Preservation Water Withdrawal permit
- Obtain Part 111, Hazardous Waste Management Permit
- Obtain Part 115, Solid Waste Management Permit
- Obtain Part 91, SESC Plan Approval – State may delegate this to the local municipality

## 6.11 Wastewater Discharge Contract

A Wastewater Discharge Contract will be entered into with the City of Manistique Wastewater Treatment Plant (WWTP). This contract will allow for discharge of treated wastewater to the WWTP for final discharge under their NPDES Permit.

## 6.12 Local and Regional Laws and Regulations

As appropriate, restoration actions will consider and comply with local plans and ordinances. Relevant local plans could include shoreline and growth management plans. Relevant ordinances could include, but not be limited to, zoning, construction, noise, and wetlands.

All required permits and approvals will be obtained prior to the start of project activities.

# 7 LIST OF PREPARERS

**Julie Sims (NOAA)**

Position: Great Lakes Regional Coordination

Education: M.S. Natural Resource Management; B.S. Environmental Biology/Zoology

Experience: 12+ years Great Lakes Restoration

Involvement: NEPA Document Preparation and Review

**Heather VanDewalker, PE (Arcadis)**

Position: Principal Engineer

Education: M.S. Environmental Engineering; B.S. Civil Engineering

Experience: 20+ years sediment feasibility study and design

Involvement: Project Manager

**Elizabeth Baker, PE (Arcadis)**

Position: Project Environmental Engineer

Education: B.S. Chemical Engineering

Experience: 10+ years sediment feasibility study and design

Involvement: Assistant Project Manager

**Richard Gilmour, AICP, PP (Arcadis)**

Position: Principal Planner

Education: MCRP City and Regional Planning; B.A. Anthropology/Sociology

Experience: 28 years NEPA Environmental Impact Statements and Environmental Assessments

Involvement: Quality Assurance/Quality Control and Environmental Review

**Tiffany Novak, ENV SP (Arcadis)**

Position: Senior Environmental Scientist

Education: M.S. Geography & Climatology; B.S. Environmental Science

Experience: 10+ years NEPA Compliance

Involvement: Impact Analyses and NEPA Document Preparation

# 8 REFERENCES

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# FIGURES

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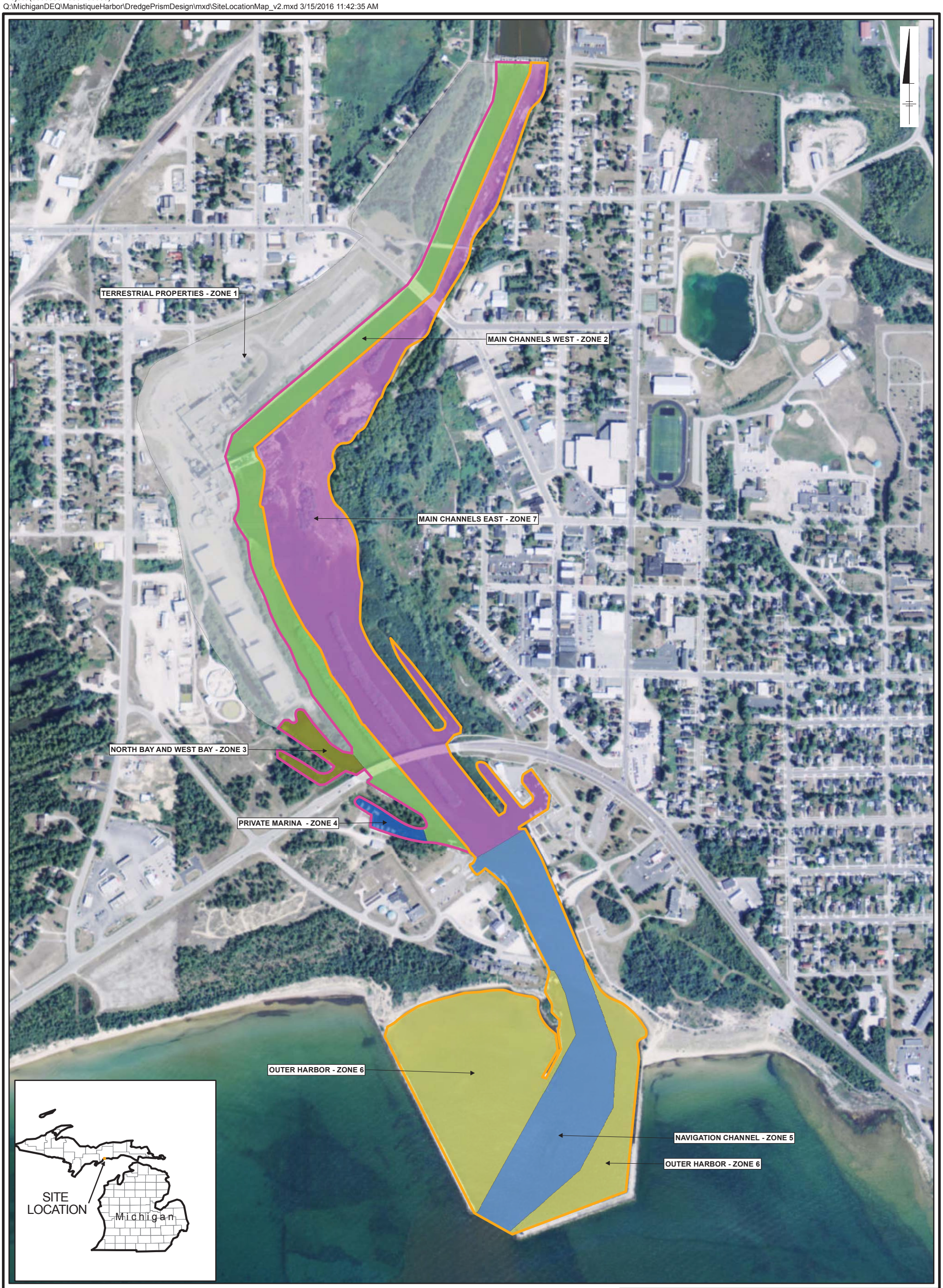


LEGEND

Zone

- TERRESTRIAL PROPERTIES - ZONE 1
- MAIN CHANNELS WEST - ZONE 2
- NORTH BAY AND WEST BAY - ZONE 3
- PRIVATE MARINA - ZONE 4
- NAVIGATION CHANNEL - ZONE 5
- OUTER HARBOR - ZONE 6
- MAIN CHANNELS EAST - ZONE 7

- OU-1
- OU-2

0 600 1,200 Feet

GRAPHIC SCALE

NOTES:

1. 2014 IMAGERY PROVIDED BY NAIP IMAGERY SERVICE LICENSED THROUGH ESRI.
2. ZONE DESGINATIONS FROM FIGURE 3-1 OF THE PART ONE FEASIBILITY STUDY FOR OPERABLE UNIT 1: ZONES 2, 3, AND 4, MANISTIQUE RIVER AREA OF CONCERN, SCHOOLCRAFT COUNTY, MICHIGAN (EA/FOTH 2013).

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MANISTIQUE RIVER AREA OF CONCERN
SCHOOLCRAFT COUNTY, MICHIGAN

# SITE LOCATION MAP

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FIGURE 1

CITY:(Reqd) DIVGROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
G:\ENVCAD\SYRACUSE\ACT\B0038001\0001\0006\BIDW\BASEMAP\380010G01.DWG LAYOUT: 2 SAVED: 2/8/2016 4:06 PM ACADVER: 19.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 2/8/2016 4:06 PM BY: SARTORI, KATHERINE
XREFS: PROJECTNAME: ----
380001X00 IMAGES: esri_siteimage_2014.jpg
380011X01


**LEGEND:**

- AREA AVAILABLE FOR CONTRACTOR USE FOR STAGING AND AREAS AND ACCESS ROADS
- VEGETATION
- PROPERTY LINE (APPROXIMATE)
- 051-700-369-00 PARCEL ID NUMBER

**NOTE:**

1. AERIAL IMAGERY SOURCE: ESRI, DIGITALGLOBE, GEOEYE, EARTHSTAR GEOGRAPHICS, CNES/AIRBUS DS, USDA, USGS, AEX, GETMAPPING, AEROGRID, IGN, IGP, SWISSTOPO, AND THE GIS USER COMMUNITY.

0 200' 400'
GRAPHIC SCALE

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
MANISTIQUE RIVER AREA OF CONCERN
SCHOOLCRAFT COUNTY, MICHIGAN

# SITE LAYOUT

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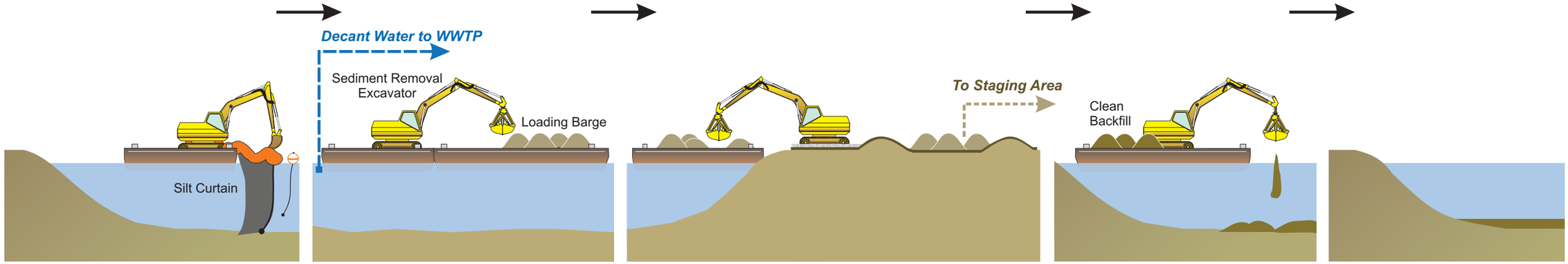
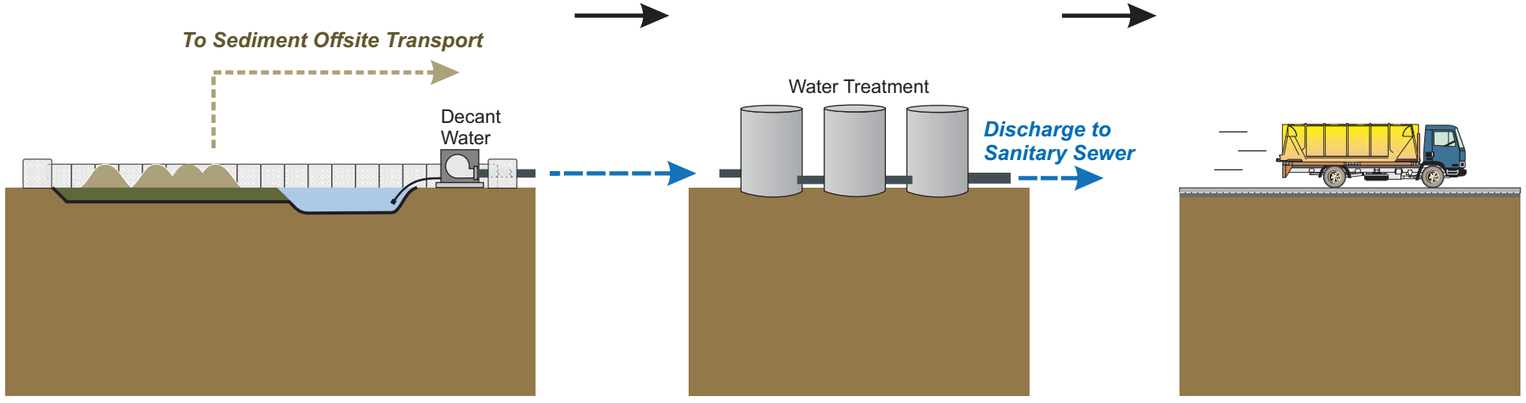
FIGURE 2

## IN-RIVER WORK




**Resuspension Controls Installation** | **Sediment Removal** | **Transfer of Sediment to Offloading/Upland Staging Area** | **Residuals Cover Placement** | **Resuspension Controls Removal**

## UPLAND STAGING AREA ACTIVITIES




**Sediment Staging Area** | **Wastewater Treatment** | **Sediment Offsite Transport and Disposal**

**Legend:**

- Water
- Sediments

**NOTE:**
Other methods for removal, dewatering, and water treatment may be used pending receipt of Contractor's Operations Plan.

**DRAFT**

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MANISTIQUE RIVER AREA OF CONCERN
SCHOOLCRAFT COUNTY, MICHIGAN

# CONCEPTUAL PROCESS FLOW DIAGRAM

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FIGURE 3

03/15/2016 SYRACUSE, DIV/GROUP: ENV/IM-DV DJHOWES
B003800\1\0001\00068\38001G02.CDR

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Manistique
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DRAFT


NOTE:

1. 2014 IMAGERY PROVIDED BY NAIP IMAGERY SERVICE LICENSED THROUGH ESRI.

LEGEND:

SAMPLE LOCATION WITH PCB > 1 MG/KG
BOTTOM DEPTH (FT)
- 0 - 1
- 1 - 2
- 2 - 3
- 3 - 4
- 4 - 5
- 5 - 6
- 6 - ≥ 7

REMOVAL AREAS
TARGET DEPTH (FT):
- 0 - 1
- 1 - 2
- 2 - 3
- 3 - 4
- 4-5
- 5 - 6
- 6 - ≥ 7
- POTENTIAL TSCA REMOVAL AREA

- SAMPLE LOCATION WITH PCB < 1 MG/KG
- SAMPLE LOCATION WITH PCB > 50 MG/KG
- PROPOSED RESUSPENSION CONTROL LOCATION

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MANISTIQUE RIVER AREA OF CONCERN
SCHOOLCRAFT COUNTY, MICHIGAN

# SAMPLE LOCATION MAP AND NEATLINE REMOVAL AREAS - ZONE 3

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FIGURE
4

DRAFT


NOTE:
1. 2014 IMAGERY PROVIDED BY NAIP IMAGERY SERVICE LICENSED THROUGH ESRI.

LEGEND:

SAMPLE LOCATION WITH PCB > 1 MG/KG
BOTTOM DEPTH (FT)
- 0 - 1
- 1 - 2
- 2 - 3
- 3 - 4

SAMPLE LOCATION WITH PCB < 1 MG/KG
SAMPLE LOCATION WITH PCB > 50 MG/KG
PROPOSED RESUSPENSION CONTROL LOCATION

REMOVAL AREAS
TARGET DEPTH (FT):
- 0 - 1
- 1 - 2
- 2 - 3
- 3 - 4

POTENTIAL TSCA REMOVAL AREA

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
MANISTIQUE RIVER AREA OF CONCERN
SCHOOLCRAFT COUNTY, MICHIGAN

# SAMPLE LOCATION MAP AND NEATLINE REMOVAL AREAS - ZONE 4

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FIGURE
5

City: SYR Div/Group: IM/DV Created By: K.Ives Last Saved By: kives
Manistique
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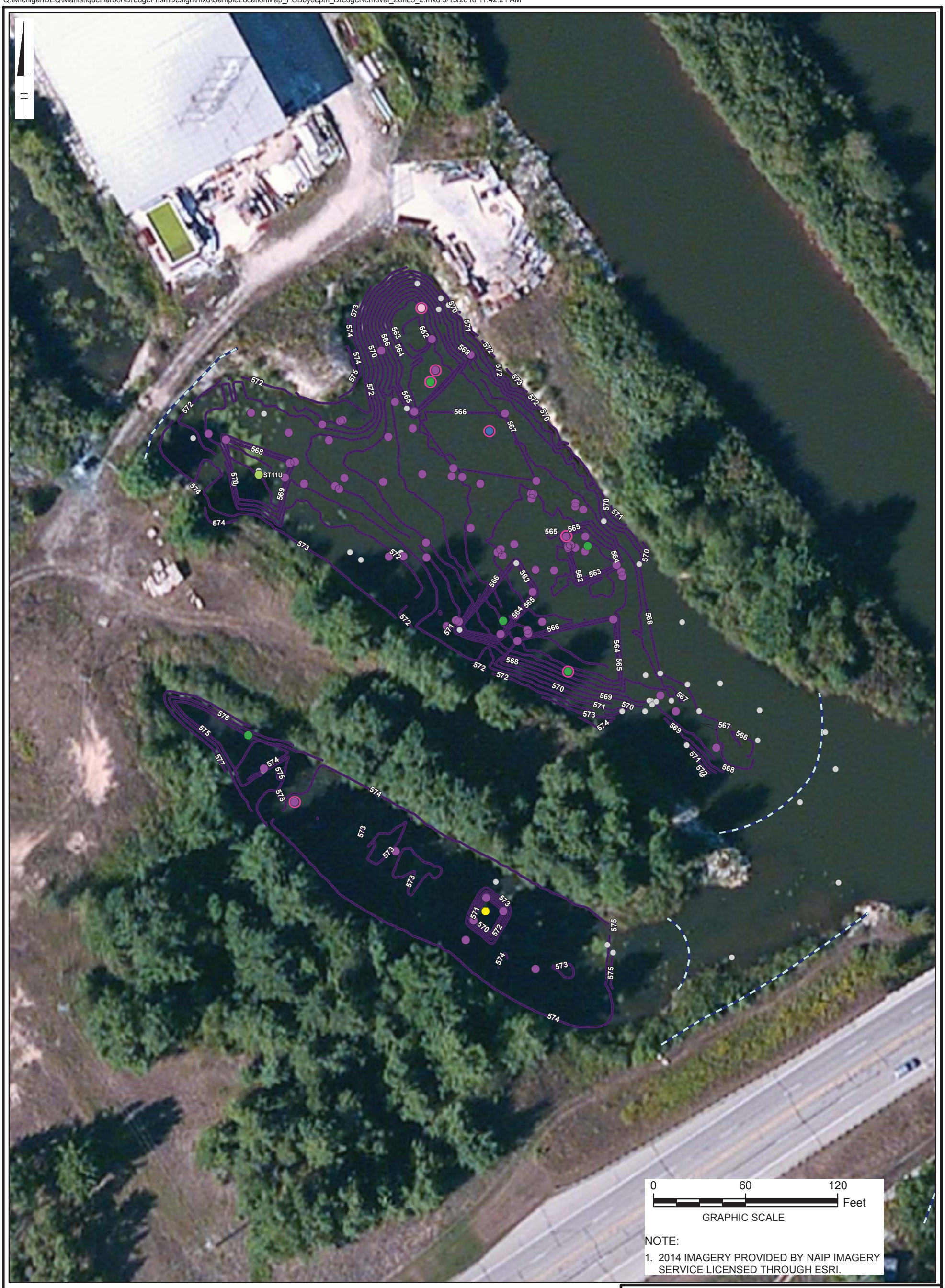


NOTE:
1. 2014 IMAGERY PROVIDED BY NAIP IMAGERY SERVICE LICENSED THROUGH ESRI.

LEGEND:
SAMPLE LOCATION WITH PCB > 1 MG/KG
BOTTOM DEPTH (FT)
- 0 - 1
- 1 - 2
- 2 - 3
- 3 - 4
- 4 - 5
- 5 - 6
- 6 - ≥ 7

- SAMPLE LOCATION WITH PCB < 1 MG/KG
- SAMPLE LOCATION WITH PCB > 50 MG/KG
- TARGET DREDGE ELEVATION (FT)
- PROPOSED RESUSPENSION CONTROL LOCATION

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
MANISTIQUE RIVER AREA OF CONCERN
SCHOOLCRAFT COUNTY, MICHIGAN

# SAMPLE LOCATION MAP AND DREDGE DEPTH LIMITS - ZONE 3

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FIGURE
6

City: SYR Div/Group: IM/DV Created By: K.Ives Last Saved By: kives
Manistique
Q:\MichiganDEQ\ManistiqueHarbor\DredgePrismDesign\mxd\SampleLocationMap_PCBbydepth_DredgeRemoval_Zone4_v2.mxd 3/15/2016 11:42:26 AM

**DRAFT**


NOTE:
1. 2014 IMAGERY PROVIDED BY NAIP IMAGERY SERVICE LICENSED THROUGH ESRI.

LEGEND:
SAMPLE LOCATION WITH PCB > 1 MG/KG
BOTTOM DEPTH (FT)
- 0 - 1
- 1 - 2
- 2 - 3
- 3 - 4

SAMPLE LOCATION WITH PCB < 1 MG/KG
SAMPLE LOCATION WITH PCB > 50 MG/KG
TARGET DREDGE ELEVATION (FT)
PROPOSED RESUSPENSION CONTROL LOCATION

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
MANISTIQUE RIVER AREA OF CONCERN
SCHOOLCRAFT COUNTY, MICHIGAN

# SAMPLE LOCATION MAP AND DREDGE DEPTH LIMITS - ZONE 4

ARCADIS Design & Consultancy for natural and built assets

FIGURE
7

# APPENDICES

# APPENDIX A

## COMPARATIVE EVALUATION OF ALTERNATIVES FROM OU1 PART TWO FEASIBILITY STUDY (EA AND FOTH, 2013B)

**Table 5-1**
**Detailed Evaluation of Remedial Alternatives for the Manistique River Area of Concern Operable Unit 1**

| Alternative* | Ability to Remove Each BUIs and Meet the RAOs and PRGs | | Compliance with Permits and Regulatory Requirements and NEPA Compatibility | | Long-Term Effectiveness and Permanence | | Short-Term Effectiveness | | Implementability and Constructability | | Cost** | | State, Stakeholder and Community Acceptance | | Ranking |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Rating | Rationale | Rating | Rationale | Rating | Rationale | Rating | Rationale | Rating | Rationale | Rating | Estimate | Rating | Rationale | |
| **Alternative 1: No Action** | 0 | Does not result in exposure concentrations consistent with a PRAL of 1 mg/kg PCB and does not limit transport to areas requiring dredging; therefore does not support removal of BUIs. | 3 | Does not require compliance, permitting, or NEPA review | 0 | Would not decrease contamination relative to current conditions, would not decrease exposure to contaminants, and would not prevent downstream transport of contaminants. | 1 | Would not create short-term impacts to human health or the environment, but would not address current risks in the short term or the long term. | 3 | No action would be highly implementable from a logistical and technical perspective as no actions would be completed. | 3 | $0 | 0 | Not acceptable because the alternative does not achieve RAOs | 10 |
| **Alternative 2: Dredging and Excavation with Trucked Landfill Disposal** | 3 | Supports removal of BUIs and meets RAOs and PRGs by removing material exceeding the 1 mg/kg PRAL. Decreases the potential for PCB transport to areas requiring dredging. | 3 | Permitting, compliance, and mitigation requirements are relatively well understood for dredging and landfill disposal and can be obtained through standard coordination. Permitting would require limited supporting studies such as site surveys. Sediment and treated water would need to be analyzed prior to disposal and discharge, respectively, to ensure compliance. Mitigation of impacts would also be required. | 3 | Long term effectiveness is probable because sediments exceeding goals are removed from the AOC by dredging and disposal. Difficulties associated with woody material may increase residuals. Residuals and potential ongoing sources pose uncertainties for long-term effectiveness; shoreline capping and dredging residuals cover help reduce this uncertainty. | 2 | Short-term impacts include worker exposure to contaminated material, increased truck traffic, and chances of accidental release during handling and transport. These can be mitigated using standard practices. Short-term negative impacts to aquatic habitats would be followed by long-term benefits of reduced contaminant levels. Onshore impacts would be restored or mitigated. Resuspension and release of material during dredging may also cause impacts, especially given that woody material complicates the dredging process; release can be mitigated by control measures, but some release may occur. | 3 | Mechanical dredging and disposal in a landfill are standard, implementable practices, although dredging in Operable Unit 1 is complicated by the presence of woody materials that may reduce dredging productivity and require specialized equipment to remove woody materials (e.g., grapple or excavator thumb) and create uncertainties regarding volume. Water treatment options, staging and dewatering areas, trucking routes, and disposal facilities are readily accessible. | 2 | $9.4M | 3 | Acceptability expected to be high based on past acceptance of dredging remedies and permittability. Potential concerns include safety during construction and disposal of material at local landfills. | 19 |
| **Alternative 3: Dredging and Particle Separation with Trucked Landfill Disposal** | 3 | Supports removal of BUIs and meets RAOs and PRGs by removing material exceeding the 1 mg/kg PRAL. Decreases the potential for PCB transport to areas requiring dredging. | 3 | Permitting, compliance, and mitigation requirements are relatively well understood for dredging and landfill disposal and can be obtained through standard coordination. Permitting would require limited supporting studies such as site surveys. Sediment and treated water would need to be analyzed prior to disposal and discharge, respectively, to ensure compliance. Coarse particles separated would need to be analyzed to assure compliance with requirements for re-use. Mitigation of impacts would also be required. | 3 | Long term effectiveness is probable because sediments exceeding goals are removed from the AOC by dredging and disposal. Difficulties associated with woody material may increase residuals. Residuals and potential ongoing sources pose uncertainties for long term effectiveness; shoreline capping and residuals cover help reduce this uncertainty. Particle size separation would not affect the long-term effectiveness. | 2 | Short term impacts are consistent with Alternative 2 above. | 1 | Mechanical dredging and disposal in a landfill are standard, implementable practices. Water treatment options, staging and dewatering areas, trucking routes, and disposal facilities are readily accessible. Hydraulic transport and sediment processing could be implementable if preceded by bench-scale testing to address whether the coarse-grained fraction must be separated from wood particles for beneficial reuse. However, given project time constraints and the time required to design this technology, this alternative is not thought to be implementable for OU1. | 0 | $13.2M | 3 | Acceptability expected to be high based on past acceptance of dredging remedies and permittability. Potential concerns include safety during construction and disposal at local landfills. | 15 |

**Table 5-1**
**Detailed Evaluation of Remedial Alternatives for the Manistique River Area of Concern Operable Unit 1**

| Alternative* | Ability to Remove Each BUIs and Meet the RAOs and PRGs | | Compliance with Permits and Regulatory Requirements and NEPA Compatibility | | Long-Term Effectiveness and Permanence | | Short-Term Effectiveness | | Implementability and Constructability | | Cost** | | State, Stakeholder and Community Acceptance | | Ranking |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Rating | Rationale | Rating | Rationale | Rating | Rationale | Rating | Rationale | Rating | Rationale | Rating | Estimate | Rating | Rationale | |
| **Alternative 4: Dredging with a Combination of Barged Confined Disposal Facility (CDF) Disposal and Trucked Landfill Disposal** | 3 | Supports removal of BUIs and meets RAOs and PRGs by removing material exceeding the 1 mg/kg PRAL. Decreases the potential for PCB transport to areas requiring dredging. | 3 | Permitting, compliance, and mitigation requirements are relatively well understood for dredging, CDF disposal, and landfill disposal, and permits and approvals can be obtained through standard coordination. Permitting would require limited supporting study such as site surveys and water transport planning. Sediment and treated water would need to be analyzed prior to disposal and discharge, respectively, to ensure compliance. Additional coordination could be required to determine conditions for CDF disposal. Mitigation of impacts would also be required. | 3 | Long term effectiveness is probable because sediments exceeding goals are removed from the AOC by dredging and disposal. Difficulties associated with woody material may increase residuals. Residuals and potential ongoing sources pose uncertainties for long term effectiveness; shoreline capping and residuals cover help reduce this uncertainty. Disposal of sediments in a CDF rather than a landfill does not affect the long-term effectiveness. | 2 | Short term impacts are consistent with Alternative 2 above, but also include risks associated with water transport of waste; these risks can largely be mitigated by standard safety practices and controls. | 2 | Mechanical dredging and disposal in a CDF are relatively standard, implementable practices. Dredging may be complicated by woody material as discussed for Alternative 2. While initial inquiries have identified a CDF as a viable option, material acceptance will depend upon results of waste characterization sampling; therefore, some uncertainty remains as to the acceptance of material by a regional CDF. Additional challenges posed by need for transfer of material between barges outside harbor and need for cross-lake transport of waste, | 1 | $10.5M | 2 | Acceptability expected to be moderate; CDF disposal is common, but potential concerns associated with potential for spills during transfer of material between barges outside harbor and with need for cross-lake transport of waste between states. | 16 |
| **Alternative 5: Partial Dredging and Capping** | 3 | Supports removal of BUIs and meets RAOs and PRGs by removing or capping material exceeding the 1 mg/kg PRAL. Decreases the potential for PCB transport to areas requiring dredging | 2 | Permitting, compliance, and mitigation requirements are relatively well understood for dredging and landfill disposal. However, requirements are less well defined for capping. Permits and approvals would require added coordination and may require mitigation for filling open waters above existing grades for capping. Permitting may require additional supporting studies associated with effectiveness of capping. In addition to requirements discussed for Alternative 2, compliance could require monitoring and maintenance associated with the cap. | 2 | Long-term effectiveness is moderately probable because sediments exceeding the PRAL are removed from the AOC or covered with a reactive cap A reactive cap is expected to reduce PCB exposure and mobility of sediments containing 1-2 mg/kg total PCBs, and potential resuspension would be reduced by limiting dredging. Uncertainty in effectiveness and permanence is associated with the limited lifespan of reactive media, cap maintenance requirements, residuals, and ongoing sources pose uncertainties for long term effectiveness. Shoreline capping, reactive capping in Zone 3, and residuals covers help reduce the uncertainty, but do not increase the permanence of the cap. | 3 | Short-term impacts to human health and the environment are similar to those for Alternative 2, except that use of a reactive cap reduces the short-term risks associated with dredging by targeting a smaller volume. Also, placement of a reactive cover may decrease PCB mobility and exposures in the short term more rapidly than dredging. | 2 | The implementability of mechanical dredging and excavation is the same as is outlined for Alternative 2. A reactive sediment cap decreases the volume to be removed, treated, and disposed of and thus reduces the magnitude of variability associated with removing a larger volume of sediment. Capping utilizes broadcast application of materials and requires specialized equipment and materials (i.e. pelletized activated carbon). Effective cap placement and function may be limited by the presence of soft sediments or boards and planks that may disrupt cap stability and continuity. Implementation of capping may also be impacted by administrative challenges regarding long-term logistics. | 2 | $8.8M | 2 | While capping has been used as part of numerous projects, acceptability Is uncertain based on lack of precedent for use of capping in similar projects within the state. | 16 |

Note: Ratings are relative and intended to facilitate comparison of alternatives. 0 = worst (for cost, highest); 3 = best (for cost, lowest).
* Alternatives 2 through 5 include dredging residuals cover and shoreline capping. For a summary of alternatives see Table 3-2.
** Costs are approximate and intended to support comparison of alternatives.
AOC = Area of Concern
BUI = Beneficial Use Impairment
CDF = Confined Disposal Facility
NEPA = National Environmental Policy Act
PCB = Polychlorinated Biphenyl
PRAL = Preliminary Remedial Action Level
PRG = Preliminary Remedial Goal
RAO = Remedial Action Objective

# APPENDIX B

## FINDING OF NO SIGNIFICANT IMPACT