ENVIRONMENTAL ASSESSMENT

MANISTIQUE RIVER SEA LAMPREY BARRIER
SECTION 1135
SCHOOLCRAFT COUNTY, MICHIGAN

U.S. ARMY CORPS OF ENGINEERS
DETROIT DISTRICT

May 2018

US Army Corps of Engineers®

Cover Page

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Authority: Section 1135 of the Water Resources Development Act (WRDA) of 1986 (P.L. 99-662), as amended by Section 304 of the WRDA of 1990 (33 U.S.C. 2309a), Project Modifications for Improvement of the Environment.

Responsible Agency: U.S. Army Corps of Engineers, Detroit District

Responsible Agency Contact: Mr. Charles A. Uhlarik, Chief, Environmental Analysis Branch, U.S. Army Corps of Engineers, 477 Michigan Avenue, Detroit, MI 48226, Attn: CELRE-PLE.

Technical Point-of-Contact: Mr. Hal Harrington, U.S. Army Corps of Engineers, 477 Michigan Avenue, Detroit, MI 48226, Attn: CELRE-PLE.

Affected Location: City of Manistique, Schoolcraft County, Michigan

Proposed Action: Construction of a sea lamprey barrier on the Manistique River in Manistique, Michigan.

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DEPARTMENT OF THE ARMY
DETROIT DISTRICT, CORPS OF ENGINEERS
477 MICHIGAN AVE.
DETROIT, MICHIGAN 48226-2550

PRELIMINARY FINDING OF NO SIGNIFICANT IMPACT
MANISTIQUE RIVER SEA LAMPREY BARRIER
SECTION 1135
SCHOOLCRAFT COUNTY, MICHIGAN

The U.S. Army Corps of Engineers, Detroit District (USACE), has prepared a Detailed Project Report and Environmental Assessment (DPR/EA), dated May2018, in accordance with the National Environmental Policy Act of 1969, as amended, and an evaluation of the effects of placing fill into the waters of the United States in accordance with Section 404(b)(1) of the Clean Water Act of 1977. The USACE assessed the environmental effects of the following proposed action of constructing a fixed crest steel sheet pile (SSP) lamprey barrier, installation of a clay berm to contain the 1% (100 year) discharge event, install four sea lamprey traps, remove an existing concrete center flume wall that no longer served a purpose and remove bedrock for project construction. The work will occur within the Manistique River in Manistique, Michigan. The purpose of the proposed action is to block sea lamprey from ideal spawning and nursery habitat. The proposed federal project in Manistique, Michigan is being conducted under Section 1135 of the Water Resources Development Act (WRDA) of 1986 (P.L. 99-662), as amended by Section 304 of the WRDA of 1990 (33 U.S.C. 2309a), Project Modifications for Improvement of the Environment.

In addition to the “no action” alternative, two action alternatives were evaluated, including the recommended plan. The recommended plan was identified as the National Environmental Restoration (NER) plan and is the environmentally-preferred alternative. All practicable means to avoid and minimize adverse environmental effects have been incorporated into the recommended plan. The recommended plan would not result in any impacts to federally-listed threatened or endangered species or their designated critical habitat, would have no impact to sites listed on or eligible for inclusion on the National Register of Historic Places, would not affect any important wildlife habitat, and would maintain floodwater conveyance through the project reach. The project will increase water depths within about 300 acres of upstream river and adjacent wetlands resulting in the change in wetland types in about 16 acres of existing wetlands. Additionally about 0.8 acres of existing wetland will be changed to upland with berm construction between the dam and the upstream railroad bridge and about 2 acres of wetland will be created from upland with the increased water levels. The State of Michigan has indicated that alteration or a change in wetland types by inundation requires mitigation or compensation under state promulgated wetland rules. Therefore, the non-Federal sponsor has proposed compensatory mitigation in the form of a conservation easement on scarce habitat located within the watershed in the state forest based on the loss of 0.8 acres of existing wetlands and the conversion of wetland types in about 16 acres of existing wetlands. The overall project results is no net loss of wetlands. The USACE is not responsible for any mitigation or compensation. The Section 404(b)(1) evaluation concludes that the proposed action is in compliance with Section 404 of the

Clean Water Act. The non-federal sponsor will obtain any necessary state permits, which will include a Section 401 water quality certification or waiver thereof. USACE has determined the proposed project will have no effect in the coastal boundary and is consistent to the maximum extent practicable with the state approved CZMA program.

Technical and economic criteria used in the formulation of alternative plans were those specified in the Water Resource Council's 1983 Economic and Environmental Principles for Water and Related Land Resources Implementation Studies. All applicable laws, executive orders, and regulations were considered in the evaluation of the alternatives. Based on the findings of the EA, Section 404(b)(1) evaluation, and evaluation of public/agency review comments received, it is my determination that the recommended plan does not constitute a major federal action that would significantly affect the quality of the human environment; therefore, preparation of an Environmental Impact Statement is not required.

_____ _____

Date

Dennis P. Sugrue
Lieutenant Colonel, U.S. Army
District Engineer

Executive Summary

This Environmental Assessment (EA) has been prepared by the U.S. Army Corps of Engineers, Detroit District (USACE), to evaluate the effects of constructing a sea lamprey (*Petromyzon marinus*) barrier near the existing Manistique Papers, Inc. (MPI) dam on the Manistique River in the City of Manistique, Schoolcraft County, Michigan. This EA has been prepared in accordance with the National Environmental Policy Act of 1969 (NEPA), Section 102(2)(C) and the Council on Environmental Quality (CEQ) "Regulations for Implementing the Procedural Provisions of NEPA," 40 Code of Federal Regulations (CFR) Parts 1500 through 1508 and the USACE, *Policy and Procedure for Implementing NEPA* (33 CFR Part 230). The objective of conducting this EA is to evaluate the magnitude of the socioeconomic and environmental impacts of the proposed action on the human environment.

The recommend alternative, a sea lamprey barrier, meets the technical definition of a dam (ER 1110-2-1156) as outlined below:

"An artificial barrier, including appurtenant works, constructed for the purpose of storage, control, or diversion of water, and which (1) is twenty-five feet or more in height from the natural bed of the stream or watercourse measured at the downstream toe of the barrier or from the lowest elevation of the outside limit of the barrier if it is not across a stream channel or watercourse, to the maximum water storage elevation or (2) has an impounding capacity at maximum water storage elevation of fifty acre-feet or more. Any such barrier which is under six feet in height regardless of storage capacity, or which has a storage capacity at maximum water storage elevation not in excess of fifteen acre-feet regardless of height is not considered a dam. This lower size limitation should be waived if there is a potentially significant downstream hazard. This definition applies whether the dam has a permanent reservoir or is a detention dam for temporary storage of floodwaters. The impounding capacity at maximum water storage elevation includes storage of floodwaters above the normal full storage elevation."

The purposed alternative has an effective height of 12 ft. when measured from the toe of structure to its crest elevation and it will impound over 250 acre-feet of water at its design elevation of 600.0 ft. NAVD88. However, the Detailed Project Report will refer to the recommended alternative as function of its purpose, which is a barrier to the upstream migration of spawning phase sea lamprey. The formulation of the recommended alternative was a risk informed process that considered the benefit to the Great Lakes Fishery and the health and safety of the citizens of the City of Manistique.

Proposed Action, Purpose and Need

The USACE is proposing construction of a steel sheet pile (SSP) sea lamprey barrier near the existing deteriorating MPI dam on the Manistique River in the City of Manistique, Schoolcraft County, Michigan (**Figures 1 and 2**). The purpose of the proposed action is to prevent spring (March through July) migration of sea lamprey to suitable and preferred spawning and larval rearing habitat located upstream of the MPI dam, and to increase sea lamprey trapping efficiency. By limiting lamprey access to viable reproduction habitat, expansion of the sea lamprey population and use of lampricides can be reduced, thus providing benefit to Lake Michigan and the Great Lakes fishery and ecosystem. This project is being developed in cooperation with the Michigan Department of Natural Resources (DNR), the U.S. Fish and Wildlife Service (USFWS), and the Great Lakes Fishery Commission (GLFC).

Historically, sea lamprey have not been able to access suitable and preferred spawning and larval rearing habitat upstream of the MPI dam; however, in recent years this dam has deteriorated to a condition that allows sea lamprey passage through fissures in bedrock at the dam and over the dam during periods of high water elevations, namely the spring sea lamprey spawning season. During their life as a parasite, a single sea lamprey kills 40 or more pounds of fish. The USFWS has been treating upstream waters with lampricides in an attempt to control sea lamprey reproduction. Treatment is costly and difficult due to the large size of the river, large area of the watershed containing suitable sea lamprey habitat, and numerous tributaries. In addition, lampricides have some negative effects on native and desirable organisms in the river. Benefits of the proposed project include reducing the length of streams within the watershed from over 275 miles to approximately 2 miles (**Figure 3**) requiring treatment and more efficient adult sea lamprey trapping for removal from the ecosystem. It is estimated that the project would be implemented in 2020, if approved.

Alternatives

Several combinations of measures and alternatives were considered during the planning process for preventing upstream movement of sea lamprey in Manistique, Michigan. A variety of locations for a barrier were considered before settling on the vicinity of the current dam. Detailed plan formulation can be found in the Detailed Project Report (DPR). Alternatives considered for detailed analysis of potential environmental impacts include:

Alternative 1: Fixed Crest Cantilevered SSP Barrier,
Alternative 2: Fixed Crest Post and Panel Barrier, and
Alternative 3: No Action.

The Recommended Alternative is Alternative 1, a fixed crest cantilevered SSP barrier. This alternative would include construction of a 360 foot long cantilevered steel sheet pile (SSP) wall approximately 17 feet downstream of the dam. The barrier wall would be constructed to a height that will provide the minimum required 1.5 foot elevation differential between the barrier crest and tailwater elevations during a 6.67% (15 year) annual chance event. The SSP barrier would extend approximately 7 feet below the river bottom into bedrock anchored in concrete and serve

as a cutoff wall to prevent lamprey escapement through the fissures in the bedrock. A walkway would extend across the entire length of the barrier and would allow USFWS personnel to access proposed lamprey traps and to remove any debris that accumulates at the barrier. Previous designs considered were to the 4% annual chance event which resulted in additional wetland conversion to uplands through berm construction north of the railroad bridge, conversion of additional acreage of wetland types and stage discharge impacts.

Both action alternatives (1 and 2) include several additional features to ensure success of the project: clearing vegetation and constructing a berm (upstream of the dam and proposed SSP barrier), removing the entire center flume wall to bedrock elevation being approximately 2,875 feet in length downstream of the dam, installing four sea lamprey traps at the dam, and bedrock excavation leading up to the traps. The proposed berm located on the west side of the river will be mainly clay with SSP tie-in at the dam and railroad bridge. It would begin at the dam and extend approximately 878 feet north (**Figures 8 and 18**) including SSP tie in walls at each end. The berm is a critical component of the project to maintain the upper pool in order to achieve the desired drop in water elevation at the barrier during rain events that the barrier is designed to function in (which prevents sea lamprey from bypassing the barrier), to prevent lamprey escapement during extreme flow events, and to prevent an increase in the floodplain for the 1% annual chance event. It must be located in the vicinity of the existing concrete wall to be effective. Berm construction will require approximately 12,000 cubic yards (CYD) of clay, 400 CYD of scour stone and 900 CYD of topsoil for construction.

The center flume wall removal would extend approximately 2,875 feet downstream of MPI dam, **Figures 2A and 19** to within 100 feet of the state designated coastal zone management boundary located about 1,300 feet downstream of the Deer Street Bridge. The center flume wall removal would eliminate the hydraulic boil at the confluence of the flume and river flows in this section of the river. Lampreys are attracted to turbulence and congregate in the area; eliminating this turbulence would promote the migration of the lamprey upstream to the barrier and the trap and sort complex. Excavation of the bedrock pathways leading to the traps at the dam would be graduated upstream toward the barrier. These pathways are intended to provide attractive flow in the area of proposed lamprey traps. The new SSP barrier would include two stoplog sections where the State of Michigan could implement a fish passage facility at their convenience. In addition, approximately 30 feet of the west and center flume walls would be temporarily removed to provide access for the construction of a temporary rock causeway located on the bedrock of the river bottomlands. The temporary causeway with three foot diameter culverts for flow continuation is needed to remove the bedrock in the dry and set the SSP barrier in concrete. The work will be completed in small segments using a trench box to dewater the work site to chisel out the bedrock to set the SSP and allow the concrete to cure. The causeway allows the construction equipment to work out of the water. It is anticipated that the temporary causeway will be constructed from the west riverbank using approximately 2,700 cubic yards (CYD) of heavy riprap with a top width of 20 feet and a base of 50 feet. The temporary construction causeway will be removed within one construction season being about 150 days starting in late May after spring runoff.

The following barrier alternatives were considered during the plan formulation process, but were not carried forward for further analysis: construction of an adjustable crest barrier, an electrical

barrier, and placement of new stoplogs between existing concrete piers of the dam. Construction of a barrier at various locations upstream and downstream of the dam was also considered; however, based on potential impacts to the floodplain and anticipated success of the barrier indicated in hydraulic modeling studies, the preferred barrier construction site is at the MPI dam. Alternatives to the proposed clay berm located upstream of the dam that were considered include: repair of the existing concrete wall, replacement of the existing concrete wall with a new concrete wall, and replacement of the existing wall with a SSP wall. Repair and / or replacement of the concrete wall or construction of an entire wall out of SSP were either not effective from an engineering standpoint or were not cost effective. Refer to EA **Section 2.2** for further discussion related to recommendation of a clay berm. The proposed project approach is engineeringly feasible, environmentally acceptable and the least costly alternative evaluated. The non-Federal sponsor will need to obtain any necessary state permits including the Section 401 water quality certification from the Michigan Department of Environmental Quality (MDEQ) prior to starting work in the waters or wetlands.

Summary of Environmental Consequences and Mitigation Measures

This EA contains a comprehensive evaluation of the existing conditions and potential environmental impacts associated with implementing the proposed action as compared to taking no action, as required by NEPA. Resources and environmental elements that could be impacted by the Recommended Alternative and other action alternatives include, but are not limited to: land use, geology and topography, water resources, air quality, natural and biological resources, cultural resources, noise, transportation and traffic, hazardous materials, and socioeconomic and environmental justice. Adverse effects on these resources are not expected to be significant.

Floodplain & Hydraulic Impacts: The proposed construction of a SSP barrier in the Manistique River requires occupancy and development in the stream and adjacent floodplain. Hydraulic analysis was conducted to evaluate existing conditions of the site, and the potential floodplain impacts of the proposed action. **Figure 10** is a Geographic Information System (GIS) enhanced composite of a 1993 aerial image and a 2012 aerial image of the upstream pool and wetland area. The blue hatching depicts the inundated water area (approximately 300 acres) from 1993 when the paper mill dam was in operation; MPI permanently opened the dam gates circa 1994.

Hydraulic studies indicate that there would be a permanent increase in low-flow and flood water levels and that the floodplain inundation upstream of the proposed barrier would be altered by the proposed action. The proposed sea lamprey barrier will raise the average water surface elevation for normal flow conditions approximately 3 feet in the pool located upstream of the paper mill dam (and approximately 3.5 under 15 to 25-year flood events), which would inundate areas that were inundated when the dam was in operation prior to 1994 as depicted in blue hatched areas on Figure 10. Almost all of this inundated area is shown as open water on USGS topographic maps of the region (**Figure 25**). Approximately 96% of the inundated area is within state-owned land; the land type is mainly wetlands/slough. These land types are similar to that which would currently be inundated during a 1% flood frequency under current conditions. The impacts to the floodplain would be minor due to the undeveloped and non-human inhabited

nature of the lands. It is estimated that approximately 16 acres of existing wetlands located upstream will change wetland type from the inundation caused by the increased water levels. A small section of fringe uplands will become wetlands with the new pool elevation.

The historic pool elevation in the slough area (during dam operations) was an average of approximately 606 feet during normal flow conditions (see orange line on Figure 10). From our existing conditions hydraulic model, the water surface elevation in the slough area is an average of 601 feet during normal flow conditions (March-June) and approximately 601.4 feet during the 99.9% event (1-year event). The proposed water surface elevations in the slough area during normal flow conditions (March-June) would be approximately 603 feet NAVD88 (see white line on Figure 10) and approximately 603.3 feet for the 99.9% event.

The proposed 1% annual chance water surface elevations are higher than the existing conditions water surface elevations upstream of the proposed barrier, but they are still lower than the effective Flood Insurance Study (FIS) elevations. The proposed project berm required to maintain the upstream pool elevation for the 6.67% design event would contain the 1% annual chance event; while this would not be a flood protection levee designed to Federal Emergency Management Agency (FEMA) standards (i.e., it would not provide the required freeboard or account for uncertainty), it would mitigate potential overland flooding upstream of the dam. Refer to Appendix B, Hydraulic Engineering Appendix of the USACE DPR for the 1% annual chance floodplain delineation from the proposed conditions hydraulic model and additional information related to the proposed conditions.

The increase in flood water levels has been mitigated through minimization measures. Actions taken to minimize the impact include locating the proposed SSP barrier in the immediate vicinity of the existing dam and minimizing the proposed barrier height to the 6.67% discharge event. Construction of a barrier at various locations upstream and downstream of the existing dam was considered. Based on the potential impacts to the area floodplain, as indicated in hydraulic modeling studies, the preferred barrier construction site is at the MPI dam because it would result in the least amount of impacts on the floodplain. The changes in flood water levels appear to include mainly upstream wetland/slough areas. The temporarily demolished west and center flume walls near the dam for construction access would be stabilized should a potential flood event occur. Upon completion of the project, the access ramp and temporary construction causeway would be removed and the west flume wall would be replaced and a stoplog structure would be constructed at the center flume wall in the SSP barrier. As discussed below, the berm design was also altered.

Wetland Effects: The preferred SSP barrier location is at the MPI dam. Due to the nature of the project, a berm needs to be located on-site near the barrier and near the river to be effective. The preferred berm location is in the vicinity of the existing concrete wall on the west side of the river based on its critical need in the project to prevent sea lamprey from bypassing the barrier during high water level events and to prevent flooding impacts. Hence, the proposed berm could not be relocated to a different site to avoided wetland impacts. Several alternatives (e.g., wall replacement vs. berm), measures (e.g., changes in berm side slope) and alignments were evaluated to minimize impacts to wetlands. Project conditions such as limited space, presence of a City of Manistique water line to the west, high costs associated with removal of the existing

concrete wall were also taken into consideration. Therefore, approximately 0.8 acres wetlands would be permanently converted to upland for the excavation and construction of an earthen berm (**Figure 18**) located between the dam and the railroad bridge.

The SSP barrier would cause the inundation of approximately 300 acres upstream of the MPI paper mill dam. Approximately 16 acres of the existing wetlands within the inundated areas would convert from forested to shrub/scrub and emergent and some emergent to submergent wetlands. A hydraulic evaluation indicated that within the inundated areas, the wetland perimeter boundary is moved landward along the floodplain creating approximately 2 acres of new wetlands. The increase in water surface elevation levels will expand and enhance wetland for numerous small mammals such as muskrats, mink, and raccoon at the wetland edge, feeding, resting and nesting habitat for waterfowl, spawning habitat for northern pike and numerous amphibians and reptiles.

The improved wetland habitat in the inundated areas plus the newly created perimeter wetlands will offset the approximate 0.8 acres of wetlands directly impacted from berm construction. The remaining wetlands in the project area would continue to provide similar levels of wetland functions (e.g., sediment trapping, habitat, and floodwater storage). Therefore, based on type and quantity of wetlands at the project site and in the vicinity, and wetland expansion and enhancements, wetland impacts are not considered significant.

Cumulative Effects: The potential for cumulative effects on the environment was evaluated by reviewing other recent, present, and foreseeable projects in the vicinity of the project sites that could affect the same environmental resources. Those projects may include: Michigan DNR and USFWS consideration for future fish passage project in Manistique, Michigan; future GLFER Sea Lamprey Barrier / Trap Projects at several locations throughout Wisconsin and Michigan; USACE dredging of the Manistique Harbor Federal Navigation Channel; and the City conducting maintenance to their utility lines. Any cumulative effects associated with these projects are expected to be insignificant. Cumulative effects on wetlands would be minor because no major construction in other wetlands in the area is known to be occurring due to economic climate and regulations restricting development of wetland areas.

The No Action Alternative would not result in a change in current conditions and therefore no significant direct or indirect impacts would immediately occur under this alternative. However, as the dam continues to deteriorate, there is expected to be an increase in upstream migration of sea lamprey, continued treatment costs to manage sea lamprey, and negative effects on the environment.

Conclusion / Recommendation

Based on the findings of this EA, implementation of the Recommended Alternative, Alternative 1 as a fixed crest SSP cantilever barrier, would not have significant adverse direct, indirect, or cumulative effects on the quality of the human or natural environment. The Recommended Alternative would meet the project's purpose and need and minimize impacts to the environment. The No Action Alternative was considered but it does not meet the project's purpose and need. This EA concludes that: 1) there are no significant cumulative or long-term

environmental effects associated with the proposed action, 2) the benefits outweigh the minor, temporary effects that may result, and 3) it does not constitute a major Federal action significantly affecting the quality of the human environment.

A Preliminary Finding of No Significant Impact (FONSI) has been prepared to accompany this EA. The preliminary FONSI concludes that implementing the Recommended Alternative does not constitute a major federal action that significantly affects the quality of the human environment and an Environmental Impact Statement (EIS), the next higher level of environmental impact investigation under NEPA, is not required for this project action. If after the public review the potential project impacts are found to be insignificant, a Finding of No Significant Impact (FONSI) document would be finalized and executed, and construction of the Recommended Alternative could proceed. If the environmental impacts are found to be significant according to criteria established in 40 CFR 1508.27, mitigation measures could be proposed to reduce impact below a level of significance, or the USACE will prepare a Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS), or choose not to proceed with the proposed action.

An evaluation according to the Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material (40 CFR, Part 230) has been prepared because there will be a discharge of fill material in waters of the U.S. associated with the proposed action. The Section 404(b)(1) Evaluation concludes with the determination that "the proposed action is in compliance with Section 404 of the Clean Water Act." The EA indicates that the discharge of fill into the Manistique River will not cause pollution or contain contaminated materials. Therefore, as part of the permit application review by the state of Michigan for the project, the required Section 401 Water Quality Certification (WQC) will be requested as part of the permit application to the MDEQ by the non-Federal sponsor. The required Section 401 WQC, or waiver thereof, would be obtained prior to any in water fill placement as part of the construction. Based on the habitat benefits to fish and wildlife from raising the water elevations in the upstream wetlands and the public interest in preventing upstream sea lamprey migration, the USACE concludes that mitigation should not be required for the conversion of some 16 acres of forested and shrub/scrub wetlands to shrub/scrub and emergent wetlands and emergent wetlands to submergent wetlands. Raising the water level will create an estimated 2 acres of additional wetland acreage from the adjacent upland property surrounding the edge Jamestown Slough located upstream of the proposed SSP barrier. The berm will result in the conversion of approximately 0.8 acres of wetland to upland for the construction of the earthen berm on the west side of the river between the dam and the railroad bridge.

DRAFT ENVIRONMENTAL ASSESSMENT

MANISTIQUE RIVER SEA LAMPREY BARRIER
SECTION 1135
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SECTION 1

Introduction

This Environmental Assessment (EA) has been prepared by the U.S. Army Corps of Engineers, Detroit District (USACE), to evaluate the effects of constructing a sea lamprey (*Petromyzon marinus*) barrier near the Manistique Papers, Inc. (MPI) dam on the Manistique River in the City of Manistique, Schoolcraft County, Michigan. This EA has been prepared in accordance with the National Environmental Policy Act of 1969 (NEPA), Section 102(2)(C) and the Council on Environmental Quality (CEQ) "Regulations for Implementing the Procedural Provisions of NEPA," 40 Code of Federal Regulations (CFR) Parts 1500 through 1508 and the USACE, *Policy and Procedure for Implementing NEPA* (33 CFR Part 230). The objective of conducting this EA is to evaluate the magnitude of the socioeconomic and environmental impacts of the project on the human environment.

If such impacts are found to be insignificant, a Finding of No Significant Impact (FONSI) document would be finalized and executed, and construction of the Recommended Alternative could proceed. If the environmental impacts are found to be significant according to criteria established in 40 CFR 1508.27, mitigation measures could be proposed to reduce impact below a level of significance, or the USACE will prepare a Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS), or choose not to proceed with the proposed action.

1.1 Project Location

The proposed project site is located near the MPI dam in the City of Manistique, Schoolcraft County, in the upper peninsula of Michigan. Manistique is located approximately 380 miles northwest of the City of Detroit, Michigan, 93 miles west of the Mackinac Bridge, and 280 miles northeast of Milwaukee, Wisconsin (**Figure 1**). The MPI dam is located approximately 2 miles upstream of Lake Michigan on the Manistique River, which runs through the middle of the City of Manistique (**Figures 1- 3**). The dam is located north of downtown Manistique. MPI (now closed) formerly owned the dam, a narrow strip of land immediately east of the dam and the land west of the dam including land occupied by the existing west concrete wall (**Figure 2B**). Land west and north of the dam is either vacant or wooded. Land to the northeast and east beyond the MPI property was formerly used for industrial purposes; this land is currently vacant and owned by the City of Manistique. There are other commercial and / or industrial uses to the northeast and residential uses to the southeast and north of the project site.

1.1.1 Site History

Dam: The now abandoned powerhouse structure (at the dam) was built in 1904 to generate power for the Manistique Light and Power Company. Eventually, this structure was abandoned, partially demolished and incorporated into the dam. The remainder of the dam was constructed by the Manistique Pulp and Paper Company during the period from 1917 to 1920. When built, the dam's primary purpose was to impound water for industrial use and electrical power

generation. The need for this water source and electrical power generation capabilities has been eliminated.

The MPI dam structure consists of 5 steel tainter gates, a log sluice (with tainter gate) and an abandoned fish ladder on the east side of the river which discharge into the natural bedrock river channel. Just west of these gates are 5 tainter gates which discharge water into the flume. To the west of these gates are 5 bays which make up the abandoned powerhouse structure. The remaining portion of the dam consisted of 3 tainter gates that discharge into the flume. The bays and most gates that discharge into the flume have been removed and replaced with fix crest weirs. Thus, gate manipulations no longer occur to regulate flows, but the dam continues to alter the flow and stage of the Manistique River. See **Figures 11 and 12** for photographs of the dam, and **Figure 24** for a plan view of the MPI dam.

Flume: The concrete center flume wall structure was also constructed by the Manistique Pulp and Paper Company during the 1917 to 1920 time period. It extends approximately 3,300 feet south from the dam to the paper mill and occupies the west portion of the natural Manistique River channel. When constructed, its primary purpose was to channel and impound water for the power generation facility at the mill located downstream of the dam. Since power generation capabilities have been eliminated, the flume's primary purpose is to convey the portion of the flow of the Manistique River which is not being passed into the natural river channel located adjacent to and just to the east of the flume.

During 1997 a 250 foot section of the center wall was cut down to allow water to spill into the natural river channel to reduce the hydrostatic load on the flume walls and to reduce the potential of flooding over the west wall into flood prone areas during high flows. In 2001 an additional 400 foot section was cut down by MPI.

West Concrete Wall: Originally there was a 500 foot concrete wall starting immediately upstream of the dam (west side of the river) and an approximately 1,300 foot earth and rock fill dike. When built, the purpose of the west wall was to impound water behind the dam along the west bank of the natural river channel. A catastrophic flooding occurred in the lower portions of the Manistique River in the spring of 1920. The earth and rock fill dike was overtopped and failed. The result was damage to private homes, businesses and industrial properties. After the 1920 flooding event, the earth and rock fill dike was replaced with the existing concrete wall (**Figure 2**). The concrete wall serves the same purpose today as when built, though it is currently in a state of disrepair (**Figures 16 and 17**).

Operating History: The Manistique Pulp and Paper Company, which later became MPI, is located 0.6 miles downstream of the dam. They discontinued wood processing in 1984, and the MPI dam was abandoned for power generation in 1988; decommissioning subsequently began. The mill continued to produce paper products from mainly recycled materials until 2014 when the company filed for bankruptcy. The dam is an aging structure, in a state of disrepair, and is no longer used for power generation. The dam has undergone partial demolition and modifications to assist in flood control and maintaining public safety. In cooperation with the U.S. Fish and Wildlife Service (USFWS), MPI has modified the dam various times since 1998 in an attempt to block sea lamprey. In 1999, all 5 bays were opened to allow water to enter the flume.

Modifications to the bays and gates in the late 1990s and early 2000s lowered the average upstream water elevations. MPI was demolishing the dam and flume wall through small increments as part of their annual maintenance budget.

1.2 Proposed Action, Purpose and Need

The USACE is proposing construction of a sea lamprey (*Petromyzon marinus*) barrier near the MPI dam on the Manistique River in the City of Manistique, Michigan (**Figures 1 and 2**). The purpose of the proposed action is to prevent spring (March through July) migration of sea lamprey to suitable and preferred spawning and larval rearing habitat located upstream of the MPI dam, and to increase sea lamprey trapping efficiency. By limiting lamprey access to preferred spawning habitat, expansion of the sea lamprey population and use of lampricides can be reduced, thus providing benefits to Lake Michigan and the Great Lakes fishery and ecosystem. Additionally, lampricide costs have escalated, and the use of integrated pest management methods, such as barriers and traps, is widely accepted as being the preferred approach. This project is being developed in cooperation with the Michigan Department of Natural Resources (DNR), the USFWS, and the Great Lakes Fishery Commission (GLFC).

Failing dams that are no longer de facto barriers are allowing for the expansion of sea lamprey access to nursery habitat, which increases sea lamprey production, and subsequently increases the requirements for sea lamprey control. In response to the increasing numbers of sea lamprey larvae found upstream of Manistique, in the fall of 1998 MPI repaired the downstream edge of the spillway below the eastern most tainter gate, which provides virtually all the flow in the spring, and added a protruding steel lip. However, the following spring the USFWS observed 60 leaks through the east side of the center flume wall, ranging from small upwellings to flowing streams with a very large leak just downstream of the M-94 Bridge. An inspection of the dam revealed that once sea lampreys penetrated the center flume wall, they could likely swim up the inclined spillways of 13 bays on the dam's west side. In 1999, at their own expense, MPI built low concrete weirs across all of the bays within the flume to prevent lamprey passage. MPI and the USFWS inspected the work and determined by dye testing that several bays had minor flows through the deteriorated concrete underneath the weirs. MPI then installed permeable geotextile secured by pea-stone gravel several feet deep in the problem bays. Most of the work was done in 1999 and some in 2000; however, these modifications have not solved the problem of sea lamprey escapement above the barrier.

The MPI dam is now failing to act as a de facto barrier to sea lamprey, despite efforts by MPI to repair the dam in cooperation with the USFWS. The USFWS has been treating upstream waters with lampricides in an attempt to control sea lamprey reproduction. Treatment is costly and difficult due to the large size of the river, large area of the watershed containing preferable sea lamprey habitat, and numerous tributaries with sea lamprey spawning habitat. In addition, at certain concentrations, lampricides can have negative effects on native and desirable organisms in the aquatic ecosystem. Benefits of the proposed project include reducing the length of stream needed to be treated with lampricide from over 275 miles to approximately 2 miles (Figure 3) and more efficient sea lamprey trapping and removal from the ecosystem.

The highest priority management action listed in the Manistique River Management Plan (circa 2005) according to the MDNR, Fisheries Division is to continue to work with MPI or new owners, the USACE, and the USFWS to develop a proposal to remove or repair the MPI dam while incorporating fish passage opportunities and maintaining an effective barrier to sea lamprey.

1.3 Project Authorization

The proposed federal project in Manistique, Michigan is being conducted under Section 1135 of the Water Resources Development Act (WRDA) of 1986 (P.L. 99-662), as amended by Section 304 of the WRDA of 1990 (33 U.S.C. 2309a), Project Modifications for Improvement of the Environment. Section 2309a states: "The Great Lakes navigation system has been instrumental in the spread of sea lamprey and the associated impacts on its fishery; and the use of the authority under this subsection for control of sea lamprey at any Great Lakes basin location is appropriate." The project is subject to the requirements of the National Environmental Policy Act of 1969 (NEPA), Section 404(b)(1) of the Clean Water Act (CWA), Section 401 of the CWA, as well as U.S. Army Engineers Regulation 1105-2-100. The State of Michigan Department of Natural Resources will be the non-federal partner for this project and the Great Lakes Fishery Commission is the cost-sharing sponsor for this project.

The proposed action would comply with the State of Michigan water quality standards and be consistent to the maximum extent practicable with the State of Michigan Coastal Zone Management program. A Section 401 (CWA) water quality certification, or waiver thereof, would be obtained from the State of Michigan prior to construction by the non-Federal sponsor in addition to any applicable state permits (See CZMA analysis Section 3.12).

1.4 Public Involvement

The NEPA process is designed to inform the public of the potential environmental consequences of the Proposed Action and involve them in the federal decision-making process. The USACE recognizes that public involvement and inter-governmental coordination and consultation are essential elements in developing an EA. Formal notification and opportunities for public participation, as well as informal coordination with government agencies and planners are incorporated into the EA process.

Agencies, organizations, and members of the public having a potential interest in the Proposed Action are invited to participate in the decision-making process. Coordination was conducted with the Michigan State Historic Preservation Office (SHPO), the U.S. Environmental Protection Agency (USEPA), the U.S. Fish and Wildlife Service (USFWS), the Great Lakes Fish Commission (GLFC), the Michigan Department of Environmental Quality (MDEQ) and the Michigan Department of Natural Resources (MDNR) in order to request information regarding the resources on and near the project site. In addition, coordination letters requesting information about traditional cultural properties or sites of particular interest near the project site were sent to various Native American tribal governments that have expressed interest in actions located in the Manistique vicinity. Section 5 provides a list of entities contacted.

An evaluation according to the Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material (40 CFR, Part 230) has been prepared because there will be a discharge of fill material into waters of the U.S. associated with the proposed action (**Attachment B to the EA**). The Section 404(b)(1) Evaluation concludes with the determination that "the proposed action is in compliance with Section 404 of the Clean Water Act."

The EA and preliminary FONSI will be available to the public for comment for a period of 30 days at the Manistique Public Library located at 100 North Cedar Street, Manistique, Michigan, 49854, the U.S. Post Office located at 301 South Cedar Street, Manistique, Michigan, 49854, and on the internet at the USACE Detroit District website. At the end of the 30-day period, the USACE will consider all comments submitted by individuals, agencies, and organizations. As appropriate, the USACE may then finalize and execute the FONSI and proceed with implementing the project's Preferred Alternative. If it is determined that implementing the Recommended Alternative would result in potentially significant impacts, mitigation measures could be proposed to reduce the impact below a level of significance, or the USACE will either publish in the Federal Register a Notice of Intent to prepare an EIS, modify the project to reduce impacts or choose not proceed with the proposed action.

SECTION 2

Description of Proposed Action & Alternatives

2.1 Alternatives

This section describes alternatives considered for sea lamprey control in Manistique, Michigan. Construction of a low-head fixed elevation sea lamprey barrier at various locations upstream and downstream of the existing dam was considered. Based on the potential impacts to the area floodplain as indicated in hydraulic modeling studies and other factors, the preferred barrier construction site is at the MPI dam. Hydraulic analyses indicates that construction at the existing dam would result in the least amount of impacts to the floodplain and provide effective sea lamprey blockage up to the 6.67% discharge event. Both action alternatives of barrier construction (1 and 2) include several additional features – clearing vegetation and constructing a berm on the west side of the river to prevent lamprey from by-passing the dam during runoff events up to the 6.67% (15 year) discharge event, removing approximately 2,875 feet of the center flume wall downstream of the dam, down to bedrock, installing four sea lamprey traps and bedrock excavation leading up to the traps – are described in more detail in Section 2.2.

Alternative 1: Fixed Crest Cantilevered Barrier
Alternative 1 consists of the construction of a cantilevered steel sheet pile (SSP) wall located approximately 17 feet from the existing sill on the downstream side of the MPI dam. The SSP would be placed in a cut-off trench formed in the bedrock at a depth of approximately 7 feet below the river bottom, which would be backfilled with concrete. The subsurface portion of the SSP would serve as a cutoff wall and prohibit escapement of lamprey through fissures in the bedrock. The proposed top of barrier elevation (600.0' NAVD88) would be about 3 feet above

the existing dam sill 597.0' to 597.7' (NAVD88). The barrier would be 360 feet long, which is the width of the river at the dam. Portions of the existing dam would be demolished to accommodate the barrier. Refer to **Figures 5-7**.

Alternative 2: Fixed Crest Post and Panel Barrier
The barrier for this alternative would consist of a steel post and panel type wall placed on top of the existing MPI dam sill (refer to Appendix A, Engineering Appendix of the USACE DPR for figures and additional information). Steel and precast concrete panels were each considered with steel being the more cost effective choice. This alternative would require a small amount of concrete pier removal. Grouting of the bedrock fissures for a distance of approximately 10 feet downstream of the barrier would be required in an effort to prevent escapement of the lamprey through the fissures.

Alternative 3: No Action
Under the "No Action" alternative there would not be a project in Manistique for sea lamprey control. There would be no attempt to modify the dam or address the fissures in the bedrock to prevent lamprey from migrating upstream. Sea lamprey would continue to breach the MPI dam, move upstream and spawn throughout the Manistique River watershed. The numbers of sea lamprey that are able to breach could increase if the dam is removed or deteriorates to the point that it no longer provides any effective barrier to fish passage. The USFWS would continue to treat the entire river with lampricides, with economic and ecosystem consequences. The GLFC through the use of the USFWS may continue to trap lamprey and implement male lamprey sterilization. The Manistique River would continue to be a major contributor to the Great Lakes sea lamprey population and continue to impede the restoration of Lake Michigan and the Great Lakes fishery.

2.2 Description of the Proposed Action and Recommended Alternative

The proposed action would involve implementing one of the action alternatives. For all three alternatives the existing dam structure (see **Figures 2, 11 and 12**) would remain in place. For Alternatives 1 and 2 (action alternatives), a low-head fixed elevation sea lamprey barrier would be constructed at the MPI dam. The difference in location between the two action alternatives would vary from approximately 17 feet downstream of the existing dam sill (Alternative 1) to on top of the existing MPI sill (Alternative 2). The barrier would be attached to the existing east and west flume walls or dam abutments. Project work for both alternatives would involve some dam modifications to install the barrier, depending on which alternative is selected; however, no major changes to the dam are proposed. Gates on the MPI dam would remain open or may be removed (**Figures 11 and 12**). If gates are dismantled all materials would be removed from the site and properly disposed. Steel materials, demolished concrete (including the center flume wall), soils (related to berm construction), and other debris would be appropriately disposed of in accordance with applicable laws and regulations. Recycling of materials would be encouraged. Clean material (e.g., concrete or soils) may be reused as appropriate during project construction or offsite when consistent with applicable environmental regulations. Construction material for both action alternatives would vary slightly (but both involve concrete and steel). The SSP

barrier is anchored into the bedrock with concrete. The barrier footprint and height would be very similar for both action alternatives. The design criterion is to maintain at least a 1.5 foot of drop between the crest of the barrier and tail water elevation at the 6.67% (15-year) annual chance event. During rare flood events (e.g., 1% [100-year] annual chance event) velocity of water traveling downstream in the Manistique River would help prevent sea lamprey from passing the barrier. It is anticipated that a temporary rock construction causeway with culverts to pass flows would be used during the project construction and the immediate work area would be dewatered using a trench box to work in the dry. Both action alternatives would include:

- Construction of a steel walkway across the barrier and work platforms with hoists at four locations along the barrier to provide access for operations and maintenance of the permanent sea lamprey traps, as well as to allow for the use of temporary traps.
- Construction of two removable stoplog sections within the new barrier where the State of Michigan could implement fish passage on both the natural and flume portions of the river at their convenience.
- Construction of four permanent sea lamprey traps (each approximately 10' x 10'), including excavation of bedrock at the dam for placement of the traps, and excavation of bedrock leading up to the traps to form attractant flow for the lamprey (**Figures 5-6**).
- Permanent removal of approximately 2,875 feet of the center flume wall, down to the bedrock, starting downstream of the dam and extending to within 100 feet of the state designated coastal management boundary (**Figure 2A**). The flume wall removal would eliminate the hydraulic boil at the confluence of the flume and river flows in this section of the river. Lampreys are attracted to turbulence and congregate in the area; eliminating this turbulence would promote the migration of the lamprey upstream to the barrier and increase efficiency of the trap and sort complex. A portion of the flume wall was modified by MPI in past years.
- Temporary removal of approximate 30 feet of the west flume wall at the dam to provide construction of a temporary stone rock causeway into the water, for construction equipment access.
- Removal of approximately 30 feet of the center flume wall at the dam to allow access for causeway construction for equipment access. A stoplog structure would be constructed at the center flume wall.
- Some fissures and voids in the bedrock substrate located downstream of the dam may be sealed with concrete.
- The proposed project requires the construction of a clay berm, which will maintain the pool elevation needed for the project to function as designed during a 6.67% discharge (15-year) flood event (**Figures 8 and 9**). The berm will extend approximately 878 feet north starting at the dam going to the railroad bridge on the west side of the river. The berm needs to be located near the proposed sea lamprey barrier and near the river to be effective. The preferred berm location is in the vicinity of the existing concrete wall to prevent sea lamprey from bypassing the barrier during high water level events. Starting at the dam and proceeding to the railroad, the berm shall be located west of the existing concrete wall (see **Figure 18**). With the reduction of protection up to the 6.67% discharge event to reduce potential impacts from flooding instead of the 4% (25 year) discharge event, a berm is no longer required north of the railroad bridge. It is anticipated that the berm would tie into the dam and railroad bridge abutment with SSP. For the purpose of this evaluation, the

assumed design would include a clay berm and vegetation clearing around the new berm to occupy less than 1.8 acres (based on an approximately 878' x 90' area to be cleared). The proposed berm would have a side slope of 2.5H:1V (2.5 horizontal to 1 vertical), and be approximately 10' wide at the top and approximately 60' wide at the base. Vegetation on approximately 15' of each side of the berm would be restricted to grasses (non-woody). Final design may result in a smaller footprint, but it is not anticipated to be any wider. The proposed berm must conform to USACE guidelines. Fill material for berm construction will be obtained from a commercial quarry.

The recommended alternative is Alternative 1, construction of a fixed crest cantilevered SSP barrier designed to the 6.67% discharge event. This design is engineeringly feasible, environmentally acceptable and the least costly alternative evaluated.

2.3 Additional Discussion on Alternative Considerations

2.3.1 Barrier

Adjustable crest and electrical barriers were considered but not carried forward for detailed analysis for this project. Adjustable crest barriers have air bladders that raise and lower the barrier height based on stream discharge in order to maintain a 1.5 foot drop between the top of the barrier and tailwater elevation. Electrical barriers are built into the stream bed and use direct current electrical power to block or deter sea lampreys from migrating past, but do not block or change stream flow. The adjustable crest barrier is completely lowered and electrical barrier turned off during the time of year that sea lampreys are not migrating upstream to spawn. There are two variable crest and two electrical sea lamprey barriers deployed in the Great Lakes. The USFWS has indicated that based on their experience, electrical barriers are not consistently effective. These electric barrier types are considered experimental and will not be considered for future use until it has been demonstrated that they are effective control options in their current streams. Variable crest barriers have potential but have had operational and maintenance issues. Barrier placement on the existing dam sill between existing concrete piers of the dam was not developed further because hydraulic analysis for this alternative indicated that the required spillway capacity could not be met and it does not address the deteriorating condition of the dam. These possible alternatives were ultimately rejected.

Substantial effort has been expended to avoid and minimize impacts from the project by evaluating different locations for the proposed barrier. Construction of a barrier at various locations upstream and downstream of the dam was also considered; however, based on potential impacts to the floodplain and anticipated success of the barrier indicated in hydraulic modeling studies, the preferred barrier construction site is at the MPI dam. Barrier placement farther downstream of the MPI dam increases potential flooding impacts and flattening of the floodplain upstream of the dam makes construction impractical. The proposed location at the MPI dam is the most suitable location to achieve the project objective from an engineering, cost effectiveness, and environmental impacts perspective. To further minimize flooding and wetland impacts the height of the barrier was reduced to protect to the 6.67% (15 year) discharge event from the original designed 4% (25 year) event.

2.3.2 Berm Type and Berm Alignment

Alternatives to the proposed clay berm that were considered include repair of the existing concrete wall, replacement of the existing wall with a new concrete wall, and replacement of the existing wall with a SSP wall. Repair of the wall was not considered further due to the costs and risks associated with repair of a wall in a state of dilapidation. Construction of a new concrete wall would require large amounts of excavation which, in combination with costs associated with the actual concrete wall structure, would result in high construction costs. Consequently, this was not considered further. A SSP wall was not considered further because the presence of bedrock would prevent a positive cutoff from being formed at the SSP/bedrock interface. A concrete filled trench could be used to create the required seepage cutoff with the SSP wall, but this would elevate material and construction costs substantially.

After it was established that a clay berm is the preferred structure, locations for the proposed berm were assessed. In the area north of the railroad (see Area C, **Figure 18**), a City of Manistique water line (on City property) runs north-south just west of the concrete wall. Presence of the water line limits aligning the berm west of the existing concrete wall (see Area C, orange dotted line just left of the red concrete wall line, **Figure 18**). Thus, if a berm were constructed in this area north of the railroad bridge to provide protection up to the 4% discharge event, it would need to be located east of the concrete wall. Construction of a berm north of the railroad tracks would have resulted in fill being placed into 1.5 acres of wetlands. In the area south of the railroad (Area B, **Figure 18**), the existing concrete wall essentially runs north-south along the Manistique River bank, therefore, the berm would need to be placed west of the wall. In order to balance future maintenance needs with a desire to minimize the berm footprint, a 2.5H:1V slope was selected instead of the normal 3H:1V slope for earthen berms. Various berm slopes were also considered, however as slope increases and the footprint becomes smaller (steeper slope), it also becomes more difficult to conduct maintenance on the berm and maintain a vegetative cover to prevent erosion. Construction of the earthen berm between the dam and the railroad bridge results in filling of 0.8 acres of wetlands. Refer to EA Section 3.6 for further discussion related to potential wetland impacts from implementing the proposed project.

2.4 Details and Construction Sequence for the Recommended Alternative

Project Sequence. It is anticipated that construction of the proposed SSP barrier and associated construction activities could be completed within one construction season (approximately 150-180 days) if all work was conducted sequentially. Construction of the SSP barrier would likely occur between late spring (May) when stream flows are lower and chances of ice jams have subsided, as to minimize risks from high water flows and floods and fall (October). The temporarily demolished west and center flume walls at the dam would be stabilized should a potential flood event occur– e.g., west wall: erosion control applied to bare soil / slopes, sand bags placed to meet required flood protection heights; center wall: stoplog structure to match remaining flume heights. A permanent access road would be constructed from Weston Street to the west side of the dam at the location of an existing gravel road. Construction of temporary rock construction causeway with culverts to pass river flows would occur from the west

riverbank with actual SSP dam installation occurring in the dry using trench boxes to the extent necessary. Dewatering of the trench boxes would likely occur in phases for bedrock excavation and installation of the SSP into the concrete lined trench.

An example construction sequence could be: demolition of western concrete flume wall and construction of rock causeway with culverts to continue flows downstream (**Figure 4**); dewater within the trench boxes to excavate rock and install the SSP into concrete, demolish the concrete flume wall (downstream of the dam), and fabrication of a stoplog structure on the center flume wall; excavation and placement of steel for the sea lamprey barrier, platform, and walkway; excavation of bedrock leading up to the traps; placement of traps and hoists; grouting of fissures; removal of the temporary rock causeway and replacement of the west flume wall and stop logs at the center flume wall at the dam. Excavation of the bedrock would be by mechanical means (e.g., not blasting). Permanent removal of the 2,875 feet of the center flume wall starting at the dam could be conducted at various points during project construction. Debris from the center flume wall demolition would be disposed of at an off-site licensed and USACE approved landfill and / or recycling facility or it may be reused as part of the project, if appropriate. Excavated bedrock may be disposed of at an off-site facility. Material removed for berm construction may be reused on site if appropriate or disposed of at an off-site disposal facility. All disposals will be required to meet federal, state and local laws. Construction of the berm would be completed prior to or concurrent with construction of the barrier so the berm can be constructed in the dry. The fill material required for berm construction will be obtained from a commercial quarry as no on site borrow areas will be used. The flume wall removal can occur at any time.

Miscellaneous Project Details. Utilities would be protected and relocated as necessary. An appropriate amount of real estate would be provided by the non-federal sponsor to accommodate the project footprint as well as access and storage during construction. Real estate will be obtained for the acreages requiring flood easements from non-federal sponsors (see Real Estate Appendix). The proposed construction activities may require temporary access, staging areas, and / or construction of one or more temporary structures, upland or in-water. The temporary structures / work, storage, and staging sites would be located on the former MPI property. Temporary access for barrier and berm construction and staging would be mainly from the west side of the Manistique River, near the MPI dam (**Figure 14**). Access for the downstream flume wall removal could be from an existing access road along the east side of the Manistique River, south of the Deer Street bridge (**Figure 15**) and / or from developed MPI property on the west side of the river (**Figure 20**). The contractor would move equipment along easements, within the river, or use portable barges and work from the water. Supplementary temporary structures / staging sites would be located outside of any wetlands, areas containing federally protected species and their critical habitat, and properties listed on or eligible for listing on the National Register of Historic Places (NRHP). Although the specific type and location of temporary structures and / or staging sites cannot be determined at this time, since they would be incidental to the work being performed, it is anticipated that the temporary access roads and work and storage areas noted above would be utilized. Additional examples include turnarounds, additional work and storage areas, access roads, and office facilities. These construction aids would be within project boundaries or right-of-ways and removed when no longer needed. Temporary activities would include appropriate precautionary measures to prevent erosion and sedimentation or other undesirable environmental impacts; refer to Section 3.0, Existing

Environment, Environmental Consequences and Mitigation, for further details related to Best Management Practices (BMPs) and potential impacts of implementing the Recommended Alternative.

Some variation from the project as described may occur with respect to the sequence of activities, method of construction, disposal of materials, or design details as a result of unanticipated design improvements, site conditions, or cost-saving measures. Such variations would not result in significant changes to either the overall project design or environmental impact, without the need for further evaluation under the NEPA.

SECTION 3

Existing Environment, Environmental Consequences and Mitigation

This section describes the existing environment that could be affected by the project alternatives. Information gathered from site visits, interviews, existing documentation, and correspondence with federal, state, and local agencies was used to characterize the existing environment.

This section identifies the potential direct and indirect environmental consequences of the action alternatives and the No Action Alternative to water resources, air quality, natural and biological resources, cultural resources, noise, visual resources, transportation and traffic, hazardous materials, and environmental justice. Each alternative was evaluated for its potential to affect resources. All potentially relevant resource areas were initially considered in this EA. Some were eliminated from detailed examination because of their inapplicability to this proposed action. General descriptions of the eliminated resource categories and the basis for elimination are described in Section 3.1.

This section also describes the potential cumulative effects on the environment of the project alternatives when combined with recent, present, and reasonably foreseeable future projects. Key measures and BMPs that would be implemented to avoid or minimize potential impacts to the environment also are presented. The potential environmental impacts from implementing one of the action alternatives (Alternatives 1 and 2 – construction of a sea lamprey barrier) were considered together because Alternatives 1 and 2 would be placed at essentially the same location, either seventeen feet downstream of the existing dam sill (Alternative 1) or connected directly to the existing MPI dam sill (Alternative 2). Refer to **Figures 2, 5 and 6** for visual representation of where the proposed barrier would be located.

The following discussion elaborates on the nature of the effects that might be experienced by the environmental resources analyzed:

- ***Short-term or long-term.*** These characteristics are determined on a case-by-case basis and do not refer to any rigid time period. In general, short-term effects are those that would

occur only with respect to a particular activity or for a finite period or only during the time required for construction or installation activities. Long-term effects are those that are more likely to be persistent and chronic.

- ***Direct or indirect.*** A direct effect is caused by and occurs contemporaneously at or near the location of the action. An indirect effect 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 effect 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.
- ***Negligible, minor, moderate, or major.*** These relative terms are used to characterize the magnitude or intensity of an impact. Negligible effects are generally those that might be perceptible but are at the lower level of detection. A minor effect is slight, but detectable. A moderate effect is readily apparent. A major effect is one that is severely adverse or exceptionally beneficial.
- ***Negative or beneficial.*** A negative effect is one having adverse, unfavorable, or undesirable outcomes on the man-made or natural environment. A beneficial effect is one having positive outcomes on the man-made or natural environment. A single act might result in adverse effects on one environmental resource and beneficial effects on another resource. ***Significance.*** Significant effects are those that, in their ***Context*** and due to their ***Intensity*** (severity), meet the thresholds for significance set forth in CEQ regulations (40 CFR Part 1508.27).
  - ***Context.*** Means that the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend upon the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant. The context of an effect can be localized or more widespread (e.g., regional).
  - ***Intensity*** refers to the severity of impact. Responsible officials must bear in mind that more than one agency may make decisions about partial aspects of a major action. The following should be considered in evaluating intensity:
    - Impacts that may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial.
    - The degree to which the proposed action affects public health or safety.
    - Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.
    - The degree to which the effects on the quality of the human environment are likely to be highly controversial.
    - The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.
    - The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.

- Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.
- The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.
- The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.
- Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.

3.1 Preliminary Impact Scoping

In compliance with NEPA, the CEQ guidelines, and Engineer Regulation ER 200-2-2, Policy and Procedures for Implementing NEPA, the following evaluation of environmental impacts focuses on those resources and conditions potentially subject to effects and on potentially significant environmental issues deserving of study, and deemphasizes insignificant issues. Some environmental resources and conditions that are often analyzed in an EA have been omitted from detailed analysis. The following provides the basis for such exclusions.

Sustainability and Greening. The proposed sea lamprey barrier project does not require significant resources for construction or operation, nor produce significant emissions once constructed. Methods to implement green building technologies (i.e., utilizing recycled material or recycling waste such as concrete or steel) would be implemented where feasible and are not discussed in detail within this EA as sustainability and greening have no short or long term impacts for this project.

3.2 Physical Setting and Land Use

3.2.1 Existing Environment

The City of Manistique is located in the northern Midwest, in the upper peninsula of Michigan. Average seasonal temperatures range between 58 and 78 degrees Fahrenheit in the summer and between 0 and 10 degrees Fahrenheit in the winter. Average rainfall is about 29 inches a year. Snowfall mainly occurs between early-November and mid-April.

The headwaters of the Manistique River begin in Manistique Lake in Luce County and flow southwest across Schoolcraft County, through the City of Manistique and into Lake Michigan. The river is navigable by small boats from the mouth at Lake Michigan up to the MPI dam (approximately 2 miles), and upstream of the dam. The USACE Manistique Harbor is located at the mouth of the Manistique River. The Manistique River is part of the Manistique River watershed in the east-central portion of the Upper Peninsula of Michigan (**Figure 3**). The watershed drains approximately 1,460 square miles. The watershed includes the majority of

Schoolcraft County and portions of Luce, Mackinac, Alger and Delta Counties. The watershed contains predominantly sandy soils with some gravel-cobble deposits. Land use and land cover in the watershed is predominantly wetlands (51%) and forest (37%). Other land uses include: open water (6%), farmland, grassland and barren (approximately 2% each), and developed (0.2%). State of Michigan land is located approximately 0.5 miles upstream of the dam, and includes a tree nursery for forest management purposes. The Federal Seney National Wildlife Refuge is located approximately 20 miles north of Manistique and supports a wide variety of plants, animals and habitat types.

Topography in downtown Manistique has been changed and filled-in through development over the years but remains generally flat in the vicinity of the proposed SSP barrier. The topography of the Manistique River in the last 2 miles before Lake Michigan has been highly altered by past industry and logging activities along the river, but it is also relatively flat. The proposed location for the barrier is characterized by concrete walled riverbanks in the immediate vicinity of the dam. The concrete wall extends south along the west side of the river through the project area, south of Deer Street Bridge. The concrete wall extends north of the dam along the west side of the river, but is located inland north of the railroad bridge, as the Manistique River veers toward the east as it runs north of the railroad bridge. With exception of near the dam, the majority of the east side of the river is a natural river bank. Access to the section of the center flume wall to be demolished south of Deer Street would likely be via a relatively flat existing gravel access road on the east side of the river used by locals to access the river for recreation (e.g., fishing) (**Figures 15 and 20**), and / or from developed MPI property on the west side of the river (**Figure 20**). The river banks and floodplain flatten out north of the MPI dam.

3.2.2 Environmental Consequences

No Action Alternative

By taking no action, there would be minimal changes to current conditions, and therefore, no impacts to the physical setting or land uses would occur. The No Action Alternative would not contribute to cumulative impacts to the physical setting or land uses.

Recommended Alternative

The proposed SSP lamprey barrier location is seventeen feet downstream of the sill at the MPI dam in the Manistique River, and includes four main areas of work (**Figure 2**):

1) In-stream location of the proposed sea lamprey barrier (width of river at the MPI dam) [**Figures 11-12**]);
2) Work and storage area located on the west side of the river, near the dam and temporary access ramp and rock construction causeway at the dam (**Figure 14**);
3) Vegetation clearing and construction of an approximately 878 linear foot (LF) clay berm, beginning at the dam and extending north along the west side of the river to the railroad bridge, including temporary work and storage area at the north end of the proposed berm (**Figures 2B and 17**); and

4) Shore (east and / or west sides of river) and in-stream location for removal of the center flume wall (2,875 linear feet), beginning downstream of the dam (**Figures 2A and 13**) and extending to within 100 feet of the state designated coastal zone management boundary.

The proposed action would not cause significant impacts to the physical setting or land uses. The riverbed near the existing dam would be occupied by the proposed SSP barrier, and land along the concrete wall north of the dam would be occupied by a clay berm. These proposed structures would occupy the land in a similar manner to what currently exists and would not cause a significant change to land use. The proposed action includes removal of the concrete center flume wall to the riverbed elevation. Removal of the flume wall would help equalize water level elevation between the flume and river side but not significantly affect current conditions. Access roads to the dam and flume wall removal area would be used only during project construction and for maintenance and operation of the facility.

3.3 Air Quality

3.3.1 Existing Environment

The EPA and MDEQ monitor air quality across the State of Michigan. Data specific to the City of Manistique was not available. The closest DEQ air monitoring station is located in Seney, Michigan (approximately 40 miles north of Manistique). Data indicates that Schoolcraft County is currently in attainment for National Air Quality Standards and has good air quality, where the majority of days with data were rated as "good."

3.3.2 Environmental Consequences

No Action Alternative

By taking no action, there would be minimal changes to current conditions, and therefore no impacts to air quality would occur. The No Action Alternative would not contribute to cumulative impacts to air quality.

Recommended Alternative

Impacts to air quality would arise from emissions of motorized construction equipment and minor fugitive dust associated with the proposed construction activities. Emissions and exposed soil conditions associated with the proposed construction would be short-term and temporary. The proposed project is relatively small scale and would likely involve the use of only a few pieces of equipment at a time (i.e., a crane, couple excavators, and trucks delivering supplies / removing concrete / waste, etc.). Fugitive dust control methods such as spraying down dust with water and revegetating exposed soils as soon as possible would be implemented throughout the project. In addition, the proposed work areas include a relatively industrialized area of the river and woods indicating few potential sensitive receptors. Trees in the vicinity would aid in reducing transport of dust particles. Any impacts would be short-term and minor. All equipment would be required to meet emission standards. The prevailing winds are from the west and northwest. The proposed work will not affect air quality. Air impacts during operations at the sea

lamprey barrier would be negligible. Once construction activities are complete, the project would not produce air emissions. During peak sea lamprey trapping season (approximately 8-12 weeks each year from March through July) negligible emissions would be associated with 1 to 2 pick-up trucks visiting the site each day to check the traps, in addition to a 1-1/2 ton truck to pick up lampreys 3-4 times per week. A small generator may be used to operate electric winches to access the sea lamprey traps.

3.4 Hazardous, Toxic and Radioactive Waste (HTRW)

3.4.1 Existing Environment

The purpose of a HTRW investigation is to ascertain the environmental history and current conditions of a site as it relates to HTRW, within practical measures and using reasonably available resources. By conducting such an investigation, the uncertainty regarding the potential for HTRW in connection with the project is reduced, though not eliminated. There is always some risk of encountering unknown HTRW elements during a project, thus contract clauses incorporate wording on how to address such conditions should they be discovered. The Manistique River is listed as an Area of Concern from the dam to the outer breakwaters of the river at the confluence with Lake Michigan. The primary concern is PCB in the sediment from the de-inking process used in paper recycling downstream of the paper mill discharges and the settling ponds that discharged downstream of the flume wall to the Manistique River. None of the proposed work is within the discharge area. The proposed work areas of SSP barrier placement and flume wall removal consist of river bedrock. The proposed work will not disturb sediments within identified PCB contamination areas. No in-stream sediment excavation is required. Berm construction upstream of the MPI dam is not within the designated river sediment contaminated area. The details from the contaminated sites lists database and resource reviews are included below.

There are no known HTRW sites at any of the 4 work areas for the proposed project – within the Manistique River at the dam, along the west side of the dam and river, at the center flume wall (including the area proposed to access the wall), or along the existing concrete wall beginning at the dam and extending north. The USACE reviewed the EPA's EnviroMapper data, which includes Superfund sites, toxic releases, water dischargers, air emissions, and hazardous wastes, indicates that no HTRW sites are known to be at the project work site or would be impacted by the proposed construction. A search for contaminated sites (as defined under the Michigan Natural Resources and Environmental Protection Act 451 of 1994, as amended) on the DEQ's Part 201 and Part 213 site lists indicates that no impacted properties are located at the project work sites.

A former saw mill was located at the west side of the MPI dam, and railroad spurs were formerly located along the west side of the river in the vicinity of the existing concrete wall (near the railroad line that runs east-west across the Manistique River) and extending along the river south of the MPI dam. The rail spur was removed and is now used as an off-road recreational trail. Based on review of available historical documents (e.g., Sanborn Fire Insurance maps, aerials), discussions with the property owner, and a site visit conducted in June 2012, contaminant impacts from past land uses were not identified and are not anticipated.

Nearby property located northeast of the MPI dam (commonly referred to as the Manistique Industrial Park site) has been investigated at various times between 1988-2009 and partially remediated (between 2008-2009) by the DEQ and is known to contain some soil and groundwater contamination; however, the proposed project is not anticipated to involve access, construction or earthwork at the Manistique Industrial Park site on the eastern side of the river. The eastern end of the proposed barrier would tie into the existing dam abutment; with no soil excavation east of the concrete riverbank wall. Soil borings and sampling in the vicinity of the dam abutment on the east side of the river occurred in September 2012 to establish existing soil conditions in this area. Laboratory results indicate no organic soils contamination at regulated levels, and metals were below background levels and suitable for unrestricted upland placement. No soils excavation east of the riverbank concrete retaining wall is anticipated with the proposed construction plans.

3.4.2 Environmental Consequences

No Action Alternative

By taking no action, there would be minimal changes to current conditions, and therefore no impacts to HTRW resources in the area would occur. The No Action Alternative would not contribute to cumulative impacts to HTRW resources.

Recommended Alternative

Based on available information regarding site conditions and the general area, it is not anticipated that construction of the proposed sea lamprey barrier project, berm construction, flume wall removal nor upstream areas that could become inundated during a 1% chance flood event (**Figure 10**), would encounter contaminated materials or cause a release of any contaminated materials. As a precaution, the construction contract would contain standard language on procedures to follow to ensure that there are no releases and that the materials are properly remediated where applicable, in the event that contaminated materials are encountered.

3.5 Water and Sediment Quality

3.5.1 Existing Environment

Water quality of the Manistique River at and above the MPI dam is considered good based on chemical analysis and habitat survey results from MDEQ and MDNR sampling events (circa 1999-2005, 2009). The Manistique River drains mostly forests and wetlands within the watershed. Various natural activities create disturbances to the rivers and land adjacent to rivers, generating turbidity (suspension of fine grained sediments into the water column). Natural disturbances occur through rain events, which can cause sediment to run into rivers and cause re-suspension of the riverbed sediments; however, turbidity at the project site is minimal because the substrate in the project area is bedrock (**Figure 13**), both immediately upstream and downstream of the dam. Therefore, the river has minimal turbidity from fines and no sediment material is currently retained behind the dam.

The EPA characterizes the last 1.7 miles of the Manistique River as an Area of Concern (AOC) from the upstream boundary at the MPI dam downstream through the Manistique Harbor based on current Beneficial Use Impairments (BUI), including restrictions on fish and wildlife consumption and restriction on dredging alternatives. The area was listed as an AOC in the 1970s due to identified presence of contaminants including polychlorinated biphenyls (PCBs), oils, and heavy metals. The EPA has conducted remedial actions in the area over more than the past 10 years, including the removal of sediments contaminated with PCBs and other industrial waste, allowing the MDEQ to remove the Manistique River's degradation of benthos and loss of fish and wildlife habitat impairments. Activities to further improve conditions in the AOC continue to include USEPA funded contaminant clean up dredging of PCB contaminated sediments in and adjacent the Federal navigation channel in FY17.

3.5.2 Environmental Consequences

No Action Alternative

By taking no action, there would be minimal changes to current conditions, and therefore no impacts to water and sediment quality would occur. The No Action Alternative would not contribute to cumulative impacts to water and sediment quality.

Recommended Alternative

Potential threats to water quality of the river at the project site include sediment from runoff and petroleum leaks from equipment used for construction. Some of the proposed downstream project actions would occur within the AOC; however, the substrate at the locations of these actions (at the MPI dam and the center flume wall downstream of the dam) is comprised of river bedrock and is not contaminated. Contaminated sediments located downstream of the project site would not be disturbed by the proposed action. The proposed action of the removal of the concrete center flume wall downstream of the dam, bedrock excavation at the dam and berm construction would not contribute to degrading the AOC or involve contaminated sediments.

Erosion Control: Appropriate erosion control measures would be implemented to prevent sediment runoff from entering the Manistique River. The contractor shall prepare and / or obtain any required erosion and sediment control plans and permits. Soil erosion control methods would be put in place prior to beginning construction activities and maintained during construction to minimize earthen berm materials placed at the western riverbank from entering the river system; the riverbed in the project area is bedrock. Other erosion control measures such as the use of silt fencing, straw bales, geo-fabrics, hydroseeding, or various other immediate re-vegetation tactics would be developed and implemented prior to, during and after construction, as needed. Disturbed surface areas or temporary construction sites would be re-vegetated (grass only) to similar conditions for long-term erosion control, or restored as applicable, upon project completion.

Construction Equipment: The proposed construction would occur from a temporary rock causeway, located in the water using land-based construction equipment. Use of the rock

causeway, is not anticipated to significantly impact the water quality. Equipment to be used for construction would come to the site with new or sound hydraulic hoses and connections to minimize risk of leaks. Hoses and connections would be inspected daily at minimum, and equipment would be removed from service if a leak is detected. Equipment would be stored over-night and fueled in a designated area away from the immediate river bank to minimize any potential leaks or spills from entering the river. Minor petroleum / chemical seepage from the land-based equipment may occur during construction activities, but it is not expected to result in any significant effects on water quality. The duration of in-stream work is anticipated to be one construction season of 150-180 days. In addition, the temporary causeway would be removed after SSP installation. Related materials from the construction would be removed from the project site unless utilized during construction activities.

Materials Placed: Materials placed in the river as part of the proposed project would include wood forms, concrete, fissure grout (mainly concrete), steel and stone. Fines are not associated with these sorts of materials and would not contribute to water quality degradation. Concrete for anchoring the SSP into the bedrock would be placed in the dry using trench shields of some type to hold back the water. Although an access ramp for construction equipment would be constructed along the west bank, it would be stone; sediment would not be placed in the river as part of the proposed project. The substrate at the MPI dam is bedrock, thus construction induced increases in suspended solids and turbidity, if they occurred, would be minor and short-term. Pursuant to the CWA, a Section 404 (b)(1) Evaluation of the environmental effects of the discharge of fill material into waters of the United States has been prepared (**Attachment B**). The Section 404(b)(1) Evaluation concludes with the determination that "the proposed action is in compliance with Section 404 of the Clean Water Act." A Section 401 (CWA) water quality certification, or waiver thereof, would be obtained by the non-Federal sponsor from the MDEQ prior to construction activities.

3.6 Prime Farmland and Wetlands

3.6.1 Existing Environment

Farmland. Based on review of available information such as aerial photographs and a June 2012 site visit, there is no prime or unique farmland located at the project site. The State of Michigan owns and leases out land utilized as a tree nursery north of the project area; however, this is not considered prime or unique farmland.

Wetlands. The USACE coordinated the presence of potential wetlands with the MDEQ and the USACE Regulatory Office, and conducted a wetlands delineation in June 2012 within Areas B and C (**Figure 18**). Approximately 1.15 acres of wetlands were identified within Area B, and approximately 3.1 acres of wetlands were located within Area C. The delineation followed the 3-parameter criteria detailed in the 1987 Corps of Engineers Wetland Delineation Manual, and the Northcentral and Northeast Regional Supplement. The assessment included the proposed work areas, including additional area west of the current proposed berm footprints both north and south of the railroad bridge. All wetlands delineated as part of this review were determined to be adjacent to the Manistique River, a Traditionally Navigable Water (TNW), or were abutting Relatively Permanent Waters directly flowing into TNWs, and therefore are regulated under

Section 404 of the Clean Water Act (CWA). The site is in an area where the State of Michigan has assumed Section 404 authority under the provision of Section 404 (G-L of the CWA), and the 2011 Memorandum of Agreement between the EPA and the State of Michigan, therefore the USACE's approved jurisdiction determination form documenting the presence of waters of the United States is not required. A copy of the delineation report can be requested, if desired.

Including the delineated wetlands, there are four areas containing waters of the U.S. or wetlands but only three areas are expected to be affected by the project as described below and shown on **Figure 18 and Figure 19**: Area A-South of the MPI dam; Area B- Between the MPI dam and railroad; Area C- North of railroad- No longer affected by berm construction; and Area D- North of project site with wetlands inundation. Besides the Manistique River and areas noted below, there are no other known wetlands or surface water in the immediate vicinity of the project site or proposed work areas. As necessary, new areas that become part of the project would be assessed for the presence of wetlands.

Area A-South of the MPI dam (Figure 20): Wetlands are not present at the proposed barrier location (in-stream riverbed) or at the proposed work and storage area near the west side of the dam. Wetlands are not present in-stream at the proposed center flume wall demolition area; however, wetlands are present in the vicinity on the east riverbank. Access to and from the river could be via an existing gravel road used by MPI when they conducted partial flume wall demolition in the past, and / or from developed MPI property on the west side of the river. Wetlands in this area are beyond the access road and would not be affected by use of the access road for removal of the center flume wall.

Area B- Between the MPI dam and railroad (Figure 21) : The area between the dam and railroad, west of the existing concrete wall is a combination of wetland, upland (appearing to be a result of old fill events), and what may be the remnants of braided stream channels running from the river southwest toward Lake Michigan. Approximately 1.15 acres of Area B are wetland and open water. The portion of the wetlands just south of the railroad contains an area of glossy buckthorn (*Frangula alnus*). Glossy buckthorn is an invasive, non-native shrub that can form dense stands, crowding out native wetland species. The area of wetland just north of the dam consists of fill scattered throughout the wetland. Fill areas were too numerous to individually map; it is estimated the area is 60% filled, with 40% unfilled and degraded wetland remaining. The soils are very shallow in this portion of the wetland. Water flowing over bedrock was observed in some areas between the fill piles. The water was flowing west / southwest, toward Lake Michigan and away from the river. The water appeared to be seepage from the Manistique River; however, local residents have stated that natural springs are also present in the area.

The USACE wetland delineation identified Area B as a mix of forested/shrub/scrub and disturbed wetlands (e.g., filled in the past, impacted hydrologic connection to the river by construction of the existing concrete wall) and upland, with the southern portion mainly filled wetlands. Wetland functions (e.g., flood storage capacity, filtering, and habitat) are diminished by historic filling in the area, as well as the physical and hydrologic barrier of the existing wall between land and the Manistique River. Wetlands in this area are considered fair to poor quality.

Uplands within this area contain a path, an ATV trail, a portion of Weston Street, and old fill associated with the dam, the concrete wall, and residential construction. A culvert connecting areas north and south of the railroad is located approximately 200' west of the concrete wall (**Figure 18**). The culvert is functioning, and at the time of the inspection, water was running south into a braided stream remnant. The narrow area east of the concrete wall (along river) is densely vegetated and drops off steeply to the water's edge.

Area C- North of railroad (Figure 22): Area C contained approximately 3.1 acres of wetlands. Wetland types included forested, scrub-shrub and emergent; with the exception of two fill areas near the railroad bridge, the entire area east of the concrete wall is wetland (**Figure 18**). Approximately 65% of the wetland within the delineated area is forested and scrub-shrub, with the remainder considered emergent wet meadow. The northern 400'- 450' of this area is forested wetland, dominated by white cedar and balsam fir trees, with an understory of speckled alder, green ash, willow, sedges, grasses, and wetland forbs. Scrub-shrub wetland dominated by speckled alder, green ash, and red maple saplings, with a wet meadow understory containing sedges and grasses continues south, with the shrub density varying throughout. Small areas of mature green ash and red maple trees are scattered throughout the southern half of this area, and the density of trees (versus shrubs) increases towards the railroad bridge.

The area west of the concrete wall consists of primarily old fill. Fill extends from the edge of the wall for 20'-25' west. A 5'to 10' wide, shallow vegetated drainage runs parallel to the wall for most of its length. The soils in this area are disturbed, and drainage way appears to have been constructed in wetlands, to drain the adjacent filled areas. Wetland vegetation and hydrology are present in this area, which totals 0.15-0.20 acres. The remaining 15'-20' wide area west of the drainage in the study area (part within MPI property and part owned by the City of Manistique) is fill associated with what appears to be an old road bed, which extends through the upland area immediately west of the drainage. This strip extending from the railroad to Intake Park Road (located on City-owned property in the vicinity of the water line), had recently been cleared of mature woody vegetation (**Figure 19**). Per the City of Manistique, this area was cleared to allow access to utility lines. The proposed 1% annual chance water surface elevations are higher than the existing conditions water surface elevations upstream of the proposed barrier, but they are still lower than the effective Flood Insurance Study (FIS) elevations. No project berm is required to maintain the upstream pool elevation for the 6.67% design event. Where a berm was required with the 4% design height, no berm or fill material will be placed along the west side of the river within Areas A-C, and therefore no wetlands will be converted to uplands north of the railroad tracks.

Area D- North of project site (Figure 23): Large wetland areas (approximately 300 acres) upstream of the MPI dam including the Jamestown Slough and Island Slough are located upstream of the project site. The historic pool elevation in the slough area (during MPI dam operations) was an average of approximately 606 feet during normal flow conditions (see orange line on Figure 10). From our existing conditions hydraulic model, the water surface elevation in the slough area is an average of 601 feet during normal flow conditions (March-June) and approximately 601.4 feet during the 99.9% event (1-year event).

3.6.2 Environmental Consequences

No Action Alternative

By taking no action, there would be minimal changes to current conditions, and therefore no impacts to wetland resources in the area would occur. No farmland is present therefore there would be no impacts to farmland resources. The No Action Alternative would not contribute to cumulative impacts to farmland and wetland resources.

Recommended Alternative

Farmland. The proposed project is compliant with the Farmland Protection Policy Act (FPPA) Subtitle I of Title XV, Section 1539-1549, of the Agriculture and Food Act of 1981 (Public Law 97-98) and the proposed action would not impact prime or unique farmland.

Wetlands. The proposed project would impact wetlands in Areas B, and D as described below.

Area A-South of the MPI dam (Figure 20): There are limited access points to the Manistique River for demolition of the center flume wall. Different locations were assessed for access of equipment and ability to obtain real estate. The proposed access is from the east or west side via existing access roads. Impacts to wetlands in this area are avoided and minimized by using the existing access roads, turn-around and developed MPI property (**Figure 15**). The two small vegetated islands on the river side near the flume would be avoided. In addition, appropriate erosion and sediment control measures (e.g., silt fence and placing gravel on the access road to reduce erosion of existing soils), would be implemented to further minimize any impacts. The existing ditch located between the concrete wall and MPI property (west side of the river) would be protected and not disturbed. No significant or long-term impacts to wetlands in this area would be expected.

Area B - Wetland Impacts associated with the berm located between the MPI dam and the railroad (Figure 18): As identified in Section 2.2, the proposed project requires the construction of a berm. Several engineeringly feasible berm designs, alignment alternatives and measures were evaluated to minimize impacts to wetlands. Project conditions such as limited space, presence of a City of Manistique water line to the west, and consideration of associated costs were also taken into consideration. Due to the nature of the proposed project, the berm could not be relocated to different sites to avoid wetland impacts within Area B.

Impacts to wetlands in Area B would be minimized by locating the berm on uplands where feasible and increasing the slope to 2.5H:1V. Impacts would include vegetation clearing, excavation and construction associated with the proposed berm and maintaining a “no woody vegetation zone” along the berm. It is estimated that up to approximately 0.8 acres of wetlands would be impacted in this area and converted to uplands with berm construction. Based on wetland quality, habitat fragmentation, and the area containing existing fill, the level of impacts would not be significant.

<u>Area C - Wetland Impacts associated with the berm located north of the railroad (Figure 18)</u>: Measures to minimize wetland impacts within Area C included evaluating various alignments that shifted the berm west and increasing the berm slope to reduce its footprint. The footprint of proposed berm layouts north of the railroad range from being located on an upland ridge thereby reducing wetland encroachment, to being located east of the existing concrete wall in a wetland area [least costly engineeringly feasible option ($660k)]. Changing the berm side slopes from 3H:1V to 2.5H:1V reduced the footprint of the berm and wetland encroachment. Realigning the berm to more upland areas would reduce wetland areas impacted from 1.6 acres to 0.6 acres but increase estimated berm costs from $660k to $1.1M. This alignment requires removal of the existing concrete wall which drives up costs. Replacing the berm with a new concrete wall could further reduce wetland impacts to 0.4 acres but escalate costs to $2.8M. The alignment on the upland ridge requires the necessary USACE vegetation free zone on the west side of the berm to be located on the adjoining City of Manistique property.

The berm alignment evaluation indicated that space is limited by City utilities located west of the MPI property. In addition, if the dilapidated concrete wall failed during a flood event, it could result in a focused flow toward the berm, thus compromising the integrity of the berm. Hence the wall would need to be addressed in some manner if the berm is located west of the structure. Potential options to address the wall include removal, repair, or encasement in the berm. Repair of the concrete wall is not feasible for this project due to its poor condition. Removal of the wall in combination with berm construction, and replacing the wall with a new concrete wall were evaluated. The costs associated with removal and / or replacement of the wall was higher than constructing the berm east of the existing wall, in part due to material costs and subsurface bedrock conditions. Based on increased water levels located upstream and the fill required for berm construction (1.5 acres wetland fill), the original design of the dam to the 4% (25 year) flood event was reduced to the 6.67 discharge event (15 year). Therefore, no berm nor any fill is proposed to be located north of the railroad bridge, thus eliminating the adverse impacts to approximately 1.5 acres of wetland (see Area C, **Figure 18**). The berm located in Area C is no longer required to prevent sea lamprey escapement upstream during the 6.67% discharge event.

<u>Area D - Wetland impacts north of the project site in slough area (Figure 23)</u>: Once the proposed SSP barrier is constructed, hydraulic studies indicate that the existing wetland areas north of the MPI paper mill dam (Area D) will be permanently inundated; approximating some of the shallow water wetland habitat conditions that existed for almost 100 years when the MPI paper mill dam was in operation. The proposed lamprey barrier will raise the average water surface elevation for normal flow conditions about 2 feet upstream of the MPI dam (Appendix B, Hydraulic Engineering Appendix of the USACE DPR). Therefore, the water surface elevation during normal flow conditions (March-June) and for the 99.9% event would be approximately 603 feet (see the white line on **Figure 10,** the blue line on **Figure 18,** and the red line on **Figure 26**), which is less than what the historic water surface elevation (606 feet) was when the MPI dam was in operation.

The proposed sea lamprey barrier project would inundate approximately 300 acres upstream of the MPI dam. Approximately 96% of the inundated area is within state-owned land.
Almost all of this inundated area is shown as open water (Jamestown Slough and Island Slough) on USGS topographic maps of the region (**Figure 25**). Current (2012) and past (1993)

conditions are depicted on **Figure 10**. The blue hatching within the solid blue boundary line depicts the inundated water area (approximately 300 acres) from 1993 when the paper mill dam was in operation. A hydraulic evaluation indicated that the perimeter boundary of the river bank touching upland areas for the approximate 300 acres of upstream inundated wetlands is approximately 15,000 lineal feet (LF) (see the red line on **Figure 26**). Presuming a slope of at least 2H:1V and a 6 foot inundation on the upstream riverbank, approximately 2 acres of wetland will be created along the perimeter through inundation (15,000' x 6' = 90,000 ft^2/43,560 ft^2/acre). If the slope of the land is shallower than 2H:1V (let's say the river bank slopes are 3H:1V or 4H:1V), then more wetlands along the perimeter will be created through inundation.

With a rise in surface water levels from 2 feet (nearest the barrier) to 0 feet (at the upstream end of inundation), it is estimated that approximately 16 acres of wetlands would convert to different wetland types, some from emergent to submergent, some would remain as emergent, and some shrub/scrub forested wetlands could convert to emergent or shrub/scrub (**Figure 27**). Approximately 2 acres of new wetlands are expected to be created along the inundation boundary where upland will be inundated. Inundation of the wetlands does not cause a harmful interference to flood flows nor result in occupation of the floodplain or result in a measurable loss of flood storage capacity. Standing water in the wetlands will improve resting and feeding areas for a variety of waterfowl and wading birds, amphibian spawning and some reptiles. The shallow water wetlands will provide nursery and spawning habitat for a variety of phytophilic spawning fishes. The proposed project will increase the overall habitat value of the inundated wetland for waterfowl and fish. The inundated wetland likely has no value for groundwater recharge as the wetland is adjacent to the river and within the floodplain adjacent to higher ground. The wetland is most likely a groundwater discharge area. The proposed project will not eliminate wetland values or functions for wetland areas upstream of the proposed barrier. The submergent and emergent wetlands will grow plant material that will continue to recycle nutrients and filter sediment. Even though a percentage of the wetlands will be altered from emergent to submergent the wetland's value and function will be maintained for nutrient uptake and sediment retention.

The proposed increase in water surface elevation levels upstream of the SSP lamprey barrier will expand and enhance wetland for numerous small mammals such as muskrats, mink, and raccoon at the wetland edge, feeding, resting and nesting habitat for waterfowl, spawning habitat for northern pike and numerous amphibians and reptiles. The wetland boundary is moved landward along the floodplain creating approximately 2 acres of new wetlands. The improved wetland habitat value in the inundated areas plus the newly created perimeter wetlands will help to offset the 0.8 acres of wetlands directly impacted from berm construction.

In summary, it is anticipated that 16 acres of existing wetlands located in Jamestown Slough will be changed to different classes of wetlands with the additional water inundation caused by the construction of the new SSP barrier. Some of the emergent wetlands will be converted to submergent wetlands, some shrub/scrub will be converted to emergent wetlands and some forested wetlands converted to shrub/scrub wetlands. Based on discussions with MDNR biologists, the overall habitat within the wetland inundation area will be improved for fish and wildlife with the increased depths of water within the existing wetland area. The MDNR has proposed mitigation in the form of scarce habitat preservation through the use of a conservation

easement for unique lands located upstream with the watershed in the state forest boundary as authorized by Michigan DEQ Part 303, Wetlands Protection promulgated state rules. Existing uplands located along the perimeter of the wetlands will also convert to wetlands with increased water levels (estimated at 2 acres total). The MDNR is providing the state required mitigation in the form of wetlands protection over identified scarce wetland types within the state forest property. The USACE is not providing any mitigation or compensation for the state imposed mitigation requirement. Table 1 presents a summary of the required project components and associated impacts to wetlands.

Table 1: Summary of Project Components and Potential Wetland Impacts.

Area	Project Component(s) in the Area	Potential Wetlands Impact
A) South of dam	Access to river to demolish center flume wall	No significant effects- an existing access road is present and would be used to access the river from the east, avoiding and minimizing impacts to wetlands. This is the same road that MPI used in past for similar access to the river and flume wall work; substrate in the river is bedrock.
B) Between dam and railroad	Clay berm with SSP tie in near the dam and at the railroad bridge	Clearing, excavation and filling of some wetlands for construction of berm west of the existing concrete wall; potential cut-off of water seeping from the river to the existing wetlands, though existing wetlands may also be supplied by springs and other surface water sources. Approximate potential impact of 0.8 acres.
C) North of railroad	No impacts, no berm construction.	No longer potential impact of 1.5 acres of wetlands.
D) North of project site	No direct component; water surface elevations would increase in this area as a result of the proposed barrier	No significant adverse effects- A permanent increase in water surface elevations would inundate approximately 300 acres of existing wetland areas that would enhance wetland habitat values. This increase in surface water elevation will improve the condition of hundreds of acres of wetlands upstream of the dam and create approximately 2 acres of new wetland along the perimeter. Impacts are considered to be positive.

3.7 Vegetation, Wildlife Habitat, Wildlife and Aquatic Resources

3.7.1 Existing Environment

No significant amount of vegetation is located at the dam or in-stream at the downstream location where the center flume wall would be removed. The river substrate in this area is bedrock (**Figure 13**). Due to substrate type and fast river currents, there is no significant amount of vegetation or habitat within the river at the project site.

Both the east and west banks of the Manistique River in the vicinity of the dam, and the west bank downstream where the flume wall removal would occur are comprised of concrete walls. Further downstream of the dam on the east side of the river the overbank consists of woods and a gravel access road (**Figure 15**). Immediately beyond the west bank at the dam is gravel with occasional grass and woody vegetation, and an existing gravel road leading west to Weston Street (**Figure 14**). A work and storage area may be located near the west side of the dam and occupy approximately 0.2 acres consisting of mainly gravel road and upland. Vegetation and trees line the east bank and extend approximately 5' to 10' east before becoming mainly grass (**Figure 2**). East beyond the grass, New Elm Street runs south along the river, and N. Cedar Street runs north along the river. Land along the east bank is not anticipated to be disturbed as part of the proposed action. Land west of the proposed flume wall removal, beyond the concrete wall is developed and was used by MPI. There is a ditch located between the concrete wall and MPI property (**Figure 20**).

On the west riverbank, wetlands are generally present east of the existing concrete wall that extends north to Intake Park Road, and upland / fill with occasional wetlands present west of the concrete wall (**Figures 18, 21-23**) . Refer to the wetlands section above for additional details related to wetland locations and types. A DNR tree nursery is located immediately north of the project site (**Figures 19 and 23**).

The portion of the wetland located in the project area north of the railroad bridge is part of a larger riverine wetland that traps sediment, and attenuates flood flows above the dam. It provides habitat for reptiles, amphibians, aquatic invertebrates, passerines, wading birds, and piscivorous species such as eagles, kingfishers, mink, and otter. During high flows and flood events it provides shelter and nursery areas for fish. It forms the downstream end of a travel corridor for wildlife migration and dispersal along the river; residential and commercial development south of Deer Street and northwest of the dam and railroad bridge have fragmented or eliminated these functions along the west bank of the river to Lake Michigan. Little wildlife is present east of the dam due to development (residential and industrial) and human activity.

The Manistique River contains a diverse community of native fishes thus some aquatic organisms would be expected in the project area, but no significant or unique fish / aquatic organisms or habitat is known to exist at the project site. Several types of fish are common in the river downstream of the MPI dam during specific times of the year – steelhead mainly in the spring and some in the late fall / early winter, and salmon in the fall. Lake sturgeon are also present above the dam (stocked at Big Manistique Lake) and below the dam. The MPI dam has blocked passage of desirable fish species since its construction in 1919. The USFWS performs sea lamprey control (trapping) at the project site during spawning season (typically March through July).

3.7.2 Environmental Consequences

No Action Alternative

By taking no action, there would be minimal changes to current conditions, and therefore no significant impacts to aquatic resources in the area would occur. Sea lamprey would continue to

pass the MPI dam and spawn upstream. The No Action Alternative would not likely contribute significantly to cumulative impacts to aquatic resources if the USFWS continues to chemically treat for sea lamprey larvae.

Recommended Alternative

The proposed SSP barrier and berm structure improvements, and center flume wall removal would occur in areas where there have been and continue to be historic habitat disturbances associated with the river and riverine corridor. In addition, trains traveling via the CN railroad across the proposed berm construction area would be expected to create additional disturbances. In summary, construction of the proposed SSP barrier, clay berm and center flume wall demolition is not anticipated to cause significant, direct impacts to vegetation, habitat or aquatic resources. Construction of the proposed berm will involve vegetation clearing and temporary disturbances to habitat in the vicinity of the existing concrete wall, however, the impacts would not be significant. Impacts directly related to wetlands are addressed in the **Wetlands** section above.

In-Stream (at dam and downstream of dam): There is no substantial or unique vegetation or habitat at the in-stream location of the proposed SSP barrier or downstream flume wall removal. The footprint of the proposed barrier would impact an insignificant amount of bottom land bedrock within the Manistique River, which is not currently providing significant amounts of habitat for fish or aquatic organisms. Few benthic organisms would be expected in the river at the project site due to the banks being constructed concrete walls, riverbed of bedrock, and high velocity water coming over the MPI dam. Minor, direct in-stream impacts to fish and other aquatic organisms occurring during the barrier construction and center flume wall removal would likely be limited to the work area. Fish present downstream of the MPI dam would temporarily avoid the area during construction but would return upon completion of the project.

Construction of the proposed barrier would not impact fish passage at the project site due to the presence of the existing MPI dam. The State and USFWS are interested in providing fish passage beyond the MPI dam for native, desirable species at a later date. As such, removable stoplog sections would be emplaced to accommodate construction of future fish passage on both the natural and flume portions of the river. A future fish passage structure at the barrier site could increase the possibility of both native and non-native fish movement above the dam, thus passage would likely be a trap and sort type passage. Impacts of fish passage would need to be evaluated if a fish passage structure is placed in the future.

The reduction in the number of reproducing sea lamprey as a result of the proposed action would have long-term benefits to fisheries. No significant negative impacts to aquatic resources or the area's fishery are anticipated. At this time there are no fishery restrictions related to proposed construction. Depending on when in-stream construction work is expected to occur, a public information campaign would be coordinated by the USACE or the project sponsor to help alleviate disturbances caused by potential in-stream work during peak fishing times (April and mid Sept to mid-October). Recreational fishing could be impacted during construction and is discussed below in the **Recreation** section of the EA.

Land at the Dam and Downstream: Minimal habitat is present in the immediate vicinity (landward) of the dam on both the east and west banks, and or within the proposed work and storage area west of the dam; thus, no significant impacts to habitat is anticipated in these areas. Access to the river to perform removal of the center flume wall would be via an existing gravel road on the east side of the river and / or from developed MPI property on the west side of the river; therefore no significant impacts to vegetation or habitat are anticipated in this area. The existing ditch located between the concrete wall and MPI property would be protected and not disturbed.

North of Dam: Most of the impacts to wildlife species, including reptiles, amphibians, birds, and small mammals are expected to be as a result of minor habitat loss or alteration in the area of the proposed berm. Vegetation along the existing concrete wall extending north from the dam would be cleared for construction of the proposed berm. To maintain berm and barrier effectiveness, the non-federal sponsor would be responsible to maintain the area free of large woody vegetation. To minimize impacts, all disturbed areas would be re-vegetated upon completion of the project to prevent erosion, reestablish a vegetative cover to reduce erosion and to help prevent establishment of invasive plant species.

Wildlife in the vicinity of the project site is somewhat limited due to the location within the City of Manistique. Wooded areas would remain to the northwest and wetlands would remain west and northwest of the proposed SSP barrier and continue to provide habitat. Increased water surface elevations in the upstream slough would recreate emergent wetland conditions suitable for numerous small mammals such as muskrats, mink, and raccoon at the wetland edge, feeding, resting, and nesting habitat for waterfowl, spawning habitat for northern pike and numerous amphibians and reptiles.

Construction activities would occur primarily in the river at the existing MPI dam and along the concrete wall. Some wildlife including birds and small mammals would avoid the area during construction but would return following project completion. The tree nursery located to the north currently experiences flooding during large rain events (e.g., 1% annual chance event) and the proposed action would not significantly alter conditions or increase the flood conditions to the point where major impacts to vegetation would be expected. A portion of the tree nursery near Intake Park Road may be used as a work and storage area for construction activities occurring north of the dam. It is anticipated that the work and storage area would be contained within an already disturbed area of the tree farm thus minimizing potential adverse impacts. The reduction or elimination of lampricide application to the upper portions of the Manistique River system would have long-term beneficial impacts on aquatic resources. The proposed project would not result in significant negative impacts to wildlife or aquatic resources.

3.8 Threatened and Endangered Species (T&E)

3.8.1 Existing Environment

The USACE reviewed the USFWS "County Distribution of Federally-Listed Threatened, Endangered, Proposed and Candidate Species" (revised October 2016) for Schoolcraft County,

Michigan. The Canada lynx (*Lynx canadensis*) and gray wolf (*Canus lupis*) is listed as threatened. The Canada lynx and gray wolf tend to reside in northern forests, though no resident populations of the Canada lynx or gray wolves are known to exist at the MPI dam. While the Canada lynx and gray wolf could be present in the vicinity, they would not be likely at the proposed project site. The Kirtland's warbler (*Dendroica kirtlandii*) is also listed as endangered. The preferred habitat for the Kirtland's warbler consists of large stands (> 80 acres) of young jack pine, generally 5 to 20 years old; this habitat is not present at the project site. Habitat for the endangered piping plover (*Charadrius melodus*), and threatened dwarf lake iris (*Iris lacustris*), Houghton's goldenrod (*Solidago houghtonii*) and pitcher's thistle (*Cirsium pitcher*) include beaches along shorelines of the Great Lakes, partially shaded sandy-gravelly soils on lakeshores, sandy flats along Great Lakes and stabilized dunes and blowout areas, respectively. None of these preferred habitats are located at the project site. The bald eagle was recently (circa 2007) removed from protection under the federal Endangered Species Act and Section 7 consultation with the USFWS is no longer necessary. However, the bald eagle remains protected under the Bald and Golden Eagle Protection Act. There are no known bald eagle nests in the vicinity of the project site. Since the early coordination with the USFWS, two Federally listed T&E species have been added. The species are the Northern long-eared bat (*Myotis septentrionalis*) and the Rufa Red knot (*Calidris canutus rufa*). Trees are located in the proposed clearing area necessary to construct the earthen berm. Some of the trees will be cut in the winter for berm construction. With tree cutting proposed in the winter, the USACE has determined that the work may affect but not likely to adversely affect the Northern long eared bat. The USACE has initiated consultation regarding impacts to the Northern long eared bat with the USFWS using the Rule 4(d) streamlined consultations process. The site does not contain substantial suitable habitat for the Rufa Red knot.

3.8.2 Environmental Consequences

No Action Alternative

By taking no action, there would be minimal changes to current conditions, and therefore no impacts to federally listed species in the area would occur. The No Action Alternative would have no effect on federally listed species, and would not contribute to cumulative impacts to federally listed species.

Recommended Alternative

Habitat for Federally listed endangered, threatened or candidate species is not considered likely to be present in the area where the project is to take place except for the Northern long-eared bat. Any tree cutting will be conducted in the winter months and therefore have a "may affect but not likely to adversely affect" the Northern long-eared bat. The USACE determined the project would likely have *no effect* on federally listed species and / or critical habitat based on coordination with the FWS (see Section 5, Agency Coordination updated August 3, 2016). However, the project is being re-coordinated with the USFWS under Rule 4(d) as may affect but not likely to adversely affect the Northern long eared bat based on vegetation clearing during the winter months. The USFWS concurred in an email dated March 16, 2018.

According to the Michigan Natural Features Inventory (MNFI) database, osprey nests have occurred in the Jamestown Slough, north of the project area, and loon nests were documented on the Lake Michigan shoreline. The most recent reports for both species in the area occurred in the 1990s. Nest habitat may be present within the project area for ospreys, which are a state bird species of special concern. Loons, a state-threatened bird species, usually nest along lake shores, in protected bays, where dense vegetation extends to the water's edge. The closest likely nest habitat for loons would probably be some of the protected waters of Jamestown Slough. The project would not be expected to directly impact loons. Ospreys utilize a variety of habitats for breeding and feeding, including swamps and forested shorelines. Nest sites must be in openings, near shallow water, and have an adequate supply of fish within 10-20 kilometers (MNFI Fact Sheet, 2007). The project site may contain adequate nest habitat for ospreys, though previously documented sightings were upstream in Jamestown Slough. Ospreys may use the site for roosting and fishing in the river. If impacts occurred from construction noise, the impacts would be short-term and minor.

The ebony boghaunter's (a dragonfly that is a State insect species of special concern) habitat requirements are not well known, though it appears to prefer sphagnum bogs, and northern swamps with sphagnum pools adjacent to upland conifer and deciduous forests (Massachusetts Division of Fisheries and Wildlife, 2008). The reported observation occurred in 1960. The proposed berm construction area did not contain sphagnum communities, however available literature did not indicate this is a limiting factor for the ebony boghaunter. No significant impact to the ebony boghaunter is anticipated as the amount of disturbance for the proposed project is minor compared to remaining wetland habitat in the vicinity.

MNFI records for occurrences of the calypso orchid and greenwhite sedge, both state-threatened plant species, are from 1916 and 1920, respectively. Calypso orchids prefer shade, and can be found in conifer swamps and in drier cedar-fir thickets along the Great Lakes, especially in calcareous soils. They also inhabit hummocks in bogs (MNFI, 2004). Greenwhite sedge prefers sandy soils, in openings associated with clearings, fields, bogs, and prairies (Ohio Department of Natural Resources, 2001). The wetland located in the north area of proposed berm construction may be suitable for both of these species. Neither species was observed during the wetland delineation, however both can be difficult to locate. The potential for occurrence is low due to habitat present at the site.

3.9 Exotic and Invasive Species

3.9.1 Existing Environment

The sea lamprey is an invasive, predatory fish species from the Atlantic Ocean. They existed throughout the St. Lawrence Waterway and Lake Ontario but are thought to have gained access to the upper four Great Lakes after the Welland Canal and associated canal system was constructed in the late 1800s. The mortality caused by the sea lamprey, combined with intense fishing pressure and spawning habitat destruction, resulted in the dramatic decline of many native fish species in the Great Lakes and significantly damaged other fish stocks. In response, the GLFC was formed during 1955 as a coalition between the United States and Canada to rehabilitate the fishery in the Great Lakes and coordinate research and control efforts for sea

lampreys. Since the 1950s, the GLFC has contracted the USFWS and the Canadian Department of Fisheries and Oceans to deliver the sea lamprey management program. Sea lamprey management is a critical fishery management action in support of objectives identified in the 1980 Joint Strategic Plan for Management of Great Lakes Fisheries and subsequent revisions. A massive chemical control effort was implemented in the 1950s. The primary sea lamprey control method continues to rely on the application of lampricides to streams to kill larval sea lampreys before they transform into parasites. This management effort continues today, though integrated management methods, such as barriers and traps, is widely accepted as being the preferred approach.

Sea lamprey live, breed, and thrive within the Great Lakes watershed. Mature adults migrate into streams to spawn from late March through July. Adults die after spawning and the larvae (ammocoetes) that develop from the eggs take up residence in the stream bottom. The ammocoetes feed on organic debris and algae present in the stream until they transform to their adult parasitic form and return to the lakes after an average of approximately 3 to 6 years. After returning to the lakes they attach to large fish such as salmon (*Oncorhynchus spp.*) and lake trout (*Salvelinus namaycush*) to feed on body fluids as parasites. During their life as a parasite, a single sea lamprey kills 40 or more pounds of fish.

Since the proposed project at Manistique is at an existing dam upstream of the rivermouth of the Manistique River, any aquatic nuisance species found in the Great Lakes that moves solely through the aquatic pathway must possess either: 1) self-propelled mobility or 2) the ability to "hitchhike" on other organisms to travel upstream. This eliminates organisms that rely on current for dispersal such as plants and algae. Ruffe (*Gymnochephalus cernuus*), threespine stickleback (*Gasterosteus aculeatus*), round goby (*Neogobius melanostomus*) and tubenose goby (*Proterorhinus marmoratus*) are invasive fish species that are found in the Great Lakes. The ruffe, three spine stickleback, round goby and tubenose goby are associated with river mouths and estuaries of large river systems. Literature from Europe and Russia indicate the ruffe and tubenose goby do inhabit upper river systems but no ruffe or tubenose goby have been collected locally in any upper Great Lakes river tributaries to date. Three spine stickleback have been collected in a very few upper river locations. The round goby has been found in small numbers in upper river systems across Michigan but this species is not anticipated to be a significant problem in the Manistique River due to the existing MPI dam barrier.

Invasive plant species were observed mostly confined to areas west of the existing concrete wall, and near/along the railroad and surface streets, and remain limited in the area north of the railroad and east of the concrete wall, likely a result of extensive natural wetlands and sloughs upstream, and minimal human activity due to the terrain and dense vegetation. In general, most of the upland areas contained some non-native species, including invasive species commonly associated with disturbed soils. At Intake Park Road (extreme north end of the project area), reed canary grass was observed along the existing roadside ditch, and extended across the north project boundary. South of the railroad, and west of the concrete wall, an area of glossy buckthorn was observed in the area between the ATV trail and the railroad. Spotted knapweed was observed in uplands south of the railroad. South of the railroad, and east of the concrete wall, the woody species were dominated by boxelder (*Acer negundo*) - a native species that can be considered invasive. Cattails were scattered throughout the wetlands, in deeper water areas;

however, it could not be determined whether it was the native (*Typha latifolia*) or the non-native invasive (*T. angustifolia*). In general, the wetland area north of the railroad, on the east side of the concrete wall, was the least-affected area for non-native invasive species.

3.9.2 Environmental Consequences

No Action Alternative

By taking no action, there would be minimal changes to current conditions and no significant impacts to exotic and invasive species would be expected; however, the sea lamprey would continue to breach the dam and spawn upstream. This alternative would not likely contribute significantly to cumulative impacts to exotic and invasive species if the USFWS continues to chemically treat for sea lamprey larvae.

Recommended Alternative

Reducing sea lamprey numbers in the Great Lakes is a multi-agency and State of Michigan goal to help protect the Great Lakes fishery and ecosystem. The recommended alternative would restrict passage and subsequent spawning, and increase trapping efficiency of the invasive and biologically damaging sea lamprey at the MPI dam. The action would also reduce or eliminate the need for the USFWS to continue costly chemically treating for sea lamprey larvae upstream of the MPI dam. The impacts from the proposed action would negatively affect the sea lamprey, and beneficially affect Lake Michigan and the Great Lakes' aquatic resources.

A future fish passage structure at the barrier site would increase the possibility of both native and non-native fish movement above the dam. An analysis which considers and weighs the potential benefits of passing native species and the potential risks related to passing invasive species, disease and contaminants would need to be conducted prior to constructing a fish passage structure; refer to Section 3.15.2 for additional discussion related to cumulative effects of potential future fish passage. Based on presence of the existing dam and no current fish passage, the proposed action would not significantly change the distribution or impacts from *Viral hemorrhagic septicemia* virus (VHSv), a fish virus prevalent in the Great Lakes that has been excluded from many rivers upstream of the first dam. Best Management Practices (BMP's) and special equipment handling would be implemented to reduce the transport of invasive plants by seed. BMPs may include off-site power-washing of machines and equipment prior to being transported to the site and revegetating disturbed areas with regionally appropriate species to help prevent establishment of non-native and invasive plant species.

3.10 Cultural Resources

3.10.1 Existing Environment

In compliance with Section 106 of the National Historic Preservation Act of 1996 and Executive Order 11593 (Protection and Enhancement of the Cultural Environment, May 1971), the NRHP and the SHPO have been consulted. The project site, including the dam and existing concrete wall area, has been reviewed for historic and cultural resources. No known historic properties

listed on or eligible for listing on the National Register, or archeological sites / items are known to be located in the area of the proposed project site.

3.10.2 Environmental Consequences

No Action Alternative

By taking no action, there would be minimal changes to current conditions, and therefore no impacts to cultural resources in the area would occur. The No Action Alternative would not contribute to cumulative impacts to cultural resources.

Recommended Alternative

In compliance with Section 106 of the National Historic Preservation Act of 1996 and Executive Order 11593 (Protection and Enhancement of the Cultural Environment, May 1971), the NRHP and the SHPO was consulted in December 2010. Subsequent coordination occurred in March 2012 and May 2012 to address the berm feature. The USACE has reviewed the project site for historic and cultural resources. No known historic properties listed on or eligible for listing on the National Register, or archeological sites / items are known to be located in the area of the proposed project site. Per SHPO response letters dated January 2011 and June 2012 (**Attachment C**), "no historic properties are affected within the area of potential effects of this undertaking." The site was previously disturbed by original construction of the MPI dam, flume walls and west concrete wall. Construction contracts would include clauses protective of any discovered cultural resources. If any unusual sites / items that may have historical value are encountered during the course of proposed construction, work would stop and the sites / items would be protected while the appropriate authorities, including the District archeologist, are contacted. It is not anticipated that the proposed construction of a sea lamprey barrier would affect cultural resources.

3.11 Noise and Traffic

3.11.1 Existing Environment

Noise in the vicinity of the project site is typical of that found in a mixed use industrial / residential area near a small to medium sized downtown. Downtown Manistique is located south of the project site. The area south of the dam is occupied by the MPI facility, the area southeast of the dam is developed as residential and northeast is vacant industrial property. The area north and southwest is relatively undeveloped and mostly wooded. Although the MPI dam is no longer used for power supply it gives off associated sounds related to presence of a dam, such as rushing water. An anticipated noise range which would be considered typical during the day in the vicinity of the dam would be 60-75 decibels (dB). The table below presents noise levels in relative terms for interpretation.

Table 2: Approximate Sound Levels and Human Response.

Overall Noise Level (dBA)	Common Sounds	Effect
0		Threshold of hearing
10-30	Just audible to soft whisper at 15 feet	Negligible to very quiet
40	Bird calls	Very quiet
50	Light auto traffic at 100 feet	Quiet
60	Air conditioning unit at 20 feet	Intrusive
70	Noisy restaurant, passenger car at 65 mph, freeway traffic at 50 feet	Moderately loud, telephone use difficult
80	Alarm clock at 2 feet, food blender or garbage disposal	Annoying
90	Power mower, heavy truck at 50 feet or city traffic	Very annoying
100-110	Garbage truck / pile drivers, rock band	Very loud, very annoying, difficult to hear talking
120	Jet takeoff at 200 feet or auto horn at 3 feet	Uncomfortably loud, maximum vocal effort necessary

Access roads to the dam are present on both sides of the river. Traffic on both roads is relatively light as the site is not along a highway, not densely developed, and is located north of downtown. Boat traffic in the Manistique River at the project site is restricted by the dam; the presence of the dam prevents navigation at the project site.

3.11.2 Environmental Consequences

No Action Alternative

By taking no action, there would be minimal changes to current conditions, and therefore no significant impacts to noise and traffic resources in the area would occur. The noise level would remain the same, with a range of approximately 60-75 db. The No Action Alternative would not contribute to cumulative impacts to noise and traffic resources.

Recommended Alternative

Temporary and minor noise and traffic disturbances would occur from the presence and operation of heavy machinery during the proposed construction activities, they would not be significant or long-term. Effects beyond the site are not expected to exceed levels necessary for the protection of public health and welfare, which is typically identified as 70 db for NEPA assessments based on EPA publications. The closest residential structures are about 200 feet east of the eastern edge of the dam and parallel to the center flume wall. Intensity of noise decreases with increased distance from the source due to the spreading of the sound energy over an increased area. As distance doubles, the noise level decreases by approximately 6 dB. The table

below represents approximate noise levels that would be expected during construction activities.

Table 3: Predicted Noise Associated with Construction Activities.

Construction Equipment	Approx. Noise Level at Operator (dBA)		Predicted Average Noise Level at Various Distances from Source (dBA)									
			Distance from Source (feet)									
Distance from source (ft):	**5**		**10**	**20**	**40**	**80**	**160**	**320**	**640**	**1,280**	**2,560**	**5,120**
	Average	**Range**	**Average (dBA)**									
Backhoe	86	79-93	80	74	68	62	56	50	44	38	32	26
Bulldozer	96	89-103	90	84	78	72	66	60	54	48	42	36
Roller	90	79-93	84	78	72	66	60	54	48	42	36	30
Grader	89	82-95	83	77	71	65	59	53	47	41	35	29
Truck	96	89-103	90	84	78	72	66	60	54	48	42	36
Crane	100	97-102	94	88	82	76	70	64	58	52	46	40
Generators	< 85		78	72	66	60	54	48	42	36	30	24
Pile Driver (diesel)	98	82-105	92	86	80	74	68	62	56	50	44	38

Predicted noise levels would continue to decrease at distances further from the noise source. Levels would fluctuate throughout the day during construction and could be impacted by intervening buildings, vegetation, wind direction, and atmospheric conditions. The proposed project is relatively small scale in the sense that it would involve the use of only a few pieces of equipment at a time (i.e., a crane, couple excavators, and trucks delivering supplies / removing concrete / metal waste, etc.). Based on this analysis, excessive noise above what might be considered typical in the project vicinity is not anticipated for any prolonged duration. Potential effects from noise would be minimized by ensuring that construction activities would only occur during times of the day designated by the City.

Construction activities such as initial mobilization for the project, transport of materials to the construction site, and transport of waste materials off-site (e.g., demolished concrete or rock, etc.) would cause general traffic in the area to be heavier than normal, but impacts would be short-term, minimal and not have significant effects. All equipment and / or materials hauled to and from the project site would use approved hauling routes and abide by local, state, and federal hauling requirements. The contractor would be required to coordinate with the local authorities regarding use of access routes and obtain the appropriate permit(s), if necessary. Access to the project site for the SSP barrier and berm construction would be via the west bank; it would be from the east and / or west bank for center flume wall demolition. The MPI dam currently prevents navigation upstream and downstream at the project site; therefore construction activities would not interfere with navigation.

Once constructed, there would be negligible noise and traffic associated with operation of the proposed sea lamprey barrier and traps. Minor noise may be associated with operating the

generators / hoists to empty the sea lamprey traps during peak trapping season from March through July; however it would not be significant in comparison to the existing noise associated with the dam and industrial activities that currently occur in the vicinity. Generator noise is anticipated to be in the range of 50-70 db for approximately 1 hour run time per day when used. Additional traffic is anticipated during peak sea lamprey trapping season. Traffic may include 1-2 pick-up trucks daily to check traps during peak trapping season (lasting approximately 8-9 weeks each year). A 1-1/2 ton fish truck would visit the site approximately 3-4 times a week during peak trapping season to transport lamprey off site that have been removed from the traps. Trucks associated with trapping would access the project site from the west bank.

3.12 Coastal Zone Management, Floodplains & Hydrology

3.12.1 Existing Environment

Coastal Zone. The farthest downstream section of the lower flume wall removal is located approximately 100 feet north of the Coastal Zone Management Boundary as indicated by the MDEQ Coastal Zone Boundary Map for Manistique Township in Schoolcraft County.

Floodplains & Hydrology. The FEMA National Flood Insurance Program (NFIP) Flood Insurance Rate Map (FIRM) for Manistique, Michigan (circa December 5, 1990) indicates that the project site and dam are located within the floodplain established by FEMA. The existing conditions hydraulic model that was created for this study shows that the existing conditions water surface elevations are actually lower than the effective Flood Insurance Study (FIS) elevations. This is due to the physical changes that were made to the dam and center flume wall by MPI but had not been incorporated into a revised model or FIRM. Refer to Appendix B, Hydraulic Engineering Appendix of the USACE DPR for copies of the effective FIRM, the 1% annual chance floodplain delineation from the existing conditions hydraulic model, and additional information related to existing conditions.

The west concrete wall provides protection to the City of Manistique during the 1% chance flood event. USACE engineers conducted a conditions assessment of the concrete wall in fall 2011. The wall is in extremely poor condition with deteriorating concrete, several large cracks and occasional vegetation growing out of crevices. A ditch is located between the concrete wall and MPI property along the west bank of the river in vicinity of the proposed center flume wall removal (**Figure 20**).

3.12.2 Environmental Consequences

No Action Alternative

By taking no action, there would be minimal changes to current conditions, and therefore no impacts to coastal zone management and floodplain resources in the area would occur. Water surface elevations would remain at current levels with all dam gates permanently open. It is anticipated that the existing west concrete wall would continue to deteriorate and potentially fail; causing floodplain impacts and potentially allow additional routes for the sea lamprey to travel upstream. The No Action Alternative would not contribute to cumulative impacts to coastal

zone management, but could contribute to minor cumulative impacts to floodplain resources.

Recommended Alternative

Coastal Zone. The proposed sea lamprey barrier would be constructed north of the MDEQ identified Coastal Zone, thus the proposed action would be "consistent to the maximum extent practicable" (as defined in 16 USC 1456, Coastal Zone Management Act, approved 1978) with the Michigan Coastal Zone Management Plan. Direct impacts to the coastal zone from the proposed construction of the SSP barrier are very minor and would not be detectable at the coastal boundary. The indirect positive effects to the coastal zone from the removal of adult spawning phase sea lamprey from the proposed SSP barrier construction would be improvement of the overall lake fishery through lessened fish predation and destruction of the adult fish.

The Manistique River is defined as an inland water under Part 301 of the Natural Resources and Environmental Protection Act (NREPA) 1994 P.A. 451, as amended. The entire project is located outside of the Coastal Zone of Michigan's Coastal Management Program. No dredging or filling will occur within the coastal zone and no impacts or effects will occur to the lower Manistique River or Lake Michigan from sedimentation resulting from berm construction or the project. The USACE has analyzed the proposed action with respect to the following enforceable policies of the State of Michigan Coastal Program as described above being Parts 31, 91, 301, and 303. Parts 301, Inland Lakes and Stream and 303, Wetlands Protection require evaluation if fill material is placed in wetlands or on bottomlands. The berm and SSP barrier work area is upstream of the coastal boundary and soil erosion control practices are included with the reconstruction to stabilize the fill and minimize erosion. Therefore, no sediments will migrate downstream to the coastal zone and as such no fill will be deposited within the coastal boundary. Therefore, the applicable state enforceable policies of Parts 301 and 303 do not apply to CZM as no fill is deposited into the waters within the coastal boundary. Similarly, placement of concrete fill to anchor the SSP barrier within the bedrock trench, removal of bedrock and construction of the permanent lamprey trap on bottomlands does not cause an effect within the coastal boundary. With the soil erosion control measures in place for berm construction, the work will comply with Part 91, Soil Erosion and Sedimentation control requirements and have no effect on the coastal zone. The proposed work may have a positive effect on the fishery within the Great Lakes. The proposed work does not cause a harmful interference with flows in the coastal boundary so no further evaluation is required under Part 31, Water Resource Protection for the discharge of river waters into the coastal zone. With the inclusion of silt screens around the berm work area and flow diversion through culverts for the temporary causeway, phased construction and isolating work areas, the USACE has determined the project will have no effect on the designated coastal zone and the proposed work is consistent to the maximum extent practicable with Michigan Coastal Zone Program. Removal of the concrete flume wall is upstream of the coastal zone and requires evaluation under Part 301, Inland Lakes and Streams for removal of a structure from bottomlands. The concrete flume wall will be chipped and hauled away from the river leaving no fill materials on the bottomlands. Therefore this work will have no effect on the coastal zone.

The USACE has determined that the proposed work will have "No Effect" on any coastal use or resource under the state enforceable policies being Parts 31, 91, 301 and 303 of Natural

Resources and Environmental Protection Act (NREPA) 1994 P.A. 451, as amended. The CZMA consistency determination conducted by the USACE concluded that this project has "No Effect" on the state designated coastal zone. The proposed work will not be injurious to the public interest and the work will occur on publically owned MDNR lands.

All of the proposed project work will occur outside, i.e., upstream of the existing Coastal Zone as indicated on the MDEQ Coastal Zone Boundary Map for Manistique River in Schoolcraft County. Per 15 CFR 930.33(c), federal agency activities outside of the coastal zone are subject to Federal agency review to determine whether they affect any coastal use or resource. The USACE assessed the potential for coastal impacts of the project through the evaluations conducted for this EA and 404(b)(1) evaluation and has determined that implementing the proposed project will have no effects on coastal uses or resources. The USACE has determined that the proposed work will have "No Effect" on any coastal use or resource under the state enforceable policies being Parts 31, 91, 301 and 303 of Natural Resources and Environmental Protection Act (NREPA) 1994 P.A . 451, as amended. The CZMA consistency determination conducted by the USACE concluded that this project has "No Effect" on the state designated coastal zone.

Floodplains & Hydrology. Hydraulic analysis was conducted to evaluate existing conditions, conditions of proposed alternatives, and the potential floodplain impacts of the proposed action. The proposed construction of a sea lamprey barrier in the Manistique River requires occupancy and development in the stream and adjacent floodplain. The barrier would operate at a fixed height year-round to prevent upstream movement of sea lamprey. **Figure 10** is a Geographic Information System (GIS) enhanced composite of a 1993 aerial image and a 2012 aerial image of the upstream pool and wetland area. The blue hatching depicts the inundated water area (approximately 300 acres) from 1993 when the paper mill dam was in operation; MPI permanently opened the dam gates circa 1994.

Hydraulic studies indicate that there would be a permanent increase in low-flow and flood water levels and that the floodplain inundation upstream of the proposed barrier would be altered by the proposed action. The proposed sea lamprey barrier will raise the average water surface elevation for normal flow conditions approximately 2 feet in the Jamestown Slough area located upstream of the MPI dam which would inundate areas that were inundated when the dam was in operation prior to 1994 (see blue hatched area identified on **Figure 10**). Almost all of this inundated area is shown as open water on USGS topographic maps of the region (**Figure 25**). Approximately 96% of the inundated area is within state-owned land; the land type is mainly wetlands (slough area). These land types are similar to that which would currently be inundated during a 1% flood frequency under current conditions. The impacts to the floodplain would be minor due to the undeveloped and non-human inhabited nature of the lands.

The historic pool elevation in the slough area (during dam operations) was an average of approximately 606 feet during normal flow conditions (see blue line on **Figure 10**). From our existing conditions hydraulic model, the water surface elevation in the slough area is an average of 601 feet during normal flow conditions (March-June) and approximately 601.4 feet during the 99.9% event (1-year event). The proposed water surface elevations in the slough area during

normal flow conditions (March-June) would be approximately 603 feet NAVD88 (see white line on Figure 10) and approximately 603.3 feet for the 99.9% event.

The proposed 1% annual chance water surface elevations are higher than the existing conditions water surface elevations upstream of the proposed berm barrier, but they are still lower than the effective Flood Insurance Study (FIS) elevations. The proposed project berm required to maintain the upstream pool elevation for the 6.67% design event would contain the 1% annual chance event; while this would not be a flood protection levee designed to Federal Emergency Management Agency (FEMA) standards (i.e., it would not provide the required freeboard or account for uncertainty), it would mitigate potential overland flooding upstream of the dam. Refer to Appendix B, Hydraulic Engineering Appendix of the USACE DPR for the 1% annual chance floodplain delineation from the proposed conditions hydraulic model and additional information related to the proposed conditions.

The increase in flood water levels has been mitigated through minimization measures. Actions taken to minimize the impact include locating the proposed barrier in the immediate vicinity of the existing dam and minimizing the proposed barrier height. Construction of a barrier at various locations upstream and downstream of the existing dam was considered. Based on the potential impacts to the area floodplain, as indicated in hydraulic modeling studies, the preferred barrier construction site is at the MPI dam because it would result in the least amount of impacts on the floodplain. The temporarily demolished west and center flume walls near the dam for construction access would be stabilized should a potential flood event occur. Upon completion of the project, the access ramp and temporary construction causeway would be removed and the west flume wall would be replaced and a stoplog structure would be constructed at the center flume wall at the barrier. The existing ditch located between the concrete wall and MPI property would be protected and not disturbed.

Although the project site is located within the floodplain, the proposed action complies with the Federal Executive Order on Floodplain Management (E.O. 11988) because there is no practicable alternative to construction in the floodplain, nor would the project encourage floodplain development.

3.13 Social Setting and Environmental Justice

3.13.1 Existing Environment

The local economy is mainly supported by tourism. The Manistique Harbor is active with a marina and sport fishing. An annual fishing derby attracts hundreds of fishermen in mid-July. The City of Manistique's population was approximately 2,983 people in 2014. The residences identified themselves as 86% White, 10% American Indian and Alaskan Native, 4% two or more races, and 1% a combination of African American, Asian or other races (2010 U.S. Census). Schoolcraft County had a population of approximately 8,495 people per the 2010 U.S. Census. The median household income in Manistique for 2014 is estimated at $25,654 U.S. dollars. Approximately 16% of the total Schoolcraft population falls below the poverty level (as identified by the U.S. Census as approximate income of $11,500 per year for a single person and

approximate income of $23,000 for a family of four), while approximately 26% of under age 18 in Schoolcraft County falls below the poverty level. Manistique makes up approximately 36% of Schoolcraft County's population, thus it can be estimated that approximately 5-10% of the City of Manistique population may fall below the poverty line. The State of Michigan has a total population of approximately 9.9 million people per the 2010 U.S. Census, with a median household income of approximately $45,400 and approximately 17% of individuals below the poverty level.

In general, population is heaviest in the city with much of the surrounding land undeveloped and occupied by forests and occasional farmland. Historic uses of the Manistique River and harbor include shipping, fishing, saw mills, paper mills and various small industries. Land north of Manistique was heavily logged in the 19th century, but has re-grown into forests. Aesthetics within the vicinity of the project site is typical of that found in a mixed use industrial / residential area near a small to medium sized downtown.

Several principles were considered while evaluating the proposed action for environmental justice to evaluate if the recommended alternative would cause disproportionately high and adverse effects on low-income, minority and tribal populations. These included consideration such as the human composition of the affected area (e.g., low-income and minority groups), recognizing the interrelated cultural, social, occupational, historical, or economic factors that may amplify the natural and physical environmental effects of the proposed action, and coordination with local Tribes. In addition, the public will be encouraged to participate in the decision making process via pubic review and comment on this EA.

3.13.2 Environmental Consequences

No Action Alternative

By taking no action, there would be minimal changes to current conditions, and therefore no impacts to community cohesion, desirable community growth, tax revenues, property values, public facilities, public services, regional growth, employment or the labor force, business and industrial activity, or human-made resources; nor would the project cause displacement of people or a disproportionately high and adverse effect on low-income, minority, tribal or child populations. It is expected that the USFWS would continue treating the river for sea lamprey. The dam would continue to deteriorate and could increase the number of sea lamprey moving upstream. The No Action alternative does not provide for sea lamprey control, and taking no action could result in additional sea lamprey passage over time that could require additional treatment. Since one of the goals of this action is to reduce or eliminate chemical treatment for sea lamprey in the Manistique River, the need to continue or potentially increase chemical treatment is not desirable.

Recommended Alternative

The presence and operation of such construction equipment would not significantly affect the social setting of the area at the dam, as the general area is industrial and / or undeveloped and any effects would be minor and short-term. Annoyance resulting from construction activities

involves the subjective responses of individuals. Construction activities would only occur during times of the day designated by the City. Based on coordination with the DNR, the public will be notified of proposed construction dates as it relates to fishing due to the popularity of this activity in Manistique. In addition, the City of Manistique has been involved in the planning for this project. Coordination of the proposed action was conducted with tribal governments early in the planning process, as well as receipt of this EA for review and comment. The proposed barrier would reduce or eliminate the need for chemical sea lamprey treatment upstream of the MPI dam and provide a beneficial impact to users of aquatic resources in this area since non-chemical treatments are typically preferred by the public.

The proposed project would not have a significant impact on community cohesion, desirable community growth, tax revenues, property values, public facilities, public services, regional growth, employment or the labor force, business and industrial activity, or human-made resources; nor would the project cause displacement of people. The action would not cause disproportionately high and adverse effects on low-income, minority, tribal or child populations. No families or residential structures would be removed or displaced with the proposed action.

3.14 Recreation and Climate Change

3.14.1 Existing Environment

Recreational boating, fishing, and other leisure activities are popular in Lake Michigan and Manistique Harbor. Fishing occurs on the Manistique River upstream and downstream of the MPI dam; however, boating is and has been restricted since the early 1900's due to the presence of the dam at the project site. No recreational use is known to exist at the existing dam or project site, with the exception of some ATV / snowmobile traffic along the existing gravel access trail extending north from the dam (**Figure 21**) and some recreational fishing downstream of the dam. Physical setting discusses local climate. When the MPI dam was operational, an extensive warmwater fishery existed in Jamestown Slough, a 300 acre backwater impoundment located upstream created by the dam. A boat launch located on the south riverbank upstream of the dam provided small boat access to Jamestown Slough. When the MPI dam gates were opened and the water was lowered in the 1990's, use of the boat launch diminished greatly as boat traffic is confined to very shallow draft vessels operating within the main channel and the slough has reverted to emergent vegetation.

3.14.2 Environmental Consequences

No Action Alternative

By taking no action, there would be minimal changes to current conditions, and therefore no impacts to recreation resources in the area would occur. The No Action Alternative would not contribute to recreation resources.

Recommended Alternative

Some recreational use of the river immediately downstream of the dam (e.g., fishing, wildlife

viewing) could be impacted during construction activities. Disturbances would be minor and short-term. Depending on when in-stream construction work is expected to occur, a public information campaign would be coordinated by the USACE or the project sponsor to help alleviate disturbances caused by potential in-stream work during peak fishing times (April and mid Sept to mid-October). Construction and presence of the sea lamprey barrier would not significantly impact recreation or tourism in the Manistique vicinity. Conditions and restrictions would not vary significantly from that caused by the existing MPI dam. ATV use of the trail would be restricted during construction activities. The access trail along the concrete wall would be replaced with the proposed berm. Recreation would not be permitted on the berm. Some recreation within the vegetation-free zone (area where vegetation is restricted to grasses) would be acceptable depending on width of the zone and the proposed use (e.g., non-destructive). This property is privately owned but is anticipated to be held in fee simple by the Michigan DNR that would determine appropriate recreational use and be in accordance with USACE berm guidelines.

No Action Alternative

By taking no action, there would be minimal changes to current conditions, and therefore no impacts to climate in the area would occur. The No Action Alternative would not contribute to climate change.

Climate Preparedness and Resiliency: Executive Order 13653 *Preparing the United States for the Impacts of Climate Change* of November 1, 2013, requires the Federal Government to build on recent progress and pursue new strategies to improve the Nation's preparedness and resilience by modernizing Federal programs, planning for climate preparedness and resiliency related risk, managing lands and waters for climate preparedness and resiliency risk, and providing and sharing information, data and tools for climate preparedness and resilience.

To this end, the USACE has directed that all water resource planning decision documents include considerations regarding possible climate preparedness and resiliency impacts to the project being studied for development. A more thorough discussion is presented in the DPR.

Global climate change is expected to lead to six major types of (physical) changes in the Great Lakes basin: 1) increased annual averages in air and surface water temperatures (with greater extremes in hottest temperatures), 2) increased duration of the stratified (thermocline) period, 3) changes in the direction and strength of wind and water currents, 4) flashier precipitation (increases in the intensity of storms and drier periods in between) and river flows, 5) greater variation in annual ice cover/greater water surface evaporation/larger lake effect snow events, and 6) greater variations in lake levels. The work will not affect the local climate or have a measurable impact on the climate.

It is anticipated that climate preparedness and resiliency will have minimal impact on the operation of the local area or Manistique River or the operation of the sea lamprey traps or barrier. Of greater likelihood is the potential decline in the Manistique River stage caused by more frequent drought and the subsequent increase in river water temperatures, which would not

have a near-term impact on lamprey spawning or any other portion of their life-cycle aside from a potentially earlier spawning run. Seasons and water temperatures directly affect when spawning-phase sea lamprey enter streams in the spring to spawn. Use of permanent traps would not be affected by fluctuating water temperatures because the USFWS would be able to install traps into the trapping complex earlier or later to account for variability in the timing of spawning runs.

Recommended Alternative. The recommended alternative is Alternative 1, construction of the SSP barrier, earthen berm, installation of permanent lamprey traps and removal of bedrock and the center flume wall will not measurably affect climate change .

3.15 Cumulative Effects

This section presents the recent, present and foreseeable future projects that were considered during the assessment of cumulative effects of each alternative. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time. Principles of cumulative effects analysis are outlined in the CEQ guide "Considering Cumulative Effects under the National Environmental Policy Act" (CEQ, 1997) which states: "for cumulative effects analysis to help the decision maker and inform interested parties, it must be limited through scoping to effects that can be evaluated meaningfully."

The potential for cumulative effects on the environment from the project alternatives were evaluated by reviewing available data such as historical aerial photographs and reports to identify recent projects, and by reviewing ongoing and planned projects within the vicinity of the proposed project areas that could affect the same environmental resources as each alternative. Actions that were considered include construction and other sea lamprey control projects that were recently completed, are currently underway, or are programmed to occur within the near future. Cumulative effects are described for each resource area in the following sections.

3.15.1 Recent, Present, and Reasonably Foreseeable Future Projects

Michigan DNR Fish Passage: The MDNR has requested that the proposed SSP barrier be designed to accommodate construction of a future fish passage facility. At this time, the MDNR has not indicated any anticipated date that they would implement fish passage at the proposed barrier site at the MPI dam. The USFWS is aware of the MDNR's desire for fish passage in Manistique. Construction of a fish passage structure at the barrier site could result in additional beneficial and detrimental cumulative effects to fish species. The USFWS and MDNR would engage in and facilitate development of a risk assessment or structured decision process prior to constructing a fish passage structure to protect the upper Manistique River and watershed from invasive species, disease and contaminants.

GLFER Sea Lamprey Barrier / Trap Projects: Several locations are being considered for potential studies to place a barrier and / or barrier / trap: St. Mary's River, MI, Cheboygan River, MI, White River, MI, AuSable River, MI, Muskegon River, MI, Little Manistee River, MI, Saginaw River tributaries, MI, and Bad River, WI.

USACE Federal Navigation Channel (FNC) Dredging: Critical shoals within the Federal Navigation Channel (FNC) were mechanically dredged at Manistique Harbor in 2011. Approximately 105,000 cubic yards of material was placed at a nearby contractor furnished unrestricted upland site. In the fall of 2016, approximately 40,000 cubic yards of sediment characterized by the testing data as suitable for unrestricted upland placement were dredged from the a portion of the upstream section of the Federal channel and placed upland at a city owned site located northeast of town.[1] The USACE is working with the EPA to conduct additional sediment sampling within the FNC as part of delisting the Manistique AOC.

EPA / NOAA Investigation: The EPA and NOAA are investigating PCB and other contamination in the harbor and lower 0.5 mile of the Manistique River. They sampled the harbor in 2012 and are currently evaluating the results. The EPA and NOAA anticipate implementing remediation dredging at the harbor in FY17 to remove sediment containing higher levels of PCB contamination. Some remediation dredging occurred in 2017.

Flume Wall Removal: Flume wall removal downstream of the MPI dam is part of the project. Hydraulic analysis shows that complete removal of the center flume wall would not negatively impact the proposed sea lamprey barrier project. The center flume wall removal would decrease the water surface elevation for the 6.67% annual chance (25-year) event on the flume side by less than 6 inches and thus is a component of the overall project design.

The City of Manistique operates utilities in the vicinity of the proposed project, near the concrete wall and dam. No major utility or infrastructure improvements are planned near the proposed project. Activities that are expected to occur may include vegetation clearing, minor maintenance, and emergency access. No impact from these activities is expected to affect the proposed project, nor is the proposed project expected to impact any City projects. The City of Manistique has been involved in planning of this project. In addition, per the City, no developments or improvements in the vicinity of and north of Weston Road are planned due to classification of this area as a flood zone.

3.15.2 Evaluation of Cumulative Effects on Resources

No Action Alternative

The No Action alternative would not have a significant impact on cumulative effects from recent, present, or reasonably foreseeable future projects. Fish passage has been impeded by the MPI dam since 1919. If no action was taken at this time, the dam could conceivably deteriorate to a point where fish passage for sea lamprey would continue, but passage for native, desirable species would also be possible. The time for such deterioration would likely take many decades since the most recent dam safety inspection report (circa 2006) indicates that the dam structure is in good condition.

Without construction of the proposed SSP barrier, the invasive and biologically damaging sea lamprey would continue to bypass the MPI dam and access suitable and preferred spawning and

1 Environmental Assessment, Upland Dredge Material Placement, Manistique, Michigan dated June 2016.

larval habitat upstream. Sea lamprey passage could increase if the dam deteriorates. Access to spawning and larval habitat would lead to a potential increase in sea lamprey numbers, and continued and possibly increased need for sea lamprey chemical treatments. Though chemical treatments are successful in reducing sea lamprey numbers, they are known to be particularly expensive at this site and may have negative impacts to the ecosystem.

Recommended Alternative

The recommended alternative would have negligible to minor impacts to the majority of resources, and minor (long-term) to moderate (short-term) potential impacts to wetlands and vegetation, and minor potential impacts to floodplains / hydrology (**Table 4**). Based on evaluation of these potential impacts, and consideration of recent, present, and reasonably foreseeable future projects, the proposed action would not cause significant, long-term cumulative effects on the majority of resources.

Summary

The table below summarizes potential impacts of the No Action and Recommended Alternative, as well as Cumulative Effects of the Recommended Alternative.

Table 4: Summary of Potential Effects and Cumulative Effects.

	POTENTIAL EFFECTS		
RESOURCE	***No Action***	***Recommended Alternative (Construct a Barrier*)***	***Cumulative Effects of Recommended Alternative****
Physical Setting and Land Use	No effects	Negligible, beneficial effects	Negligible cumulative effects
Air Quality	No effects	Short-term, minor negative effects	Negligible, negative cumulative effects
Hazardous, Toxic and Radioactive Waste (HTRW)	No effects	No effects	No cumulative effects
Water and Sediment Quality	No effects	Short-term, minor negative effects	Negligible cumulative effects
Prime Farmland	No effects	No effects	No cumulative effects

	POTENTIAL EFFECTS		
RESOURCE	***No Action***	***Recommended Alternative (Construct a Barrier*)***	***Cumulative Effects of Recommended Alternative****
Wetlands	No effects	Minor to moderate short-term and temporary negative effects (e.g., clearing during construction); to minor long-term to permanent negative effects (filling 0.8 acres for berm); and moderate long-term permanent beneficial effects (upstream inundation)	It is anticipated that wetland impacts would not be significant, and that wetlands in Jamestown Slough would expand with inundation replacing wetlands lost in berm construction. Wetland types located upstream will change but with no net loss of wetland.
Vegetation, Wildlife Habitat, and Wildlife	No effects	Short-term, minor negative effects; and long-term, moderate benefits from increased water surface elevation in the upstream pool	The expanded and enhanced wetland habitat upstream at Jamestown Slough would provide more suitable habitat for numerous fish and wildlife.

	POTENTIAL EFFECTS		
RESOURCE	***No Action***	***Recommended Alternative (Construct a Barrier*)***	***Cumulative Effects of Recommended Alternative****
Aquatic Resources	Negligible, negative effects	Short-term, minor, negative effects (construction); and long-term, moderate benefits from reduction in number of reproducing sea lamprey, reduction or elimination of lampricides application to upper portion of Manistique River system, and increased water surface elevation in the upstream pool	The expanded and enhanced aquatic habitat upstream of the project would provide more suitable habitat for numerous fish and wildlife. If the State constructs a fish passage structure at the barrier site in the future, there could be additional beneficial and detrimental cumulative effects to fish species. The USFWS would engage in and facilitate development of a risk assessment or structured decision process with the DNR prior to constructing a fish passage structure to protect the upper Manistique River and watershed from invasive species, disease and contaminants.
Threatened and Endangered Species	No effects	May affect but not likely to adversely affect	No cumulative effects
Exotic and Invasive Species	Negligible effects	Short-term, minor negative effects (from construction); Long-term, moderate negative effects (on the sea lamprey- goal of the project)	If the State constructs a fish passage structure at the barrier site in the future, there could be additional beneficial and detrimental cumulative effects to invasive species. The USFWS would engage in and facilitate development of a risk assessment or structured decision process with the DNR prior to constructing a fish passage structure to protect the upper Manistique River and watershed from invasive species, disease and contaminants.
Cultural Resources	No effects	No effects	No cumulative effects

	POTENTIAL EFFECTS		
RESOURCE	***No Action***	***Recommended Alternative (Construct a Barrier*)***	***Cumulative Effects of Recommended Alternative****
Noise and Traffic	No effects	Short-term, minor negative effects	Negligible, negative cumulative effects
Coastal Zone Management	No effects	No effects	No cumulative effects
Floodplains & Hydrology	No effects	Long-term, minor, positive effects	No cumulative effects
Social Setting and Environmental Justice	Minor, negative effects (continued lampricides)	Minor, short-term negative effects (construction); minor, long-term benefits (reduced lampricides)	No cumulative effects
Recreation	No effects	Short-term, negligible to minor, negative effects	No cumulative effects but positive effects on recreational use in Jamestown Slough for fishing and trapping. berm
Climate Change	No effects	Short-term, minor, negative effects	No cumulative effects

* The potential environmental impacts from implementing one of the action alternatives (Alternatives 1 and 2 – construction of a sea lamprey barrier) were considered together because Alternatives 1 and 2 consisted of different types of structures, located at essentially the same location, either seventeen feet downstream of the existing dam (Alternative 1) or connected directly to the existing dam sill (Alternative 2). Both types of barriers would be the same height.

SECTION 4

Conclusions

The purpose of the proposed project is to prevent upstream migration of the sea lamprey to suitable and preferred spawning and larval rearing habitat and to increase sea lamprey trapping efficiency, resulting in a benefit to Lake Michigan and the Great Lakes fishery and ecosystem.

This EA has been prepared in accordance with the National Environmental Policy Act (NEPA), the Council on Environmental Quality, *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* (40 CFR Parts 1500-1508), and the Corps of Engineers, *Policy and Procedure for Implementing NEPA* (33 CFR Part 230).

This EA contains a comprehensive evaluation of the existing conditions and potential environmental impacts associated with implementing the proposed action as compared to taking no action, as required by NEPA. Resources and environmental elements that could be impacted by the Recommended Alternative and other action alternatives include, but are not limited to: land use, geology and topography, water resources, air quality, natural and biological resources, cultural resources, noise, transportation and traffic, hazardous materials, recreation, climate change and socioeconomic and environmental justice. Adverse effects on these resources are not expected to be significant as described below.

Floodplain & Hydraulic Impacts: The proposed construction of a sea lamprey barrier in the Manistique River requires occupancy and development in the river and adjacent floodplain. Hydraulic analysis was conducted to evaluate existing conditions of the site, and the potential floodplain impacts of the proposed action. **Figure 10** is a Geographic Information System (GIS) enhanced composite of a 1993 aerial image and a 2012 aerial image of the upstream pool and wetland area. The blue hatching depicts the inundated water area (approximately 300 acres) from 1993 when the paper mill dam was in operation; MPI permanently opened the dam gates circa 1994.

Hydraulic studies indicate that there would be a permanent increase in low-flow and flood water levels and that the floodplain inundation upstream of the proposed barrier would be altered by the proposed action. The proposed sea lamprey barrier will raise the average water surface elevation for normal flow conditions approximately 2 feet in the pool located upstream of the MPI dam which would inundate areas that were inundated when the dam was in operation prior to 1994 (see blue hatched area identified on **Figure 10**). Almost all of this inundated area is shown as open water on USGS topographic maps of the region (**Figure 25**). Approximately 96% of the inundated area is within state-owned land; the land type is mainly wetlands/slough. These lands consist of wetland types and are similar to that which would currently be inundated during a 1% flood frequency under current conditions. The impacts to the floodplain would be minor due to the undeveloped and non-human inhabited nature of the lands.

The historic pool elevation in the slough area (during dam operations) was an average of approximately 606 feet during normal flow conditions (see orange line on **Figure 10**). From our existing conditions hydraulic model, the water surface elevation in the slough area is an average of 601 feet during normal flow conditions (March-June) and approximately 601.4 feet during the 99.9% event (1-year event). The proposed water surface elevations in the slough area during normal flow conditions after the SSP barrier construction (March-June) would be approximately 603 feet NAVD88 (see red line on Figure 10) and approximately 603.3 feet for the 99.9% event. The proposed 1% annual chance water surface elevations are higher than the existing conditions water surface elevations upstream of the proposed barrier, but they are still lower than the effective Flood Insurance Study (FIS) elevations. The proposed project berm required to maintain the upstream pool elevation for the 6.67% design event would contain the 1% annual chance event; while this would not be a flood protection levee designed to Federal Emergency Management Agency (FEMA) standards (i.e., it would not provide the required freeboard or account for uncertainty), it would mitigate potential overland flooding upstream of the dam.

Wetland Effects: The preferred sea lamprey barrier location is at the MPI dam. Due to the nature of the project, a berm needs to be located on-site near the barrier and near the river to be effective. The preferred berm location is in the vicinity of the existing concrete wall based on its critical need in the project to prevent sea lamprey from bypassing the barrier during high water level events and to prevent flooding impacts. Hence, the proposed berm could not be relocated to a different site to avoided wetland impacts. Several alternatives (e.g., wall replacement vs. berm), measures (e.g., changes in berm slope) and alignments were evaluated to minimize impacts to wetlands. Project conditions such as limited space, presence of a City of Manistique water line to the west, high costs associated with removal of the existing concrete wall were also taken into consideration. Therefore, approximately 0.8 acres of wetlands would be permanently adversely impacted for the clearing, excavation and construction of a berm (**Figure 18**). These 0.8 acres of wetland would be changed to upland.

The SSP barrier would result in the inundation of approximately 300 acres of existing wetlands upstream of the MPI paper mill dam. Some 16 acres of existing wetlands within the inundated areas would convert from emergent to submergent wetland, some shrub/scrub forested wetlands could convert to emergent or shrub/scrub. The rest of the wetland types would remain with additional water depths. A hydraulic evaluation indicated that within the inundated areas, the wetland perimeter boundary is moved landward along the floodplain creating approximately 2 acres of new wetlands. The increase in water surface elevation levels will expand and enhance wetland for numerous small mammals such as muskrats, mink, and raccoon at the wetland edge, feeding, resting and nesting habitat for waterfowl, spawning habitat for northern pike and numerous amphibians and reptiles.

The improved wetland habitat in the inundated areas plus the newly created perimeter wetlands (approximately 2 acres) will help offset the approximate 0.8 acres of wetlands directly impacted from berm construction. The remaining wetlands in the project area would continue to provide similar levels of wetland functions (e.g., sediment trapping, habitat, and floodwater storage). Therefore, based on type and quantity of wetlands at the project site and in the vicinity, and wetland expansion and enhancements, wetland impacts are not considered significant. The Michigan DNR has agreed to state required mitigation in the form of a conservation easement over some rare wetland types within the watershed.

Cumulative Effects: The potential for cumulative effects on the environment was evaluated by reviewing other recent, present, and foreseeable projects in the vicinity of the project sites that could affect the same environmental resources. Those projects may include: Michigan DNR and USFWS consideration for future fish passage project in Manistique, Michigan; future GLFER Sea Lamprey Barrier / Trap Projects at several locations throughout Wisconsin and Michigan; USACE dredging of the Manistique Harbor Federal Navigation Channel; and the City conducting minor maintenance to their utility lines. Any cumulative effects associated with these projects are expected to be insignificant. Cumulative effects on wetlands would be minor because no major construction in other wetlands in the area is known to be occurring due to economic climate and regulations restricting development of wetland areas.

The No Action Alternative would not result in a change in current conditions and therefore no significant direct or indirect impacts would immediately occur under this alternative. However,

as the dam continues to deteriorate, there is expected to be an increase in upstream migration of sea lamprey, continued treatment costs to manage sea lamprey, and negative effects on the environment.

The proposed project has been reviewed pursuant to the following Acts and Executive Orders, as amended: National Environmental Policy Act of 1969, Fish and Wildlife Act of 1956, Fish and Wildlife Coordination Act of 1958, National Historic Preservation Act of 1966, Clean Air Act of 1970, Executive Order 11593-Protection and Enhancement of the Cultural Environment of May 1971, Coastal Zone Management Act of 1972, Endangered Species Act of 1973, Water Resources Development Act of 1976, Clean Water Act of 1977, Executive Order 11990-Wetland Protection of May 1977, Executive Order 11988-Floodplain Management, and the Farmland Protection Policy Act (Subtitle I of Title XV of the Agriculture and Food Act of 1981), Executive Order 12898, Social Justice and Executive Order 13514, Preparing for and Managing Change, climate adaptation for biodiversity and ecosystems. Environmental analysis has found the proposed project to be in compliance with the above Acts and Executive Orders including:

- Endangered Species Act of 1973; there would be *no effect* on federally listed species.
- Section 106 of the National Historic Preservation Act of 1996 and Executive Order 11593 (Protection and Enhancement of the Cultural Environment, May 1971), the National Register of Historic Places and the State Historic Preservation Office (SHPO) have been consulted and has concurred with USACE's determination "*that no historic properties are affected within the area of potential effects*."
- The proposed action would be exempt as *de minimis* and meet the Conformity Requirements under Section 93.153 of the Clean Air Act, 40 CFR, as amended.
- The proposed action would be "consistent to the maximum extent practicable" (as defined in 16 USC 1456, Coastal Zone Management Act, approved 1978) with the Michigan Coastal Zone Management Program and not significantly impact the coastal zone.
- E.O. 11988, Floodplain Management. Although the project site is located within the floodplain, the proposed action complies with the Federal Executive Order on Flood Plain Management (E.O. 11988) because there is no practicable alternative to construction in the floodplain, nor would the project encourage floodplain development.

Conclusion / Recommendation

Based on the findings of this EA, implementation of the Recommended Alternative (Alternative 1, construction of a fixed crest cantilevered SSP barrier) would not have significant adverse direct, indirect, or cumulative effects on the quality of the human or natural environment. The Recommended Alternative would meet the project's purpose and need. The No Action Alternative was considered but it does not meet the project's purpose and need. This EA concludes that: 1) there are no significant cumulative or long-term environmental effects associated with the proposed action, 2) the benefits outweigh the minor, temporary effects that may result, and 3) it does not constitute a major Federal action significantly affecting the quality of the human environment.

An evaluation according to the Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material (40 CFR, Part 230) has been prepared because there will be a

discharge of fill material in waters of the U.S. associated with the proposed action. The Section 404(b)(1) Evaluation concludes with the determination that "the proposed action is in compliance with Section 404 of the Clean Water Act." Therefore, a 401 Water Quality Certification (WQC) will be requested from the State of Michigan as part of the permit application by the non-Federal sponsor. A 401 WQC, or waiver thereof, would be obtained prior to construction.

A preliminary Finding of No Significant Impact (FONSI) has been prepared to accompany this EA. The preliminary FONSI concludes that the Recommended Alternative does not constitute a major federal action that significantly affects the environment and an Environmental Impact Statement (EIS), the next higher level of environmental impact investigation under NEPA, is not required for this project action. This EA and preliminary FONSI will be made available to the public for a 30-day review period. If after the public review the potential project impacts are found to be insignificant, a Finding of No Significant Impact (FONSI) document would be finalized and executed by the District Engineer, and construction of the Recommended Alternative could proceed. If the environmental impacts are found to be significant according to criteria established in 40 CFR 1508.27, mitigation measures could be proposed to reduce impact below a level of significance, or the USACE will prepare a Notice of Intent (NOI) to prepare an EIS, or choose not to proceed with the proposed action.

SECTION 5

Agency Coordination

The proposed action for construction of a sea lamprey SSP barrier in Manistique, Michigan was coordinated via written correspondence with numerous Federal, State, and Tribal groups. No significant concerns were noted in responses. These entities will receive a copy of the EA for review and comment during the 30-day public review period.

5.1 Michigan State Historic Preservation Office (SHPO)

In compliance with Section 106 of the National Historic Preservation Act of 1966, as amended, the proposed action was coordinated with the Michigan State Historic Preservation Officer, and the SHPO provided opinions via letters (January 2011 and June 2012) that *no historic properties are affected* within the area of potential effects of the proposed undertaking. This concludes the USACE's compliance with 36 CFR 800.4 "Identification of historic properties," and the fulfillment of the USACE's responsibility to notify the SHPO, as a consulting party in the Section 106 process, under 36 CFR 800.4(d)(1) "No historic properties affected." If any artifacts are encountered during construction, the SHPO office would be notified.

5.2 U.S. Environmental Protection Agency (EPA)

An EPA early coordination response letter (February 2011) recommended that NEPA documentation address whether or not sea lamprey are expected to accumulate on the

downstream side of the dam, and if so, what method(s) of removal would be pursued. The barrier design would accommodate four sea lamprey traps that the USFWS would utilize to capture and remove sea lamprey, and release native fish species. Their response letter also indicated that after consultation with the EPA Superfund Division and Great Lakes National Programs Office (GLNPO) in regards to sediment contamination located downstream of the proposed project, they have no substantive comments at this time. No superfund sites are located in Manistique, MI. Additional coordination between the USACE and EPA GLNPO has not indicated any significant concerns regarding implementation of the propose project and with respect to AOC work at Manistique Harbor. Continued coordination would occur in association with the proposed action and EPA delisting work for the Manistique priority AOC to allow information to be shared for the benefit of both projects and the Manistique River.

5.3 U.S. Fish and Wildlife Service (FWS)

The USFWS Sea Lamprey Control personnel have been project partners during planning of this project. The U.S. Fish and Wildlife Service, East Lansing, Michigan Field Office was coordinated with in January 2011 and in June 2012. They indicated via letters (February 2011 and July 2012) that they agree with the USACE determination that threatened or endangered species in Schoolcraft County would not be affected by the proposed project, precluding the need for further action on this project as required by the Endangered Species Act. Two additional species were listed for Schoolcraft County since 2012 being the northern long-eared bat and the Rufa red knot and the gray wolf was re-listed after a Federal court decision. In an email dated August 3, 2016, the USFWS stated "For the new no effect determinations, concurrence from our office is not required. This precludes the need for further action on this project as required by the ESA. However, if the project is modified or new information about the project becomes available that indicates listed species or critical habitat may be affected, you should reinitiate consultation with this office. " The original letter also contained comments in association with the Fish and Wildlife Coordination Act. The three primary concerns outlined in a position paper regarding Manistique River Sea Lamprey Barrier Fish Passage are: the USFWS does not support passage of non-native species due to potential interactions with native species at Seney National Wildlife Refuge and the supporting watershed; the USFWS supports passage of native species if supported by an analysis of risks and benefits associated with passing native species; and the USFWS supports a barrier design that accommodates future construction of a fish passage facility.

These items have been addressed in this EA. Each action alternative covered in the EA would prevent passage of non-native fish, specifically targeting the sea lamprey. The "no action" alternative would allow continued migration of the sea lamprey to spawning and larval habitat upstream of the MPI dam. The proposed barrier design includes four permanent sea lamprey traps. Although these traps would be designed for sea lamprey, any native fish trapped could be allowed passage or be placed back in-stream below the dam. Traps would be operated by the USFWS thus selected releases would be at their discretion. The dam currently blocks passage of native fish above the dam and removable stoplog sections implemented on both the natural and flume portions of the river could accommodate fish passage. The USFWS would engage in and facilitate development of a risk assessment or structured decision process with the DNR prior to

constructing a fish passage structure to protect the upper Manistique River and watershed from invasive species, disease and contaminants.

5.4 State of Michigan, Department of Natural Resources (DNR) & Department of Environmental Quality (DEQ)

This project is being developed in cooperation with the State of Michigan DNR. Both the DNR and DEQ have been involved in various aspects of project development and study via participation in conference calls, site visits and correspondence. Coordination with appropriate State DEQ and DNR offices (e.g., dam safety, fisheries, floodplains, wetlands) will continue as appropriate.

The MDEQ has determined that a state permit will be required under the Natural Resources and Environmental and Environmental Protection Act (NREPA) 1994 PA 451 Part 301, Inland Lakes and Stream, Part 303, Wetlands Protection and Part 31, Water Resources Protection. Construction of the SSP barrier and berm will raise water levels upstream in an existing wetland area about 300 acres in size locally known as the Jamestown Slough. Flooding caused by the re-impoundment of the wetland will change the nature of some 16 acres of the existing wetland areas. Construction of the berm upgrades will result in the conversion of about 0.8 acres of existing wetland to upland. The MDNR fish and wildlife biologists have stated the re-impoundment of the wetlands would provide better habitat for fish and wildlife. Based on the interpretation of the MDEQ regarding their state statutes and rules for dredge and fill, the conversion of a wetland to another type of wetland requires mitigation. Additionally, the MDEQ has stated that potential permit review impacts need to be addressed in the proposed raising the water elevation upstream of the dam, even though it is at a lower elevation than it was for approximately 100 years with the MPI dam. Written authorization has been received from impacted property owners for the MDNR to apply for the necessary state permit. Permanent inundation will require flood waivers from impacted property owners. The MDNR, acting as the local sponsor, has identified appropriate mitigation in the form of rare habitat preservation within the watershed in upstream state lands for the conversion of wetland types consistent with state rules. The upstream stage increase with inundation will convert an estimated 2 acres of upland to wetland.

The DNR, Wildlife Division concluded that the proposed action would not impact rare or unique natural features at the site. Ongoing coordination has also occurred with the DNR, Fisheries Division. The Fisheries Division has conveyed their support for the proposed construction of a sea lamprey barrier on the Manistique River. Barrier design includes removable stoplog sections to accommodate the DNR's interest in providing fish passage beyond the MPI dam. In addition, the Fisheries Division recommends conducting a public information campaign to address potential in-stream work during peak fishing times (April and mid Sept to mid-October). In response, such a campaign would be coordinated by the USACE or the project sponsor.

The proposed project includes the discharge of fill material into the waters of the United States for construction of the proposed sea lamprey barrier. Therefore, a Section 404(b)(1) Evaluation has been prepared in accordance with the Clean Water Act (CWA) and is included in

Attachment B of the EA. In accordance with Section 401 of the CWA, the non-Federal sponsor will request a Water Quality Certification from the MDEQ for the project. A Section 401 (CWA) water quality certification, or waiver thereof, would be obtained from the State of Michigan prior to construction.

5.5 Native American Tribes

The following Native American Tribal governments were coordinated with in January 2011 and in June 2012. These tribes will also receive a copy of this EA for review and comment. No Native American Tribes have commented on the proposed project to date. It is not expected that the proposed action would impact any Native American or other cultural resources. Tribes would be coordinated with in the event that any archeological or cultural artifacts are encountered.

Mr. Kenneth Meshigaud, Chairman
Hannahville Indian Community of Michigan
N14911 Hannahville, B1 Road
Wilson, MI 49896-9728

Mr. Warren C. Swartz, Jr., Tribal President
Keweenaw Bay Indian Community
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Baraga, MI 49908-9678

Mr. Alan Shively, Chairman
Lac Vieux Desert Band of Lake Superior Chippewa Indians of Michigan
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Mr. L John Luffkins, Executive Director
Inter-Tribal Council of Michigan
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Mr. Tom Gorenflo, Director
Inter-Tribal Fisheries and Assessment Program
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Ms. Kimberly Bouchard, Superintendent
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Carol Bergquist, Tribal Planner
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Mr. Mike Allen, Sr., Executive Director
Great Lakes Intertribal Council
P.O. Box 9

Sault Ste. Marie, MI 49783 Lac Du Flambeau, WI 54538

Mr. Christopher J. Chosa
KBIC THPO/NAGPRA Director
16429 Beartown Road
Baraga, Michigan 49908

SECTION 6

List of Preparers

Preparers Name & Title	Education & Experience	Primary Responsibilities
Mr. Hal Harrington, Biologist	M.S., Fisheries and Wildlife, Michigan State University 1974, B.S., Michigan State University, 1972. 40 years of experience in wetlands management, fisheries management dredge and fill regulatory programs,	NEPA Task Lead. Environmental Scientist / Biologist; data collection, analysis and preparation of EA text.
Mr. Charles A. Uhlarik, Chief, Environmental Analysis Branch	M.S., Environmental Biology, Eastern Illinois University, 1989; B.A., Ecology, University of Illinois, 1987. Over 20 years experience in ecosystem restoration and environmental permitting and planning.	NEPA technical review and quality assurance of the EA.

SECTION 7

Acronyms

AOC	Area of Concern
ATV	All-Terrain-Vehicle
BMP	Best Management Practice
BUI	Beneficial Use Impairment
CEQ	Council on Environmental Quality

CFR	Code of Federal Regulations
CWA	Clean Water Act
DEQ	Michigan Department of Environmental Quality
DNR	Michigan Department of Natural Resources
DPR	Detailed Project Report
E.O.	Executive Order
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ER	Engineer Regulation
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
FONSI	Finding of No Significant Impact
FPPA	Farmland Protection Policy Act
USFWS	U.S. Fish and Wildlife Service
GIS	Geographic Information System
GLFC	Great Lakes Fishery Commission
HTRW	Hazardous, Toxic and Radioactive Waste
IGLD	International Great Lakes Datum
MPI	Manistique Papers, Inc.
NEPA	National Environmental Policy Act of 1969
NFIP	National Flood Insurance Program
NOI	Notice of Intent
NRHP	National Register of Historic Places
PCB	Polychlorinated biphenyl
P.L.	Public Law
RONA	Record of Non-Applicability
SHPO	Michigan State Historic Preservation Office
SSP	Steel Sheet Pile
TNW	Traditionally Navigable Water
USACE	U.S. Army Corps of Engineers, Detroit District
USC	U.S. Code
USGS	U.S. Geological Survey
WQC	Water Quality Certification
WRDA	Water Resources Development Act

SECTION 8

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ATTACHMENT A

FIGURES AND PHOTOGRAPHS

Figure 1: Site Location Map for Manistique, MI

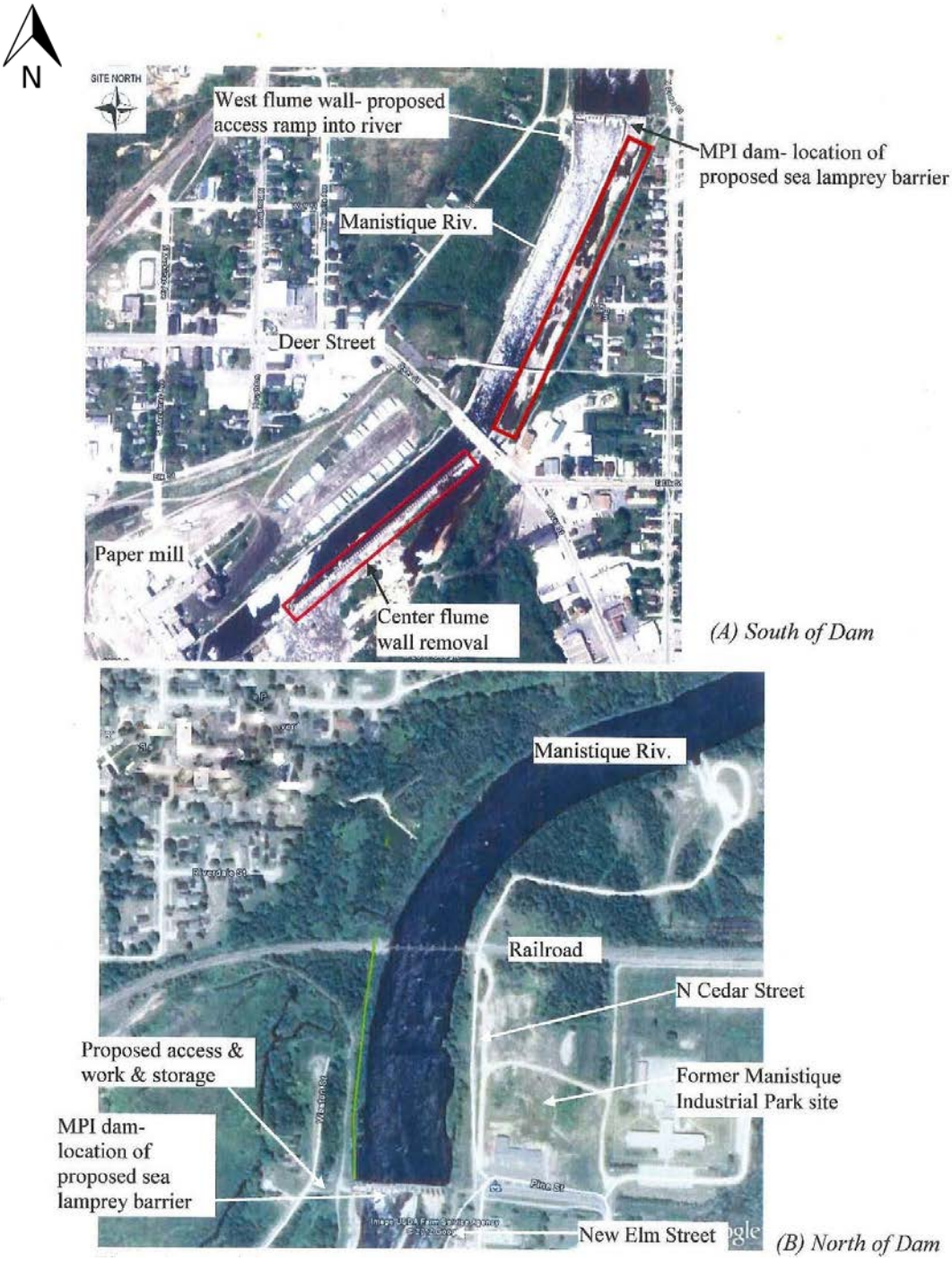

Figure 2: Aerial photographs of project areas at the MP1 dam, Manistique, Michigan. North is up. Not to scale.

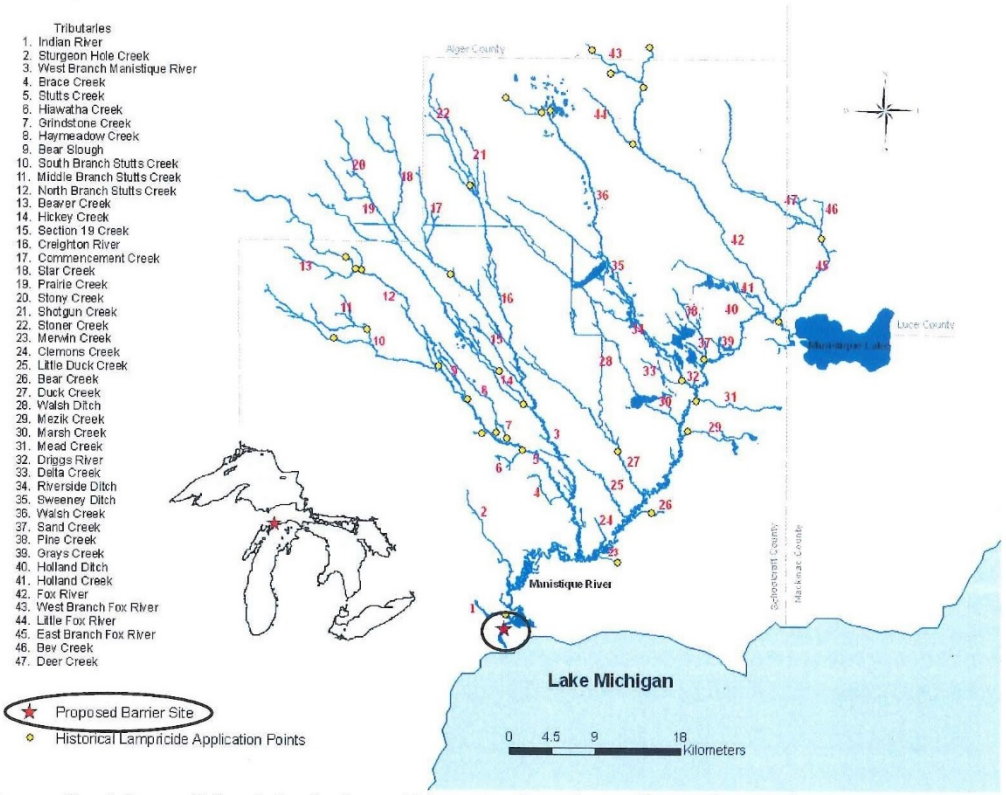

Figure 3: Map of the Manistique River and major tributaries. The proposed location of the sea lamprey barrier (indicated by a red star) is about 2 miles north of Lake Michigan

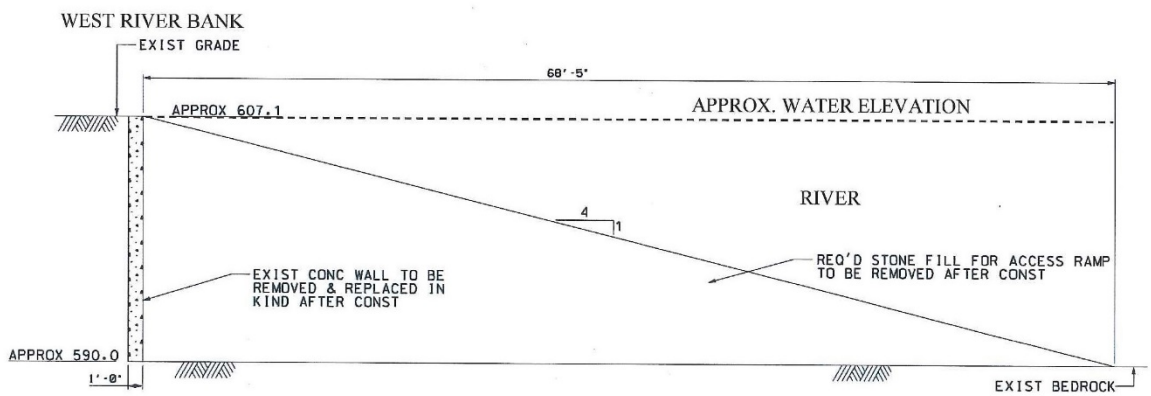

Figure 4: Cross section of proposed equipment access ramp into river; west bank. Not to scale.

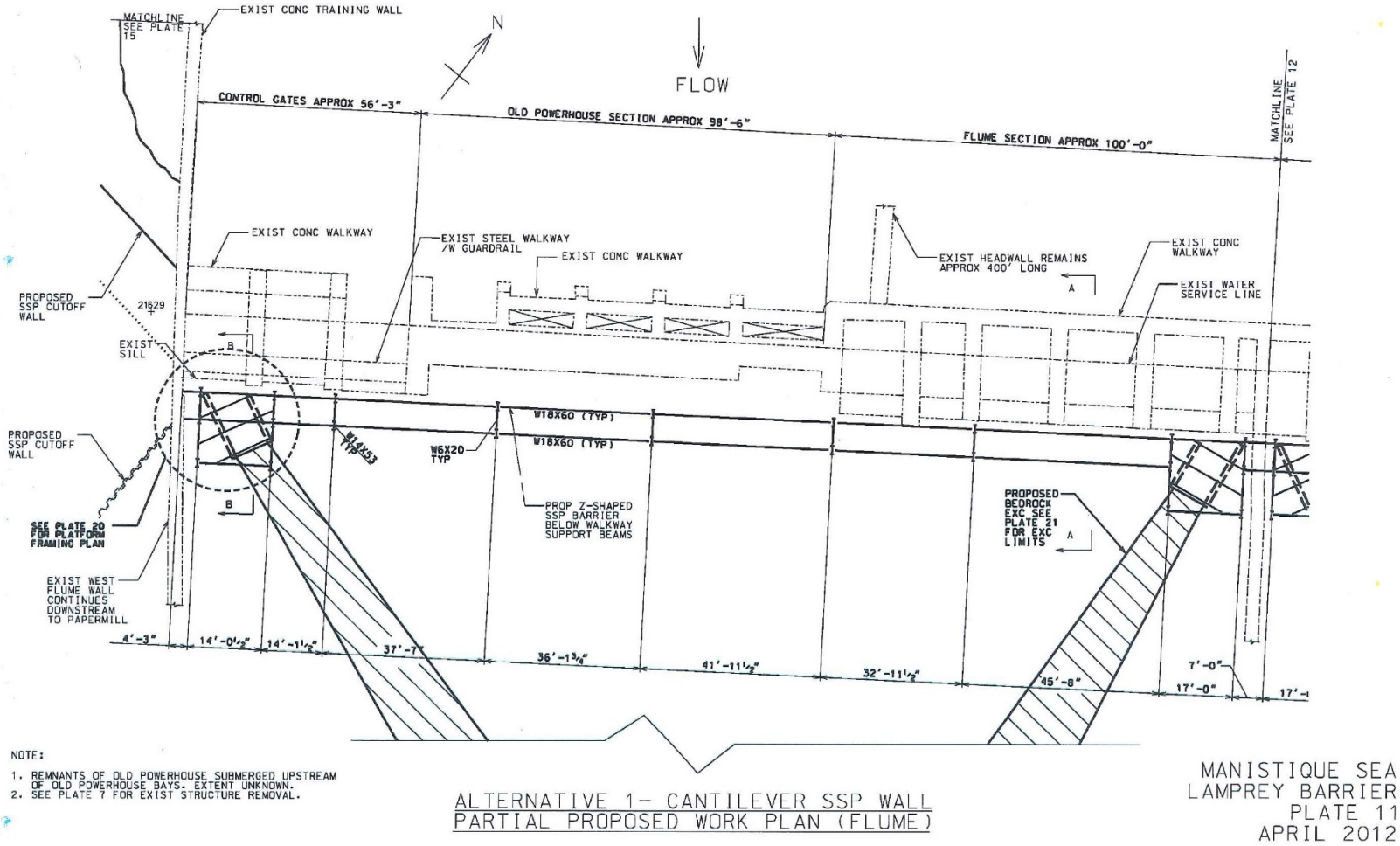

Figure 5: Alternative 1 - Fixed Crest Cantilevered Barrier – Plan (Sheet 1 of 2). Not to scale.

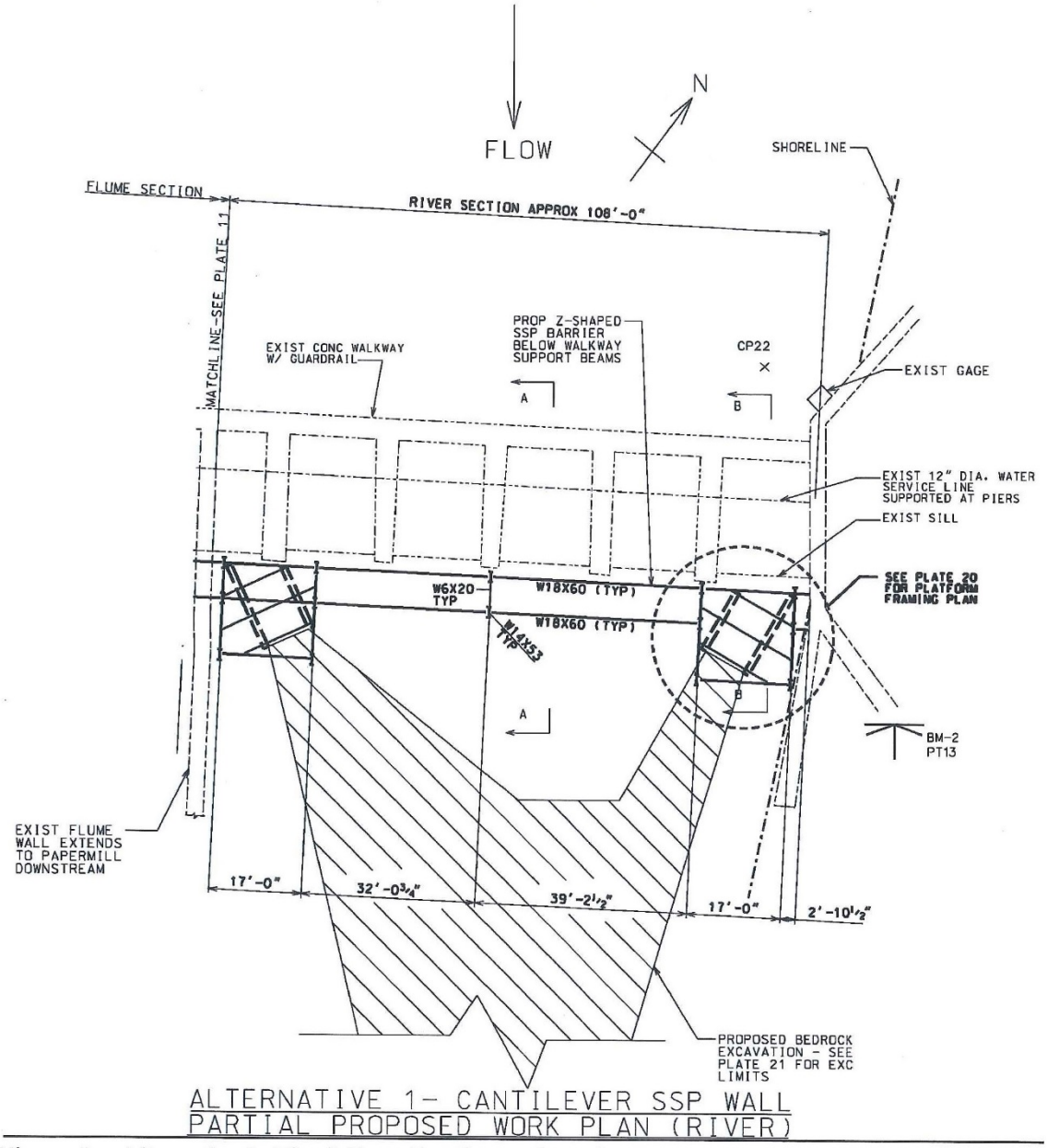

Figure 6: Alternative 1 – Fixed Crest Cantilevered Barrier Plan (Sheet 2 of 2). Not to scale.

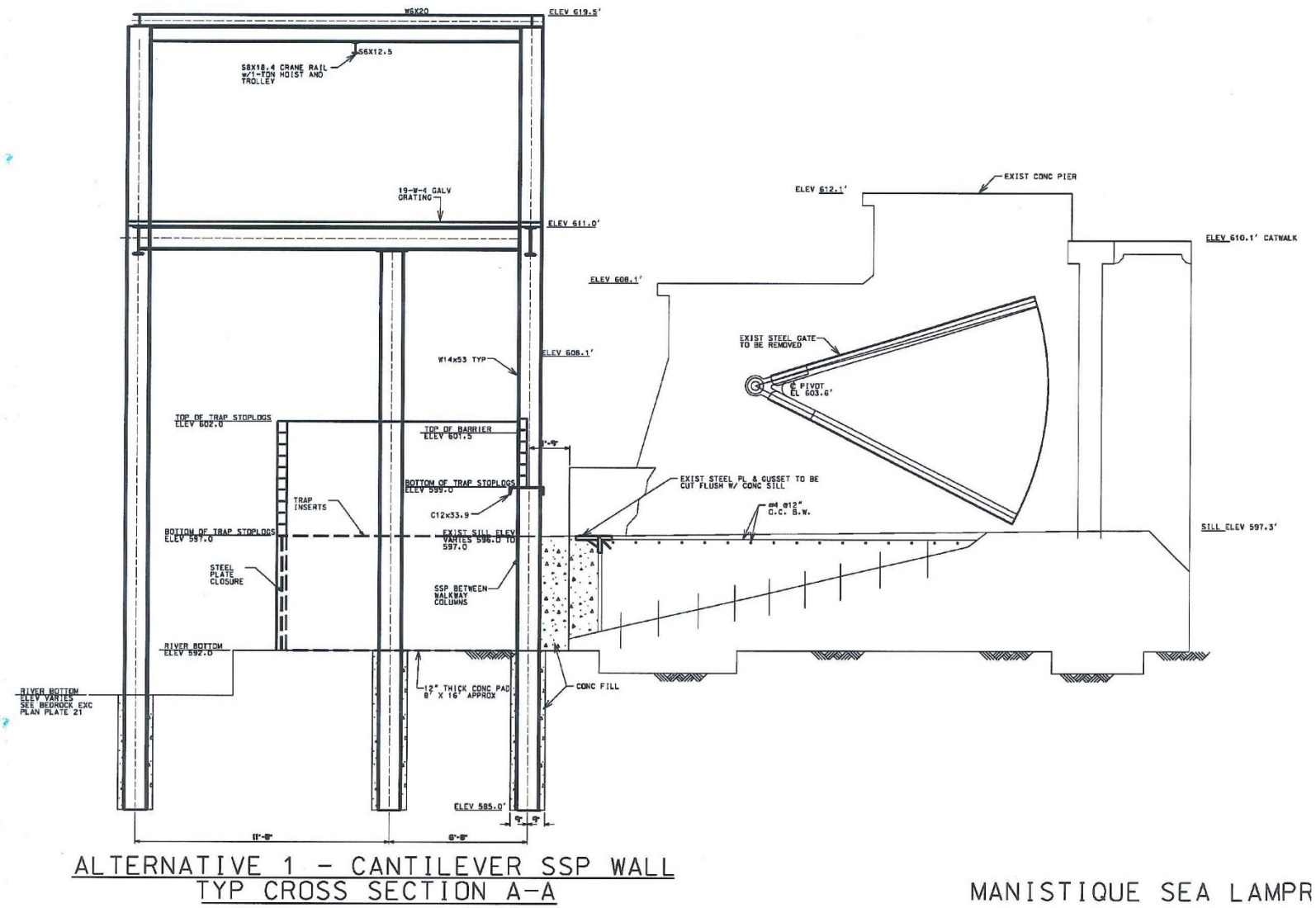

Figure 7: Alternative 1 – Fixed Crest Cantilevered Barrier – Typical Cross Section. Not to scale.

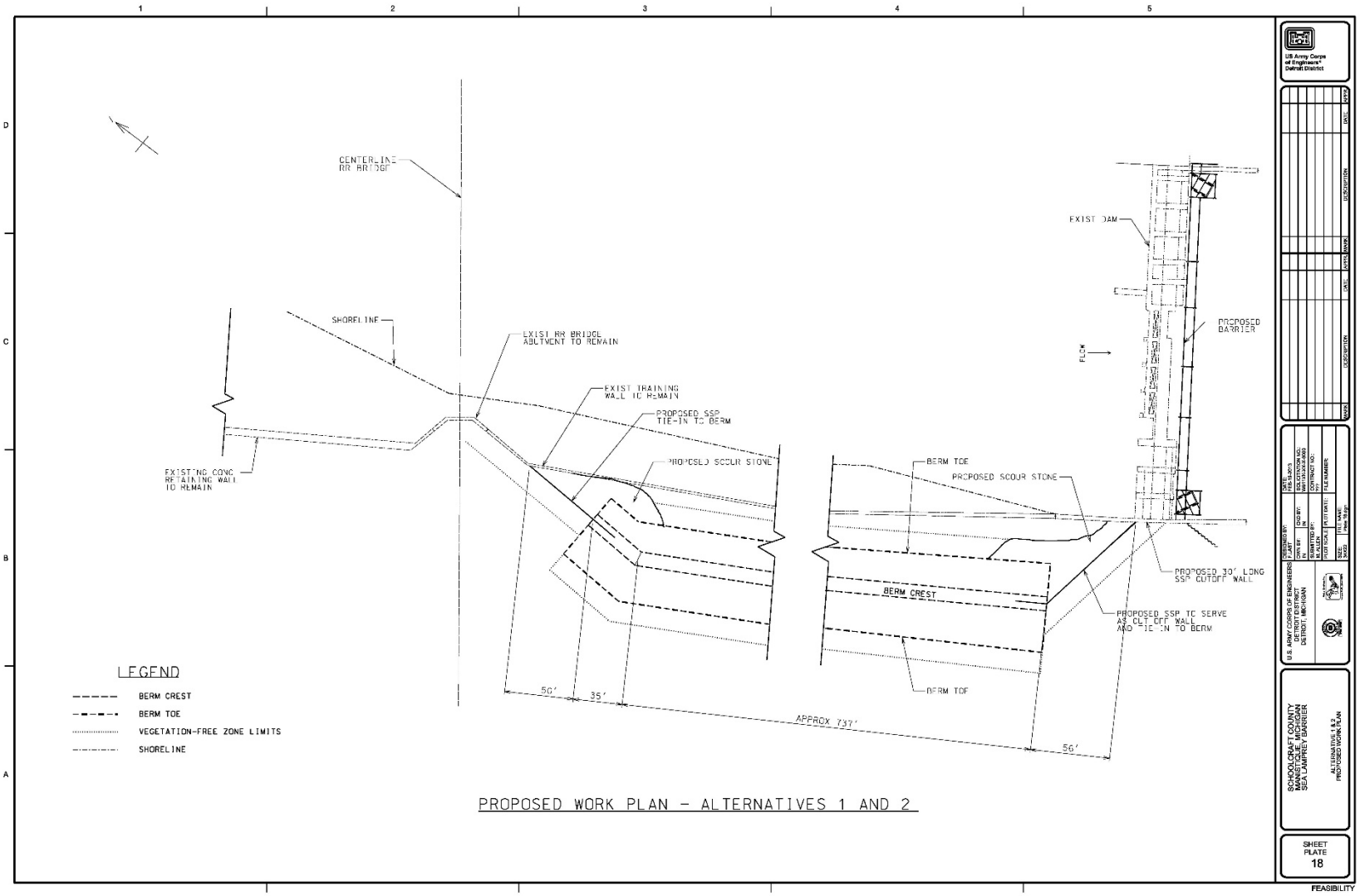

Figure 8: Plan of Proposed Berm. Not to Scale.

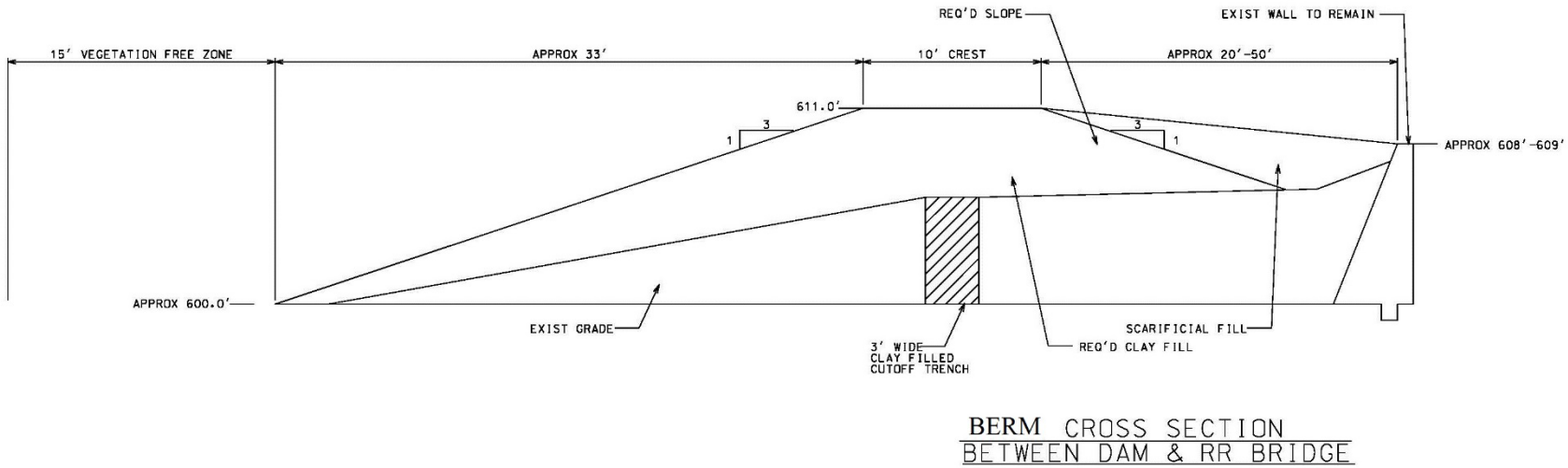

Figure 9A: Typical Proposed Berm Cross Section – Between Dam and Railroad.

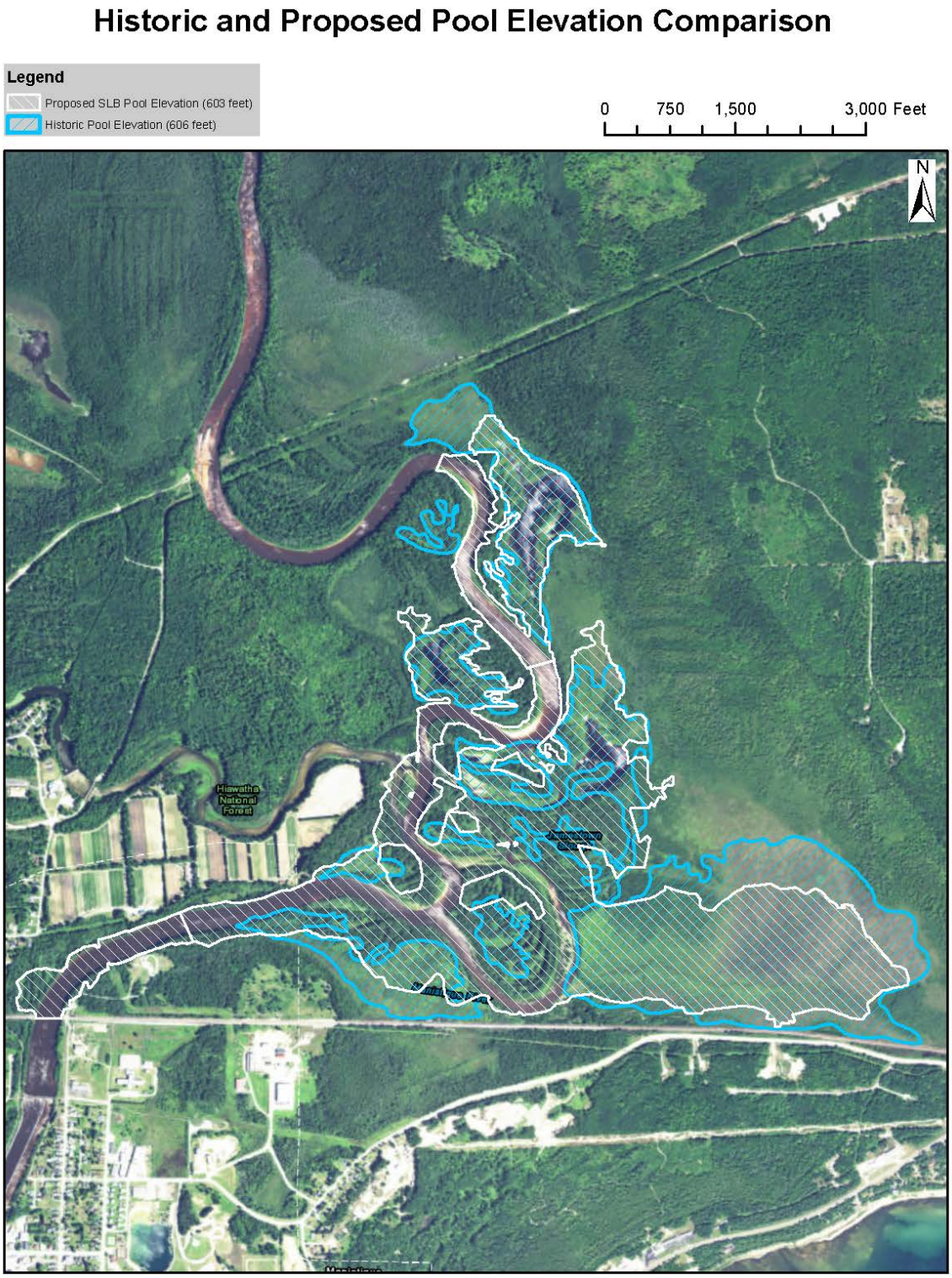

Figure 10: Aerial Showing Approximate Historic and Proposed Pool Elevations.

Figure 11: Photograph of MP1 dam, east channel (river side); Manistique River, Schoolcraft County, Michigan.

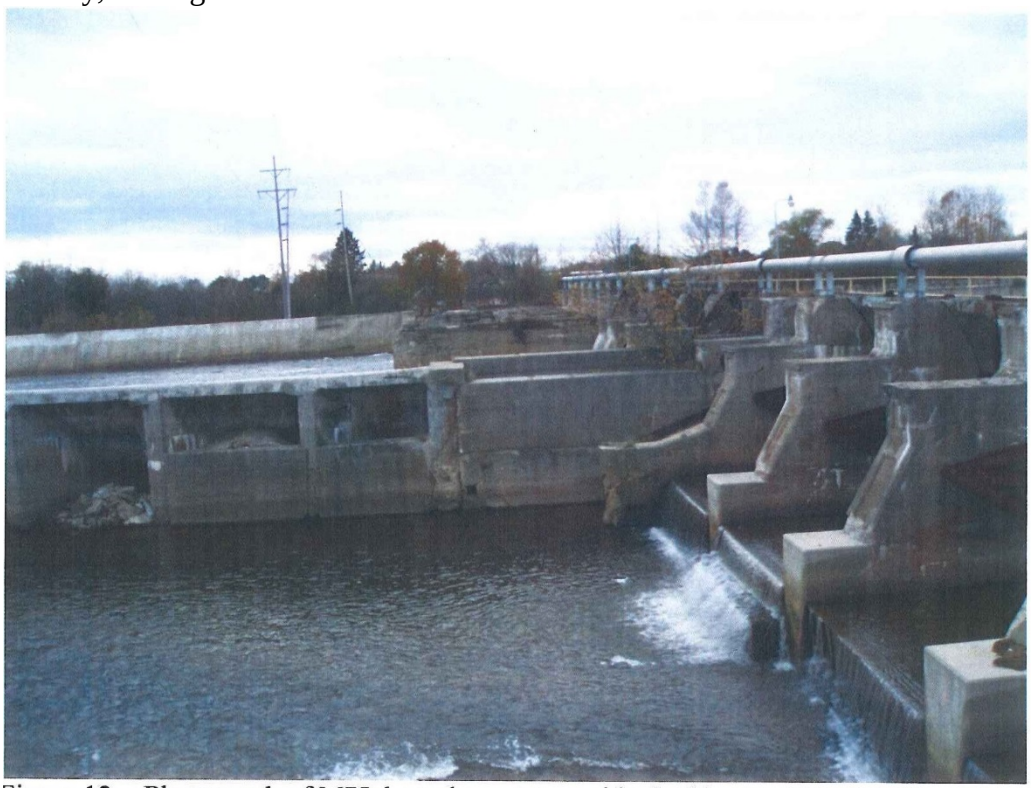

Figure 12: Photograph of MP1 dam, downstream side, looking east to west; Manistique River, Schoolcraft County, Michigan.

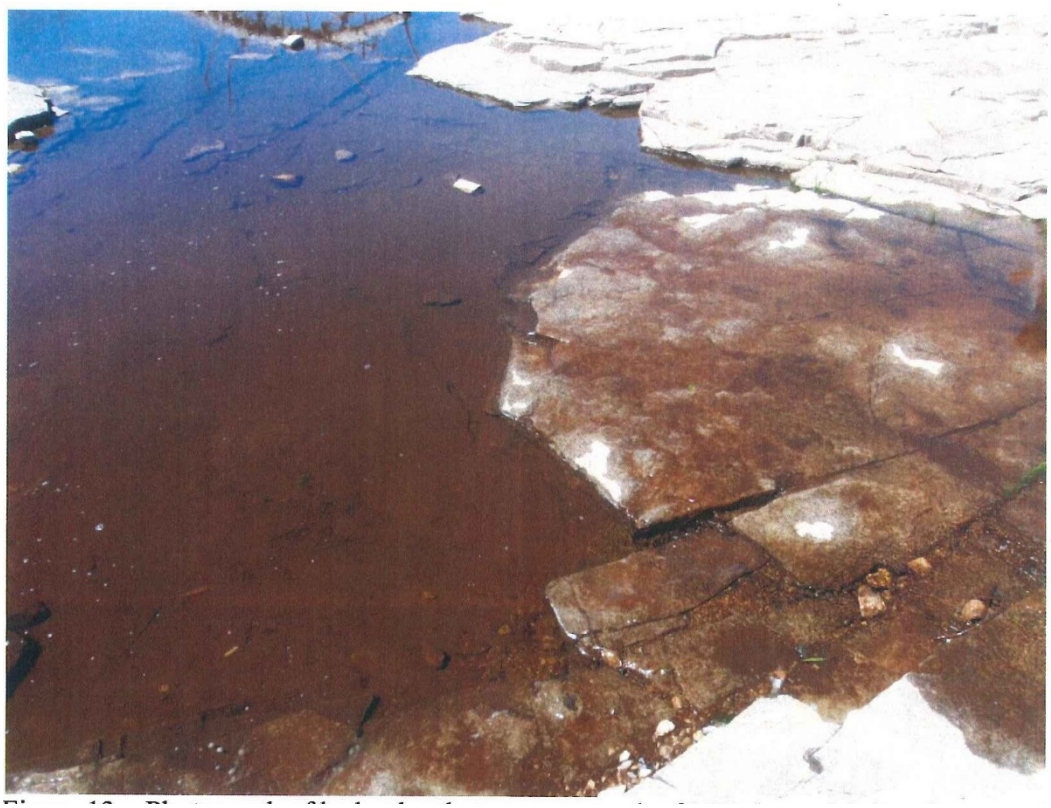

Figure 13: Photograph of bedrock substrate near south of MP1 dam, vicinity of proposed center flume wall removal.

Figure 14: Access road and proposed work and storage area, west bank near MP1 dam. Looking west.

Figure 15: Proposed access road to river located on east side of river for center flume wall removal. Photo showing turn around, looking west toward river.

Figure 16: Existing concrete wall and previously proposed location for berm, north of the railroad bridge (west side of river). Earthen berm no longer required north of railroad bridge at 6.67% discharge event. (west side of river).

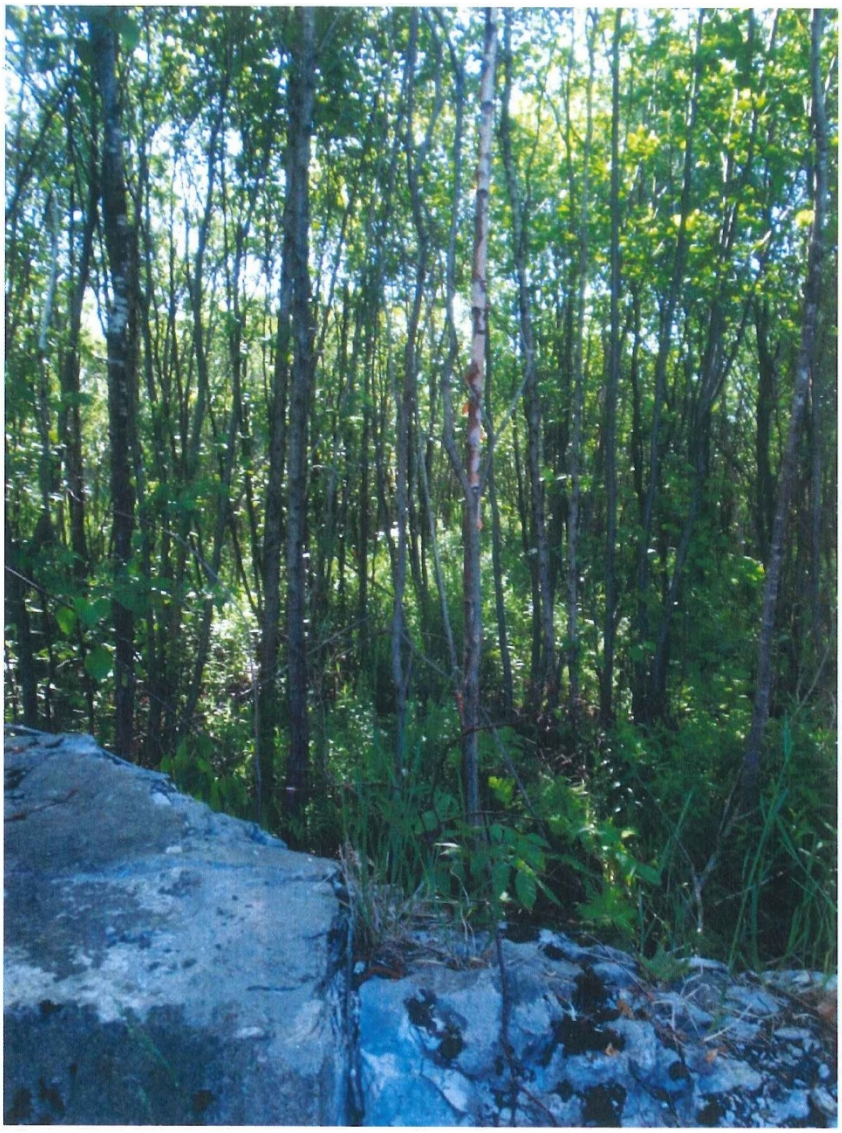

Figure 17: Existing concrete wall and proposed berm location, midway between dam and railroad, looking east

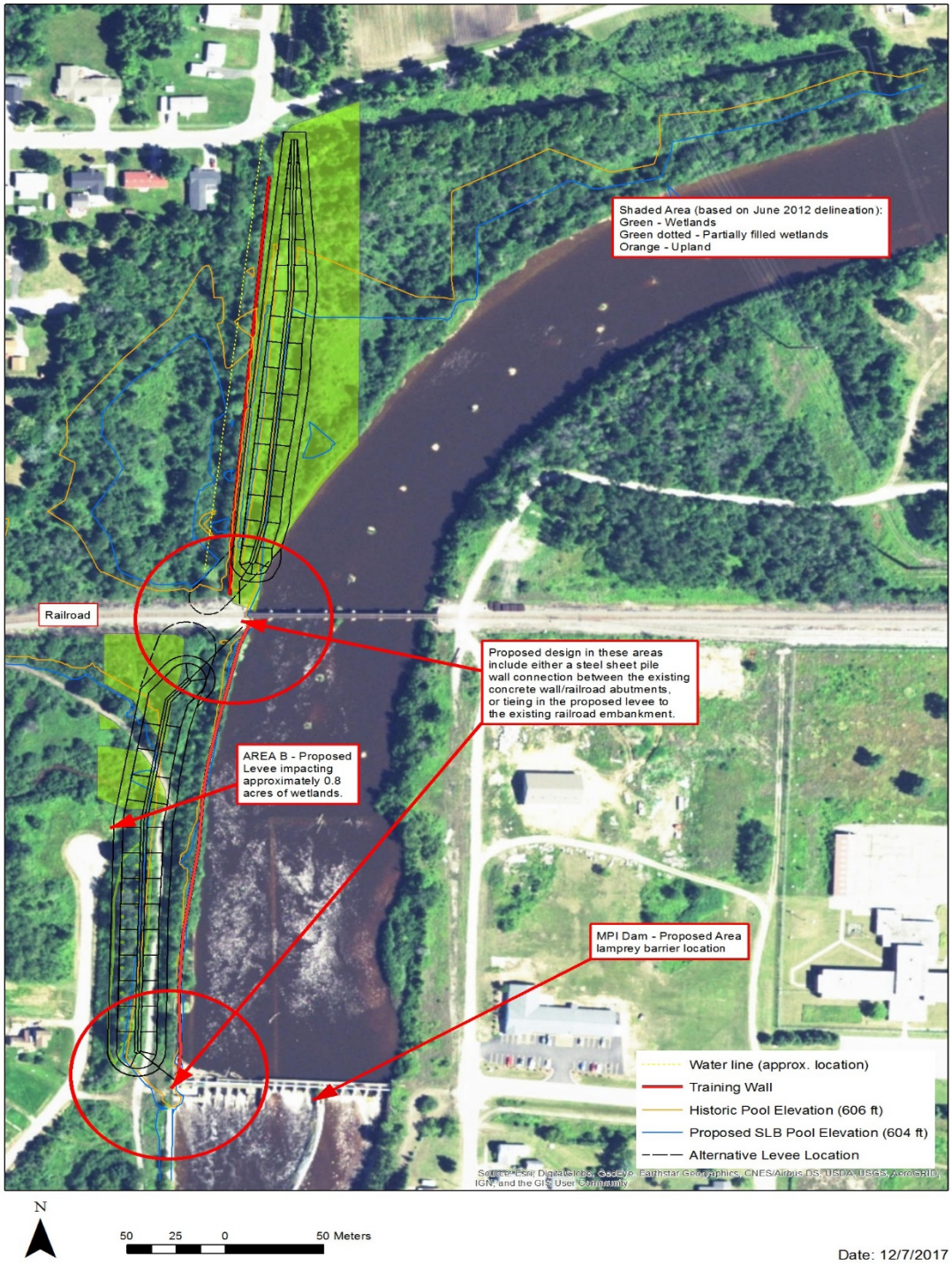

Figure 18: Wetlands delineation map overlaid with approximate locations of project components in wetlands. No berm required north of railroad bridge but shown for previously identified impacts at the 4% discharge event. *Note: delineated area extends beyond footprint of the proposed berm & work areas.*

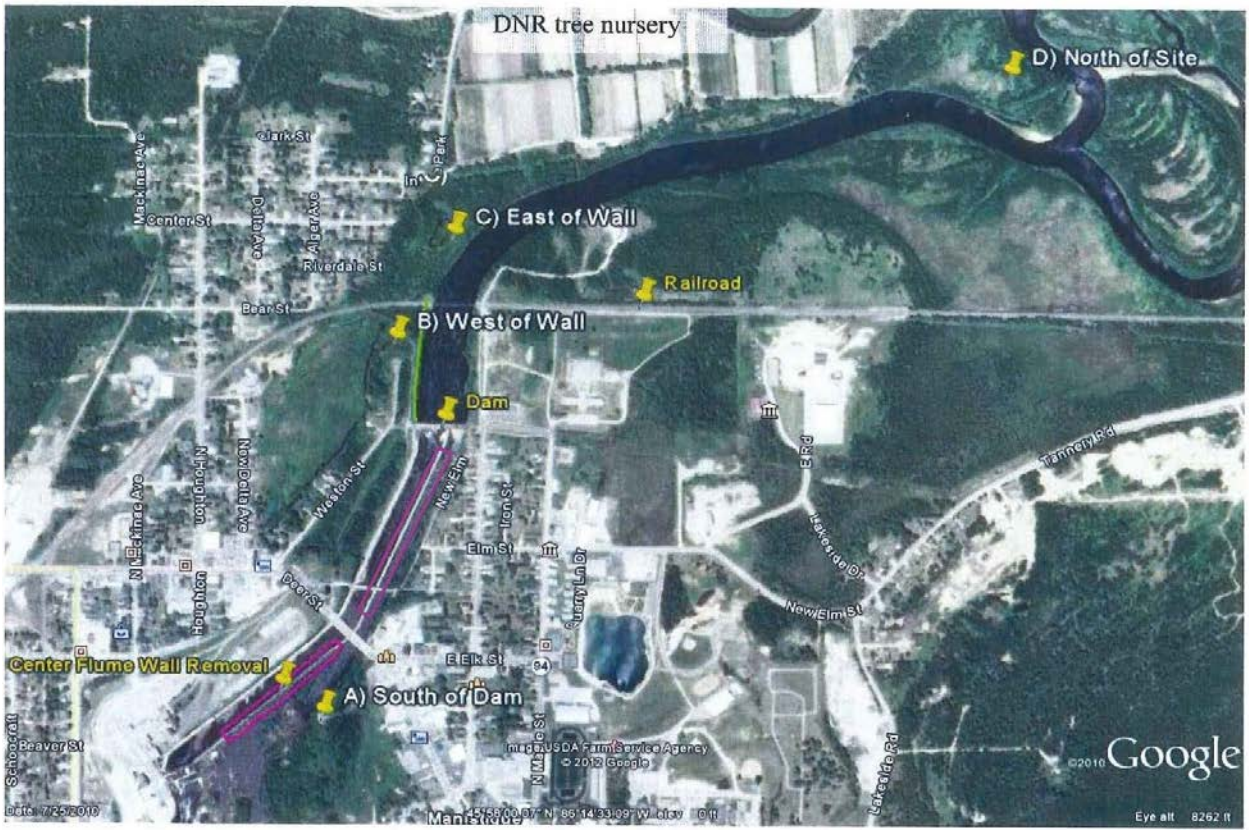

Figure 19: Overview of wetlands near project. *Green line represents the approximate location of the existing concrete wall. Purple lines indicate approx. area for center flume wall demolition. North is up. Not to scale.*

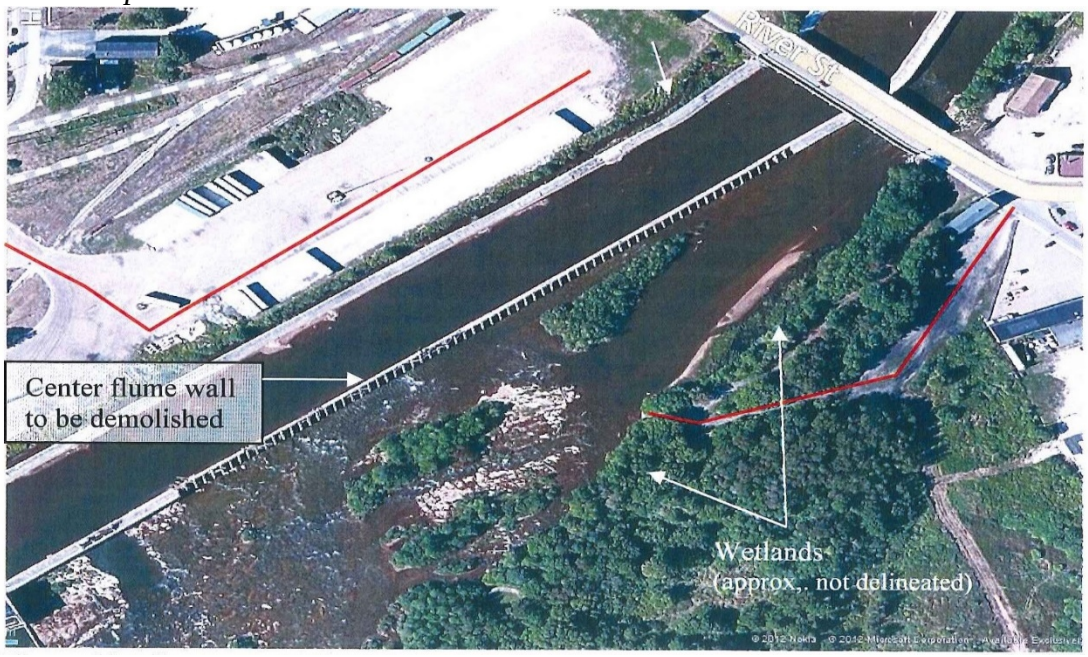

Figure 20: Close up of Wetland Area A- South of dam, east side of river. *Red line represents approximate location of the existing access roads. North is up. Not to scale.*

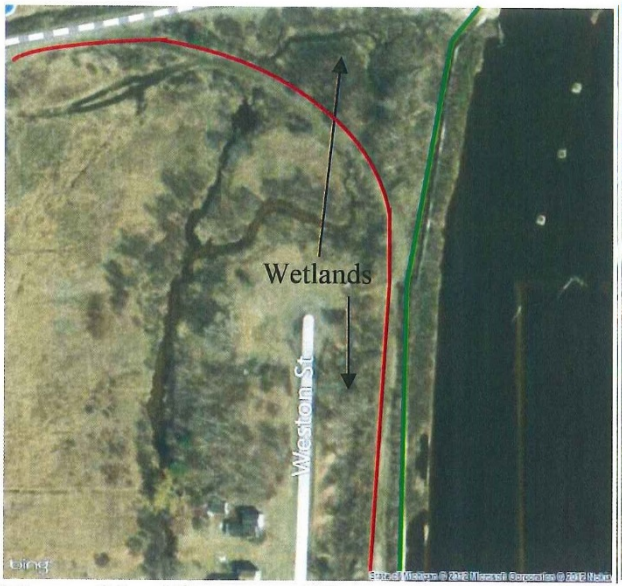

Figure 21: Close up of Wetland Area B- West of wall, between dam and railroad.

Figure 22: Close up of Wetland Area C- East side of wall, north of railroad.

Figure 23: Close up of Wetland Area D- North of the project site.

Notes for Figures 21-23:

North is up. Not to scale.

Red line in represents approximate location of the existing access road.

Green line represents the approximate location of the existing concrete wall

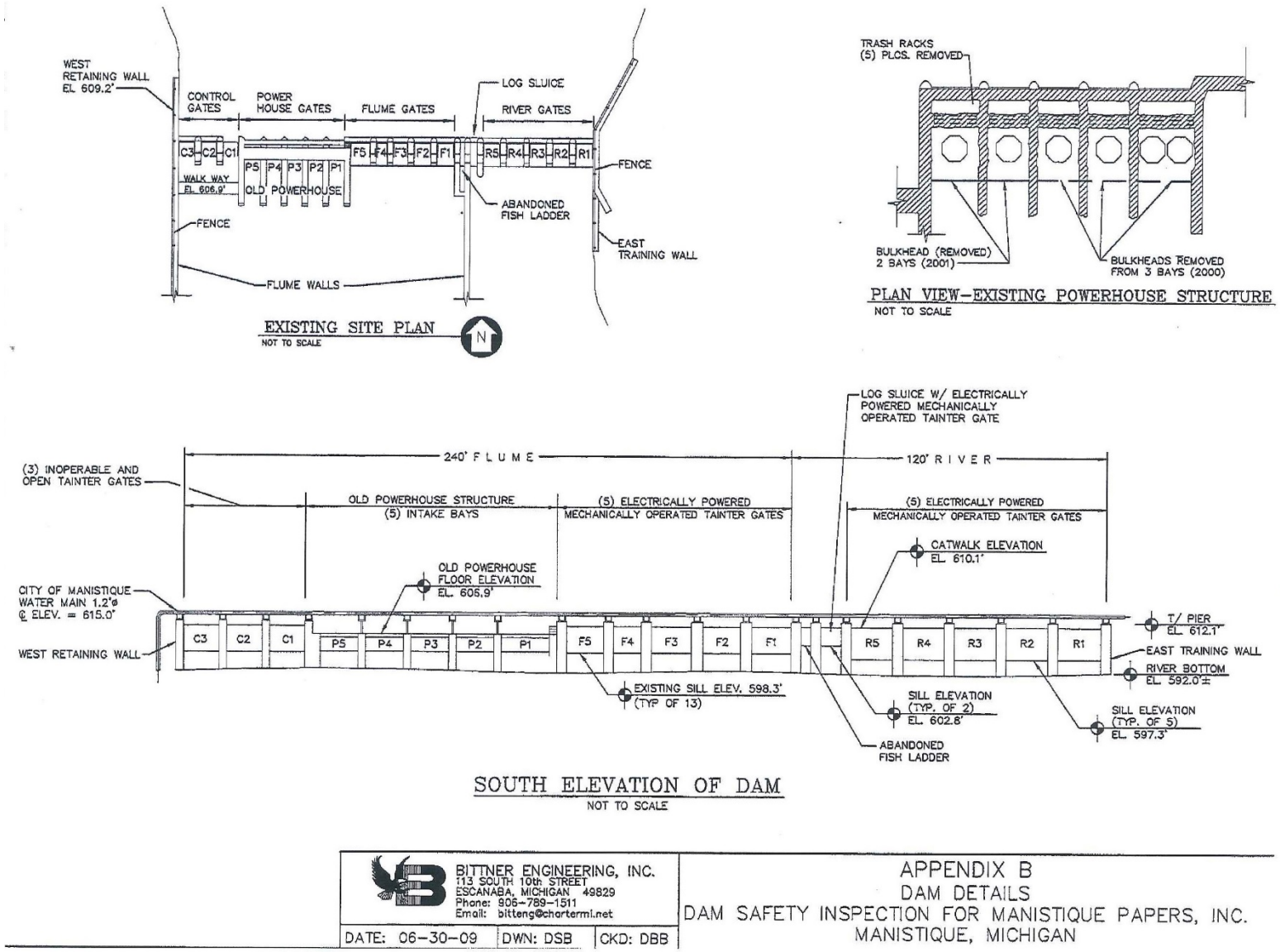

Figure 24: Plan view of the MP1 dam (from Bittner Engineering Inc. Dam Safety Report, 2009)

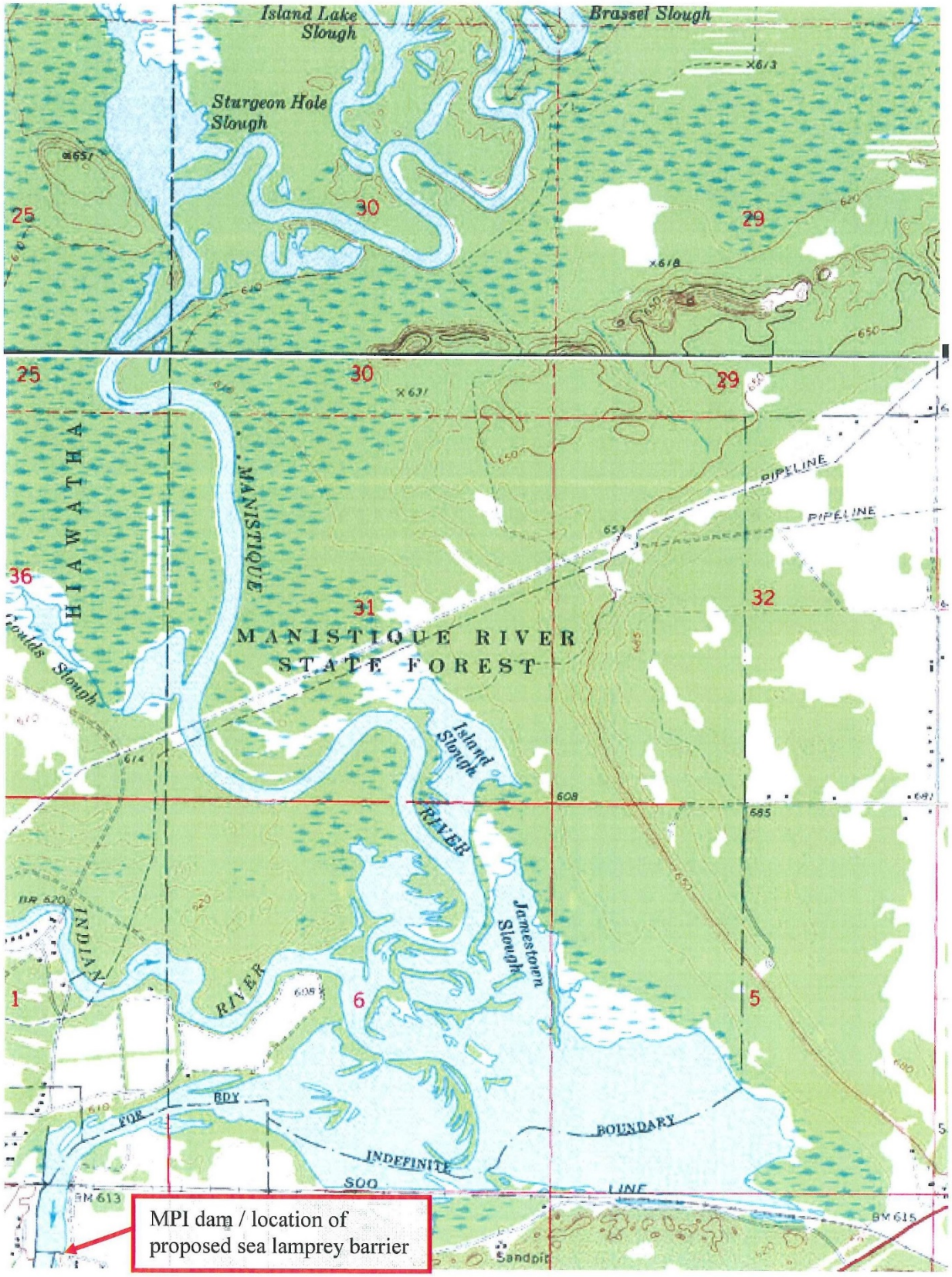

Figure 25: Topographic map of project area (USGS). *North is up. Not to scale.*

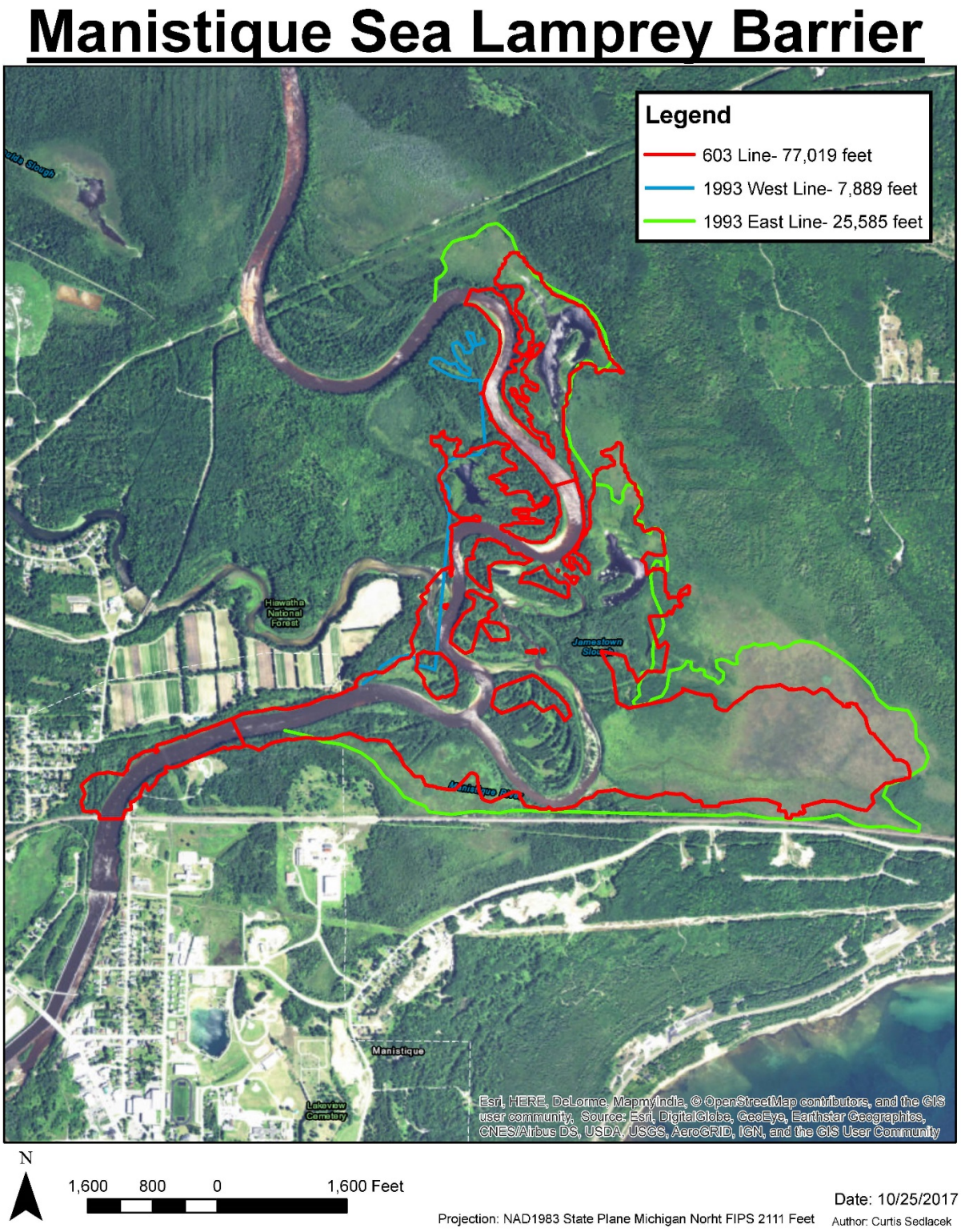

Figure 26: Area D – Wetland perimeter through inundation.

Figure 27: Wetland Type Conversions from Water Level Depth Increase.

ATTACHMENT B

SECTION 404(b)(1) EVALUATION OF THE CLEAN WATER ACT

MANISTIQUE RIVER SEA LAMPREY BARRIER
SECTION 1135
SCHOOLCRAFT COUNTY, MICHIGAN

CLEAN WATER ACT
SECTION 404(b)(1) EVALUATION
Of the Effects of Placing Fill Material into the Waters of the United States

I. PROJECT DESCRIPTION

a. Project Location, Description, and Authority: The U.S. Army Corps of Engineers, Detroit District (USACE), is proposing construction of a steel sheet pile (SSP) sea lamprey (*Petromyzon marinus*) barrier under Section 1135 of the Water Resources Development Act of 1986 (P.L.99-662), as amended. The proposed action is to construct a low-head fixed elevation SSP barrier at the existing Manistique Papers, Inc. (MPI) dam on the Manistique River in the City of Manistique, Schoolcraft County, Michigan. The recommended alternative is a fixed crest cantilevered barrier. ***Refer to the EA for detailed descriptions of the affected environment and evaluation of potential impacts of the proposed action and alternatives***. In summary, the proposed action would involve:

- Construction of a cantilevered steel sheet pile (SSP) barrier, approximately 17 feet downstream of the dam which would remain in-place). The SSP barrier footprint would extend the width of the river and be approximately 3 feet wide and 360 feet in length anchored approximately seven (7) feet into the bedrock by concrete.
- Construction of a steel walkway across the barrier and work platforms with hoists at four locations along the barrier supported by pilings to provide access for operations and maintenance of the permanent sea lamprey traps, as well as to allow for the use of temporary traps.
- Construction of two stoplog sections within the new barrier where the State of Michigan could implement fish passage at their convenience.
- Construction of four permanent sea lamprey traps (each approximately 10’ x 10’), including excavation of bedrock at the dam for placement of the traps, and excavation of bedrock leading up to the traps to form attractant flow for the lamprey (**Figures 5-6**).
- Permanent removal of approximately 2,875 feet of the center flume wall starting immediately downstream of the MPI dam, down to the riverbed bedrock (**Figure 2**). The removal would eliminate the hydraulic boil at the confluence of the flume and river flows in this section of the river. The lampreys are attracted to turbulence and congregate in the area, eliminating this would promote the migration of the lamprey upstream to the barrier and the trap and sort complex. A portion of the wall has already been modified by MPI.
- Temporary removal of approximate 30 feet of the west flume wall at the dam to allow construction of a temporary stone access ramp into the water and construction of the temporary rock causeway for construction equipment access.
- Removal of approximately 30 feet of the center flume wall at the dam to allow access for construction equipment. A stoplog structure would be constructed at the center flume wall.

- Some fissures and voids in the bedrock substrate located downstream of the dam may be sealed with concrete slurry.
- Construction of a berm beginning at the dam on the west side of the river, and extending north along the river for approximately 878 feet (**Figures 2 and 8**). The berm would tie into the dam and railroad bridge with SSP. Current design would include a clay berm and vegetation clearing around the new berm to occupy about 0.8 acres of wetlands between the dam and the railroad bridge. The proposed berm design would be approximately 10' wide at the top and approximately 50' wide at the base (**Figure 9**). Within the cleared 1.8 acre area necessary for construction (878' x 90'), approximately 0.8 acres of wetland would be directly impacted within the footprint by the berm fill.
- Construct a temporary construction causeway with rock and 3 foot diameter culverts for construction access on the riverbed downstream of the dam.

The SSP dam construction and center flume wall removal would likely involve use of land-based construction equipment located on the temporary rock causeway. No demolition or construction material would remain in the river upon completion of the project. The potential impacts from the project are evaluated and discussed further in the EA, and are not discussed further in the 404(b)(1) evaluation as the concrete flume wall will be removed.

b. Description of Placement Methods: For construction of the proposed SSP barrier and center flume wall removal, the action would involve placement of the following materials in the river: wood forms, concrete, fissure grout (mainly concrete), steel, stone, and construction equipment. Steel, concrete and grout would remain after construction. Wood forms and stone (access ramp and construction causeway) would be removed upon completion of construction. Steel materials, demolished concrete (including the center flume wall), soils (related to berm construction), and other debris would be appropriately disposed of in accordance with applicable laws and regulations. Recycling of materials would be encouraged. Clean material (e.g., concrete or soils) may be reused as appropriate during project construction or offsite when consistent with applicable environmental regulations. It is anticipated that the proposed SSP barrier would be constructed using land-based construction equipment. Equipment would work from the construction causeway for SSP installation and within low water for flume wall removal. The berm will be constructed from land.

For construction of the proposed berm, the action could involve temporary impacts and will result in the filling of 0.8 acres of wetlands located along 878 feet of the existing concrete wall between the dam and the railroad bridge. The proposed berm would be constructed of mainly clay. Steel sheet pile will be used to tie in at the dam and the railroad bridge abutment. Soil debris (e.g., existing soils that are not suitable for use in berm construction or other beneficial uses) would be appropriately disposed of in accordance with applicable laws and regulations, and would not be placed in wetlands or waters of the U.S.

c. Description of Habitat: River habitat at and in the immediate vicinity of the proposed SSP barrier is bedrock with concrete riverbank walls. Habitat for bottom dwelling organisms and fish is limited due to lack of suitable substrate, vegetation, and high velocity of water coming over the MPI dam. Habitat along the existing concrete wall ranges from highly disturbed wetlands that have been filled and an ATV trail near the dam, to minimally (east of wall) to moderately

(west of wall) disturbed wetlands north of the railroad bridge.

II. FACTUAL DETERMINATION

a. Physical Substrate Determinations: The proposed sea lamprey barrier would be constructed in the vicinity of the MPI dam, which has a bedrock riverbed and concrete riverbanks. The proposed berm would be constructed on a combination of existing fill and wetlands, underlain by shallow bedrock. The greatest impact would be to wetlands located north of the dam to the railroad bridge. Work on the berm to prevent the by-passing of lamprey during runoff events up to the 6.67% (15 year) discharge event will result in the placement of fill materials into approximately 0.8 acres of existing wetlands. Raising the water levels upstream by the construction of the SSP barrier will result in the conversion over time of approximately 2 acres of upland to wetlands along the boundary of the flooded Jamestown Slough. It is anticipated that overall wetland impacts would not be significant, and that wetlands in the area would continue to provide similar levels of wetland functions (e.g., sediment trapping, habitat, and floodwater storage). Approximately 16 acres of existing wetlands will be converted to other types of wetlands with the inundation caused by installation of the SSP barrier and raising of the upstream water level within the Jamestown slough.

b. Water Circulation, Fluctuation, and Salinity Determinations: No significant effects. The proposed sea lamprey barrier would be constructed at the MPI dam, with the dam remaining in-place. There would be a permanent increase in low-flow and flood water levels associated with the proposed action. The floodplain inundation upstream of the barrier would be altered and is anticipated to increase due to the anticipated increase in water level elevations for all flow events. Water circulation, fluctuations and salinity conditions would remain similar to existing conditions. Depending on the final design and alignment of the berm, any wetlands located within the footprint of the proposed berm would be converted to uplands during berm construction.

c. Suspended Particulate/Turbidity Determinations: No significant effects. Neither the materials to be placed in the river, nor the substrate at the proposed SSP barrier location site consist of fines. The concrete used to anchor the SSP barrier into the excavated bedrock trench will be placed in the dry likely through the use of trench shields that will act as a dam to keep the water out. Some particles may become suspended when the west flume wall is demolished and the stone access ramp is constructed, however this turbidity would be minor and temporary. Turbidity effects would dissipate over time and distance from the work area and would not have significant long-term effects. Potential fines created during berm construction would be controlled using erosion control measures and by physical barriers (existing concrete wall, existing wetlands), causing no significant effects. Fines and sediment will not migrate downstream to the state designated coastal boundary.

d. Contaminant Determinations: All materials used for construction of the proposed SSP barrier and berm would come from an approved source. No contaminated materials are anticipated to be encountered during construction activities.

e. Aquatic Ecosystem and Organism Determinations: No significant effects. No significant amount of habitat is known to exist at the proposed construction site, therefore construction is

not anticipated to disrupt existing habitat at the site or its use by fish and wildlife, which would avoid the area because of the noise and activity. Bottom-dwelling organisms could be destroyed, if present, but would eventually re-colonize the area. Wetland plants would be disturbed and / or destroyed in berm construction, and animals would be temporarily displaced.

f. Federally Listed Species: Habitat for federally listed endangered, threatened or candidate species has not been identified as being present in the area where the proposed action is to take place. Any required tree cutting will occur in the winter to minimize any impacts to the northern long eared bat. Therefore, the USACE has determined the project would likely have no effect on federally listed species and / or critical habitat. However, the USACE is re-coordinating with the USFWS under Rule 4(d) as vegetation clearing in the winter may affect but is not likely to adversely affect the Northern long eared bat. In addition, the Michigan Department of Natural Resources, Wildlife Division concluded that the proposed action would not impact State rare or unique natural features at the site.

g. Proposed Disposal Site Determinations: No significant effects on municipal or private water supplies, recreational or commercial fisheries, water related recreation, aesthetics, parks, monuments, wilderness areas, research sites, or similar preserves are expected. Refer to EA for additional discussion.

h. Determination of Cumulative and Secondary Effects on the Aquatic Ecosystem: The proposed action would prevent migration of sea lamprey to habitat located upstream of the MPI dam, increase sea lamprey trapping efficiency, and help reduce sea lamprey in the Great Lakes, thus providing benefit to the Great Lakes fishery and ecosystem. Over time, construction of the dam will result in the savings of several hundred thousand dollars in lamprey treatments costs. Construction of the dam with an increase in water levels and will cause a secondary inundation effect on approximately 300 acres of existing wetlands located upstream. Approximately 16 acres of the wetlands that now exist in Jamestown Slough will be changed to different classes of wetlands with the additional water inundation. Some of the emergent wetlands will be converted to submergent wetlands, some shrub/scrub wetland will be converted to emergent wetlands and some forested wetlands converted to shrub/scrub wetlands. Based on discussions with MDNR biologists, the overall habitat within the inundation area will be improved for fish and wildlife with the increased depths of water. The MDNR has proposed mitigation in the form of scarce habitat preservation through the use of a conservation easement for unique lands located upstream within the state forest boundary that is part of the watershed to meet the anticipated permit requirements from the MDEQ. There would be a permanent increase in water surface elevations in the upstream pool which would provide benefits to fish and wildlife and enhance wetland habitat. It is estimated that over time, approximately 2 acres of wetlands would be created from uplands with the increased water levels along the perimeter of Jamestown slough. No significant cumulative or secondary effects are expected to occur from the proposed action.

Under the 404(b)(1) evaluation, Section 230.76(d) when a significant ecological change in the aquatic environment is proposed by the discharge of dredged or fill material, the permitting authority should consider the ecosystem that will be lost as well as the environmental benefits of the new system. The USACE has determined that there is no net loss of wetland acreage though wetland types change on about 16 acres though some functions change. Approximately 2 acres

of wetlands are created from uplands with the inundation upstream in the boundary of the Jamestown slough. The environmental benefits and public interest in the proposed project outweigh the detriments from the proposed action. The direct project impacts result in the conversion of 0.8 acres of existing wetlands to uplands with berm construction.

III. FINDING OF COMPLIANCE

a. On the basis of the *Guidelines for Specification of Disposal Sites for Dredged or Fill Material* (40 CFR part 230), it has been determined that the proposed action is in compliance with Section 404(b)(1) of the 1977 Clean Water Act, as amended. The overall benefits from the project outweigh the detriments, the adverse effects of the project are minimal and mitigated to the extent practicable by minimizing fill area for berm construction within the wetlands.

b. The project purpose is to block the movement of lamprey and prevent their spawning access upstream of the MPI dam. Alternatives considered include: Alternative 1: Fixed Crest Cantilevered Barrier; Alternative 2: Fixed Crest Post and Panel Barrier; and Alternative 3: No Action. Construction of a barrier at various locations upstream and downstream of the dam was considered; however, based on potential impacts to the floodplain, the preferred barrier construction site is at the MPI dam. The proposed action is construction of a low-head fixed elevation SSP barrier involving a cantilevered wall and upstream berm. The berm is needed to maintain the upper pool to achieve the desired drop in water elevation at the barrier during rain events that the barrier is designed to function in, to prevent lamprey escapement during extreme flow events, and to prevent an increase in the floodplain for the 1% annual chance event.

c. The proposed project is in compliance with applicable State of Michigan water quality standards. The action would not cause or contribute to significant degradation of the waters of the United States. A Section 401 (CWA) water quality certification, or waiver thereof, would be obtained from the State of Michigan prior to beginning construction by the non-Federal sponsor through the state permit process.

d. The proposed action would not result in significant effects on human health or welfare, municipal and private water supplies, recreational fishing, aquatic life, wildlife dependent on the aquatic ecosystem, or the diversity, productivity and stability of the aquatic ecosystem at the project site. The proposed action has been coordinated with the U.S. Fish and Wildlife Service under Section 7 of the Endangered Species Act. Federally listed endangered or threatened species or their critical habitats would not be affected.

e. Appropriate steps would be taken to minimize adverse environmental effects on the aquatic ecosystem. Contract specifications would include specific environmental protection clauses to ensure protection of natural resources, proper installation and maintenance of appropriate and effective erosion control measures during and after the project, and planned sequencing of the construction activities to minimize effects on the environment.

f. No significant adaptations of the Section 404(b)(1) Guidelines were made relative to this evaluation.