

## **Appendix I**

### **Clean Water Act - 404(b)1 Evaluation**

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## Section 404(b)(1) Evaluation

### Project Description

**Location.** The Piasa and Eagle's Nest Islands Habitat Rehabilitation and Enhancement Project (HREP) is located in Jersey and Madison counties, Illinois, near Grafton, in Pool 26 between Upper Mississippi River (UMR) river miles 207.5 and 211.5. The Project is comprised of 1,381 acres of side channel, main channel, forested island, and backwater habitat.

**General Description.** The goal of the Project is to restore and improve the quality and diversity of aquatic and island ecosystem resources within the Project Area. The objectives identified to meet this goal are to:

- 1) Restore depth (>8 feet) and increase velocity over existing conditions to improve sediment transport and geomorphic processes within Piasa Chute;
- 2) Increase the depth and connectivity between the Piasa Island Backwater and the Mississippi River, as measured by acres of deep water habitat (>5 feet) and number of days connected; and
- 3) Increase the aerial coverage of islands, as measured in acres.

**Authority.** The Upper Mississippi River Restoration – Environmental Management Program was authorized by Congress in Section 1103 of the Water Resources Development Act of 1986 (Public Law 99-662), as amended. The proposed project would be funded and constructed under this authorization.

**Purpose.** The purpose of the evaluation portion of this document is to comply with Section 404 of the Clean Water Act pertaining to guidelines for the placement of fill material into waters of the United States. This evaluation, in conjunction with the *Feasibility Report with Integrated Environmental Assessment, Upper Mississippi River Restoration Program, Piasa and Eagle's Nest Islands Habitat Rehabilitation and Enhancement Project, Jersey and Madison counties, Illinois* will assist in analysis of alternatives for the proposed project, resulting in a designated Tentatively Selected Plan. Additionally, this evaluation will provide information and data to the state water quality certifying agency demonstrating compliance with state water quality standards.

### General Description of Excavated and Fill Material.

1. General Characteristics of Material.
  - a. *Fill Material.* Fill materials will include quarry run limestone consisting of graded "A" stone and earthen materials including silt, sand, and clays.
  - b. *Excavated Material.* Excavated material is defined as material that is either hydraulically dredged or mechanically excavated from waters of the United States. Earthen material excavated in Piasa Chute and Piasa Island Backwater will consist of alluvial sand, silt, and clay and will be beneficially reused within the site for construction of the islands.
2. Quantity of Material. An estimated 885,000 cubic yards (CY) of material would be hydraulically or mechanically dredged from Piasa Chute. An estimated 156,000 CY of material would be hydraulically dredged from Piasa Island Backwater. The material would be used to construct the island features. These estimates would be confirmed prior to construction.
3. Source of Material. Stone used for the project will be obtained from commercial stone quarries in the vicinity of the project area.

### Description of Proposed Placement Sites

1. Location. The proposed placement sites of dredged material are located in the interior of the project area and will be used to construct the islands; shown in the Project Features Map (Figure I.1). The placement of material dredged from Piasa Chute and Piasa Island Backwater would be used to construct islands to an elevation of 421.0 NGVD, the prevailing height of Piasa Island. The island construction/dredged placement sites follow historic imagery, and hydraulic model outputs of areas with low shear stress and shallow depths. Approximately 77 acres would be converted from open water aquatic habitat to sandbar island habitat due to construction of the island features.

In summary, the resulting dredge disposal material would be used beneficially to construct the proposed project features.

2. Size and Types of Habitat. Final placement of project features will result in loss or conversion of minor amounts of natural habitat.

Temporary, short-term impacts to wetlands may result from construction activities. The dredging of Piasa Island Backwater, the intent of which is to restore the connectivity of the backwater to the Mississippi River by removing the sediment plug at the entrance of the backwater, may result in conversion of wetland to open water habitat along the periphery of the existing backwater. No conversion or removal of existing forested wetland habitat is anticipated.

The placement of the dredge disposal material would be beneficially reused to construct the island features. Placement of material to construct the island features would result in approximately 77 acres of open water habitat being permanently converted to sandbar island habitat.

Overall, implementation and construction of the project features would enhance the ecosystem functionality within the Project.

3. Type of Site
  - a. *Permanent Deposits of Excavated or Fill Material.* The construction of proposed islands and the notched rock structure would result in permanent placement of dredge disposal material and stone.

Material dredged from Piasa Chute and Piasa Island Backwater would be used to construct the island features.

- b. *Temporary Deposits of Excavated or Fill Material.* Temporary placement of fill material will be done in such a manner as to avoid and minimize impacts to wetlands and other natural features. Temporary stockpiles of material may also be necessary during construction of the various project features. Construction staging areas would be created in a logical manner in order to avoid impacts to wetlands.

4. Timing and Duration of Placement. The construction of the notched rock structure would require work to be performed within higher (but non-flood) stages. Depending on local weather and river flooding conditions, the construction period may occur over several years.

**Description of Placement Method.** Material removed from Piasa Chute and Piasa Island Backwater would be hydraulically or mechanically dredged, or both, depending on contractor's equipment utilized

for the Project. Hydraulic dredging equipment could consist of a cutterhead dredge, pontoons, and/or pipelines to transport the excavated dredge material in the form of a slurry. Mechanical dredging equipment could consist of a crane with clamshell bucket or a barge mounted excavator along with deck barges to transport the excavated dredge material in a more solid or cohesive condition. Either construction method selected would use the removed material from Piasa Chute and Piasa Island Backwater for beneficially construct the island features. The excavated dredge material would be transported on site to the planned island locations by either pipeline system (hydraulic dredging) or by barge (mechanical dredging). The preferred method for removing material from the chute and backwater would be the hydraulic dredging method as previously described. During the plans and specifications phase, the project delivery team would identify locations for pipe crossings that would avoid and minimize the amount of temporary impact to habitat within Piasa Island. After material has been placed to the desired height for the islands (421.0 NGVD), the material may be re-graded using earth-moving equipment.

A-stone used to construct the notched rock structure and the stone protection of the islands would be transported by barge to the project site. Heavy equipment (e.g., cranes and/or excavators) operating from a barge would be used to place stone to construct these features.

## Factual Determinations

### Physical Substrate Determinations

1. Substrate Elevation and Slope. Piasa and Eagle's Nest Islands lie within the Upper Mississippi River and consist of typical alluvial material. The predominant elevations within the Project range from 418.0 to 424.0 ft. NGVD. Much of the project area is sloped no greater than 1-2%. Construction specifications are provided in the full report.
2. Sediment Type. The soil in the project area has been characterized by the Natural Resources Conservation Service as solely comprised of Darwin silty clay. The Darwin soils series consists of very deep, poorly and very poorly drained, and very permeable soils formed in clayey alluvium floodplains. The soils are found on 0 to 2 percent slope and frequently flooded for long durations.

Substrate samples were taken as part of a 2014 mussel survey. Substrate was primarily composed of sand, silt, and clay in varying proportions. Silt and clay made up a larger percentage of the substrate near the banks, while loose sand became more common near the center of Piasa Chute and riverward of Piasa and Eagle's Nest Islands.

3. Excavation/Fill Material Movement. Dredge disposal material used for island construction would be subject to erosion, but the stone rock placement would limit erosion and protect the integrity of the construction island by locking the dredged material in place. The A-Stone used in the island protection and notched rock structure have been sized to withstand the force of floodwaters, and are not expected to move.
4. Actions Taken to Minimize Impacts. Numerous actions will be taken to avoid adverse effects of sediment related impacts. Project features will be designed with stable slopes. Project features will be positioned to minimize impacts to forest habitats. Faunal impacts from the construction of project features would be limited to short-term disruption of the aquatic and terrestrial communities in the areas of the disturbance. Construction would be scheduled in such a way as to avoid impacting threatened and endangered species. Additionally, best management

practices for construction will be enforced to minimize impact to Piasa Creek and the Mississippi River.

### **Water Circulation, Fluctuation, and Salinity Determinations**

1. Water. Excavation would temporarily reduce water quality in the adjacent area. Turbidity and sedimentation would increase. This would cease after construction completion and the improved depth and velocity within Piasa Chute and increased depth and connectivity of Piasa Island Backwater would benefit fish and wildlife resources in the long-term.
2. Current Patterns and Circulation. One of the main objectives of this project is to increase flow within Piasa Chute. Dredging of Piasa Chute and construction of the notched rock structure would alter current velocity and patterns; however, based on results of the hydraulic modeling these alternations would not significantly change the hydraulics of the main channel, but would improve the hydraulics within the Project Area by increasing flow and bathymetric diversity.
3. Natural Water Level Fluctuations. Normal water level fluctuations in the Mississippi River would be unaffected. Restoration features would not detrimentally increase flood heights or adversely affect private property or infrastructure.
4. Actions That Will Be Taken to Minimize Impacts. Best management practices for construction will be enforced.

### **Suspended Particulate/Turbidity Determinations**

1. Expected Changes in Suspended Particles and Turbidity Levels in Vicinity of Placement Site. Short-term increases in suspended particulates and turbidity due to construction activities are expected within the vicinity of the dredging areas, rock structure, and islands. This will cease after construction completion and the improved depth and increased velocity within Piasa Chute, increased depth and connectivity of Piasa Island Backwater, and restored sandbar island habitat would benefit fish and wildlife resources in the long-term.
2. Effects on Chemical and Physical Properties of the Water Column.
  - a. *Light Penetration*: There will be a temporary reduction until sediments suspended as part of the project activities settle out of the water column.
  - b. *Dissolved Oxygen*: No adverse effects expected.
  - c. *Toxic Metals and Organics*: No adverse effects are expected.
  - d. *Aesthetics*: Aesthetics of work sites are likely to be adversely affected during construction, but are expected to be temporary and improve after construction.
  - e. *Water Temperature*: No adverse effects expected.
3. Effects on Biota. The project would likely result in some short-term displacement of biota in the immediate vicinity of construction activities due to temporary decreases in water quality and disturbance from construction equipment. Long-term beneficial effects would occur as aquatic species, especially riverine species, benefit from improved habitat within the side channel and backwater. Increased sandbar island habitat resulting from the project would benefit wildlife, including the endangered least tern.

**Contaminant Determinations.** The project is located in the Mississippi River floodplain which is primarily natural habitat with a history of agriculture. There is little evidence that the land has been used for other purposes. The Phase I Hazardous, Toxic, and Radioactive Waste survey has been completed and revealed low level recognized environmental conditions that should not impact the project.

### **Aquatic Ecosystem and Organism Determinations.**

1. Effects on Plankton. The project could have temporary adverse effects on the plankton in the immediate vicinity of the project area. This would cease after construction completion.
2. Effects on Benthos. Negative effects to benthos would be limited to elimination of those organisms currently residing in the immediate dredging sites, island placement areas, and notched rock structure placement site. Benthic organisms in the immediate vicinity of sites designated for the placement of dredged material or rock will be lost due to burial; however the benefits gained from improved aquatic habitat, reconnecting backwater, and island habitat would far outweigh any loss in benefits during the time of construction. And rock used to construct proposed project features would quickly be colonized by benthic organisms.
3. Effects on Nekton. Temporary adverse effects may be experienced by free-swimming aquatic life during construction, as with the benthic community; the long-term impact would be beneficial.
4. Effects on Aquatic Food Web. Effects on the aquatic food web are expected to be beneficial overall by improving backwater habitat, side channel habitat, and island habitat.
5. Effects on Special Aquatic Sites. Effects on special aquatic sites should be negligible in the project area; no sanctuaries or refuges would be adversely affected by the proposed action. Project goals and features have been developed in coordination with state and federal partners.
  - a. *Sanctuaries and Refuges.* The project is expected to greatly benefit fish and migratory wildlife.
  - b. *Wetlands, Mudflats, and Vegetated Shallows.* No wetlands or mudflats, vegetated shallows, coral reefs, or riffle and pool complexes would be adversely affected over the long-term by the proposed action. The Piasa Island Backwater may extend beyond its existing open water footprint, affecting existing wetland areas; however, the proposed backwater dredging is geared toward removal of the sediment plug and deepening the interior of the backwater, while minimizing impacts to wetlands, mudflats, and vegetated shallows. The placement of the dredge disposal material to build the island features would avoid impacts to wetlands. Project planning considered the full extent the minimization of wetland loss.
6. Threatened and Endangered Species. Presence, or use by, federally endangered and threatened species is discussed in the Biological Assessment in the Feasibility Report. No adverse effects are expected to result from this Project.
7. Other Wildlife. The Project would likely result in some short-term displacement of wildlife in the immediate vicinity of construction activities. Minimizing disruption of migratory waterfowl during fall and early winter will be considered during the development of plans and specifications. Wildlife, especially waterfowl, would benefit from the increase in habitat diversity and food resources made possible through improved island diversity and improved foraging habitat.

#### **Proposed Placement Site Determinations**

1. Mixing Zone Determinations. A mixing zone is that volume of water at a placement site or discharge site required to dilute contaminant concentrations associated with discharge of excavated material to an acceptable level. The concentration of sediment material associated with construction of proposed project features would not be high enough to require a mixing zone.
2. Determination of Compliance with Applicable Water Quality Standards. This Section 404(b)(1) evaluation serves as the necessary compliance required by law under the Clean Water Act. A

Section 401 Water Quality certification and all other permits necessary for the completion of the project, would be obtained prior to project construction.

3. Potential Effects on Human Use Characteristics. No long-term adverse impacts to municipal and private water supplies; water-related recreation; aesthetics; or parks, national and historic monuments, national seashores, wilderness areas, research sites or similar preserves would occur. Following construction, the proposed project would enhance fish and wildlife habitat and improve the overall ecosystem functionality of Piasa and Eagle's Nest Islands.

**Determination of Cumulative Effects on the Aquatic Ecosystem.** Although minor short-term construction-related impacts to local and wildlife populations are likely to occur, no negative cumulative impacts to fish and wildlife are identified. From a systemic approach, the proposed project would result in positive long-term benefits to side channel, backwater, and island habitat located in and around Piasa and Eagle's Nest Islands HREP.

**Determination of Secondary Effects on the Aquatic Ecosystem.** No adverse secondary affects should result from the proposed action. Long-term benefits to aquatic habitat and wildlife are expected.

## Findings of Compliance or Non-Compliance with the Restrictions on Discharge

- A. No significant adaptations of the 404(b)(1) guidelines were made relative to this evaluation.
- B. Alternatives that were considered for the proposed action included more features than the tentatively selected plan. They were analyzed for environmental benefits and costs. The tentatively selected plan provided a large number of environmental benefits and best met project objectives and the four plan formulation criteria of completeness, effectiveness, efficiency, and acceptability.
- C. Certification under Section 401 of the Clean Water Act would be obtained from the Illinois Department of Natural Resources.
- D. The project is not anticipated to introduce toxic substances into nearby waters or result in appreciable increases in existing levels of toxic materials. The proposed activity is in compliance with Applicable Toxic Effluent Standards or Prohibitions under Section 307 of the Clean Water Act.
- E. No significant impact to Federal or state listed threatened or endangered species would result from the proposed action. Prior to construction, full compliance with the Endangered Species Act would be documented.
- F. No municipal or private water supplies would be affected by the proposed action, and no degradation of waters of the United States is anticipated to result from the proposed action. The proposed construction activity would not have a significant adverse effect on human health and welfare, recreation and commercial fisheries, plankton, fish, shellfish, wildlife, or special aquatic sites. No significant adverse effects on life stages of aquatic life or other wildlife dependent on the aquatic ecosystem are expected to result. The proposed construction activity would have no significant adverse effects on aquatic ecosystem diversity, productivity, and stability. No significant adverse effects on recreational, aesthetic, and economic values would occur.
- G. The materials used for construction would be chemically and physically stable and non-contaminating.
- H. No other practicable alternative less damaging to the aquatic environment has been identified that would address the project goal and objectives better than the tentatively selected plan. The proposed action is in compliance with Section 404(b)(1) of the Clean Water Act, as amended. The proposed action would not significantly impact water quality. On the basis of the guidelines the proposed disposal site for the discharge of excavated material is specified as complying with the inclusion of appropriate and practical conditions to minimize pollution or adverse effects to the aquatic ecosystem.

\_\_\_\_\_ Date: \_\_\_\_\_

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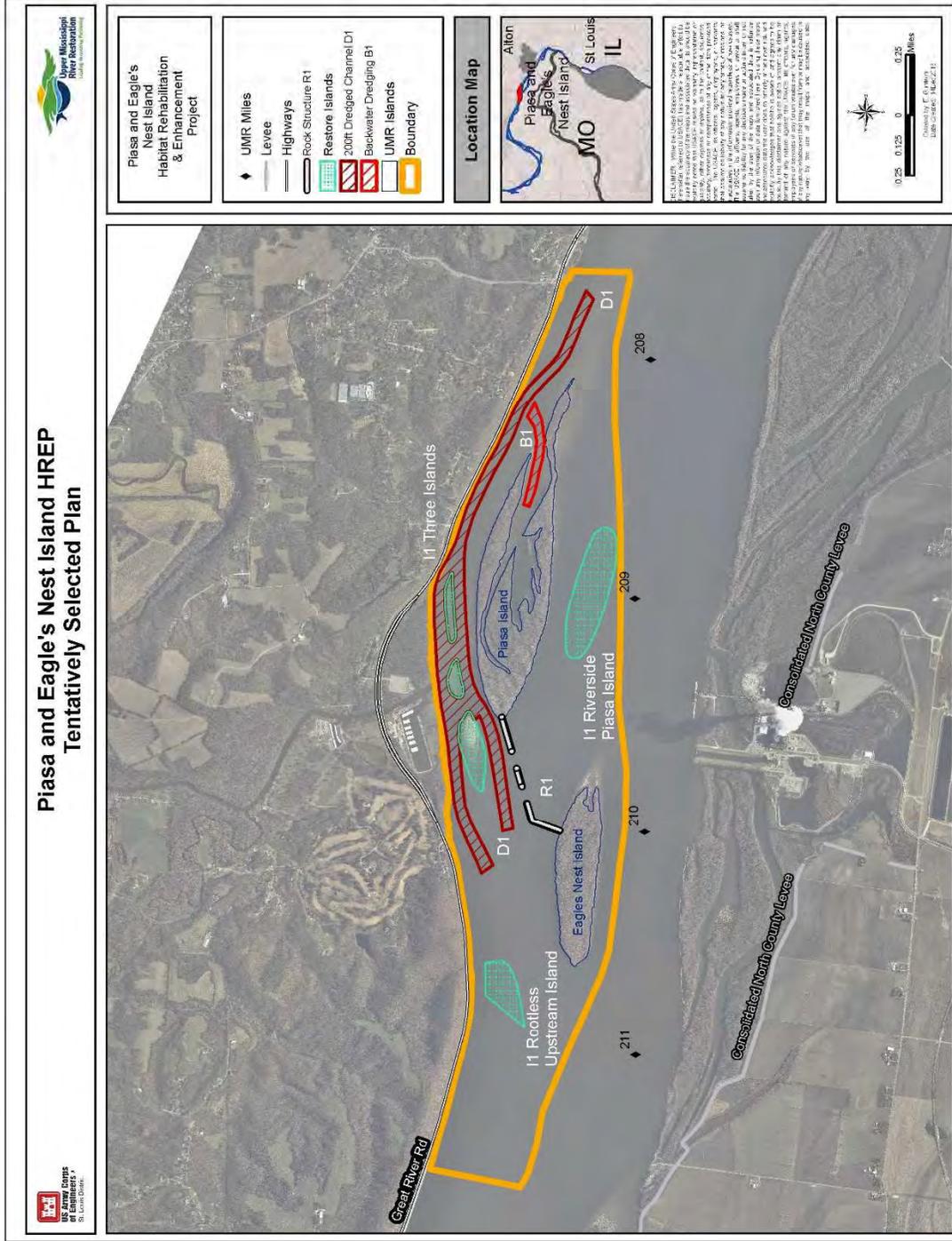


Figure I.1.1. Location of restoration measures of the tentatively selected plan