

Appendix B:

Section 404(b)(1) Evaluation

*Lower Pool 2 Channel Management Study:
Boulanger Bend to Lock and Dam No. 2*

I. Project Description

A. Location

The proposed fill activities would occur between the cities of Hastings and Cottage Grove, Minnesota, in Dakota and Washington Counties. Fill activities would occur in the main (i.e., navigation) channel border areas of Lower Pool 2 of the Mississippi River.

B. General Description

The proposed project would consist of excavating and maintaining a wider channel that is still within authorized dimensions and constructing two new rock training structures (rock sills): one on the right descending bank from River mile 819.9 to 819.5 and one on the left descending bank from River mile 818.9 to 818.4. These changes would improve navigability, safety and reduce channel maintenance requirements.

In compliance with Section 404 of the Clean Water Act, this evaluation addresses the impacts resulting from the discharge of fill into approximately 6.3 acres of waters of the United States.

Detailed description of the project features can be found in the Letter Report and Environmental Assessment.

C. Authority and Purpose

The Corps of Engineers holds the authority and responsibility to maintain a navigable channel on the Upper Mississippi River. Authority for continued operation and maintenance of the Upper Mississippi River 9-Foot Channel project is provided in the River and Harbor Acts of 1930 and 1932. Original authority for the Corps of Engineers to work on the Mississippi River was provided in the River and Harbor Act of 1878.

D. General Description of Dredged or Fill Material

1. General Characteristics of Material

The training structures would be constructed using rockfill (a quarry-run stone with no processing). Rockfill has a wider gradation band than graded riprap, which eliminates the need for processing.

Approximately twenty-five, four-foot boulders would be spaced (approximately every 250 feet) throughout the top of the training structures to make it more visible at high water conditions.

2. Quantity of Material

Estimated quantities for fill material are:

Rock:

The larger West Rock Training Structure is 33,890 Cubic Yards

The smaller East Rock Training Structure is 20,921 Cubic Yards

For a total of 54,811 Cubic Yards

Approximately twenty-five, four-foot boulders.

3. Source of Material

Riprap would be sourced by the contractor. Clean rock.

E. Description of the Proposed Discharge Sites

1. Location

The proposed training structures would be constructed primarily in the main channel border on the right descending bank between River Miles 819.9 and 819.5 and on the left descending bank between River Miles 818.9 and 818.4. Figures detailing the locations of the proposed project features can be found in the Environmental Assessment.

2. Size

The constructed top width of the training structures would be 10 feet and would have 5H:1V side slopes for the top two vertical feet. The lower slopes (2 feet below crest and below) would have side slopes of 1.5H:1V. The width at the bottom would be variable depending on depth. The crest of the training structures would be 0.8 feet above Low Control Pool elevation (687.4 – crest elevation in 1912 datum). The training structures would have a total footprint of approximately 6.3 acres.

3. Type of Site

The project site is situated in an area where the main-navigation channel meanders back and forth across the floodplain that is mostly inundated from Lock and Dam 2. The river is approximately 160 feet below the surrounding upland bluffs. The floodplain at the upstream portion of the Project Area (RM 821) is just over two miles wide with the main-navigation channel situated between Lower Grey Cloud Island and Spring Lake. Between RM 820 and Lock and Dam 2 the valley width constricts to just less than one mile in width.

4. Types of Habitat

A variety of aquatic habitats exist in the Project Area as classified by Wilcox (1993). The main navigation channel conveys the majority of river discharge with the 200 foot (61 m) wide navigation channel marked with buoys, lights and daymarks. The navigation channel is maintained to a minimum depth of nine feet (2.6 m). Typically, flows are at a higher velocity with shifting substrates and devoid of vegetation. Main channel border areas lie between the main navigation channel and the riverbank (i.e., island shorelines) and may harbor river

training structures, submerged logs and riprap that provide habitat for a variety of biota. Tertiary channels (i.e., Boulanger and Nininger sloughs), less than 100 feet (30 m) wide, are between the apparent shorelines or inundated natural bank lines offering variable habitats depending on flow, water depth, substrate, submerged structures, light penetration, wind, water quality, etc. Contiguous backwater floodplain lakes (i.e., Spring Lake) are hydraulically connected to the main channel with low current velocity that offer a wide variety of plant and animal habitat determined by local conditions. Contiguous impounded areas of large open water exist adjacent to and upstream of Lock and Dam 2. Habitat in the impounded area is variable and influenced by water depth, substrate, wind, submerged structures, light penetration, water quality, flow, etc.

The changes under project conditions would be decreases in main channel border habitat (-13.7 acres), impounded aquatic (-7.8 acres), and wing dam habitat (-3.6 acres), although the wing dams are mapped from historic data and many of the wing dams no longer exist. Project conditions would increase main channel areas (+15.2 acres), revetment (+5 acres), and floodplain shallow aquatic habitat (+4.9 acres).

F. Description of Disposal Method

Material would most likely be placed using mechanical dredging equipment.

II. Factual Determinations

A. Physical Substrate Determinations

1. Substrate Elevation and Slope

The existing elevation varies throughout the feature footprints, but in general the channel border areas have a gradual slope and are between 3-7 feet deep (Elevation 683.7 – 679.7 feet). As the channel borders approach the main channel, the slope increases sharply and the channel bottom is generally between 9 and 18 feet deep (Elevation 677.6 – 668.6 feet).

Under project conditions, the islands would be constructed to about 0.8 feet above LCP (Elevation 687.4 feet (1912 datum)) and would have slopes of 5H:1V (upper two feet) and 1.5H:1V. Additional details of the project feature construction can be found in the Plans and Specifications Appendix of the Letter Report.

2. Sediment Type

Substrate in the off-channel areas of the project area consists mostly of fat clay overlying sand. Substrate within the channel generally consists of a mixture of shifting coarse silts and fine sand.

3. Fill Material Movement

Secondary movement of fill material used to construct the project would be minimized because project features would be designed to discourage erosion, and would be constructed of rock riprap, which would require significant energy to move.

4. Physical Effects on Benthos

Any benthic organisms in the filled and dredged areas would be destroyed during construction. However, a relocation effort will be undertaken to move freshwater mussels out of the project footprint in order to avoid impacts. Mussel relocations are typically more than 90% effective.

5. Actions Taken to Minimize Impacts

As stated in section II.(A)(4), a freshwater mussel relocation is being undertaken to minimize impacts to mussels. Further information regarding the mussel relocation can be found in Appendix G of the Letter Report.

B. Water Circulation, Fluctuation, and Salinity Determination

1. Water

a. Salinity

The proposed project would have no effect on salinity.

b. Water Chemistry

The use of clean fill materials should preclude any significant impacts on water chemistry. If hydraulic dredging is used for any part of the project, the carriage return water would be taken from the Mississippi River to mix with the dredged material and allow hydraulic movement, and returned to the river after settling. Returning this water without the suspended sediments should not have any effect on water chemistry.

c. Clarity

During construction of the training structures, some sediment would likely become suspended and would cause a temporary, minor reduction in local water clarity.

d. Color

The proposed project would have no effect on water color.

e. Odor

The proposed project would have no effect on water odor.

f. Taste

The proposed project would have no effect on water taste.

g. Dissolved Oxygen Levels

The proposed project would have no effect on dissolved oxygen levels.

h. Nutrients

The proposed project would have no effect on nutrient levels in the water.

i. Eutrophication

The proposed project would have no effect on eutrophication.

j. Temperature

The proposed project would have no effect on water temperature.

2. Current Patterns and Circulation

a. Current Velocity and Patterns

Stream velocity in the immediate project area would be altered by the construction of the proposed project. The magnitude of change in current velocity is dependent upon the discharge conditions being considered, and therefore four different scenarios were evaluated. In general, breakout flows are contained, particularly east of Freeborn Island. Channel velocities are generally higher in the in the navigation channel for project conditions. Velocities are much lowered in the area downstream of the horseshoe-shaped rock sill, although not eliminated water would seep through the pores in the riprap of the sills and eddy flows would likely form around the back side of the rock sill. A more detailed description of the effects of the proposed project on current velocity can be found in Chapter 6.2.1 of the Environmental Assessment and the Hydraulics Appendix.

b. Stratification

The proposed project would not significantly affect stratification.

c. Hydrologic Regime

The proposed project would not significantly alter the existing hydrologic regime within the project area.

3. Normal Water Level Fluctuations

The proposed activities would not have an effect on normal water level fluctuations in the project area.

4. Salinity Gradient

The proposed project would have no effect on the salinity gradient.

5. Actions Taken to Minimize Impacts

No special actions would be taken to minimize the effects of the proposed project on water circulation, fluctuation, or salinity.

C. Suspended Particulate/Turbidity Determination

1. Expected Changes in Suspended Particulates and Turbidity Levels in the Vicinity of the Disposal Site

Minor increases in suspended particulates and turbidity levels would occur from the construction activities in the immediate project vicinity. The utilization of BMPs during construction would minimize this effect. Upon completion of construction activities, suspended particulates and turbidity levels would return to pre-project conditions.

2. Effects on Chemical and Physical Properties of the Water Column

The minor increase in suspended particulates is not expected to cause a change in dissolved oxygen, toxic metals, organisms, or pathogens in the water column.

3. Effects on Biota

The decrease in sediment deposition in the immediate project vicinity would increase the stability of the habitat, and would likely improve the biotic community in the project vicinity.

4. Actions Taken to Minimize Impacts

Best management practices would be used to reduce the turbidity caused by project construction. No special actions would be taken to minimize the effects of the proposed project on suspended particulates or turbidity downstream of the project vicinity.

D. Contaminant Determinations

The rock used for training structure construction would be clean, free of fines, obtained from a local quarry.

E. Aquatic Ecosystem and Organism Determination

1. Effects on Plankton

During construction, increases in turbidity and suspended solids near the dredged and filled areas would have a localized suppressing effect on phytoplankton productivity. However, these local effects would be short-term and minor. The plankton populations would recover quickly once construction activities have ceased.

2. Effects on Benthos

The proposed fill activity would directly affect approximately 6.3 acres of benthic habitat. Any benthic organisms remaining in the affected areas after the freshwater mussel relocation effort would be covered. After project completion, benthic organisms would colonize new rock substrate provided training structures. This rock substrate would alter the benthic habitat diversity in the area.

3. Effects on Nekton

During construction, increases in turbidity and suspended solids near the dredged and filled areas would have a localized suppressing effect on nekton productivity. Nekton would most likely leave or avoid the area while construction was occurring. These effects would be local, short-term, and minor, and the nekton populations would quickly recover once construction activities have ceased.

4. Effects on Aquatic Food Web

The burial and dredging of existing benthos and localized impacts on plankton productivity would cause a temporary, minor, adverse impact on the local food web. However, these organisms would be expected to recover quickly following the completion of the project, and there would likely be no long-term negative effects to the aquatic food web.

5. Effects on Special Aquatic Sites

The proposed project would not impact any special aquatic sites.

6. Threatened and Endangered Species

The proposed action would not affect any federally-listed species. Mussel surveys conducted in and around the project area collected no Federally-listed species. An individual live Higgins' eye pearlymussel (*Lampsilis bigginsi*) was recently collected near the project area, but it is unlikely that the species occurs within the footprint of the project given the habitat conditions identified during the surveys.

The proposed action would affect several state-listed mussel species. One State-listed endangered species - pistolgrip (*Tritogonia verrucosa*); two State-listed threatened species - wartyback (*Quadrula nodulata*) and butterfly (*Ellipsaria lineolata*); and one State-listed special concern species - black sandshell (*Ligumia recta*) were found in surveys conducted for this project. Impacts to these species (and all freshwater mussels) would be minimized due to the implementation of a mussel relocation in the project footprint prior to project construction.

7. Other Wildlife

The proposed project would likely have a positive long-term effect on other wildlife such as waterfowl, shorebirds, and other wildlife species that would utilize habitat in the project area.

8. Actions Taken to Minimize Impacts

As stated in section II.(A)(4), a freshwater mussel relocation is being undertaken to minimize impacts to mussels. This effort would remove the majority of mussels from the footprint of the proposed fill prior to project construction. Further information regarding the mussel relocation can be found in Appendix G of the Letter Report.

During construction of the proposed project, BMPs would be implemented to prevent and minimize surface water degradation. Specific construction methods, including BMPs have not

yet been identified, but would be further detailed during the development of Plans and Specifications.

F. Proposed Disposal Site Determinations

1. Mixing Zone Determination

Material placement and dredging to construct the proposed channel would cause a minor increase in turbidity levels in the immediate project vicinity. However, no long-term adverse impacts to water quality would likely occur from any of the proposed project features/activities.

2. Determination of Compliance with Applicable Water Quality Standards

It is not anticipated that the proposed project would violate Minnesota's water quality standards for toxicity. Materials such as rock would be sourced from approved pits and quarries in the project area. This should ensure that State water quality standards would not be violated during placement of this material. Water quality certification would be obtained from Minnesota prior to project construction.

3. Potential Effects on Human Use Characteristics

a. Municipal and Private Water Supply

No municipal or private wells would be affected by the proposed project.

b. Recreational and Commercial Fisheries

The channel side of the control structures that would be exposed to current would likely continue to provide habitat characteristics preferred by species such as walleye, sauger, and flathead catfish. The downstream side of the channel control structures would be better-suited to species seeking refuge from current. These changes would be localized and the proposed project would not be expected to have noticeable effects on recreational or commercial fisheries.

c. Water Related Recreation and Aesthetics

The proposed project would have minimal impacts on recreation in the project area. The rock sills would improve safety within the channel by helping to maintain a reliably wider navigation channel. As is true throughout the main navigation channel, recreational boaters would need to be mindful of the structures to avoid collisions with them.

d. Cultural Resources

The potential for the Project Area to contain intact, significant cultural resources is remote. The Corps has determined that the Project will have no potential to effect historic properties. A synopsis of the cultural resources investigations for the Project can be found in Chapter 6.3 of the Letter Report and Integrated Environmental Assessment.

G. Determination of Cumulative Effects on the Aquatic Ecosystem

For the purposes of the Clean Water Act 404(b)(1) evaluation, the Environmental Protection Agency defines cumulative impacts as “Changes in the aquatic ecosystem that are attributable to the collective effect of a number of individual discharges of dredged or fill material.”

A subset of actions identified in the Environmental Assessment would be expected to have impacts to the aquatic ecosystem due to discharges of dredged or fill material. Past actions identified include modifications made to the Upper Mississippi River for navigation, including the construction of Locks and Dams, as well as wing dams and other channel-modifying structures. Reasonably foreseeable actions identified that would affect nearby aquatic resources include the proposed expansion of the Nelson aggregate material mine in Lower Pool 2, which would destroy the benthic organisms and aquatic vegetation within approximately 230 acres of backwaters.

The project would have cumulative impacts to benthic organisms, particularly freshwater mussels. However, these effects would not be significant due to the proposed mitigation.

H. Determination of Secondary Effects on the Aquatic Ecosystem

No significant secondary effects on the aquatic ecosystem would be expected from the proposed action.

III. Finding of Compliance With Restrictions on Discharge

1. No significant adaptations of the guidelines were made relative to this evaluation.
2. The proposed fill activity would comply with the Section 404(b)(1) guidelines of the Clean Water Act. The proposed project is the least environmentally damaging practicable alternative.
3. There are no practical and feasible alternatives to the placement of fill in the proposed areas that would meet the objectives and goals of this project.
4. The proposed fill activity would comply with State water quality standards. The disposal operation would not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.
5. The proposed projects would not harm any endangered species or their critical habitat.
6. The proposed fill activities would not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreation and commercial fishing. The proposed activities would not adversely affect plankton, fish, shellfish, wildlife, and special aquatic sites. The life stages of aquatic life and other wildlife would not be adversely affected. Significant

adverse effects on aquatic ecosystem diversity, productivity, and stability and on recreational, aesthetic, and economic values would not occur.

8. On the basis of this evaluation, I have determined that the proposed discharge complies with the requirements of the guidelines for discharge of dredged or fill material.

Date

Samuel L. Calkins
Colonel, Corps of Engineers
District Engineer