

**Highway N Bridge**  
**Section 14 Emergency Streambank Stabilization Project**  
**Thompson River, Harrison County, Missouri**

**Section 404(b)(1) Evaluation**

**1. Introduction**

This Section 404(b)(1) Evaluation is for the Highway N Bridge Section 14 Emergency Streambank Stabilization Project, Thompson River, Harrison County, Missouri. This evaluation meets the requirements found in 40 CFR 230, Section 404(b)(1): Guidelines for Specification of Disposal Sites for Dredged and Fill Material.

**2. Project Description**

- a. Location:** The project area is located at the MoDOT Highway N Bridge on the Thompson River, just west of Cainsville in Harrison County, Missouri. It is in Section 14 of Township 65 North, Range 26 West. The Thompson River generally flows north to south for several hundred feet upstream and downstream of the bridge, which is situated east to west across the river.
- b. General Description:** The U.S. Army Corps of Engineers - Kansas City District, in cooperation with the Missouri Department of Transportation, District 1, propose an emergency streambank stabilization project along the Thompson River in Harrison County, Missouri. The purpose of the project is to address severely eroding banks along the Thompson River that are threatening to damage and flank the left bridge abutment of the Highway N Bridge and lead to its potential failure. The left bank upstream of the bridge is experiencing erosion because of the migrating bend in the Thompson River. There is no vegetation on the slope and stream bank sloughing is occurring. The channel of the Thompson River has migrated toward the left bank directing the river flow away from the center of the bridge. High flow events in 2007 and 2008 have accelerated the rate of erosion on the left bank and the unstable river bend is expected to damage the left abutment and potentially flank the bridge in 2 – 3 years. If the river experiences high flow events before the project is constructed, bridge damage and failure is likely.

Four bendway weirs would be constructed along the left bank upstream of the bridge with full slope revetment on the left abutment and stone toe reinforcement on the right abutment. These weirs would realign the river channel and stabilize the upstream left descending bank by directing

water towards the center of the bridge. The design would also encourage material deposition to stabilize the left bank. Each bendway weir would extend into the channel 60-ft and is approximately 5-ft above the channel bed with a trapezoidal key below the channel bed. They are spaced 100-ft apart and point upstream to direct water away from the unstable left streambank as it flows over the crest of the weirs. All the rock used for the bendway weirs would utilize Type 2 gradation. Rock revetments and reinforcement at the bridge abutments would provide additional protection during high flow events. The left bridge abutment would be protected by a 140-ft full slope revetment that would extend up two drainage ditches without impeding local drainage flow. The right bridge abutment would be protected by a 170-ft stone toe reinforcement that also extends up two other drainage ditches. These measures would protect the abutments during high water events. All the rock used in the left bank revetment and right bank reinforcement would utilize Type 1 gradation.

Direct project related impacts to waters of the U.S. would result from contouring the existing stream banks and placing clean rock fill along both banks of the Thompson River. Combining the two locations, fill would be placed along approximately 840 linear feet of the river. Contouring the stream banks would result in approximately 1,000 cubic yards of earthen fill material being placed below the ordinary high water mark elevation of 818.5 feet. Additionally, about 2,000 cubic yards of clean rock fill with minimal fines would be placed below the ordinary high water mark. These quantities have been increased by 20% from the preliminary design calculations to represent the maximum amount of fill that would be placed below the ordinary high water mark.

- c. Authority:** This activity is regulated by the U.S. Army Corps of Engineers under Section 14 of the Flood Control Act of 1946 (Public Law 79-526), as amended, and Section 404 of the Clean Water Act (33 USC 1344).

### **3. Review of Compliance (§ 230.10 a-d)**

- a.** No practicable alternative to the proposed project would have a less adverse impact on the aquatic ecosystem while providing a suitable level of bank protection to minimize the threat of damage to the Highway N Bridge. Additional information on the impacts of various alternatives to waters of the U.S. can be found in Section 4 of the Draft EA.
- b.** The proposed project does not appear to violate any applicable state water quality standards, or applicable toxic effluent standard or prohibition under Section 307 of the Clean Water Act. The proposed project is not likely to jeopardize the continued existence of species listed as

endangered or threatened under the Endangered Species Act of 1973, as amended, to result in the likelihood of the destruction or adverse modification of critical habitat. Furthermore, the proposed project would not violate the requirements of any Federally designated marine sanctuary.

- c. The proposed project would not cause or contribute to significant degradation of waters of the U.S. This includes no adverse effects on human health, life stages of organisms' dependant on the aquatic ecosystem, ecosystem diversity, productivity and stability, and recreational, aesthetic, and economic values.
- d. Appropriate and practical steps have been taken which will minimize potential adverse impacts on the aquatic ecosystem.

#### 4. Technical Evaluation Factors (Subparts C-F)

##### a. Potential Impacts on Physical and Chemical Characteristics of the Aquatic Ecosystem (Subpart C)

- 1) **Substrate:** Placement of riprap structures along 840 linear feet of the Thompson River to armor the streambank would bury the existing sand and silt substrate. It is necessary to bury the existing substrate with riprap because it is highly erosive and is threatening the stability of the Highway N Bridge. The proposed project would result in a minor, long-term impact to the existing substrate along a relatively short section of the Thompson River.

The Missouri Stream Mitigation Method was used to determine any compensatory mitigation that would be necessary to offset any potential negative impacts resulting from armoring the banks. The Missouri Stream Mitigation Method has been publicly vetted and approved for use by Corps Regulatory Offices within the state of Missouri. Using this method, a total of 1480 debits were generated by protecting the streambanks using riprap structures. A total of 2738 credits were generated by providing streambank stability along this same stretch of the Thompson River. Therefore, no additional mitigation measures are proposed.

- 2) **Suspended particulates/turbidity:** The proposed plan would result in minor short-term impacts to suspended particulates and an increase in turbidity during project construction. This would result from disturbing the existing sand/silt substrate in the channel and along the streambanks. Long-term, the eroding streambanks would be stabilized as a result of the project, therefore reducing the

amount of particulates that enter the Thompson River. No long-term negative impacts are expected.

- 3) Water:** The project would not result in any long-term negative impacts to water quality. The project may result in minor short-term construction related impacts to water quality due to activities taking place within the river channel and on the banks. These activities would result in increased suspended particulates and increased turbidity. This has the potential to have secondary impacts on nutrient concentrations, dissolved oxygen, pH, and conductivity. These impacts would be minimized by using Best Management Practices (BMPs) to minimize the amount of runoff, and land/channel disturbance that would occur during project construction. Furthermore, project construction is tentatively scheduled for mid/late fall time period which would further minimize the impact to water quality because of cooler temperatures and reduced biological activity during this time of the year.
- 4) Current patterns and water circulation:** Earthen fill material and clean rock fill would be used to protect the streambanks from erosion and would redirect the flow of water toward the center of the Highway N Bridge. Any changes to the direction or velocity of water flow and circulation would be minor. It is not anticipated that this would result in any significant changes to the location, structure and dynamics of the aquatic community, or the rate and extent of the mixing of dissolved and suspended components of the water body.
- 5) Normal water fluctuations:** There are no anticipated changes to normal water fluctuations that would result from the proposed project. The project would not result in any changes to inundation periods or water level modifications during flood events, or during periods of baseflow.
- 6) Salinity Gradients:** The proposed project would not impact any salinity gradients. The Thompson River is a freshwater system and this would not change as a result of the project.

#### **b. Potential Impacts to the Biological Characteristics of the Aquatic Ecosystem (Subpart D)**

- 1) Threatened and endangered species:** There are no Federally-listed threatened or endangered species known to occur within or adjacent to the proposed project area. The U.S. Fish and Wildlife Service was consulted and it was determined that no Federally-

listed species, candidate species, or designated critical habitat are located within or adjacent to the project area. See Appendix II of the Environmental Assessment.

- 2) Fish, crustaceans, mollusks, and other aquatic organisms in the food web:** The project would not result in significant adverse impacts to aquatic organisms. Minor short-term impacts to the aquatic community may result from the smothering of immobile organisms, direct displacement of organisms, and an increase in turbidity, during project construction. The impacts may affect individual organisms in a small stretch of the Thompson River, but would be unlikely to have a significant impact on the overall population of any particular species within the waterbody. Long-term, there would be a positive impact to the aquatic community by reducing the amount of sediment entering the river. Construction is tentatively scheduled to occur in October 2012, a time of the year when there is less biological activity. No significant adverse long-term impacts are anticipated.
- 3) Other wildlife:** Wildlife associated with aquatic ecosystems includes resident and transient mammals, birds, reptiles, and amphibians. There would be minor, short-term impacts to these types of wildlife as a result of removing herbaceous vegetation and grasses. All disturbed land areas would be seeded with native grasses as part of project construction. Noise from construction equipment may also create a short-term negative impact to wildlife. Construction is tentatively scheduled to occur in October 2012, a time of the year when there is less biological activity. No significant adverse long-term impacts are anticipated.

#### **c. Potential Impacts on Special Aquatic Sites (Subpart E)**

- 1) Sanctuaries and Refuges:** No sanctuaries or refuges were identified in or adjacent to the project area.
- 2) Wetlands:** No wetlands were identified in or adjacent to the project area.
- 3) Mud flats:** No mud flats would be impacted by the proposed project.
- 4) Vegetated shallows:** No vegetated shallows would be impacted by the proposed project. No rooted aquatic vegetation is located within the project area.

- 5) **Coral reefs:** The project area does not provide the necessary environmental conditions to support corals.
- 6) **Riffle and pool complexes:** Because of the low gradient and sandy/silt nature of the channel substrate of the Thompson River, a stable riffle and pool complex does not exist.

**d. Potential Effects on Human Use Characteristics (Subpart F):**

- 1) **Municipal and private water supplies:** The project would not impact any municipal or private water supplies.
- 2) **Recreational and commercial fisheries:** The project would not affect the suitability of any recreational or commercial fisheries. The project area is relative small size and is not anticipated to negatively impact fish habitat.
- 3) **Water-related recreation:** The project would not impair or destroy any resources which support recreation activities.
- 4) **Aesthetics:** The project may result in minimal impacts to the aesthetics of the area as a result of using riprap to construct bank stabilization structures. This impact will be minimized by planting native vegetation in the areas disturbed by the construction process.
- 5) **Parks, national and historic monuments, national seashores, wilderness areas, research sites, and similar preserves:**  
The project would not impact any of the above mentioned property types.

**5. EVALUATION OF DREDGED OR FILL MATERIAL (Subpart G)**

- a. **General evaluation of dredged or fill material:** Fill material placed below the ordinary high water mark would consist of earthen fill material obtained from the existing streambanks, and clean rock fill with minimal fines obtained from a commercial source. There is no reason to believe that the streambanks would contain any chemical, biological, or other pollutants. Additionally, prior experience indicates that commercially available rock fill would be free from chemical, biological, or other pollutants.
- b. **Chemical, biological, and physical evaluation and testing:** The fill material meets the testing exclusion based on the fact that it would consist of local earthen materials, and clean rock fill obtained from a commercial

source. There is no reason to believe that the earthen material or the clean rock fill would be a carrier of harmful contaminants.

## **6. DISPOSAL SITE DELINEATION (§230.11 f)**

The fill locations would consist of portions of the Thompson River adjacent to the Highway N Bridge. Local earthen material and clean rock fill with minimal fines would be used to stabilize the river banks in order to protect the integrity of the bridge. The amount of fill that would be used has been determined to be the minimum amount necessary to provide the desired level of protection to the bridge. The depth of the water, the current velocity, direction, and variability, the degree of turbulence, and the rate of discharge at the disposal site has been considered in determining the acceptability of the mixing zone.

## **7. ACTIONS TO MINIMIZE ADVERSE EFFECTS (SUBPART H)**

The construction contractor would be required to obtain a Section 402 NPDES stormwater permit from Missouri Department of Natural Resources. As part of the NPDES permit, Best Management Practices (BMPs) would be required to minimize the incidental fallback of material into the waterway and to minimize the introduction of fuel, petroleum products, or other deleterious material from entering the waterway. Such measures could include the use of erosion control fences; storing equipment, solid waste, and petroleum products above the ordinary high water mark and away from areas prone to runoff; and requiring that all equipment be clean and free of leaks. To prevent fill from reaching water sources by wind or runoff, fill would be covered, stabilized or mulched, and silt fences would be used as required. Additional measures to minimize adverse effects would include using clean rock fill with minimal fines, stabilizing the earthen material with rock, using appropriate construction equipment, minimizing the amount of time that equipment would be in the river channel, and not placing fill in the river during unusual high water events.

## **8. FACTUAL DETERMINATIONS (§230.11)**

A review of the information in items 4 through 7 of this report indicates that there is minimal potential for long-term environmental effects of the proposed discharge. Additionally, there are not expected to be any cumulative or long-term secondary impacts as a result of the project.

## 9. FINDINGS (§230.12)

The proposed Highway N Bridge, Section 14 Emergency Streambank Stabilization Project has been evaluated and determined to be in compliance with Clean Water Act Section 404(b)(1) guidelines, with the inclusion of appropriate and practical conditions to minimize pollution and adverse effects on the aquatic ecosystem. Furthermore, the project would result in an overall net benefit to the aquatic ecosystem, as determined by the Missouri Stream Mitigation Method.

Prepared by: \_\_\_\_\_ Date \_\_\_\_\_  
Mr. Rick Morrow  
Biologist  
Planning Branch

Reviewed by: \_\_\_\_\_ Date \_\_\_\_\_  
Ms. Jennifer Switzer  
Chief, Environmental Resources Section  
Planning Branch

Approved by: \_\_\_\_\_ Date \_\_\_\_\_  
Anthony J. Hofmann  
Colonel, Corps of Engineers  
District Commander