

SECTION 404(b)(1) EVALUATION

Bendway Weir Construction – Mississippi River
At Fair Landing (River Mile 634R AHP),
Phillips County, Arkansas

I. PROJECT DESCRIPTION

a. Location. The proposed bendway weir construction at the Fair Landing is located along the right descending bank of the Mississippi River between River Miles 635R above head of passes (AHP) and 633R AHP in Phillips County, Arkansas.

b. General Description. The work at Fair Landing (~ River Mile 634R AHP) will involve placement of approximately 360,000 tons of Graded Stone A in six bendway weirs. The bendway weirs will extend riverward from the right descending bank and vary from 400 to 500 feet in length. Crown widths of the weirs will be approximately 14 feet.

No bank grading or excavation of material will be required to tie the weirs into the riverbank. In order to ensure the integrity of weir number two (the second most upstream dike), rock paving consisting of Graded Stone C for a thickness of 3 feet would extend from approximately 200 feet upstream to approximately 200 feet downstream of the weir centerline. The tops of all weirs would be constructed to an elevation of 30 feet below the Low Water Reference Plane (i.e. -30 LWRP). The LWRP is a computed water surface elevation profile based on low discharge statistics for a long period of daily gage records (i.e. the 97 percent exceedance discharge over a 20-year period of record). In other words, there would be at least 30 feet or more of water over the tops of the weirs even at low river stages to ensure safe navigation.

c. Authority and Purpose. The project is authorized by the Flood Control Act of 15 May 1928, Public Law No. 391-70, as amended and supplemented by subsequent Acts of Congress. This Act authorized the Mississippi River and Tributaries (MR&T) Project, which included channel improvement and stabilization works for stabilizing the channel to provide an efficient navigation alignment and protection of flood control features in the Lower Mississippi River. The purpose of this project is to create a safer navigation channel for towboats in the Mississippi River by reducing the strong drafting currents that presently exist.

d. General Description of Dredged and /or Fill Material.

(1) General Characteristics of Fill Material. Fill material will consist entirely of limestone rock. Graded Stone A will be used for construction of the weirs, and Graded Stone C will be used for bank stability upstream and downstream of weir number 2. Size requirements for Graded Stone A and Graded Stone C are shown below:

GRADED STONE A	
Stone Weight (LBS)	Cumulative % Finer by Weight
5000	100
2500	70-100
500	40-65
100	20-45
5	0-15
1	0-5

GRADED STONE C	
Stone Weight (LBS)	Cumulative % Finer by Weight
400	100
250	70-100
100	50-80
30	32-58
5	15-34
1	0-15

(2) Quantity of Material. The work at Fair Landing will involve placement of approximately 360,000 tons of Graded Stone A in six bendway weirs and placement of a total of approximately 7,000 tons of Graded Stone C for a thickness of 3 feet extending approximately 200 feet upstream and 200 feet downstream of the centerline of weir number two.

(3) Source of Material. The Graded Stone A and Graded Stone C will be obtained from quarries producing stone which meets USACE specifications.

e. Description of Proposed Discharge Sites.

(1) Location. Six bendway weirs will be constructed at Fair Landing extending riverward from the right descending bank of the Mississippi River between River Miles 633R and 635R in Phillips County, Arkansas.

(2) Size. The proposed bendway weirs will vary from approximately 400 to 500 feet in length with crown widths of approximately 14 feet.

(3) Type of Habitat. The bendway weirs will be placed in the swift currents along an outside bend in the lower Mississippi River. The weirs will tie into the existing revetted bank, will extend riverward along the primarily sand river bottom, and will remain at least 30 feet or more underwater even at low river stages.

(4) Timing and Duration of Discharge. The proposed construction would last approximately 90 days. Construction is typically conducted during the low water season extending from September through December.

f. Description of Disposal Method. Barge mounted draglines equipped with rock buckets will pull stone from floating barges into the river at the construction sites.

II. FACTUAL DETERMINATION

a. Physical Substrate Determinations.

(1) Substrate Elevation and Slope. There will be an immediate change in substrate elevation and slope over the areal extent of the structures. The bendway weirs will consist of a rock mound of uniform shape extending from the existing ACM along the outside bend into the

navigation channel. Sediment will be captured between the underwater weirs raising the channel depth along these outside bends; however, the elevation of the bendway weirs and associated trapped sediments will remain at a -30 LWRP allowing for passage of barge traffic even during low river stages. A small portion of the encroaching point bar will be removed as the currents shift away from the revetted bank along this outside bend.

(2) Sediment Type. The project sites are located entirely within the existing channel of the Mississippi River. The lower Mississippi River channel is comprised mainly of gravel, sands, silts, and clays. The stone used for the bendway weir construction will be Graded Stone A and Graded Stone C.

(3) Dredged and Fill Material Movement. No bank grading or excavation is required for the installation of the bendway weirs. Draglines will pull rock from floating barges into the river to construct the weirs. Extreme high flows may cause some potential scour and dike stone to be dislodged from the structures in the future resulting in a need for minor repairs; however, no major failures are likely to occur.

(4) Physical Effects on Benthos. Due to the high velocities and shifting substrate along the outside bend, few or no mussels are likely to inhabit the project locations or be affected by construction. The existing revetted bank are most likely colonized by high densities of hydropsychid caddisflies. Low densities of chironomids, oligochaetes, amphipods, and nematodes most likely inhabit the sandy substrate along the river bottom. During construction, many of the macroinvertebrates in the immediate vicinity of the project are expected to drift downstream. High densities of hydropsychid caddisflies would be expected to quickly colonize the large limestone rocks comprising the bendway weirs after construction. Benthic fish would temporarily shift upstream or downstream during construction. Greater utilization of the project locations by benthic fishes are expected after construction due to the expected increase in densities of macroinvertebrates.

(5) Other Effects. N/A

(6) Action Taken to Minimize Impacts. Construction of the bendway weirs will be carefully planned and executed. Contractors are required to maintain proper alignment of the weir structures. The fill material is clean limestone rock; thus, there will be minimal wash resulting from the placement of the stones. Contractors are also responsible for an approved environmental protection plan for the prevention/control of pollution and habitat disruption that may occur to the environment during construction.

b. Water Circulation, Fluctuation, and Salinity Determination.

(1) Water.

(a) Salinity. N/A

(b) Water Chemistry. No expected change.

(c) Clarity. Some sediments (mostly sands) will be stirred up when the rocks comprising the bendway weirs are deposited onto the riverbed. This increased sediment load will be local and minor compared to the natural sediment load of the river, especially during high river stages.

(d) Color. No expected change.

(e) Odor. No expected change.

(f) Taste. No expected change.

(g) Dissolved Gas Levels. No expected change.

(h) Nutrients. No expected change.

(i) Eutrophication. No expected change.

(j) Others as Appropriate. N/A

(2) Current Patterns and Circulation.

(a) Current Patterns and Circulation. With the installation of the bendway weirs, secondary currents which are currently directed downward thus deepening the channel and depositing sediment onto the encroaching point bar will be redirected. The weirs would eventually remove a small part of the edge of the sand bar that is encroaching from across the river. This would widen the channel and reduce the swift currents along the toe of the revetted riverbank. Sediments will be deposited between the bendway weirs rather than building up on the encroaching point bar.

(b) Velocity. The bendway weirs will redirect the swift currents away from the outside riverbank allowing for a wider and safer navigation channel.

(c) Stratification. No expected change.

(d) Hydrologic Regime. No expected change.

(3) Normal Water Level Fluctuations. The bendway weirs will have no discernible effects on normal water level fluctuations or overall river stages.

(4) Salinity Gradients. N/A

(5) Action Taken to Minimize Impacts. Construction of the bendway weirs will be carefully planned and executed. Contractors are required to maintain proper alignment of the weir structures. The fill material is clean limestone rock; thus, there will be minimal wash resulting from the placement of the stones. Contractors are also responsible for an approved

environmental protection plan for the prevention/control of pollution and habitat disruption that may occur to the environment during construction.

c. Suspended Particulate/Turbidity Determination.

(1) Expected Changes in suspended Particulates and Turbidity Levels in Vicinity of Disposal Sites. Some sediments (mostly sands) will be stirred up when the Graded Stone A and Graded Stone C are first deposited onto the riverbed and existing revetted bank. This increased sediment load will be local and minor compared to the natural sediment load of the river, especially during high river stages.

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

(a) Light Penetration. The temporary increase in turbidity during construction will be minor and not detectable from the surface. The proposed project will have no effect on light penetration.

(b) Dissolved Oxygen. No change is expected.

(c) Toxic Metals and Organics. No change is expected.

(d) Pathogens. N/A

(e) Aesthetics. The bendway weirs will remain underwater at all times. A small portion of the encroaching point bars will be removed resulting in a wider navigation channel during low water stages.

(f) Others as Appropriate. None noted.

(3) Effects on Biota.

(a) Primary Production. The proposed work should have no distinguishable effects on primary productivity in the lower Mississippi River.

(b) Suspension/Filter Feeders. Due to the high velocities and shifting substrate along the outside bends, few or no freshwater mussels are likely to inhabit the project locations or be affected by construction. Some benthic macroinvertebrates inhabiting the river bottom and existing ACM along the outside bends may drift downstream as rock is being deposited. Benthic macroinvertebrates are expected to quickly colonize the stones comprising the bendway weirs after construction, particularly hydrophyid caddisflies.

(c) Sight Feeders. Resident fish are adapted to turbidity increases that occur with high water events. Project-related turbidity increases will be minor compared to these natural events. Since fish and other sight feeders are highly mobile, project impacts to sight-feeding organisms will be insignificant and short term.

(4) Actions Taken to Minimize Impacts. Construction of the bendway weirs will be carefully planned and executed. Contractors are required to maintain proper alignment of the weir structures. The fill material is clean limestone rock; thus, there will be minimal wash resulting from the placement of the stones. Contractors are also responsible for an approved environmental protection plan for the prevention/control of pollution and habitat disruption that may occur to the environment during construction.

d. Contaminant Determinations. It is not expected that any contaminants will be introduced or translocated due to construction.

e. Aquatic Ecosystems and Organism Determination.

(1) Effects on Plankton. Effects, if any, on plankton communities are expected to be insignificant and of short duration.

(2) Effects of Benthos. Due to the high velocities and shifting substrate along the outside bends, few or no mussels are likely to inhabit the project locations or be affected by construction. The existing revetted bank is most likely colonized by high densities of hydroptychid caddisflies. Low densities of chironomids, oligochaetes, amphipods, and nematodes most likely inhabit the sandy substrate along the river bottom. During construction, many of the macroinvertebrates in the immediate vicinity of the project are expected to drift downstream. High densities of hydroptychid caddisflies would be expected to quickly colonize the large limestone rocks comprising the bendway weirs after construction. Benthic fish would temporarily shift upstream or downstream during construction. Greater utilization of the project locations by benthic fishes are expected after construction due to the expected increase in densities of macroinvertebrates.

(3) Effects on Nekton. Nekton will be temporarily displaced during construction, but will return shortly after project completion. Greater utilization of this river reach by benthic fishes may occur after construction due to the expected increase in densities of hydroptychid caddisflies associated with the structures.

(4) Effects on Aquatic Food Web. Temporary reductions in benthic and suspension/filter communities and drift from such a small area should not significantly impact the aquatic food web. These organisms will quickly colonize the area after construction.

(5) Effects on Special Aquatic Sites.

(a) Sanctuaries and Aquatic Sites. N/A

(b) Wetlands. There are no wetlands within the Mississippi River channel in the vicinity of the project. Thus, there would be no impacts to wetlands.

(c) Mud Flats. NA

(d) Vegetated Shallows. N/A

(e) Riffle and Pool Complexes. None exist within the proposed project area.

(6) Threatened and Endangered Species. There are no sandbars or interior least tern nesting colonies along the outside bend where the underwater weirs would be installed. A small number of least terns (between 18 and 39 individuals) have been documented nesting on the sand point bar downstream and across the river channel from the proposed project area. It is extremely unlikely that any work would extend into the least tern nesting season since all work is planned to be conducted in the winter of 2014. Nevertheless, these colony locations are located greater than 1,500 feet from the proposed project area. This distance exceeds most recommendations for buffers between waterbirds and human activities. All work would be done from floating barges; thus, there would be minimal impact to any terns that may decide to feed along the revetted bank, with the small chance that work would need to extend into the nesting season. Currents from the Mississippi River scour and move sandbars around each year. This is a natural occurrence to which the least tern is adapted. The small portion of the point bar that will eventually erode once the weirs are installed is expected to be less than 15 percent of the entire area of this large sandbar. The sandbar would still contain ample least tern nesting area following project construction. Overall, any adverse effects of the proposed bendway weir construction are localized and any redistribution of sediments downstream would result in little loss of overall habitat quantity. Although no pallid sturgeon have been collected in the immediate vicinity of the proposed project area, they could utilize the revetted bank, main channel, and channel border in the vicinity of the proposed project area. The channel border along the edge of the sandbar across from the proposed project area would shift towards the opposite river bank after installation of the bendway weirs. Spawning sites have not yet been documented on the lower Mississippi River, but spawning is suspected to occur on gravel bars. No gravel bars will be impacted by the proposed work. No significant adverse impacts to pallid sturgeon are expected due to the proposed actions. Bendway weir construction may have some local benefits to pallid sturgeon by providing current velocity shelters behind each weir and increased fish forage potential. The swift river currents and shifting substrate along outside bends of the Mississippi River are not conducive habitat for the fat pocketbook pearly mussel. Furthermore, it is highly unlikely that any mussels would be found at the weir sites. The project is not likely to adversely impact the species. The proposed project is part of the Channel Improvement Program for the Mississippi River and Tributaries Project. The potential for adverse effects on the interior least tern, pallid sturgeon, and fat pocketbook mussel resulting from this program, including bendway weir construction, are addressed in the 2013 formal consultation with the U.S. Fish and Wildlife Service (USFWS), pursuant to Section 7 of the Endangered Species Act. Requirements of Section 7 of the Endangered Species Act (ESA) have been fulfilled. However, obligations under Section 7 of the ESA will be reconsidered if new information reveals that the proposed action may affect listed species in a manner or to an extent not previously considered, the proposed action is subsequently modified to include activities which were not considered during this review, or new species are listed or critical habitat designated that might be affected by the proposed action.

(7) Other Wildlife. Since all work would be done from barges floating in the river, there would be no significant adverse impacts to terrestrial wildlife.

(8) Actions Taken to Minimize Impacts. Construction of the bendway weirs will be carefully planned and executed. Contractors are required to maintain proper alignment of the weir structures. The fill material is clean limestone rock; thus, there will be minimal wash resulting from the placement of the stones. Contractors are also responsible for an approved environmental protection plan for the prevention/control of pollution and habitat disruption that may occur to the environment during construction.

f. Proposed Disposal Site Determinations.

(1) Mixing Zone Determination. N/A

(2) Compliance with Applicable Water Quality Standards. Section 401 water quality certification has been requested from the State of Arkansas.

(3) Potential Effects on Human Use Characteristics.

(a) Municipal and Private Water Supply. N/A

(b) Recreational and Commercial Fishing. Fishing should not be affected by the proposed work.

(c) Water Related Recreation. N/A

(d) Aesthetics. The bendway weirs will remain underwater at all times; thus, no changes are expected.

(e) Parks, National Historical Monuments, National Seashore, Wilderness Areas, Research Sites and Similar Preserves. No sites exist within the footprint of the proposed project.

g. Determination of Cumulative Effects on the Aquatic Ecosystem. The Lower Mississippi River has been converted from a naturally meandering river channel of the past to a more controlled channel containing various river training structures and other navigation and flood control features that are present today. Following the disastrous flood of 1927, the Flood Control Act of 1928 was passed committing the Federal Government to a definite program of flood control, channel stabilization, and river regulation, known as the Mississippi River and Tributaries (MR&T) Project. The MR&T project has four major features: 1) levees and floodwalls for flood protection, 2) floodways to divert excess flows past critical reaches, 3) channel improvement and stabilization for both navigation and flood control, and 4) tributary basin improvements for flood protection and drainage. The MR&T project is primarily responsible for the physical, hydraulic, and ecological features that presently exist in the Lower Mississippi River. The primary environmental effects of the MR&T project and channel improvement activities include the physical loss of channel habitat quantity, a growing disconnect with the relict floodplain during low to moderate river stages, and a general loss of riverine habitat complexity. Construction of the existing MR&T project has continued

throughout ensuing years and will continue throughout the near future. Dikes, revetments, and bendway weirs found throughout the Lower Mississippi River have resulted in a mosaic of artificial and natural habitats utilized by aquatic organisms and wildlife. The construction of these bendway weirs will add to this mosaic of habitats. Maintenance dredging and construction and maintenance of channel improvement structures on the lower Mississippi River, as part of the MR&T program, are conducted annually. Ongoing construction in the vicinity of the proposed project area includes the placement of articulated concrete mattress on top of the existing damaged revetment for a length of approximately 6,800 feet along the bank in and adjacent to the proposed project area. The proposed bendway weirs at the project location would result in the addition of permanently inundated rock substrates at this outside bend adding to the mosaic of artificial and natural habitats of the lower Mississippi River. The extent of the encroaching sand point bar located across the channel from the project location would be slightly reduced after construction resulting in a wider navigation channel. The preferred alternative would result in some minor alterations to the environment; however, no significant adverse cumulative impacts are expected due to the proposed action.

h. Determination of Secondary Effects on the Aquatic Ecosystem. N/A

III. FINDING OF COMPLIANCE FOR MISSISSIPPI RIVER BENDWAY WEIR CONSTRUCTION AT FAIR LANDING

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

b. The purpose of this project is to create a safer navigation channel for towboats in the Mississippi River by reducing the strong drafting currents that presently exist. Continued towboat navigation through this hazardous Mississippi River bend increases the risk of an accident. Barges could break loose and block safe navigation of the river. Some barges could sink. If hazardous or toxic materials are involved, serious concerns for public safety could arise. Adverse environmental impacts could also incur.

c. Section 401 water quality certification has been requested from the State of Arkansas.

d. The proposed project is part of the Channel Improvement Program for the Mississippi River and Tributaries Project. The potential for adverse effects on the interior least tern, pallid sturgeon, and fat pocketbook mussel resulting from this program, including bendway weir construction, are addressed in the 2013 formal consultation with the USFWS, pursuant to Section 7 of the Endangered Species Act. The proposed activities are not likely to jeopardize the continued existence of the interior least tern, pallid sturgeon, and fat pocketbook mussel. The USFWS has been coordinated with, and requirements of Section 7 of the Endangered Species Act (ESA) have been fulfilled. However, obligations under Section 7 of the ESA will be reconsidered if new information reveals that the proposed action may affect listed species in a manner or to an extent not previously considered, the proposed action is subsequently modified to include activities which were not considered during this review, or new species are listed or critical habitat designated that might be affected by the proposed action.

e. The proposed work will not significantly affect human health and welfare, the municipal water supply, or commercial or sport fishing. No long-term impacts on plankton communities; breeding, spawning, or nursery habitats; or shellfish areas are expected. There are no wetlands present in the un-vegetated Mississippi River channel; however, it is still considered waters of the United States and subject to Clean Water Act regulations. No other special aquatic sites are located in the proposed work areas.

f. No significant adverse impacts to aquatic life or terrestrial wildlife, dependent on aquatic ecosystems, are expected.

g. The proposed work should not cause significant adverse impacts on ecosystem diversity, productivity, or stability.

h. No adverse impacts on recreational, aesthetic, or economic values are anticipated. The proposed work would create a safer navigation channel for towboats in the Mississippi River.

i. Construction of the bendway weirs will be carefully planned and executed. Contractors are required to maintain proper alignment of the weir structures. The fill material is clean limestone rock; thus, there will be minimal wash resulting from the placement of the stones. Contractors are also responsible for an approved environmental protection plan for the prevention/control of pollution and habitat disruption that may occur to the environment during construction.

j. The Memphis District Archaeologist checked records for sunken vessels in the project locations, and no records were revealed at the project location. Since all work will be conducted from the river, no known sunken vessels are in the project locations, and no grading will be conducted on the bank, there is not a possibility of affecting a significant cultural resource. The Arkansas State Historic Preservation Officer (SHPO) concurred that the proposed actions would not affect listed or eligible historic properties. However, if cultural remains are encountered during construction, all work would stop in the affected area and consultation will take place.

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