Grand River Ecosystem Restoration Study

Final Integrated Feasibility Report and Environmental Assessment

Appendix K: Section 404(b)(1) Guidelines Evaluation

October 2020

US Army Corps of Engineers ®
Kansas City District

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1.0. Introduction

This Section 404(b)(1) Evaluation is for the Grand River Feasibility Study Recommended Plan (the plan), which includes a suite of ecosystem restoration actions proposed for implementation in the Lower Grand River sub-basin. 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.

The Missouri Department of Conservation (MDC) and the Missouri Department of Natural Resources (MoDNR) are the cost-share sponsors and signatories to the Feasibility Cost Share Agreement. The Environmental Protection Agency (EPA), Missouri Department of Transportation (MoDOT), U.S. Fish and Wildlife Service (USFWS), U.S. Department of Agriculture – Natural Resources Conservation Service (NRCS), and U.S. Geological Survey (USGS) are study partners.

2.0. Project Description

2.1. Location

Components of the recommended plan would be located on and around Pershing State Park, Fountain Grove Conservation Area (Fountain Grove CA), and Swan Lake National Wildlife Refuge (NWR) in Carroll, Chariton, Linn and Livingston counties in north central Missouri (Figure 1). The plan also includes implementation of up to 316 bank stabilization projects in the upper portion of the Locust Creek sub-basin. Projects may be implemented in the following HUC-10 watersheds: Watkins Creek-Locust Creek (excluding the portion in Iowa); East Locust Creek; West Locust Creek; and Locust Creek.

2.2. General Description of Project Components

Hundreds of miles of channels within the Grand River watershed were straightened in the early 1900s to facilitate agricultural development, causing progressive instability of the watershed, loss of high value habitat, and continually threatened infrastructure. The watershed historically contained diverse complexes of river/stream channel and oxbow habitats, floodplain forest and woodland, bottomland prairie, and terrace prairie and savanna that supported rich animal communities and provided many important ecological functions. Since the mid-1800s, thousands of acres of tallgrass prairie, wetland, and bottomland hardwood habitat have been lost. Over 300 miles of natural stream corridor were channelized, adversely impacting thousands of linear feet of riparian and aquatic habitat. Sediment deposition, erosion, and habitat degradation have increased in intensity, which are now serious problems.

The recommended plan is composed of actions within three focus study areas: Locust Creek, Fountain Grove, and Yellow Creek. The Locust Creek plan features include a diversion berm across the Locust Creek floodplain and extending into the Locust Creek channel upstream of Pershing State Park. The floodplain portion of the berm would serve to prevent the progression/formation of additional avulsions that might divert water and bypass the sediment detention basin. The in-channel portion of the berm would serve to divert flows into the sediment basin while also allowing water to continue downstream on Locust Creek and Higgins Ditch. This portion of the berm would be designed to allow for fish and aquatic organism passage. Construction of the sediment detention basin would require raising/construction of a perimeter levee around the sediment detention basin (Figure 2). Two spillways were included in the levee raise to allow water to overtop in a controlled manner. A pilot/diversion channel would be excavated into the sediment detention basin to convey sediment and logs away from the diversion berm and reduce the risk of plugging the mouth of the diversion. Training levees would be constructed on either side of the channel. A portion of the existing levee on the east bank of Locust Creek would be notched to allow flow into the sediment detention basin. In addition, several existing levees within the sediment detention basin would be notched. Water would exit the sediment detention basin through a 1,500-foot spillway located on the south side of the sediment detention basin (Figure 2). On-going removal of logs from the basin or log jams in locations adversely impacting the effectiveness of the sediment detention basin may be necessary.

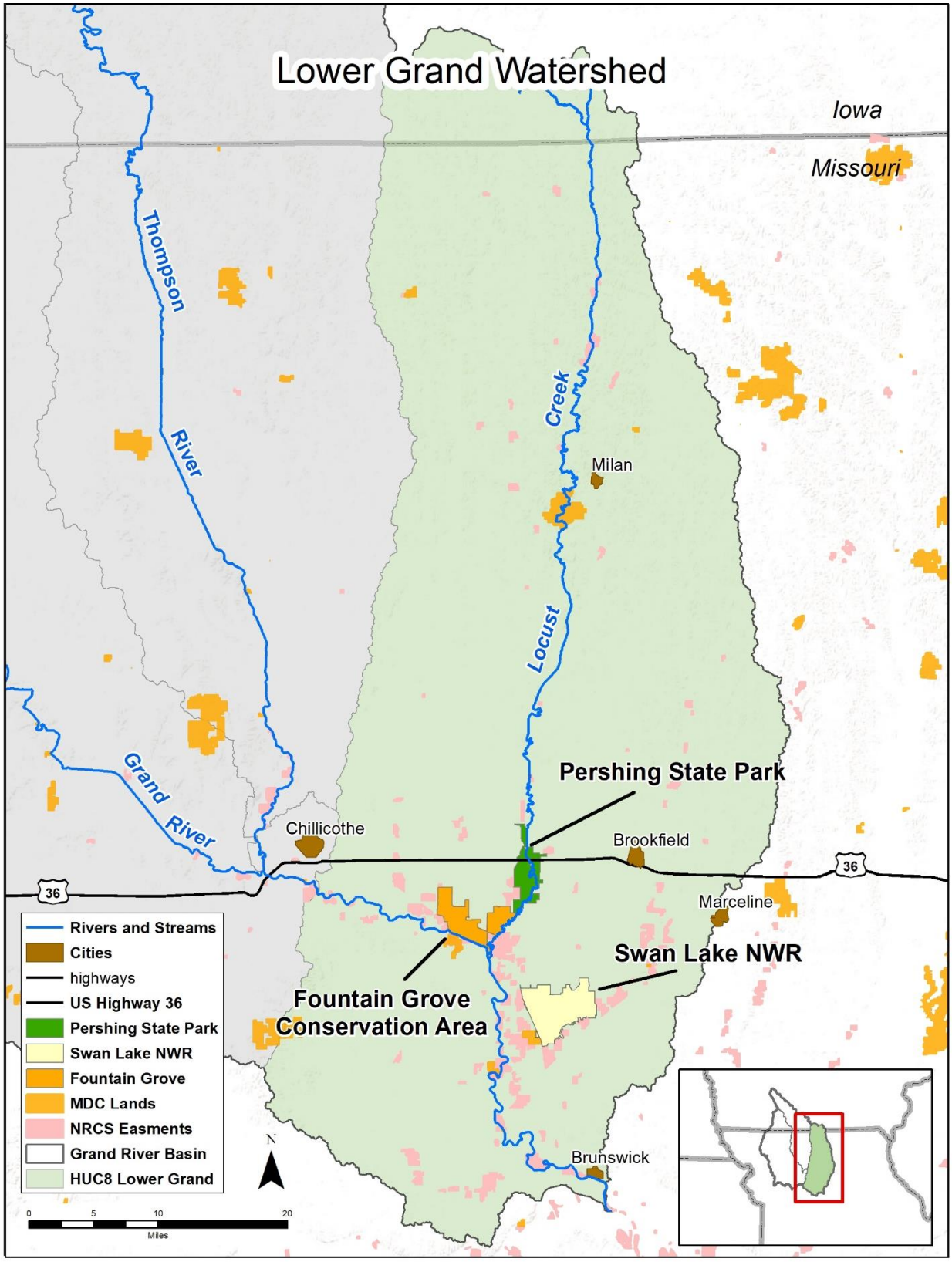

Figure 1. Lower Grand River Sub-basin

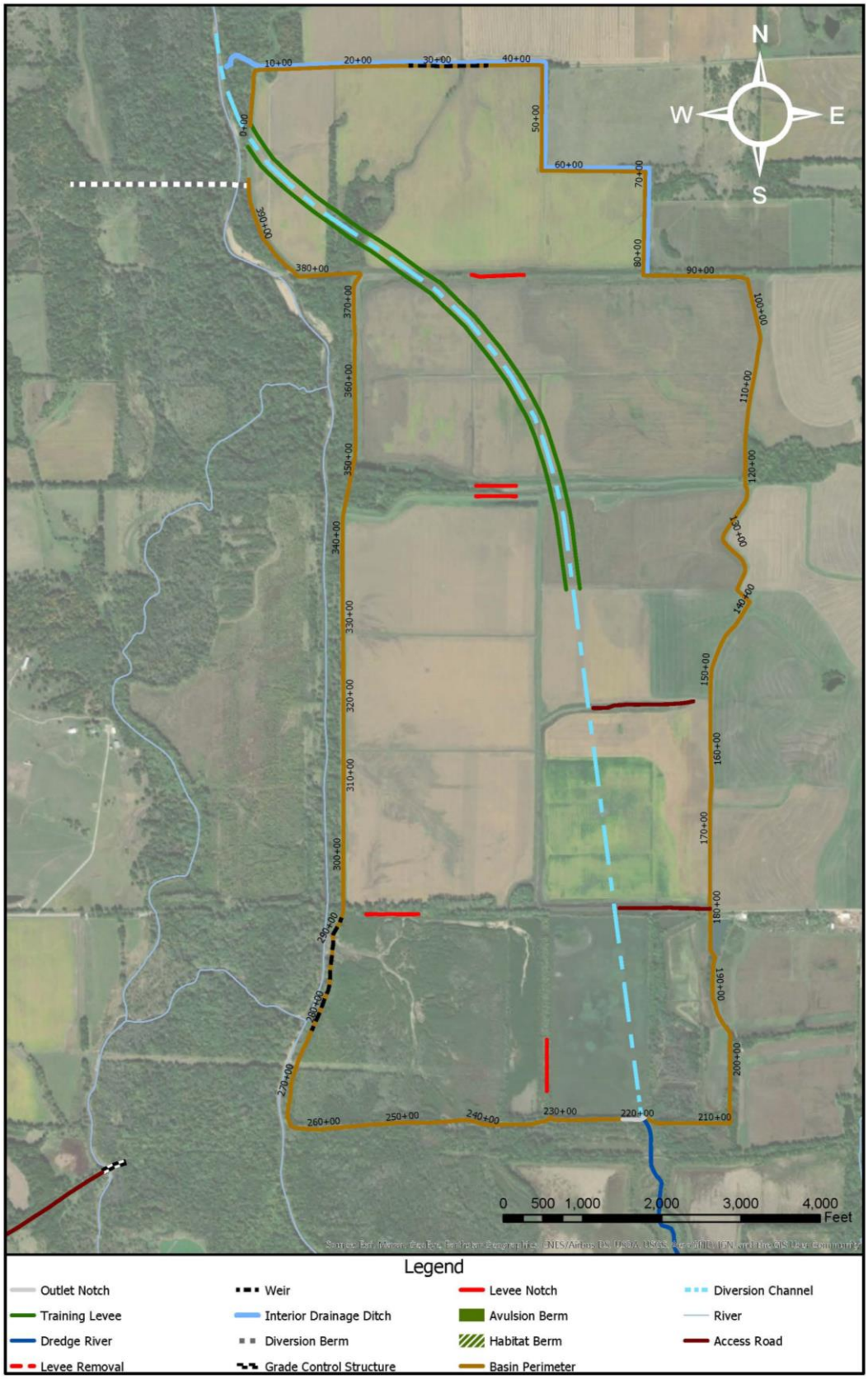

Figure 2. Locust Creek Recommended Plan Features Located Upstream of Highway 36.

The Locust Creek recommended plan includes up to four grade control structures. Two may be located on Locust Creek, one would likely be constructed along Higgins Ditch, and one on Muddy Creek upstream of its connection with the sediment detention basin to prevent head-cutting. Approximately 23,500 feet of Muddy and Locust creeks would be dredged to provide channel dimensions sufficient to accommodate the historic bankfull flow and provide appropriate slope (Figure 3). Dredge material would be used to perform small levee modifications and habitat enhancements. Dredged material would be spoiled along a portion of Locust Creek (Figure 3) to create an avulsion spoil berm. The partial removal of the levee separating the east and west sides of the Locust Creek floodplain south of HWY36 would help restore floodplain connectivity between Higgins Ditch and the Locust Creek channel.

Bank stabilization measures would be implemented in the Locust Creek watershed upstream of the sediment detention basin. It is estimated that up to 316 bank stabilization projects would be implemented to achieve a 14% reduction in quantified risk associated with uncertainties in forecasted sediment loading. Projects may be implemented in the following HUC-10 watersheds: Watkins Creek-Locust Creek (excluding the portion in Iowa); East Locust Creek; West Locust Creek; and Locust Creek. Although specific project sites are not known, plan formulation assumed small bank stabilization sites of approximately 250 feet in length with 12-foot high banks.

The Fountain Grove recommended plan features a suite of actions to enhance wetlands through increased natural ecosystem form and function, improved habitat development, and improved water management (Figure 4). The bank of the channel downstream of the Pool 3 Levee WCS, referred to as Jackson's Ditch, would be armored to prevent erosion on the neighboring property. The existing Pool 3 WCS would be set back from Jackson's Ditch. This measure allows for opening the gates at Pool 3 Levee WCS to increase the drainage rate from Fountain Grove CA pools without eroding adjacent property. The Pool 1 WCS #1 would be replaced with two 96-inch PVC pipes with two sluice gates. The culverts are used to drain Pool 1 to Pool 2. A new levee would be constructed, running north/south, on the west side of Fountain Grove CA where Parsons Creek flows are entering the area under existing conditions. The levee would prevent smaller flows from entering Fountain Grove CA and focus Parsons Creek flows towards a controlled overtopping point into a conveyance channel. The Pool 1/2 levee would be realigned to facilitate flooding of current un-manageable habitat. The Pool 2/3 levee would be re-aligned, an additional levee would be constructed within Pool 3, and a channel would be added to fill Pool 3 allowing for independent water control of all three major pools on Fountain Grove CA. The levee on the east side of Fountain Grove CA would be set back to increase flood resiliency.

A conveyance channel would be excavated through Fountain Grove CA to effectively move Parsons Creek flows through the area during high flow events. Outside of high flow events, the feature serves as a water distribution channel and provides aquatic/edge habitat for wetland species. A portion of the Chillicothe-Brunswick rail berm would be removed. Micro-topography on the site would be enhanced through the creation of sloughs and habitat mounds. Spoil from drainage channel excavation would be used to form the habitat mounds. Earthwork would be performed to modify the existing pool design on the east side of Fountain Grove CA. The intent would be to provide more naturally shaped wetland pools, which is consistent with modern wetland management practices. The redesign of the pools on the east side would allow for the removal of some water control structures in that area, creating more natural conditions, and allowing for more efficient management.

An additional drainage ditch would be constructed from the proposed Parsons Creek levee to the vicinity of the Fountain Grove CA pump station. This feature would allow for more efficient drainage of Pool 1 when desired. Two electric groundwater pumps would be installed on South Fountain Grove CA to facilitate wetlands development and more reliable hydrology. The recommended plan for Yellow Creek is alternative YC11. The main feature of the plan is the setback of a levee on Swan Lake NWR (Figure 5). The plan would include levee removal, removing three existing culverts, raising a portion of existing levee, constructing a portion of new setback levee, and addition of two 3-foot diameter concrete culverts with flap gates.

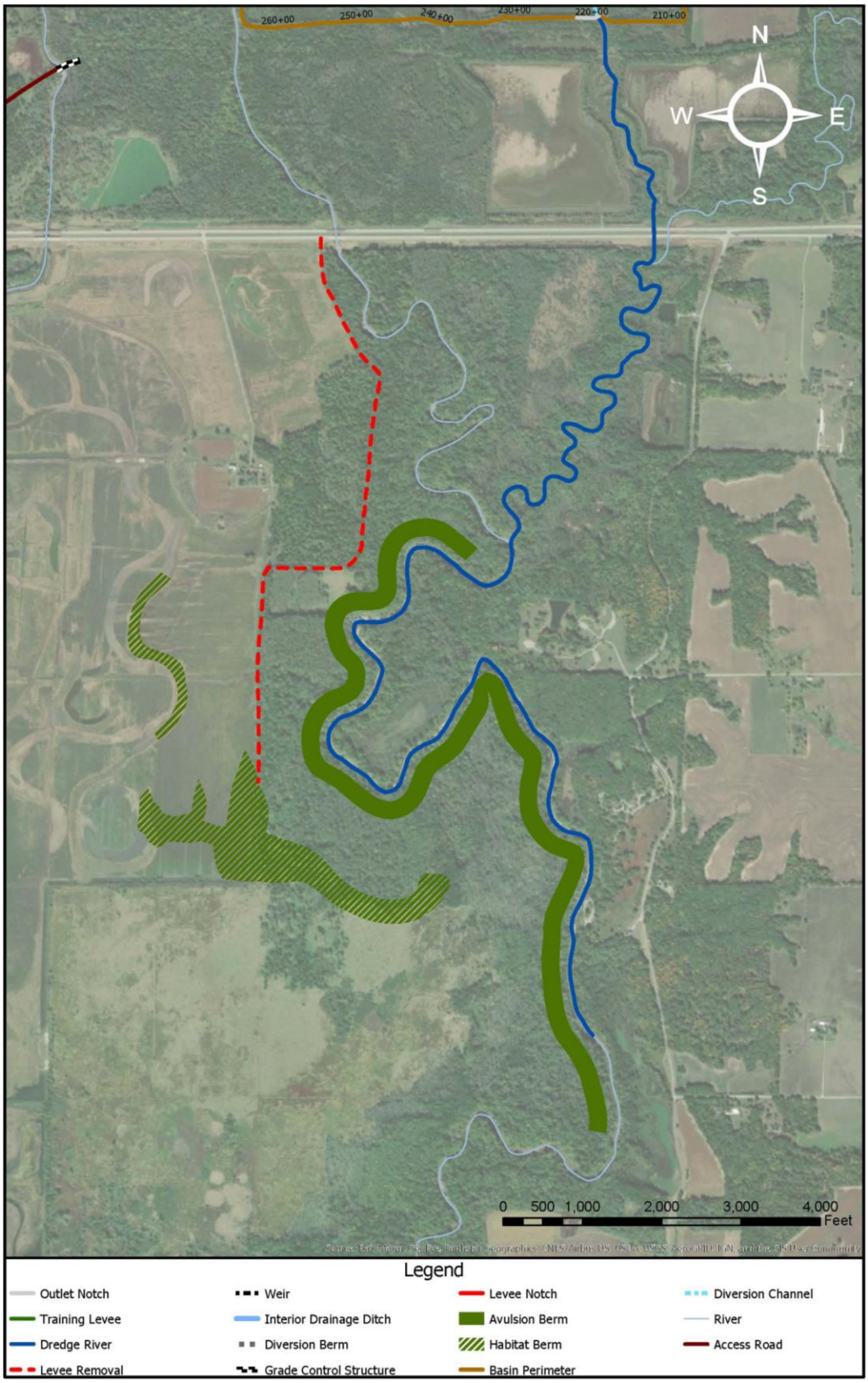

Figure 3. Locust Creek Recommended Plan Features Located Downstream of Highway 36.

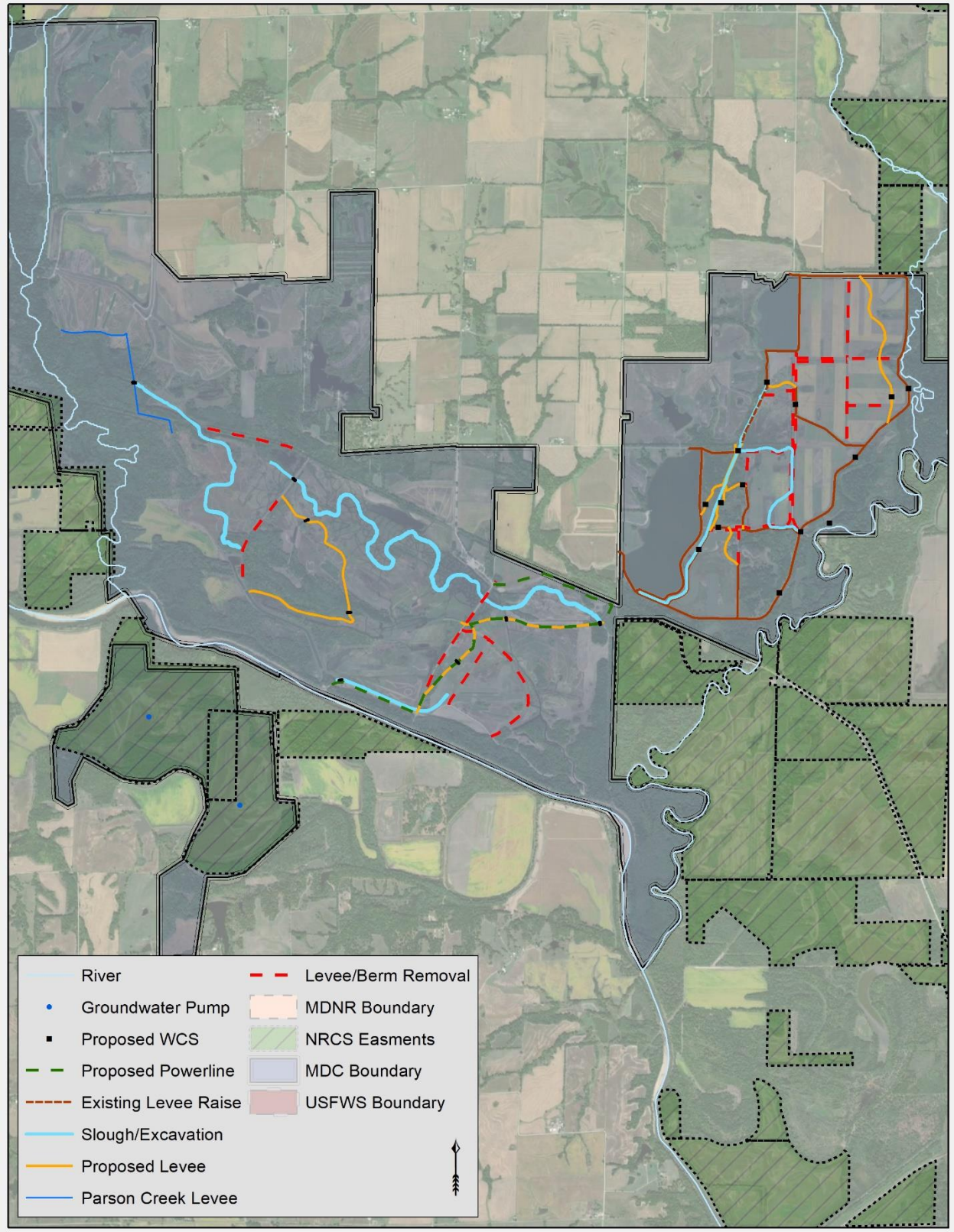

Figure 4. Fountain Grove Recommended Plan Features.

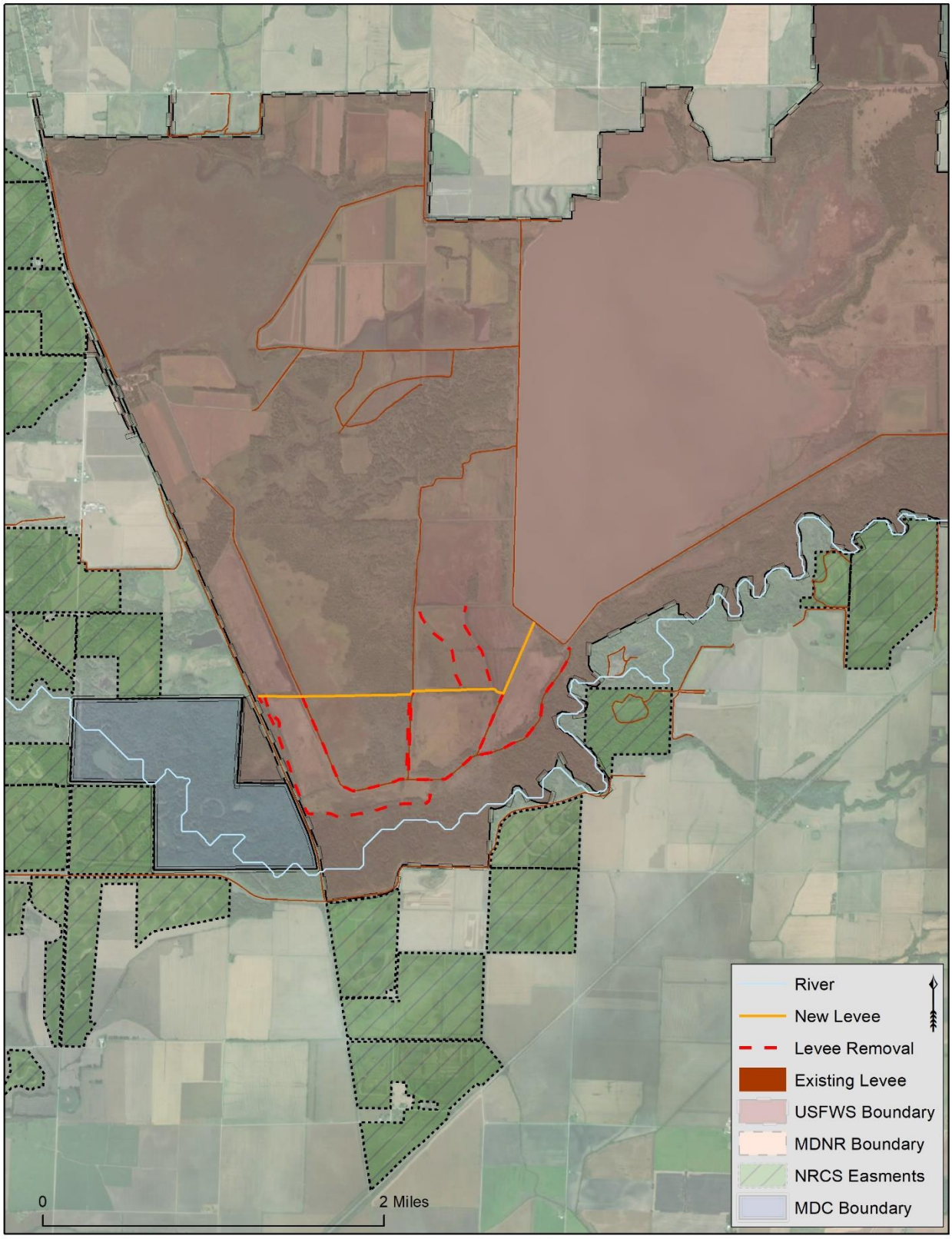

Figure 5. Yellow Creek Recommended Plan Features at Swan Lake NWR.

2.3. General Description of Dredged and Fill Material

Construction of the recommended plan would require the mechanical excavation of an estimated 1,873,680 cubic yards of material within the study areas; 1,827,901 cubic yards would remain on site (Table 1; Excavation & Earthwork) and be incorporated into constructed management measures (e.g., berms and levees, micro-topography). Bed sediment samples indicate that the bed of both Locust Creek and Higgins Ditch are predominantly medium and coarse sand. Clean Water Act, Section 401 guidelines do not require elutriate testing or sieve analyses where mechanical excavation is used for sediment removal; therefore, the Corps has not included these in this study.

The recommended plan would also require an estimated total of 136,540 tons of clean riprap to construct management measures. This does not include the amount of riprap that may be incorporated into the upstream bank stabilization projects. The plan may result in approximately 248 acres of tree clearing for clearing and grubbing associated with construction. The excavated material from tree clearing would be wasted on-site. Operations and maintenance of the constructed features may require future replacement of rock on grade control or bank stabilization structures, as well as the periodic removal of logs from the sediment detention basin or other locations in the study area. During the feasibility study, the USACE planning team avoided and minimized impacts to wetlands with placement of management measures. This 404(b)(1) evaluation covers the management measures included in the recommended plan.

Table 1. Excavation, Earthwork, Riprap, and Clearing/Grubbing Summary.

Measure	Excavation & Earthwork (cubic yards) – Material kept on-site	Excavation & Hauling (cubic yards) – Material disposed off-site	Riprap/Bedding Material Placed (tons)	Clearing & Grubbing* (acres)
Locust Creek				
Levee notch for flow entrance to sediment detention basin	8,705	NA	NA	1.23 (0.25)
Diversion berm	14,351	NA	31,286	4.0 (4.0)
Basin Perimeter levee	264,926	NA	NA	0.5
Pilot/diversion channel and training levees	250,258	NA	9,545	7.5 (7.5)
Interior Drainage	19,720	NA	156	1.0 (1.0)
Spillways	NA	NA	27,280	NA
Access Roads into Basin	7,108	NA	NA	NA
Dredge of Muddy and Locust creeks	143,081	NA	NA	10.0 (10.0)
Higgins Ditch Grade control	556	NA	30,978	1.22
Other Grade Control	NA	NA	8,529	5.0
Avulsion spoil berm	NA	NA	NA	86.0 (86.0)
Habitat enhancements	NA	NA	NA	47.0 (8.0)
Exit spillway	353		1,084	NA
Levee notches	25,044	NA	18,342	2.0 (2.0)
Lower North/South Floodplain Levee	24,913	NA	NA	NA
Sub-total	759,015	NA	127,200	165.45 (118.75)

Measure	Excavation & Earthwork (cubic yards) – Material kept on-site	Excavation & Hauling (cubic yards) – Material disposed off-site	Riprap/Bedding Material Placed (tons)	Clearing & Grubbing* (acres)
Fountain Grove				
Bank Armoring	3333	NA	4,667	4.0 (4.0)
Pool 1 WCS 1	1778	NA	420	NA
Realignment of Pool 1/2 and 2/3 levees	101587	NA	1,072	54.3 (54.3)
Levee construction Parson's Creek	11,326	NA	1,607	11.0 (11.0)
Main Conveyance Channel	248,320	NA	640	2.0 (2.0)
Pool 1 drainage Channel	80,514	NA	NA	7.0 (7.0)
Rail berm removal	29,988	NA	NA	7.8 (7.8)
Boat lanes and islands	220,111	NA	NA	15.4 (15.4)
Levee setback	100,474	NA	NA	1.0 (1.0)
E. FG Levee Realignments and channels	187,261	NA	934	26.2 (26.2)
Sub-total	984,691	0	9,340	129.0 (129.0)
Yellow Creek				
Levee setback	84,195	45,779	NA	10.0
Sub-total	84,195	45,779	NA	10.0
Total:	1,827,901	45,779	136,540	304.45 (247.75)

Note * Acres presented parenthetically are estimates of tree clearance associated with the clearing and grubbing amounts.

2.4. Authority

The feasibility study was authorized by resolution of the Committee on Environment and Public Works of the United States Senate during the 108th Congress 2nd Session on June 23, 2004. The authorization stated:

> *That the Secretary of the Army is requested to review the report of the Chief of Engineers on the Grand River and Tributaries, Missouri and Iowa, published as House Document 241, 89th Congress, First Session, and other pertinent reports, to determine whether any modifications of the recommendations contained therein are advisable at the present time in the interest of flood damage reduction, municipal and industrial water supply, recreation, fish and wildlife conservation, or environmental restoration in the Grand River Basin, Iowa and Missouri.*

The overall purpose of the study is to identify a plan to achieve ecosystem restoration benefits within the Lower Grand River sub-basin. Specifically, to reverse the trend of degradation of wetland, aquatic, and floodplain habitats within the areas of Pershing State Park, Fountain Grove CA, Swan Lake NWR, Yellow Creek CA, and surrounding public and private lands. The study seeks to identify a plan that contributes to the national ecosystem restoration (NER) objective by increasing the net quantity and/or quality of desired ecosystem resources.

3.0. Review of Compliance

The recommended plan would result in 5,184 average annual habitat units (AAHUs) of wet prairie, 8,524 AAHUs of wetland, 6,120 AAHUs of forest, and 199 AAHUs of aquatic riverine habitat types. This represents a net increase of 2,453 AAHUs of these habitats within the study area when compared to the expected degradation under the future without project condition. Although construction of plan components would occur in waters of the U.S. including streams and wetlands, the project would result in substantial benefits to habitat and no other plan provides the same benefits with fewer temporary adverse impacts. Impacts to wetlands and waters of the United States are from construction would be minimized to the extent practicable during design and BMPs will be used during construction to avoid potential impacts to wetlands and other waters of the United States. Additional information on the impacts of various alternatives can be found in Chapter 5 of the Feasibility Report and Environmental Assessment.

The plan would not be anticipated to violate any applicable state water quality standards, or applicable toxic effluent standard or prohibition under Section 307 of the Clean Water Act. The plan is not likely to affect species listed as endangered or threatened under the Endangered Species Act of 1973, as amended, or result in the destruction or adverse modification of critical habitat. In a letter dated December 6, 2019, the USFWS and USACE concurred on “may affect, but not likely to adversely affect” determinations for Indiana bat, northern long-eared bat, gray bat, and pallid sturgeon.

The plan would not cause or contribute to significant degradation of waters of the United States. Contrary to that, the evaluation of the plan indicates it would substantially benefit waters of the United States and reduce ongoing degradation to waters of the United States occurring in the study area.

Implementation of best management practices (BMPs) during construction activities would minimize potential adverse impacts on the aquatic ecosystem. BMPs would include:

- Implementation of all appropriate and reasonable BMPs related to erosion and sediment control, project stabilization, and prevention of water quality degradation. BMPs shall be properly installed prior to conducting authorized activities and maintained, repaired, and/or replaced as needed during all phases of the project to limit the amount of discharge of water contaminants.
- Exposure of unprotected soils in upland areas would be minimized. As practicable, project activity would be conducted at times of little or no rainfall to
- limit the amount of overland flow and sediment transport caused by heavy equipment.
- Construction machinery would be kept out of the water way as much as possible. If work in the water way is unavoidable, it would be performed in a way that minimizes the duration and amount of any disturbance to banks, substrate, and vegetation to prevent increases in turbidity.
- To the extent possible, construction activities would occur at low flows and water levels to limit the amount of sediment disturbance caused by heavy equipment.
- Fuel, oil and other petroleum products, equipment, construction materials, and any solid waste would not be stored below the ordinary high water mark at any time or in the adjacent flood-prone areas beyond normal working hours. All precautions would be taken to avoid the release of wastes or fuel to streams and other adjacent waters as a result of construction activities.
- Petroleum products spilled into any water or on the banks where the material may enter waters of the state would be immediately cleaned up and disposed of properly. Any such spills of petroleum would be reported as soon as possible, but no later than 24 hours after discovery to the MoDNR's Environmental Emergency Response phone line.
- Only clean, nonpolluting fill would be used.

- Waste concrete or concrete rinsate would be disposed in a manner that does not result in discharge to waterways.
- Clearing of vegetation and trees would be minimized as much as possible to construct the project.
- Disturbed areas would be restored to a stable condition. Seeding, mulching, and needed fertilization would be within three days of final contouring. Inspections would be conducted as necessary to ensure successful revegetation and stabilization. All revegetation would occur with native species.

4.0. Technical Evaluation Factors (Subparts C-F)

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

4.1.1. Substrate

Existing substrate at the location of grade control and bank stabilization projects is typically characterized by highly erosive materials such as silts and sands. Grade control would involve burying the existing substrate through the placement of riprap along the toe of the eroding banks and extending across the stream channel. Over time, the spaces in the riprap would be anticipated to fill in with similar material to what existing previously (i.e. silts and sands). However, the substrate at the grade control locations would be primarily characterized by stone over the long-term. Upstream banks stabilization projects would rely primarily on vegetative materials for stabilization such as logs or cedar revetments; however, the use of rock riprap would be possible depending on the project site.

4.1.2. Suspended Particles/Turbidity

The plan could result in minor, short-term impacts to suspended particulates and slight increases in turbidity within Muddy Creek, Locust Creek, Higgins Ditch, Jacksons Ditch, and upper sub-basin streams during construction. This would result from the placement of riprap and construction of grade control, the diversion berm, or bank stabilization projects. BMPs would be implemented to avoid and minimize any potential construction related impacts to water quality. Implementation of the plan is forecasted to reduce sediment loading within the study area and as a result would be anticipated to have a long-term beneficial effect on water quality, included suspended particulates and turbidity.

The plan would not violate any general criteria of the Missouri Water Quality Standards, 10 CSR 20-7.031. No significant adverse impacts to the chemical and physical properties of the water column are expected.

4.1.3. Water

Substantial differences in water chemistry following plan construction are not expected, and the project is not anticipated to result in violations of applicable state water standards. The rock materials are inert, having little effect on water chemistry. Odor, taste, pH, temperature and dissolved gas changes would not be affected. Turbidity (as measured by total suspended solids) is expected to temporarily increase during construction; however, in the long-term turbidity is expected to improve with constructed measures by reducing bank line inputs of sediments. Best management practices would be implemented during construction. The construction should not impair the aquatic ecosystem's capability to sustain life or reduce the suitability of the Locust Creek, Muddy Creek, or Higgins Ditch for aquatic organisms, human consumption, recreation or aesthetics.

4.1.4. Current Patterns and Water Circulation

Grade control and bank stabilization projects use earthen fill material and clean rock fill to protect streambanks from erosion and redirect the flow of water away from the eroding bank. Any changes to the direction or velocity of water flow and circulation in the localized area of the grade control or bank stabilization projects would be minor. No significant impacts 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 bodies are anticipated. The plan would intentionally redirect water flow from Higgins Ditch back to Locust Creek to restore lower Locust Creek, which is listed on the National Rivers Inventory.

4.1.5. Normal Water Fluctuation

The plan is anticipated to change water surface elevations for the 100-year event within the study area. By design, water surface elevations would increase in the area of the sediment detention basin. The

forecasted changes to water fluctuations are anticipated to be beneficial to wetlands and aquatic ecosystems within the study area.

4.1.6. Salinity Gradients

The plan would not impact salinity gradients. These are freshwater systems and this would not change as a result of the plan.

4.2. Potential Impacts to the Biological Characteristics of the Aquatic Ecosystem (Subpart D)

4.2.1. Threatened and Endangered Species

Presence of, or use by, endangered and threatened species is discussed in the Feasibility Report with Integrated Environmental Assessment. No adverse impacts are expected to result from the plan. Refer to Chapter 5-Environmental Consequences of the Feasibility Report with Integrated Environmental Assessment. A Biological Assessment was prepared and submitted to the USFWS. In accordance with Section 7 Endangered Species Act (ESA) guidelines, USACE concluded a determination of "May Affect, Not Likely to Adversely Affect" for the gray bat (*Myotis grisescens*), Indiana bat (*M. sodalis*), northern long-eared bat (*M. septentrionalis*) and pallid sturgeon (*Schaphirhynchus albus*). Conservation measures have been incorporated into the plan.

4.2.2. Fish, crustaceans, mollusks, and other aquatic organisms in the food web

The plan 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 construction. The impact may affect a small number of individuals in a small stretch of waterbodies but would be unlikely to have a significant impact on the overall population of any particular species. It is anticipated that following construction there would be a long-term beneficial impact by reducing the amount of sediment entering the study area streams and providing a substrate for benthic organisms.

4.2.3. Other Wildlife

The plan would result in beneficial long-term impacts to fish and wildlife resulting from an increase in the quantity and quality of habitat. Net increase in AAHUs modeled for habitat evaluation and quantification is considered representative for the effects of alternatives on fish and wildlife populations. The plan includes construction of features that would result in ground disturbance and/or tree clearing. Fish and wildlife within proximity to project features would experience short-term direct adverse impacts from construction activities and/or short-term indirect adverse impacts from construction-related noise or disturbance. These impacts are anticipated to be negligible to minor.

4.3. Potential Impacts on Special Aquatic Sites (Subpart E)

4.3.1. Sanctuaries and Refuges

The study area and features of the plan include levee setback actions on Swan Lake National Wildlife Refuge. The actions were formulated in coordination with the USFWS and are intended to benefit ecological resources on Swan Lake NWR. Any effects to Swan Lake NWR are anticipated to be beneficial.

4.3.2. Wetlands, Mud flats, and Vegetated Shallows

It is anticipated that these habitats within the study area would benefit over the long-term through a reduction in sedimentation and habitat degradation.

4.3.3. Coral Reefs

There are no coral reefs in the study area.

4.3.4. Riffle and pool complexes

The study area has experienced a drastic reduction in riffle-pool complexes from the long-term impacts of sedimentation in the sub-basin. Grade control structures and other bank stabilization projects would be designed to the extent possible to restore riffle-pool features within the study area.

4.4. Potential Effects on Human Use Characteristics

4.4.1. Municipal and private water supplies

The plan is not anticipated to have any effect on municipal and private water supplies.

4.4.2. Recreational and commercial fisheries

Long-term beneficial impacts to fisheries would be expected from improved aquatic riverine habitat quality.

4.4.3. Water-related Recreation

Recreation would be temporarily restricted in the study area during construction activities. Over the long-term, the plan is anticipated to benefit recreation within the study area.

4.4.4. Aesthetics

There may be short-term minor impacts to aesthetics during construction activities. However, over the long-term aesthetics would remain consistent with a rural, natural area setting.

4.4.5. Parks, national and historic monuments, national seashores, wilderness areas, research sites, and similar preserves

Beneficial impacts are expected to parks and conservation areas within the study area.

4.5. Evaluation of Dredged or Fill Material (Subpart G)

4.5.1. General Evaluation of Dredged or Fill Material

Fill materials placed below the ordinary high water mark typically consist of earthen fill materials from the existing stream bank, logs, and/or clean rock fill with minimal fines obtained from a commercial source. Prior experience indicates that commercially available rock fill would be free from chemical biological, or other pollutants.

4.5.2. Chemical, biological, and physical evaluation and testing

The fill material would meet the testing exclusions based on the fact that it consists of local earthen materials and clean rock fill from a commercial source. No contaminants would be excavated exceeding the USEPA standards in identified substrates. Possible introduction by equipment or construction-related contaminants would be controlled by adherence to runoff monitoring plans during construction activity. No additional toxic material would be introduced to the area over ambient conditions as a result of construction activities. Rock riprap would be clean, uncontaminated stone from an approved source in compliance with the Clean Water Act, Section 404 Missouri Regional Condition #4 and Section 401 Water Quality Certification Condition #5.

4.6. Disposal Site Delineation (§230.11 f)

The fill locations would consist of the streambank and channel of the proposed project areas. Typically local earthen materials and clean rock fill with minimal fines would be used to stabilize the stream banks.

The minimum amount of fill necessary would be determined. The depth of water, current velocity, direction, and variability, the degree of turbulence, and rate of discharge at the disposal site would be considered in determining the acceptability of the mixing zone. Spoil from project activities would be placed as identified in Figure 3.

4.7. Actions Taken to Minimize Adverse Effects (Subpart H)

The construction contractor would be required to obtain a Section 402 NPDES storm water permit from the state. As part of the NPDES permit, the Best Management Practices would be required to minimize the incidental fallback of material into the waterway and to minimize the fuel, petroleum products, or other deleterious material from 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 the water 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 construction equipment would be in the river channel, and not placing fill in the river during unusual high water events.

4.8. Factual Determinations (§230.11)

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

4.9. Findings (§230.12)

The recommended plan has been evaluated and determined to be in compliance with the Clean Water Act Section 404(b)(1) guidelines.

Missouri Department of NATURAL RESOURCES
dnr.mo.gov
Michael L. Parson, Governor
Carol S. Comer, Director

May 27, 2020

Colonel William C. Hannan, Jr.
Kansas City District
U.S. Army Corps of Engineers
635 Federal Building
Kansas City, MO 64106

RE: 2019-005-CW/CEK007366 in Chariton, Linn, and Livingston Counties

Dear Colonel Hannan:

The Missouri Department of Natural Resources' Water Protection Program has reviewed your request for Clean Water Act (CWA) Section 401 Water Quality Certification (WQC) for the Tentatively Selected Plan (TSP) of the proposed U.S. Army Corps of Engineers' (USACE) Project 2019-005-CW, the Grand River Ecosystem Restoration Feasibility Study. The feasibility study was authorized by resolution of the Committee on Environment and Public Works of the United States Senate during the 108th Congress 2nd Session on June 23, 2004, in the interest of flood damage reduction, municipal and industrial water supply, recreation, fish and wildlife conservation, or environmental restoration in the Grand River Basin, Iowa and Missouri. The TSP is composed of actions within the 3 focus study areas: Locust Creek, Parsons Creek, and Yellow Creek.

The Locust Creek component of the TSP features construction of a sediment detention basin (SDB) by raising and constructing a perimeter levee. A diversion berm will be constructed across the Locust Creek floodplain and extending into the Locust Creek channel at the upstream end of Pershing State Park. The floodplain portion of the berm will serve to prevent the progression and/or formation of additional avulsions that could divert water and bypass the SDB. The in-channel portion of the berm will serve to divert flows into the SDB while allowing water to continue downstream on Locust Creek and Higgins Ditch. Two spillways will be included in the raised levee to allow water to overtop in a controlled manner. A pilot channel into the SDB will be excavated to convey sediment and logs away from the diversion berm and reduce the risk of plugging its mouth. A portion of the existing levee on the east bank of Locust Creek will be notched to allow flow into the SDB. In addition, several existing levees within the SDB will be notched, and log capture features will be incorporated into the basin. Water will exit the basin through three 6-ft by 6-ft concrete box culverts located on the south side of the SDB. Ongoing removal of logs from the SDB or log jams in locations adversely impacting its effectiveness will be necessary. In addition, the 4 following grade control structures will be constructed: 2 on Locust Creek, 1 along Higgins Ditch, and 1 on Muddy Creek upstream of its connection with the SDB. Approximately 23,500 linear ft of Muddy and Locust Creeks will be dredged to provide channel dimensions sufficient to accommodate historic bankfull flow and provide appropriate slope. Dredge material will be used to perform small levee modifications and habitat enhancements. Dredged material will be spoiled along a portion of Locust Creek to create an avulsion spoil berm. The partial removal of the levee separating the east and west sides of the Locust Creek

floodplain south of Highway 36 will help restore floodplain connectivity between Higgins Ditch and the Locust Creek channel. Bank stabilization measures will be implemented in the Locust Creek watershed upstream of the SDB.

In addition, the Locust Creek component of the TSP includes an estimated 316 bank stabilization projects to achieve a 14 percent reduction in quantified risk associated with uncertainties in forecasted sediment loading. Although specific project sites are not yet known, it is anticipated the projects will be relatively small in magnitude, and plan formulation assumed small bank stabilization sites of approximately 250 ft in length with 12-ft-high banks. These projects may be implemented in the following watersheds: Watkins Creek-Locust Creek, excluding the portion in Iowa; East Locust Creek; West Locust Creek; and Locust Creek.

The Parsons Creek component of the TSP features a suite of actions to enhance wetlands at Fountain Grove Conservation Area (CA) through increased natural ecosystem form and function, improved habitat development, and improved water management. The bank of the channel downstream of Pool 3 Levee Water Control Structure (WCS), referred to as Jackson's Ditch, will be armored to prevent erosion on the neighboring property. This measure will allow for opening the gates at Pool 3 Levee WCS to increase the drainage rate from the CA pools. The Pool 1 WCS #1 will be replaced with two 96-inch pipes with sluice gates to drain Pool 1 to Pool 2. A new levee will be constructed on the west side of the CA where Parsons Creek flows enter the area under existing conditions to prevent flows lower than the 1.2-year recurrence interval from entering the CA and focus Parsons Creek flows to a controlled overtopping point into a conveyance channel. The Pool 2-3 levee will be moved closer to the pump station, and an additional levee will be constructed within Pool 3 to allow for independent water control of all 3 major CA pools. The levee on the east side of the CA will be set back to increase flood resiliency. A conveyance channel will be excavated through the CA to effectively move Parsons Creek flows through the area during high flow events. Outside of high flow events, the feature will serve as a water distribution channel and provide habitat for wetland species. A portion of the Chillicothe-Brunswick rail berm will be removed. Microtopography on the site will be enhanced through the creation of sloughs and habitat mounds. Spoil from drainage channel excavation will be used to form the habitat mounds. Earthwork will be performed to modify the existing pool design on the east side of the CA. The intent is to provide more naturally shaped wetland pools consistent with modern wetland management practices. The redesign of the pools on the east side will allow for the removal of some water control structures in that area to create more natural conditions and allow for more efficient management. An additional drainage ditch will be constructed from the proposed Parsons Creek levee to the vicinity of the pump station, allowing for more efficient drainage of Pool 1 when desired. Two electric groundwater pumps will be installed on the southern CA to facilitate wetlands development and more reliable hydrology.

The main feature of the TSP for Yellow Creek is the setback of a levee on Swan Lake National Wildlife Refuge (NWR). The plan includes levee removal, removing three existing culverts, raising a portion of an existing levee, constructing a portion of a new setback levee, and adding two 3-ft-diameter concrete culverts with flap gates.

The TSP will result in 5,184 Average Annual Habitat Units (AAHUs) of wet prairie, 8,524 AAHUs of emergent wetland, 6,120 AAHUs of bottomland forest, and 199 AAHUs of aquatic riverine habitat types. This represents a net increase of 2,453 AAHUs of these habitats within the study areas when compared to the expected degradation under the future without project condition.

The proposed projects are located over large areas within and near Pershing State Park in Linn County, Fountain Grove CA in Linn and Livingston Counties, and Swan Lake NWR in Chariton County, all within the state of Missouri. Associated park, conservation area, or refuge property; associated water resources; and approximate geographic coordinates for each of the major TSP components are as follows:

TSP Component	Location	Water	Latitude (°N)	Longitude (°W)
Diversion Berm	Pershing State Park	Locust Creek	39.81800	93.23467
Dredging	Pershing State Park	Locust Creek	39.76731	93.22031
Dredging	Pershing State Park	Muddy Creek	39.77699	93.21397
New Levee	Fountain Grove CA	Parsons Creek	39.71885	93.34039
Levee Raise	Swan Lake NWR	Yellow Creek	39.59285	93.18558

This WQC is being issued under Section 401 of Public Law 95-217, the CWA of 1977 and subsequent revisions. This office certifies the proposed project will not cause the general or numeric criteria to be exceeded nor impair beneficial uses established in the Water Quality Standards, 10 CSR 20-7.031, provided the following conditions are met:

For TSP components as fully described in the documentation provided with the USACE's request for WQC:

1. Stream changes intended within the scope of the TSP as designed and/or modeled are approved by the Department.

2. Due to the net benefits of the TSP to wetlands and streams, the Department will not require compensatory mitigation for wetland and stream impacts associated with Locust, Parsons, and Yellow Creek TSP components.

For TSP bank stabilization components yet to be determined:

3. In order for the Department to determine if bank stabilization projects require individual WQC, the USACE shall submit location information and plans for each project for Department review no less than 60 days prior to the proposed action. The Department will notify the USACE within 15 days if individual WQC is required. If individual WQC is required, the Department shall be allowed an additional 45 days to issue, issue with conditions, or deny WQC for each proposed project.

4. Bank stabilization projects resulting in channelization are strongly discouraged by the Department. If allowed, such actions may require individual WQC and compensatory stream mitigation.
   a. Channelization includes, but is not limited to, reducing the length of the channel, widening the channel for increased water storage or flow, and/or construction of hard structures which concentrate flow.
   b. Bank stabilization activities along one bank of a stream are permitted, including but not limited to bank sloping and riprapping.
   c. The redirection of flow by excavation of the opposite bank or a streambed is considered a channel modification and is prohibited.

5. Innovative bank stabilization approaches require consultation with the Department prior to approval and may require an individual WQC. The USACE shall invite the Department as well as the other state and federal resource agencies to examine innovative approaches.

6. To minimize the amount of sediment and other pollutants entering the water ways, bioengineering methods shall be used for bank stabilization when practicable. As opportunity allows, limit the amount of rock or other hard points while increasing the amount of native vegetation or a combination of rock and vegetation.

7. According to the Department's geospatial data, an 11.5-mile reach of the Grand River adjacent to Fountain Grove CA, a 5-mile reach of Locust Creek approximately 3 to 8 miles upstream of Pershing State Park, and a 19.4-mile reach of Locust Creek in Putnam County and northern Sullivan County are listed in the most current Water Quality Report (Section 305(b) Report) as impaired by channelization, a type of aquatic habitat alteration. Individual WQC may be required for any project components within these reaches.

8. Stream patterns, profiles, and dimensions shall be maintained as much as practicable. This includes but is not limited to sinuosity, slope, and channel width. No project shall accelerate bed or bank erosion. Streambed gradient and banks shall not be adversely altered during project construction.

For all TSP components:

9. Acquisition of a WQC shall not be construed or interpreted to imply the requirements for other permits are replaced or superseded, including CWA Section 402 National Pollutant Discharge Elimination System Permits. Permits or any other requirements shall remain in effect. Since proposed activities include piling dredged material on land, the USACE may need a general permit for return water and stormwater from the dredged material. Information regarding permit requirements and applications may be directed to the Department's Northeast Regional Office by phone at 660-385-8000.

10. Land disturbance activities disturbing one or more acres of total area for the entire project or less than one acre for sites that are part of a common promotional plan of development may require a stormwater permit. Instructions on how to apply for and receive the online land disturbance permit are located at www.dnr.mo.gov/env/wpp/epermit/help.htm. Questions regarding permit requirements may be directed to the Department's Land Disturbance phone line at 573-526-2082 or toll free at 855-789-3889.

11. If TSP components require project activity for longer than five years, the Department may review this WQC for revision to ensure the project has not caused or will not cause the general or numeric criteria to be exceeded or impair beneficial uses established in Missouri's Water Quality Standards, 10 CSR 20-7.031. This review may include but is not limited to onsite inspections, document reviews, and requests for additional information to be provided by the USACE as necessary to make this determination.

12. Documentation provided with the request for WQC mentions minimization through the use of Best Management Practices (BMPs). Missouri antidegradation requirements dictate all appropriate and reasonable BMPs related to erosion and sediment control, project stabilization, and prevention of water quality degradation are applied and maintained. BMPs shall be properly installed prior to conducting authorized activities and maintained, repaired, and/or replaced as needed during all phases of the project to limit the amount of discharge of water contaminants to waters of the state. The project shall not involve more than normal stormwater or incidental loading of sediment caused by project activities so as to comply with Missouri's general water quality criteria [10 CSR 20-7.031(4) on Page 15 at http://www.sos.mo.gov/cmsimages/adrules/csr/current/10csr/10c20-7a.pdf].

13. All efforts shall be made to minimize exposure of unprotected soils in upland areas. To the best of the applicant's ability, project activity shall be conducted at times of little or no rainfall to limit the amount of overland flow and sediment transport caused by heavy equipment.

14. Care shall be taken to keep machinery out of the water way as much as possible. If work in the water way is unavoidable, it shall be performed in a way that minimizes the duration and amount of any disturbance to banks, substrate, and vegetation to prevent increases in turbidity. Conduct project activity at low flows and water levels to limit the amount of sediment disturbance caused by heavy equipment.

15. Fuel, oil and other petroleum products, equipment, construction materials, and any solid waste shall not be stored below the ordinary high water mark at any time or in the adjacent flood-prone areas beyond normal working hours. All precautions shall be taken to avoid the release of wastes or fuel to streams and other adjacent waters as a result of this operation.

16. Petroleum products spilled into any water or on the banks where the material may enter waters of the state shall be immediately cleaned up and disposed of properly. Any such spills of petroleum shall be reported as soon as possible, but no later than 24 hours after discovery to the Department's Environmental Emergency Response phone line at 573-634-2436 or website at http://dnr.mo.gov/env/esp/esp-eer.htm.

17. Only clean, nonpolluting fill shall be used. The following materials are not suitable where contact with water is expected and shall not be used due to their potential to cause violations of the general criteria of Missouri's Water Quality Standards (10 CSR 20-7.031(4)(A)-(H)).
    a. Earthen fill, gravel, broken concrete where the material does not meet the Suitable Material specifications stated in the "Missouri Nationwide Permit Regional Conditions" (https://usace.contentdm.oclc.org/digital/collection/p16021coll11/id/2662/), since these materials are usually not substantial enough to withstand erosive flows, and fragmented asphalt.
    b. Concrete with exposed rebar.
    c. Tires, vehicles or vehicle bodies, and construction or demolition debris are solid waste and are excluded from placement in the waters of the state.
    d. Liquid concrete, including grouted riprap, if not placed as part of an engineered structure.
    e. Any material containing chemicals that would result in violation of Missouri's Water Quality Standards.

18. Any waste concrete or concrete rinsate shall be disposed of in a manner that does not result in any discharge to the jurisdictional water ways.

19. Clearing of vegetation and trees shall be the minimum necessary to accomplish the activity except for the removal of invasive or noxious species and placement of ecologically beneficial practices.

20. Disturbed areas shall be restored to a stable condition to protect water quality as soon as possible. Seeding, mulching, and needed fertilization should be within three days of final contouring. To ensure erosion and deposition of soil in waters of the state are not occurring from this project, onsite inspections of these areas should be conducted as necessary to ensure successful revegetation and stabilization.

21. The Department encourages the use of native vegetation to protect impacted areas from future water quality concerns. Native vegetation has evolved with Missouri's geology, climate, and wildlife to occur within a region as a result of natural processes rather than human intervention. For areas where direct impacts to streams are to be avoided, the Department recommends a minimum riparian buffer strip width of 50 ft as measured from top of bank.

22. Representatives from the Department shall be allowed upon request on the project property to inspect the authorized activity as deemed necessary by the Department to ensure compliance with WQC conditions and Missouri's Water Quality Standards. The applicant or their consultant shall submit any requested information deemed necessary by the Department to ensure compliance with WQC conditions.

23. The WQC is based on the plans as submitted. Should any plan modifications occur, please contact the Department to determine whether the WQC remains valid or needs to be amended or revoked.

24. The Department's geospatial data is available upon request, and all published data is available on the Missouri Spatial Data Information Services website at msdis.missouri.edu/. Additional information to identify the project location, including stream reaches with listed impairments or special water designations, may be obtained from the Department's Water Protection Program by phone at 573-522-4502.

Pursuant to Chapter 644, RSMo, commonly referred to as the Missouri Clean Water Law, and fee regulations under 10 CSR 20-6.011(2)(H)1., this WQC shall be valid only upon payment of a fee of $150. The enclosed invoice contains the necessary information on how to submit your fee. Payment must be received within 15 business days of receipt of this WQC. Upon receipt of the fee, the applicable office of the USACE will be informed the WQC is now in effect and final.

If you were adversely affected by this decision, you may be entitled to an appeal before the Administrative Hearing Commission (AHC) pursuant to Section 621.250, RSMo. To appeal, you must file a petition with the AHC within 30 days after the date this decision was mailed or the date it was delivered, whichever date was earlier. If any such petition is sent by registered mail or certified mail, it will be deemed filed on the date it is mailed; if it is sent by any method other than registered mail or certified mail, it will be deemed filed on the date it is received by the AHC. Contact information for the AHC is: Administrative Hearing Commission, United States Post Office Building, Third Floor, 131 West High Street, P.O. Box 1557, Jefferson City, MO 65102; phone: 573-751-2422; fax: 573-751-5018; and website: www.oa.mo.gov/ahc.

This WQC is part of the USACE's permit. Water Quality Standards must be met during any operations authorized. If you have any questions, please contact Mike Irwin by mail at Department of Natural Resources, Water Protection Program, P.O. Box 176, Jefferson City, MO 65102-0176; by phone at 573-522-1131; and by email at mike.irwin@dnr.mo.gov. Thank you for working with the Department to protect our aquatic resources.

Sincerely,

WATER PROTECTION PROGRAM

Chris Wieberg
Director

CW:mip

Enclosure

c: Sherry Bell, Fiscal Management Section, Budget and Fees Unit
Joe Bowdish, Northeast Regional Office
Jennifer Campbell, Missouri Department of Conservation
Karen Herrington, U.S. Fish and Wildlife Service
Stuart Miller, Missouri Department of Conservation
Tim Rielly, Missouri Department of Natural Resources
Michael V. Snyder, U.S. Army Corps of Engineers, Kansas City District