DRAFT Environmental Assessment

Missouri Department of Conservation Taylors Landing Public Boating Access Relocation Project

Prepared on Behalf of:

U.S. Fish and Wildlife Service
and the
Missouri Department of Conservation

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Wood Project No. 325220161
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List of Abbreviations and Acronyms

AADT	Average Annual Daily Traffic
ADA	Americans With Disabilities Act
AQCR	Air Quality Control Region
ATV	all-terrain vehicle
BGEPA	Bald and Golden Eagle Protection Act
BMP	best management practices
CA	Conservation Area
CAA	Clean Air Act
CART	County Aid Road Trust
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cfs	cubic feet per second
CO	Carbon Monoxide
CWA	Clean Water Act
dB	decibel
dBA	decibels-A weighted
DBH	diameter-at-breast-height
EA	environmental assessment
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FONSI	Finding of No Significant Impact
FPPA	Farmland Protection Policy Act
HDPE	high-density polyethylene
HUC	hydrologic unit code
HUD	U.S. Department of Housing and Urban Development
I-70	Interstate 70
IPaC	Information for Planning and Consultation
Ldn	Day-Night Sound Level
LTA	Landtype Association
LWCF	Land and Water Conservation Fund
MBTA	Migratory Bird Treaty Act
MDC	Missouri Department of Conservation
MDNR	Missouri Department of Natural Resources
MOA	Memorandum of Agreement

MoDOT	Missouri Department of Transportation
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NFWR	National Fish and Wildlife Refuge
NHPA	National Historic Preservation Act
NLCD	National Land Cover Database
NO_2	Nitrogen Dioxide
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
OHWM	ordinary high water mark
OWLD	Overton-Wooldridge Levee District No. 1
OSHA	Occupational Safety and Health Administration
PEM	palustrine emergent wetland
PFO	palustrine forested wetland
PGA	peak ground acceleration
PM	Particulate Matter
PSS	palustrine scrub-shrub wetland
RM	river mile
SEMA	State of Missouri Emergency Management Association
SFR	Sport Fish Restoration
SHPO	State Historic Preservation Office
SO2	Sulphur Dioxide
SWPPP	Storm Water Pollution Prevention Plan
USACE	U.S. Army Corps of Engineers
USCB	U.S. Census Bureau
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WOUS	Waters of the United States
WQC	Water Quality Certification

CHAPTER 1 – INTRODUCTION, PURPOSE AND NEED

1.1 Proposed Project Description and Background

The Missouri Department of Conservation (MDC) is the state agency charged with improving fishing and boating opportunities throughout the state. MDC has used Federal Aid in Sport Fish Restoration (SFR) funds to construct and improve fishing and boating access facilities since 1991. The Taylors Landing Access Relocation Project (the proposed Project) will be a grant proposal submitted under the ongoing, statewide, federal aid project Missouri Fishing and Boating Access Development (Project MO F-46-D). Once completed, costs to maintain the relocated public access would be part of the ongoing, statewide Missouri Motorboat Access Operation and Maintenance Grant (MO F-49-D). Because the proposed Project is anticipated to use federal funding through the SFR Program, this Environmental Assessment (EA) was prepared to comply with the National Environmental Policy Act of 1969 (NEPA). The proposed construction also requires federal permitting by the U.S. Army Corps of Engineers (USACE) and was separately analyzed for compliance with NEPA by the USACE for jurisdictional Waters of the United States (WOUS) permitting.

MDC proposes to relocate the Taylors Landing Access from its current location. The original access site is located on the right descending bank of the Missouri River at River Mile (RM) 185 in Cooper County, Missouri. The access was built on an MDC-owned parcel of land which is approximately nine and one-half (9.5) acres in size and is surrounded by the Overton Bottoms North Unit of the U.S. Fish and Wildlife Service (USFWS) Big Muddy National Fish and Wildlife Refuge (NFWR). The proposed relocation is approximately one (1) mile southeast downstream on the NFWR's Overton Bottoms South Unit (Figure 1-1). Both NFWR units are on land owned by the U.S. Army Corps of Engineers. The original access consists of a single lane boat ramp, an aggregate parking area that can accommodate approximately eight vehicles and boat trailers, and an area for primitive camping, all of which are accessed by a 1600-foot-long aggregate entrance road (Cooper County Road referred to as Overton Road) off State Route 98 (Figure 1-2, see photos in Appendix G).

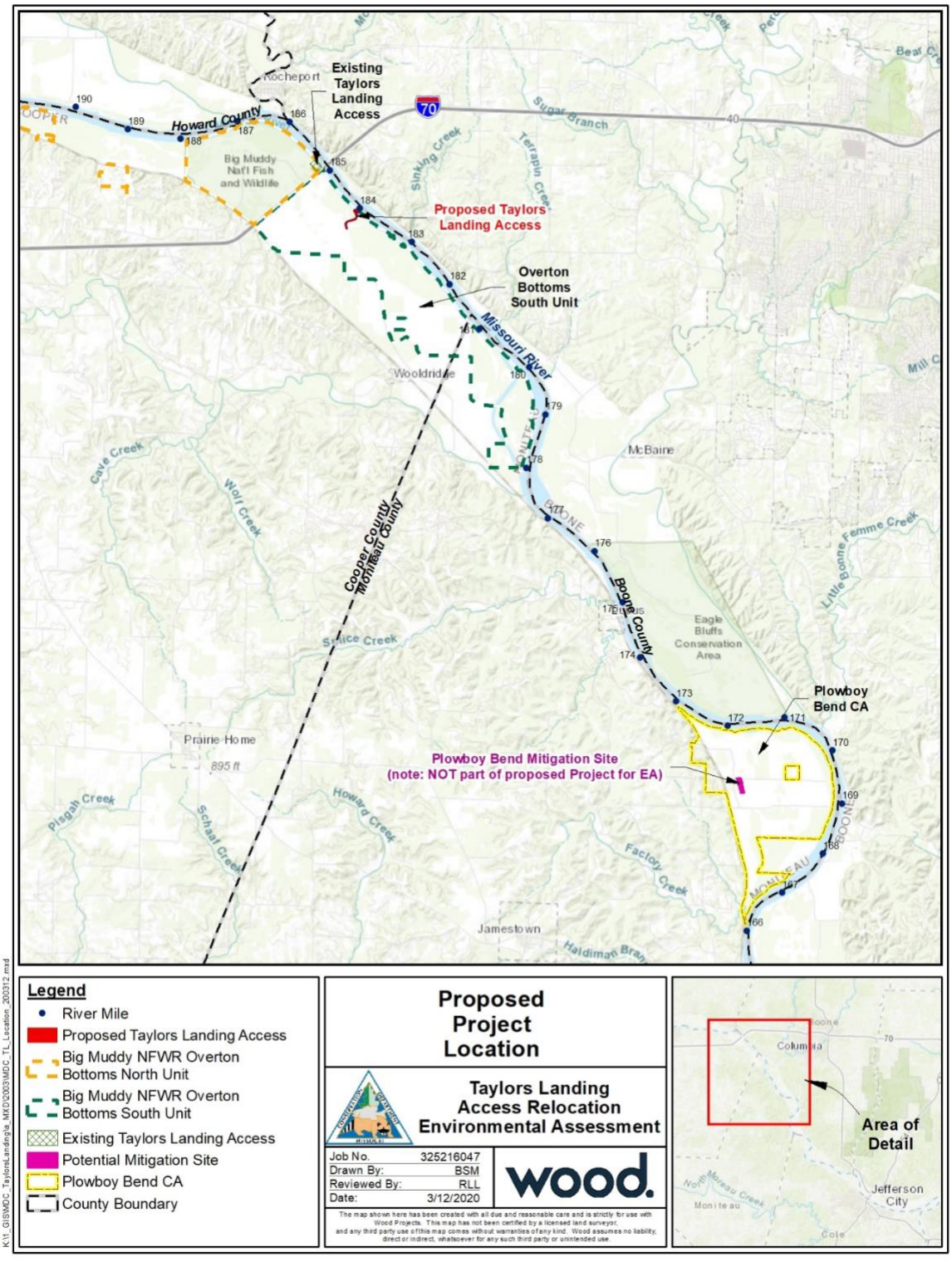


Figure 1-1. Proposed Project Location

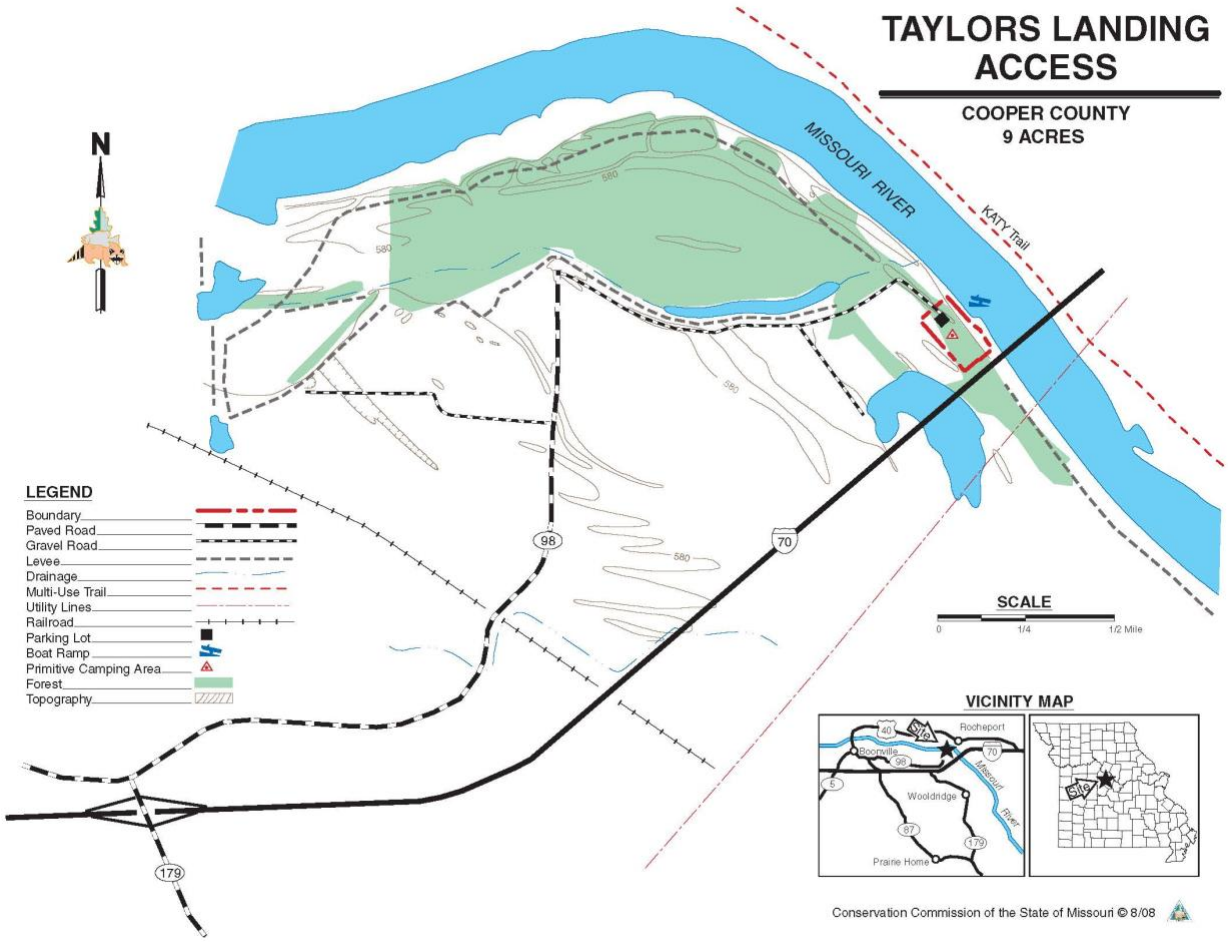


Figure 1-2. Original Taylors Landing Access

MDC purchased the existing Taylors Landing Access property with Land and Water Conservation Fund (LWCF) dollars in 1965, with the boat ramp facility constructed in 1972. The existing boat ramp was originally accessed via an entrance road along Missouri Department of Transportation (MoDOT) right-of-way from Cumberland Church Road that crossed under Interstate 70 (I-70). A scour or "blew hole" (a pool created by river scour in the floodplain), which formed under I-70 during the 1993 floods, cut off Cumberland Church Road and eliminated road access to the boat ramp. The boat ramp was rebuilt and opened to the public in 2001; however, now recreational boaters had to go north on State Route 98 at the State Route 179 and 98 interchange and head east on Route 98 that eventually merges into the "cut-off section" of Cumberland Church Road. The right for MDC to use this section of the county road was authorized through an easement from the USACE.

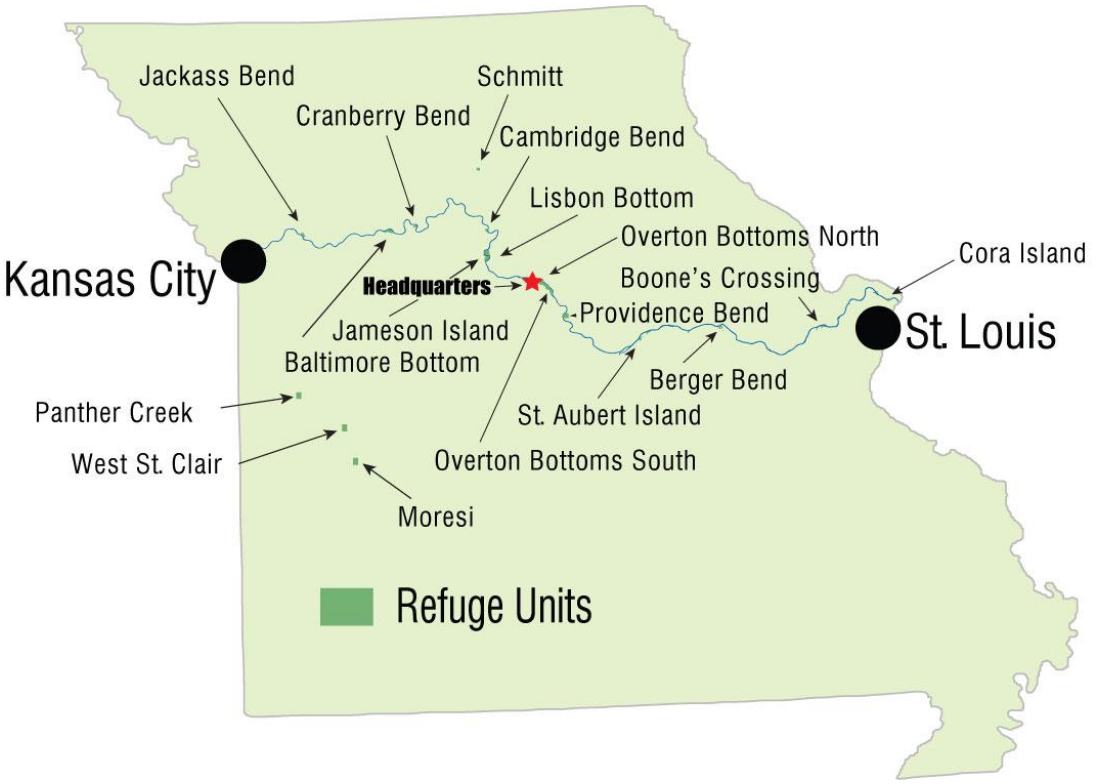
Since its construction, the original Taylors Landing Access has been frequently closed due to flood damage and frequent inundation following rain events. The entrance road has required a high level of maintenance, including annual removal of silt, repair of washouts, and reapplication of aggregate. Changes in management of the floodplain adjacent to the access have increased flooding since the area was incorporated into the Big Muddy NFWR in 1994. After a significant flood in 2011, the existing access was once again closed to the public due to flood damage. MDC is proposing to relocate the access to alleviate the high level of maintenance required to keep it open to the public at the current location.

What is a "scour hole?"

"Scour holes" or "blew holes" form during flood events as floodwaters encounter an obstacle, usually a levee, a road, or other man-made structure. If a portion of the structure gives way, the flood water pours through a constricted opening and blows out or scours the substrate away, forming a pool. When the flood water recedes, a semi-permanent water body is left behind. Scour holes provide habitat for fish, amphibians, turtles, birds and mammals.

USFWS established the Big Muddy NFWR in 1994 to restore natural floodplain habitat for fish and wildlife throughout the Missouri River corridor with the establishment of 17 management units, including the two (2) units discussed here (Figure 1-3). In the Overton Bottoms North Unit, the frequency and velocity of flooding has increased since the existing levees, breached during the 1993 and 1995 floods, were not rebuilt. Additionally, the Overton Chute built by the USACE in 2002 is approximately only 250 feet north of the access' entrance road. The Overton Chute is a side channel of the Missouri River that provides shallow and slow-moving water habitat, which is especially important for the spawning needs of a federally endangered fish, the pallid sturgeon. It has been observed, however, that when water flows south out of the chute in several locations during high flow events, it damages the entrance road. A large headcut also developed that is progressing northward from the scour hole toward the chute, and it will eventually compromise the entrance road.

In the Overton Bottoms South Unit, the levees that were breached in 1993 and 1995 were rebuilt, but they were set back at least 2,200 feet west of the riverbank. Only some portions remain of the original levee next to the riverbank, referred to now as the remnant levee, and it serves no purpose related to flood control. A spur levee that runs perpendicular to the river between the setback levee and a portion of the original levee was also built during the time of the setback levee construction and is now maintained by the Overton-Wooldridge Levee District No. 1 (OWLD).



Source: USFWS 2019a

Figure 1-3. Existing Units of Big Muddy NFWR

1.2 Proposed Project Location and Setting

The proposed Project is located in Cooper County, northeast of the Village of Wooldridge and south of the I-70 Bridge (Figure 1-1). The proposed Project site is located on the right descending bank of the Missouri River at RM 184. The site is located on property that was purchased by the USACE under the Water Resources Development Act and is currently serving as mitigation for the USACE Missouri River Bank Stabilization and Navigation Project. The property is currently owned by the USACE and managed by the USFWS as part of the Big Muddy NFWR. The proposed Project is located in the Overton Bottoms South Unit of the Big Muddy NFWR.

The proposed Project wetland mitigation area is located in Moniteau County, northeast of the City of Jamestown off of Bethel School Road and Riverbottom Road (Figure 1-1). The mitigation area is on the MDC-owned Plowboy Bend Conservation Area (CA) in the Missouri River floodplain, approximately 11 miles downstream of the proposed Project and is referred to as the Plowboy Bend Mitigation Site. This wetland mitigation site will not be federally funded through the SFR grant and is not part of the proposed Project. However, it is referenced here since there are

impacts to federal lands (both Section 408 lands for USACE and National Refuge lands for USFWS). The federal agencies have each independently reviewed and produced separate NEPA documents for their own decision-making and actions.

1.3 Purpose and Need for Proposed Project

The purpose of the proposed Project is to provide the public with reliable and safe recreational boating access to the Missouri River throughout the year, while maintaining a goal of average spacing between ramps of eight to ten river miles (Table 1-1). The Project is proposed to alleviate the high level of maintenance (and cost) required to keep the original site open for public use and to ensure long-term public access in this location near the I-70 bridge.

Table 1-1. MDC Boat Ramps with Access to The Missouri River Upstream and Downstream of Existing Taylors Landing Access.

Access Name	River Mile	Ramp Distance to Missouri River	County
Miami Access	263	On Missouri River	Saline
Brunswick Access	250	3.4 mi up Grand River	Chariton
Dalton Bottoms Access	239	On Missouri River	Chariton
Lewis Mill Access	227	1.7 mi up Little Chariton River	Chariton
Stump Island Park Access	226	On Missouri River	Howard
De Bourgmont	202	3.2 mi up Lamine River	Cooper
Franklin Island Conservation Area	195	On Missouri River	Howard
Existing (Closed) Taylors Landing Access	**185**	**On Missouri River**	**Cooper**
Providence Access	171	1.4 mi up Perche Creek	Boone
Hartsburg Access	160	On Missouri River	Boone
Marion Access	158	On Missouri River	Cole
Jefferson City (Carl R. Noren) Access	144	On Missouri River	Callaway
Moreau 50 Access	138	1.7 mi up Moreau River	Cole
Bonnots Mill Access	130	1.9 mi up Osage River	Osage
Mokane Access	125	On Missouri River	Callaway

Note: Privately owned accesses such as Katfish Katy's (Huntsdale), Cooper's Landing (Easley), and the Wilton Boat Club Ramp (Wilton) provide additional sites for resource users to access the river. River access fees may be applicable at privately owned facilities.

The access entrance road to the original site becomes inundated following rain events, along with Cumberland Church Road, and is frequently damaged during floods. Concerns for the long-term viability of the original site include an encroaching headcut expected to separate the ramp from the access road as well as increased flooding frequency and velocity in the Overton Bottoms North

Unit of the Big Muddy NFWR since the ramp was built more than forty years ago. Two logistic considerations in meeting the proposed Project purpose are:

- A site on the right descending bank in this river reach is important because the two nearest MDC boat ramps, Franklin Island CA (RM 195) and Providence Access (RM 171), are on the left descending bank. Users living in Moniteau or Cooper County are required to travel a greater distance and cross the Missouri River at Boonville or Jefferson City to access the left descending riverbank. MDC has received complaints that the drive to these alternative ramp locations is too far.
- Site proximity close to the 1-70 corridor is desirable for this project because of: high visibility; proximity to a major travel corridor for the public; and accessibility from both sides of the river, thereby supporting the high level of public use. Although not a consideration in terms of MDC's purpose, MDC is aware that public safety agencies benefit from a boat ramp near I-70 for incident response.

A boat ramp is a water dependent activity. The proposed relocation would offer boat and canoe access to the Missouri River consistent with MDC's former boating access plan (MDC 2004) by and in a location where access would be more reliable and safer for users than the original location. Using traffic counters, the USFWS estimated an annual 12,000 users at the existing Taylors Landing Access when it was still open in 2010 (MDC 2011). Abandoning the access without replacing it in a new nearby location would increase average boat ramp spacing in the vicinity of the existing access from 10 to 24 river miles. The proposed relocation Project would also be more cost-effective for MDC compared to other alternatives (see Section 2.1.1 and Table 2-1 for cost comparisons).

There is currently a lack of adequate boating and fishing access facilities on the Missouri River. Missouri ranks 15th nationally in the number of registered boats, with more than 289,000 registered as of January 2020. Most boats in Missouri are trailerable and are therefore likely to be used at public access areas with concrete boat ramps. The recreational boating industry contributes $4.5 billion in economic impact to the Missouri economy, supporting over 16,000 jobs and 670 businesses in the state (National Marine Manufacturers Association 2018). Additionally, it was estimated that over 1.0 million anglers fished in Missouri in 2011 for a total of 14.9 million angler-days that year (USFWS and U.S. Census Bureau 2011). These anglers contribute over $1.1 billion of economic impact to the Missouri economy, supporting over 10,000 jobs and generating over $73.0 million in state and local sales tax (ASA 2019). According to annual MDC fish sampling and creel survey data, the middle Missouri River provides quality recreational fisheries for channel, flathead, and blue catfish and for white crappie, common carp, bigmouth buffalo, and freshwater drum (MDC 2020b).

A substantial portion of the boating and fishing access to Missouri's public waters is provided by the areas owned, leased, or managed under cooperative agreement by MDC. The proposed Project would provide desired access on the Missouri River, alleviate the high level of maintenance required to keep the existing access open, address long-term concerns associated with the increased levels of flooding, and avoid the impacts of the encroaching headcut.

1.4 Public and Agency Involvement

The MDC Taylors Landing Access Relocation Project Draft EA is to be made available to the public and environmental review agencies for a 30-day review and comment period. Comments are to be incorporated into the EA as appropriate. Upon issuance of an environmental finding by MDC, the Final EA and environmental finding are to be made available to the public for a 30-day review period.

1.4.1 Section 404 Permitting Process and Related Public Review

In 2011, after closure of the existing Taylors Landing Access due to flooding damage to the entrance road, MDC conducted a feasibility study to determine options to reopen the access. With input from the USFWS, USACE, the Federal Emergency Management Agency (FEMA), and the local OWLD, MDC evaluated five different options (see Section 2.1 for alternatives considered but eliminated from further discussion) for reopening Taylors Landing, including abandoning the current site, changing the current site, and relocating the access.

In March 2014, MDC and USACE gathered for a pre-application consultation meeting at which it was determined that MDC should apply for a Clean Water Act (CWA) Section 404 Individual Permit for the proposed Project.

In September 2014, MDC submitted an application and supplementary documentation to USACE for a CWA Section 404 Individual Permit for relocation of the Taylors Landing Access by constructing a new entrance road, parking area, and boat ramp in the Overton Bottoms South Unit of the Big Muddy NFWR. The permit would cover unavoidable impacts to WOUS on the proposed Project footprint for the filling of 1.91 acres of wetland to install the entrance road and 0.55 acre of fill in the Missouri River to install the boat ramp and a portion of the parking area. The permit application also considered short-term impacts to 0.81 acre of wetland associated with access to a borrow area. In the original application, fill required for construction of the proposed entrance road and parking area would be borrowed from a remnant of the original levee structure just south of the OWLD-maintained spur levee at the proposed Project site.

In September 2015, the USACE issued a public notice for the CWA Section 404 permit for WOUS affected by the proposed relocation of the Taylors Landing Access. This public notice was issued within 15 days of receipt of the complete application to solicit comments from the public, adjacent

property owners, interested groups and individuals, local agencies, state agencies, and Federal agencies. During the 30-day review period, the public was encouraged to write or email any substantive comments concerning the proposed project to the USACE within this period. The USACE evaluated all the comments received and integrated them in the decision-making process.

On October 2, 2015, MDC met with the OWLD to discuss the district's concerns regarding the proposed Project. The OWLD's primary concern was for the integrity of its levees and maintaining compliance with federal "cost share" standards with respect to use of the levees for the proposed Project. OWLD discussed specific requests or conditions regarding these issues should MDC move forward with the project as proposed at the time of this discussion.

In October 2015, as part of the USACE public notice, the USFWS Missouri Ecological Services Field Office requested that the proposed compensatory mitigation site be located within the Missouri River floodplain. The proposed site included in the original Section 404 application was located at the MDC Scrivner Road CA in Cole County, Missouri, which is not within the floodplain of the Missouri River.

In an October 22, 2015 letter in response to the original 2014 Section 404 permit application, the USACE requested that MDC provide analysis of additional practicable alternatives (see USACE Alternatives A, B, and C and Alternative 1 [USACE Alternative D] described in Section 2.1) for the proposed Project. The request was made by USACE to allow for consideration of alternatives that could minimize impacts on the aquatic environment.

On February 19, 2016, MDC responded to USACE's October 2015 letter. In this correspondence, MDC provided analysis of additional USACE Alternatives A, B, and C and response to public comments received during the 2015 public comment period for the CWA Section 404 permit application (Appendix B). Response to public comments included additional explanation in relation to the following topics:

- Questions about the purpose and need for the project;
- Alternatives considered;
- Location of compensatory wetland mitigation;
- No net loss of Bank Stabilization and Navigation Program mitigation lands;
- Borrow material location;
- Datum used for levee height, boat ramps, and river;
- Cost of compensatory wetland mitigation; and
- Concern for increased road traffic and maintenance.

On April 15, 2016, MDC met with representatives from USACE at the proposed Project site to discuss the location of a new borrow area that would not utilize the remnant levee.

MDC corresponded with the OWLD on July 27, 2016 and September 1, 2016 about conditions under which the spur levee could be modified and used for the proposed Project (USACE Alternatives B and C). The OWLD's response letter dated September 19, 2016, echoed concerns presented previously, particularly its belief that the location of the road proposed under USACE Alternatives B and C could cause damage to the spur levee. Due to public concerns and liability issues regarding spur levee modification, increased project footprint required for an entrance road at this elevation and an approach to the top of the levee, increased wetland and forest impacts, and requirement of a large amount of fill to be brought in from outside of the proposed Project footprint, MDC dismissed consideration of USACE Alternatives B and C and established a revised borrow area that would not utilize the remnant levee (Appendix B).

On October 18, 2017, MDC provided USACE with a revised borrow area map; discussion of practicability of spur levee use for Alternatives B and C identified by USACE; and a mitigation plan for unavoidable proposed Project impacts through permittee responsible mitigation at Plowboy Bend CA.

On May 22, 2018, USACE executed the Section 404 Individual Permit for the proposed Project (Appendix E).

In February 2020, in coordination with USACE, MDC revised the proposed Project entrance road design (lowering the elevation) so that it would no longer require a borrow area for earth fill. It had been determined previously that the permitted borrow area contained wetlands and soils that were not conducive for use as construction fill. All borrow required for the lower elevation road design would be taken from the construction footprint. The revised entrance road plans (Appendix C) were submitted to USACE on March 9, 2020 for modification of the permit.

On April 16, 2020, USACE approved the Section 404 permit modification for the proposed Project (Appendix E).

1.4.2 Additional Agency Coordination and Permitting

As discussed in above in Section 1.4.1, early coordination was conducted as part of the Section 404 permit process by MDC with various state and federal agencies to obtain feedback regarding potential environmental impacts. Agencies included in the consultation included:

- USACE, Kansas City District
- USFWS
- Missouri Department of Natural Resources (MDNR)
- MDNR State Historic Preservation Office (SHPO)

- FEMA
- OWLD

The majority of coordination was conducted informally through email and phone discussions. Copies of documented agency correspondence are contained in Appendix A. Through early coordination, comments and input received from these agencies were taken into consideration and are incorporated into this EA, where appropriate.

In accordance with the Endangered Species Act (ESA), MDC contacted USFWS regarding federally listed special status species. MDC also consulted internally with MDC Resource Science Division (now Science Branch) specialists, and performed a Natural Heritage Review, with regards to state-listed species. MDC conducted a habitat assessment survey for the federally threatened Indiana bat as part of the CWA Section 404 permit process in November 2013 and the results are described in the Protected/Sensitive Species Section 3.11.1.1.7 of this EA. Effect statements for federally listed species were determined by USFWS and/or MDC and are also reflected in this EA.

In accordance with Section 106 of the National Historic Preservation Act (NHPA), the MDNR SHPO was also contacted with an opportunity to comment on the effects of this project. In a letter dated April 18, 2014, the MDNR SHPO concurred that no historic properties would be affected. The response letter from the MDNR SHPO is included in Appendix A. Concurrent with public notice of this Draft EA, the USFWS initiated formal consultation with Native American tribes that have expressed potential interest in archaeological resources located in the county or region of the proposed Project, including the following:

- Iowa Tribe of Kansas and Nebraska
- Iowa Tribe of Oklahoma
- Kaw Indian Nation of Oklahoma
- Miami Tribe of Oklahoma
- Osage Nation
- Ponca Tribe of Nebraska
- Ponca Tribe of Oklahoma
- Sac and Fox Tribe of the Missouri in Kansas and Nebraska
- Sac and Fox Tribe of the Mississippi in Iowa
- Sac and Fox Nation of Oklahoma

Any received correspondence will be incorporated into the Final EA upon receipt.

The following is a summary of the agency coordination conducted and permits required for the Taylors Landing Access Relocation Project EA:

- **USACE CWA Section 404 Permit – completed April 2020.** The permit process is described above in Section 1.4.1.
- **USFWS Endangered Species Act Coordination – completed January 2014.** After determining that the proposed Project contained potentially suitable habitat for the federally and state-listed pallid sturgeon, gray bat, Indiana bat, and northern long-eared bat, MDC staff reviewed the proposed Project location and did not identify highly suitable habitat for the pallid sturgeon. On August 19, 2014, the USFWS concurred with MDC's recommendation that no seasonal spawning restrictions for the pallid sturgeon be required for the proposed Project (Appendix A). MDC staff conducted an Indiana bat roost tree survey of the proposed Project site in November 2013 that identified one potentially suitable bat roost tree. Through coordination with the USFWS, MDC removed the potentially suitable roost tree in January 2014. On January 2, 2014, the USFWS stated that the proposed Project is "*not likely to adversely affect*" either the Indiana or northern long-eared bat (Appendix A). As part of the USACE public notice response in October 2015, the USFWS Ecological Services Field Office indicated that the Project also "*may affect, but is not likely to adversely affect*," gray bat. It is therefore anticipated that the proposed Project "*may affect, but is not likely to adversely affect,"* the pallid sturgeon, Indiana bat, northern long-eared bat, and gray bat.
- **USACE, Kansas City District Hydrologic Engineering Branch – completed September 2013.** MDC completed coordination with Mike Chapman of the USACE, Kansas City District Hydrologic Engineering Branch regarding the ramp's placement in the navigation channel in relation to the Rectified Channel Line on September 30, 2013 (Appendix A).
- **MDNR, Water Protection Program – completed May 2018.** An application and supporting documents were submitted to MDNR, Water Protection Program for individual CWA Section 401 Water Quality Certification (WQC). Certification was granted on May 1, 2018. MDNR has already issued MDC a general State Operating Permit MO-R 100007 on July 1, 2017 that authorizes land disturbance activities for five years.
- **MDNR SHPO Section 106 Coordination – completed April 2014.** A Phase I cultural resource survey of the proposed Project was completed in April 2014. No cultural resources were identified within the proposed Project footprint. MDC received MDNR SHPO concurrence on April 18, 2014 that there will be "no historic properties affected" by the proposed Project (Appendix A).

- **State of Missouri Emergency Management Association (SEMA) – pending**. MDC has a Blanket Floodplain Development Permit under a Memorandum of Agreement (MOA) with SEMA that was most recently extended for two years on March 22, 2019. However, this MOA only applies to maintenance projects. After approval of final entrance road design, MDC will apply for a Floodplain Development Permit with SEMA for the proposed Project.

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CHAPTER 2 – ALTERNATIVES

2.1 Alternatives Considered but Eliminated from Further Discussion

2.1.1 MDC-Developed Alternatives

With input from the USFWS, USACE, FEMA, and OWLD, MDC evaluated several alternatives for the proposed Project, including: abandoning the existing access without relocating; maintaining the existing access at the current level of maintenance; maintaining the existing access and addressing the headcut encroachment; constructing a new entrance road to the existing access from the south; and relocating to the Overton Bottoms South Unit and building a new entrance road along the spur levee.

Each of the alternatives considered but dismissed is listed below.

- **No Build – Abandoning the existing access without relocating.** Abandoning the access without building a new one would not meet the high demand for boat ramps on the Missouri River, as use of the existing access has been very high (approximately 12,000 users annually) when open. Abandoning the access would also increase average ramp spacing in the vicinity of the existing access from ten miles to 24 miles (see Table 1-1). In addition, MDC purchased the existing Taylors Landing Access property using the LWCF in 1964. Abandonment would likely require MDC to administratively address the federal interest from the LWCF. Currently, it is considered to be in a status of obsolescence with MDNR and NPS.
- **Original Section 404 Permitted Alternative Entrance Road Design.** This alternative was the original design for the Proposed Alternative that was granted a CWA Section 404 Individual Permit by USACE in 2018. This design has a higher elevation entrance road design than the Proposed Alternative and would require fill to be obtained from a nearby borrow field. Because the higher elevation design required fill, the Section 404 permit had a special condition requiring a detailed plan for the borrow field to be used. After a wetland delineation and soil analysis of the proposed borrow field, it was determined that the borrow field contained wetlands that would require an additional Section 404 permit and soils that were not conducive to use for borrow. Therefore, MDC lowered the elevation of the entrance road design so that it would not require fill from outside of the proposed Project footprint. The resulting design (the Proposed Alternative) would use fill only from the proposed Project footprint and would still meet the purpose and need for the project. Although very similar to the Proposed Alternative,

this original design alternative would have more adverse impacts than the Proposed Alternative, including increased footprint, use of borrow field, increased wetland impacts both within the proposed Project footprint and the borrow site, and borrow transport on Cumberland Church Road.

- **Alternative 1 – Maintaining the existing access at the current level of maintenance.** In 2011, MDC estimated the current level of maintenance to keep the entrance road open at the existing Taylors Landing Access would cost approximately $33,000 per year (MDC 2011). The entrance road requires the removal of silt and the installation of gravel following flood events. The entrance road is also regularly inundated following rain events. This alternative would not involve additional impact to any WOUS. Although this is the least expensive option, maintaining the access at the current level would not likely allow the access to remain open to the public in the long-term since it does not address the encroachment of the headcut, the frequently flooded entrance road, or the long-term implications of remaining in the regularly flooded Overton Bottoms North Unit.

  MDC does not consider Alternative 1 practicable because:

  - Alternative 1 does not meet the objective of the proposed Project because the public cannot access the boat ramp when the entrance road and Cumberland Church road are flooded, either by river floodwaters or by rain events. No amount of maintenance will resolve that the elevations of these roads makes them susceptible to inundation and standing water. Both the access road and Cumberland Church Road fail to meet the criteria of reliable access for this reason.
  - A headcut at the blew hole threatens to separate the access road from the boat ramp, thereby making the ramp inaccessible in the near future.
  - A river channel (i.e., Overton Chute) north of Cumberland Church Road continues to exert erosive force on riverbanks and is now less than 50 yards from Cumberland Church Road. The channel may separate Cumberland Church Road and the entrance road from the boat ramp.
  - If the current site is abandoned without a replacement/relocation, boat ramp spacing will increase to 24 river miles and one of the proposed Project purposes (e.g., close to home fishing access) will not be met.
  - MDC will no longer maintain the access road to the existing boat ramp, such as grading the road or adding additional rock fill. Costs to maintain the existing access were estimated at $33,000 annually (in 2011), based on frequent grading of the road and additional rock. MDC anticipates these costs will likely increase over time due to the frequency of road inundation. For example, MDC estimates

repair work took place at least three times in 2007 and staff spent at least 3.5 weeks on maintenance activities. In subsequent years 2008, 2009, and 2011, MDC staff spent at least 2.5 weeks of staff time annually on maintenance activities for the site. The original site was closed in 2011.

- **Alternative 2 – Maintaining the existing access and addressing the headcut encroachment**. Alternative 2 involved remaining at the existing access but installing a grade control structure at the headcut and raising the entrance road above the floodplain elevation. In 2011, MDC estimated this alternative would cost approximately 1.25 million dollars to raise 1,600 feet of the entrance road approximately 4 feet higher, install three box culverts along the road, and install a 200-foot-long, 100-foot-wide, and 6-foot-deep rock grade control structure (MDC 2011). This alternative is the costliest, would impact approximately 1.34 acres of wetland habitat, and it is not known whether the grade control structure would stop the encroachment of the headcut in the long-term. The long-term implications of remaining in the regularly flooded North Unit are also not addressed under this alternative.
- **Alternative 3 – Constructing a new entrance road to the existing access from the south.** Alternative 3 involved remaining at the existing access but abandoning the entrance road and building a new road from the south. In 2011, MDC estimated this alternative would cost approximately 1.0 million dollars to build a new 8,600-foot-long road along an abandoned levee, a section of a degraded levee and the OWLD-maintained spur levee (MDC 2011). This alternative would involve approximately 10.59 acres of fill, at least 6 acres of which is wetland habitat. This alternative is costly and involves a large amount of fill and potential wetland impact. This alternative would also require conditional approval from the OWLD to run along the spur levee, which may not be in the best interest for MDC to meet. If MDC could not reach agreement with OWLD on the use of the spur levee, then it would involve an additional 1.90 acres of wetland impact.
- **Alternative 4 – Abandoning the existing access and relocating to the south, building a new entrance road along the spur levee.** Alternative 4 was to abandon the existing access and relocate to the south, building a new entrance road along the spur levee. MDC estimated in 2011 that this alternative would cost approximately $600,000 to widen the spur levee and construct a new parking area and boat ramp (MDC 2011). Although this alternative was the same cost as the Proposed Alternative, it would involve a larger area of fill (7.13 acres) and wetland impact (4.96 acres) for the entrance road to be at the same height as the spur levee. Additionally, this alternative would require conditional approval from the OWLD to run along the spur levee, as described for Alternative 3.

2.1.2 USACE-Identified Alternatives

MDC applied for a CWA Section 404 Individual Permit for the proposed Project in September 2014. In October 2015, USACE requested that MDC's alternatives analysis in the permit application include three new USACE-identified practicable alternatives (USACE Alternatives A, B, and C and USACE Alternative D (same as previously identified Alternative 1), in addition to review of previously considered MDC-developed alternatives.

USACE must demonstrate compliance with Guidelines developed by the U.S. Environmental Protection Agency pursuant to Section 404(b)(I) of the CWA (published at Title 40 Code or Federal Regulations (CFR) 230). For projects that involve impacts to Special Aquatic Sites (i.e., wetlands), the Guidelines set up an automatic rebuttal presumption that a less environmentally damaging practicable alternative exists to working in wetlands. In accordance with that provision of the Guidelines, the USACE requested that MDC provide analysis of these additional alternatives that would result in less impacts on the aquatic environment. Each of the USACE-identified alternatives considered but dismissed is described below.

- **USACE Alternative A – Access Relocated to Rocheport at Moniteau Creek or other locations (unknown)**. For Alternative A, USACE suggested that the access be relocated to Rocheport, Missouri or to other (unknown) locations on the Missouri River or on a direct tributary to the river. USACE specifically suggested a location on Moniteau Creek near its confluence with the Missouri River in Rocheport. MDC had previously considered and dismissed the following potential access locations in the Rocheport area.
    - Rocheport Park currently provides a boat access on Moniteau Creek near its confluence with the Missouri River. The confluence is very shallow and would likely be impassable for any but the smallest boats during low water levels on the Missouri River; thus, it would not meet the need to provide reliable access to the Missouri River. Additionally, this access point on Moniteau Creek is not considered feasible by MDC as a permanent concrete boat ramp to access the Missouri River because of stability and logistic reasons. During two different site visits the shore was cleaving away from the land and slumping into the creek, which would be cost prohibitive to stabilize. Additionally, this alternative would access the Missouri River from the left descending bank, which does not meet the right descending bank logistic consideration (as discussed in Section 1.3).
    - The Rocheport Boat Ramp is a concrete boat ramp further upstream on Moniteau Creek. This ramp consists of two slabs of uneven concrete. The top of the boat ramp exits directly onto Columbia Street. Similar to Rocheport Park, this site accesses the Missouri River via Moniteau Creek. Therefore, users of this site would be subject to greatly reduced service (unpassable to all but the smallest

boats) during periods of low water in the Missouri River. Additionally, the ramp exits directly onto a public road (Columbia Street), which would be unsafe for people using the ramp (towing a boat and trailer) and for people driving on the public road. Secondly, there is no publicly owned land available to develop a parking lot, and the nearest place for parking is across Columbia Street. This would force ramp users to cross a public road not under MDC control, which is undesirable for public safety based on American Association of State Highway and Transportation Officials, Manual of Uniform Traffic Control Devices, and Americans With Disabilities Act (ADA) standards. Finally, this alternative would access the Missouri River from the left descending bank, which does not meet the right descending bank logistic consideration (as discussed in Section 1.3).

- **USACE Alternative B – Construct Entrance Road to New Access Site via Spur Levee and Degraded Levee**. Alternative B would require use of the existing OWLD-maintained spur levee for a portion of the entrance road to the proposed parking area and boat ramp. The spur levee would be widened and would join an existing degraded levee. This alternative would require widening of the spur levee (to accommodate two lanes of traffic), as the public would drive on top of the spur levee for approximately 1,100 feet. Therefore, Alternative B would require the OWLD to approve modification of the spur levee and allow creation of a new public road on top of the levee.

  In submitted public comments (see further explanation in Section 1.4.1), the OWLD expressed concerns about modification of the remnant levee (for potential use for borrow materials) and that hydrology of the floodplain could negatively change as a result. Additionally, the OWLD expressed concerns about the possible increase of traffic, damage, and vandalism in the area. MDC recognizes OWLD concerns about possible structural impacts of modifying and driving on top of a levee maintained by the OWLD. Additionally, it may be harder to restrict public use to the levee under Alternative B compared to a single, perpendicular crossing on a public road with cabled fence barrier (Proposed Alternative). Further, MDC does not have interest in potential liability from direct modifications to the spur levee and subsequent maintenance that could have real or perceived impacts to levee integrity.

  The elevation of the proposed entrance road for USACE Alternative B must be at a higher elevation than the Proposed Alternative to meet safety standards for road grade, turning radius, and visibility when routing onto the spur levee. This would result in a larger project footprint than the Proposed Alternative and would require a large amount of fill brought in from outside the project footprint (Proposed Alternative uses fill from within the proposed footprint), transport of borrow materials on the county road and on the

levee, and concerns with obtaining a 'no rise certification' (no impact on the 100-year flood or floodway elevations).

In addition, the estimated wetlands impact of USACE Alternative B is 2.27 acres, which is greater than the wetlands impact of the Proposed Alternative (1.04 acres), and more forested wetlands (1.16 acres) would be affected than under the Proposed Alternative (0.59 acre). A cost estimate was not produced.

MDC does not consider USACE Alternative B to be practicable because of public concerns and liability issues regarding spur levee modification, increased project footprint required for an entrance road at this elevation and an approach to the top of the levee, increased wetland and forest impacts, and requirement of a large amount of fill to be brought in from outside of the proposed Project footprint. Further, MDC would want to avoid taking control of a private interest (OWLD-maintained spur levee).

- **USACE Alternative C – Construct New Entrance Road South of Cumberland Church Road to Proposed New Access Site.** Alternative C would construct an entrance road parallel to and on the south side of the existing spur levee at the elevation of Cumberland Church Road. The new road would cross the existing spur levee and extend to the proposed parking area and boat ramp. USACE Alternative C would require OWLD approval for a new public road crossing of the spur levee.

  Alternative C would impact more forested wetlands (1.63 acres) than the Proposed Alternative, which impacts 0.59 acres of forested wetland and 0.45 acres of scrub-shrub and emergent wetland. Presence/absence of wetlands was estimated from National Wetland Inventory (NWI) Maps, although the potential impacts could be different based on field delineation. A cost estimate was not produced.

  Similar to USACE Alternative B, MDC does not consider USACE Alternative C to be practicable because of public concerns and liability issues regarding spur levee modification, increased project footprint required for an entrance road at this elevation and an approach to cross the spur levee, increased wetland and forest impacts, and requirement of a large amount of fill to be brought in from outside of the proposed Project footprint. Further, MDC would want to avoid taking control of a private interest (new crossing of the OWLD-maintained spur levee).

  In summary, MDC determined that both USACE-identified Alternatives B and C would result in larger project footprints and, thus, larger environmental impacts than the Proposed Alternative, and they are impractical because they would require approval and liability concerns for modification of the spur levee.

Table 2-1 summarizes impacts and feasibility of the original five MDC-developed alternatives that were examined and dismissed, as well as the USACE-identified Alternatives A-C.

Table 2-1. The Proposed Alternative Compared with Alternatives Considered but Eliminated from Further Discussion

	Description	Safety	Reliability	Meeting Public Demand	Cost Estimate (2011 Dollars)	Estimated Environmental Impacts	Other Considerations
No Build	Abandon access	N/A	N/A	No • High demand on MO River • increases ramp spacing to 24 mi	100% payback to Land & Water Conservation Fund	None	
Original Section 404 Permitted Alternative	Relocated access: entrance road crosses spur levee on public road – higher elevation entrance road	• Public and entrance roads safe • Ramp safe	Public and entrance roads reliable	Yes	$600,000	• 1.91 ac wetland within footprint • Additional wetland impacts within borrow field • 0.55 ac stream • More impacts than Proposed Alternative: increased footprint; large amount of fill; and transportation of borrow on county road and levee.	• No impacts to spur levee structure (crosses spur levee within existing right-of-way, same as Proposed Alternative)
Proposed Alternative	Relocated access: entrance road crosses spur levee on public road – lower elevation entrance road	• Public and entrance roads safe • Ramp safe	Public and entrance roads reliable	Yes	$600,000	• 1.04 ac wetland • 0.55 ac stream	• No impacts to spur levee structure (crosses spur levee within existing right-of-way)

	Description	Safety	Reliability	Meeting Public Demand	Cost Estimate (2011 Dollars)	Estimated Environmental Impacts	Other Considerations
Alternative 1 (USACE Alternative D)	Existing access: current level of maintenance	• Public and entrance roads not safe during and following flood events • Ramp safe	Public and entrance roads not reliable	No • Public and entrance roads not safe or reliable	$33,000/year (does not include hauling costs)	• Washing away of gravel into river • No stream impact from a new ramp	• Long-term viability of the site
Alternative 2	Existing access: build grade control structure and raise entrance road to existing ramp	• Public road not safe during and following flood events • Entrance road safer in short-term but unknown in long-term • Ramp safe	• Public road not reliable • Entrance road more reliable in short-term but unknown in long-term	Partially • Public road not safe or reliable • Entrance road is safer and more reliable in short-term but unknown in long-term	$1,250,000	• 1.34 ac wetland • No stream impact from a new ramp	• Long-term viability of the site
Alternative 3	Existing access: new entrance road from south to existing ramp	• Public and entrance roads safe • Ramp safe	Public and entrance roads reliable	Yes	$1,000,000	• 6 ac wetland • No stream impact from a new ramp • More impacts than Proposed Alternative: increased footprint; large amount of fill; and transportation of borrow on county road and levee.	• Impacts to spur levee • Require OWLD approval for modifications to spur levee and public use on top of the levee
Alternative 4	Relocated access: Entrance road along spur	• Public and entrance roads safe • Ramp may be less safe	Public and entrance roads reliable	Partially • Ramp may be less safe	$600,000	• 4.96 ac wetland • 0.55 ac stream • More impacts than Proposed Alternative:	• Impacts to spur levee • Require OWLD approval for modifications to

	Description	Safety	Reliability	Meeting Public Demand	Cost Estimate (2011 Dollars)	Estimated Environmental Impacts	Other Considerations
	levee to new ramp					increased footprint; large amount of fill; and transportation of borrow on county road and levee.	spur levee and public use on top of the levee
USACE Alternative A	Relocated access: Rocheport Park	No • Bank stability at ramp	No • Accesses the Missouri River via Moniteau Creek (low water)	Partially • Cannot reliably access MO River via Moniteau Confluence	Not evaluated	Not evaluated	• Does not meet need on right descending bank
USACE Alternative A (and others)	Relocated access: Rocheport Boat Ramp	No • Ramp access on public road unsafe for ramp users and public road users • Boat/car parking across a public road is unsafe	No • Accesses the Missouri River via Moniteau Creek (low water)	Partially • Cannot reliably access MO River via Moniteau Confluence • Ramp site expected to be underwater frequently	Not evaluated	Not evaluated	• Does not meet need on right descending bank
USACE Alternative B	Relocated access: modify spur levee	• Public and entrance roads safe • Ramp safe	Public and entrance roads reliable	Yes	Not evaluated	• 2.27 ac wetland • 0.55 ac stream • More impacts than Proposed Alternative: increased footprint; large amount of fill; and transportation of	• Impacts to spur levee • Require OWLD approval for modifications to spur levee and public use on top of the levee

	Description	Safety	Reliability	Meeting Public Demand	Cost Estimate (2011 Dollars)	Estimated Environmental Impacts	Other Considerations
						borrow on county road and levee.	
USACE Alternative C	Relocated access: new road south of spur levee	• Public and entrance roads safe • Ramp safe	Public and entrance roads reliable	Yes	Not evaluated	• 1.63 ac wetland • 0.55 ac stream • More impacts than Proposed Alternative: increased footprint; large amount of fill; and transportation of borrow on county road and levee.	• Impacts to spur levee • Creating a new public road to cross the spur levee • Would require OWLD approval for new road crossing

2.2 Alternatives Carried Forward for Analysis

MDC selected relocating and building a new access in the Overton Bottoms South Unit as the Proposed Alternative because it will: meet the public demand for boat and canoe access on this stretch of the Missouri River; offer access from the right-descending bank to balance other MDC access sites located up and down river on the left-descending bank; address long-term concerns associated with the increased levels of flooding in the Overton Bottoms North Unit; avoid the impacts of an encroaching headcut at the current site; alleviate the high level of maintenance required at the existing location; and avoid requiring approval from the OWLD that would involve meeting OWLD conditions that are either untenable to MDC and/or MDC and OWLD would be unlikely to reach a final agreement on them.

2.2.1 No Action Alternative

Under the No Action Alternative, the USFWS would not issue grant funding for construction of the Proposed Alternative, and MDC would not implement the proposed relocation of the Taylors Landing Public Boating Access using Sport Fish Restoration Act grant funds. Under this alternative, MDC would not reopen the existing Taylors Landing boat ramp, and, thus, there would be no public access on this section of the Missouri River. Occasional inspection activities are performed by MDC and USFWS personnel at the closed Taylors Landing Access. This alternative would not allow MDC to meet their purpose and need (Section 1.3).

2.2.2 Applicant's Proposed Alternative – Taylors Landing Access Relocation Project Alternative (Proposed Alternative)

MDC proposes to abandon the existing Taylors Landing Public Boating Access located in the Overton Bottoms North Unit of the Big Muddy NFWR on the north side of I-70 and relocate it to the Overton Bottoms South Unit on the south side of I-70 near Missouri RM 184 (Figure 1-1). The original site for the Taylors Landing Access is located at RM 185 on the right descending bank of the Missouri River, and flooding in the Overton Bottoms North Unit has caused the site to be closed since 2011. Occasional inspection activities are performed by MDC and USFWS personnel at the closed Taylors Landing Access. The proposed relocation site is owned by the USACE and managed by the USFWS.

The proposed Project would include construction and operation of the following boating and fishing access facilities, as shown in Figure 2-1:

- Boat Ramp – A new 290-foot-long, 16-foot-wide single-lane reinforced concrete boat ramp would be installed on the river.
- Parking Area and Parking Pad – A new 1.47-acre gravel (aggregate) parking area and one concrete parking pad would be constructed adjacent to the boat ramp.

- Entrance Road – A new 2,026-foot-long gravel (aggregate) entrance road would extend between existing Cumberland Church Road, over the OWLD spur levee on existing right-of-way, and northeast to the new gravel parking area.

Prior to construction, the approximate 3.7-acre proposed Project site would be surveyed and staked. A stormwater pollution prevention plan (SWPPP) would be developed in accordance with MDC's MDNR Land Disturbance Operating Permit and associated best management practices (BMPs) would be implemented. BMPs would vary according to site conditions, but would typically include use of silt fences, straw waddles, anti-tracking pads, and sedimentation basins.

All trees at the proposed Project site would be removed during the winter, between November 1, 2020 and March 31, 2021, to avoid disturbance of nesting and roosting wildlife. The proposed Project construction footprint would be cleared and grubbed and would be graded as needed. Construction of the proposed entrance road and parking area would be above the ordinary high water mark (OHWM) (elevation 572.4) using earth fill from the proposed Project footprint; no earth fill would be brought in from outside sources. Rock fill and aggregate road surfacing would be brought in to be used under the boat ramp and for the entrance road and parking area driving surfaces.

The new public access facilities would be accessible to disabled users and meet ADA standards. Areas disturbed by construction activities would be seeded and mulched post-construction. Following construction and once vegetation has become established, silt fences and other temporary erosion control devices would be removed.

Based on the observations and experiences of MDC's engineering, construction, and maintenance staff and the expected lifetimes of the primary components of the system (*Condition Assessment Guide for the Infrastructure Asset Management Project*), the overall useful life of the proposed Project is expected to be 30 years. At the end of this period, the federal interest in the capital improvements funded through the SFR grant would end unless there are other reasons for continuing its interest (i.e., federal funding of operation and maintenance beyond the useful life or federal funding of major repairs or renovations that extend the useful life of the capital improvements).

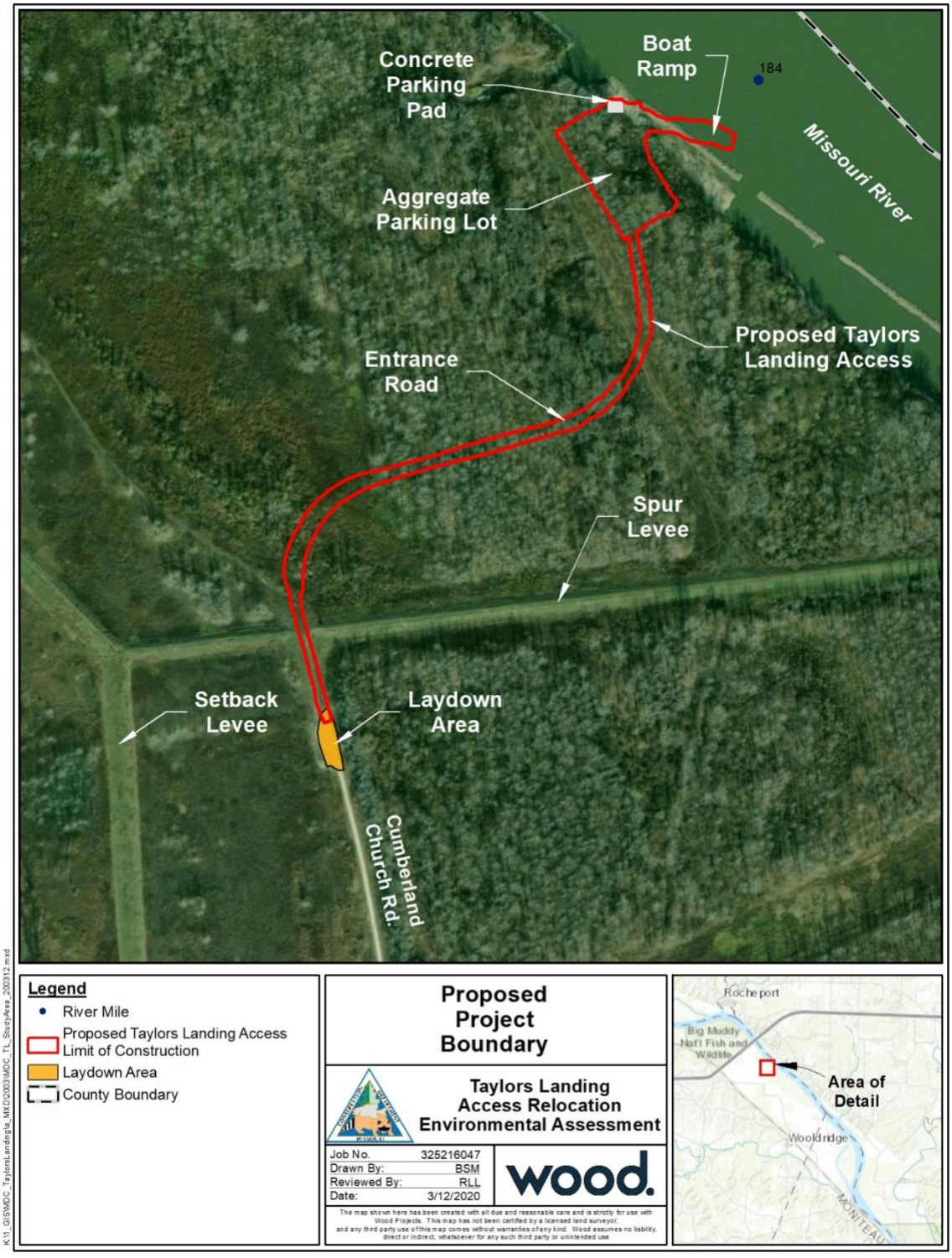

Figure 2-1. Proposed Taylors Landing Access Relocation Project

2.2.2.1 Proposed Project Features

Construction plans (Appendix C) and specifications for the proposed Project were developed by a team of MDC staff, led by a project engineer. Proposed Project construction would be performed by a contractor under the supervision of MDC. The proposed Project would be contracted in accordance with all applicable state and federal regulations governing civil works projects and the competitive bid process. The proposed Project consists of the following features:

- Boat Ramp
- Entrance Road
- Parking Lot and Pad
- Temporary Laydown Areas

Each of these proposed Project features is fully described in the following sections and are shown on Figure 2-1.

2.2.2.1.1 Boat Ramp

A new 290-foot-long, 16-foot-wide single-lane reinforced concrete boat ramp would be installed on the Missouri River and would be angled downstream in order to be self-cleaning. The ramp would include 4-foot-wide rock shoulders and would lie on a rock base, almost entirely on top of an existing rock revetment. Approximately 0.55 acre of the boat ramp would extend into the river channel. To construct the proposed boat ramp, a total of 3,163 cubic yards of riprap and 87 cubic yards of concrete would be deposited in a total of 0.55 acres of the Missouri River along 375 linear feet of the right descending bank. A portion (236 cubic yards) of the riprap that is to be deposited would be excavated from an existing USACE revetment (Revetment no. 192.65) and redeposited for the construction of the proposed boat ramp. The remainder of the required riprap (2,927 cubic yards) would be trucked from a local, USACE-approved quarry to the proposed Project site. A MoDOT Type II Rock Blanket (riprap) would be placed around the ramp (approximately 100 feet from each side of the ramp) to stabilize the riverbank area disturbed by construction.

No dewatering would be required for construction of the proposed boat ramp. For construction of the bottom-most section of the ramp, the concrete slab would be cast higher on the river bank, allowed to cure, and then pushed into place under the water with mechanical equipment such as bulldozers.

2.2.2.1.2 Entrance Road

A new 2,026-foot-long elevated gravel (aggregate) entrance road would be constructed above the 100-year floodplain elevation. It would extend between existing Cumberland Church Road, over the OWLD spur levee, and northeast to the new gravel (aggregate) parking area. The crossing of the spur levee would be within an existing right-of-way for an abandoned section of Cumberland Church Road. The entrance road would have two 10-foot-wide travel lanes with 4-

foot-wide shoulders for safety. Two 24-inch and one 18-inch high-density polyethylene (HDPE) pipes would run underneath the entrance road to allow for ordinary water flow and cross drainage.

For construction of the entrance road, all borrow earth fill would come from within the proposed Project footprint. A total of 2,289 cubic yards of earthen material would be deposited as fill into a total of 1.04 acres of wetlands, including 0.59 acre of forested wetlands and 0.45 acres of scrub/shrub wetlands.

2.2.2.1.3 Parking Lot and Parking Pad

A new 1.47-acre, 356-foot by 180-foot pervious gravel (aggregate) parking area would be constructed above the 100-year floodplain adjacent to the boat ramp to provide parking for approximately 30 trailered vehicles. There would be one concrete pad parking spot that meets ADA standards. Because the volume of rock fill brought in for the boat ramp would be offset by volume of excess soil taken from the footprint for construction of the parking area and trucked offsite, the net fill in the proposed Project footprint would be zero. At a normal high water elevation, the closest parking spot would be approximately 200 feet from the river. Riverbanks that would be disturbed by construction would be reinforced with MODOT Type II Rock Blanket (riprap).

2.2.2.1.4 Additional Proposed Project Features

Additional proposed Project features would include curve advisory signs along the entrance road, a kiosk with informational pamphlets, and a wire rope fence on either side of the entrance road to keep traffic off of the spur levee, other than at the designated access crossing. No restroom facilities or other permanent buildings or structures are planned for the proposed Project site.

2.2.2.1.5 Temporary Laydown Areas

A temporary laydown area would be located at an existing gravel parking area along Cumberland Church Road (see Figure 2-1). Additional laydown areas would be within the proposed Project construction footprint.

2.2.2.2 Construction Schedule

Pending receipt of appropriate permits, approvals, and permissions, MDC has scheduled construction for the proposed Project to begin in December 2020 and be completed by September 30, 2022. Equipment used for construction would include excavators, loaders, skid steer, tractors, forklifts, dump trucks, and various pickup trucks, trailers, and crew trucks. The preliminary construction schedule is as follows:

December 1, 2020 – March 31, 2021:

- Contractor mobilizes
- Contractor installs soil erosion control measures prior to ground disturbance

- Contractor clears trees between November 1, 2020 and March 31, 2021
- Contractor clears and grubs the proposed Project site

April 1, 2021 – June 30, 2021:

- Contractor grades and initiates construction of access road and parking lot
- Contractor constructs boat ramp

July 1, 2021 – September 30, 2021:

- Contractor finishes construction of access road, parking lot, and boat ramp, dependent on weather and site conditions

October 1, 2021 – December 31, 2021:

- Additional time for contractor to finish construction of access road, parking lot, and boat ramp, due to potentially difficult site conditions associated with being in the Missouri River floodplain

January 1, 2022 – March 31, 2022:

- MDC project engineer conducts final inspection
- MDC project engineer issues substantial completion
- Contractor compiles project cost documentation
- Contractor submits final invoice
- MDC submits interim financial and performance reports to SFR

April 1, 2022 – June 30, 2022:

- MDC reviews documentation and verifies meets all requirements, may request additional documentation
- MDC issues final payment to contractor

July 1, 2022 – September 30, 2022:

- MDC develops final completion reports
- MDC closes out award

2.2.2.3 Operations and Maintenance

Proposed Project facility maintenance would be directed toward providing a safe and comfortable environment for area and facility users, economical and efficient operation, and prevention of problems. Maintenance would be conducted with enough frequency to make an area safe and inviting to the public. Access maintenance would be performed by personnel who are thoroughly trained in MDC Motorboat Access Maintenance Standards, familiar with local customers, and

proactive in fulfilling the public's expectations. Cultural resource clearance and environmental compliance permits shall be obtained when necessary for maintenance activities. The following operations and maintenance procedures for the proposed Project would be followed subsequent to construction:

- The site would be open year-round, from 4:00 am to 10:00 pm, except during periods of high water when the site would be closed for public safety.
- Areas around parking lots would be mowed, sprayed using hand, backpack, all-terrain vehicle (ATV), or truck sprayers with herbicides approved for use near waterways, or cleared with a frequency as needed to establish vegetation and grass height that is comfortable for walking and to present an inviting and landscaped appearance. For example, depending on vegetation and rainfall, this level of effort might require mowing one time per week during the growing season and more frequently during heavy use times. In some cases, vegetation would be maintained at a height required to discourage unauthorized uses.
- Litter pickup should occur approximately one time per week at a minimum and more frequently when appropriate to keep an area inviting to users.
- Rock or mulch base would be used for roads, trails, and parking lot perimeters when feasible to minimize high maintenance areas needing constant attention, such as highly manicured areas with minimal public use.
- Improved roads are open to public vehicles and maintained by MDC's Infrastructure Management Branch and Regional staff. Area maintenance staff are responsible for the area maintenance activities such as mowing, spraying, and woody vegetation removal. These roads should be maintained to avoid potential sight restrictions and to prevent conditions that might otherwise hinder regular maintenance (such as sod/grass encroachment into the normal driving lanes, woody vegetation encroachment on shoulders or in ditches, tree canopy encroachment over road corridor, etc.).
- Management of woody vegetation would employ various methods, including:
    - Chainsaw crews, brush chippers, and cut stump treatments;
    - Foliar herbicide applications;
    - Basal bark herbicide treatments;
    - Use of mowers; and/or
    - Tree shear and other heavy equipment
- Signs or information kiosks would be maintained with enough frequency to provide accurate and timely information. MDC would replace signs and information if stolen/removed by the public.

- A flexible, annual area maintenance schedule would be maintained with increased maintenance efforts during times or seasons of high use and appropriate maintenance efforts (as needed) during times or seasons of low use.
- Most access maintenance/repairs related to flooding involve removing silt/debris from roads, parking lots, and boat ramps; re-graveling the roads and parking lots; reinforcing boat ramps with riprap; repairing/replacing concrete boat ramps; repairing/replacing signs; filling in scoured areas; etc.
- Adequate enforcement for inappropriate activities like vandalism, litter, fish and wildlife code violations, off road use by vehicles, etc. would be provided. A cooperative effort is more effective in enforcement of area regulations. As a result, primary enforcement efforts would be done by MDC's Conservation Agents; however, other MDC staff and local law enforcement agencies would also be involved with area regulation enforcement as needed.

2.3 Comparison of Alternatives

The environmental impacts of the alternatives are summarized in Table 2-2. These summaries are derived from the information and analyses provided in Chapter 3.

Table 2-2. Summary and Comparison of Alternatives by Resource Area

Resource	No Action Alternative	Proposed Alternative
Topography, Geology and Soils, Prime Farmland	No impact to underlying geologic features. Minor impacts from sediment accumulation at original access.	No impacts to underlying geologic features. Minor impacts from sediment accumulation at original access. Impacts to soil erodibility would be minor during the construction phase. Revegetation/stabilization of the disturbed areas would minimize long-term impact. No conversion of prime farmland soils to other uses.
Land Use and Recreation	Moderate, long-term adverse impacts to recreation activities as river access spacing would remain at 24 miles at this location.	Minor, short-term adverse impacts related to disruption to existing land uses and recreational activities during construction. Moderate long-term beneficial impacts by restoring access to the Missouri River near the I-70 bridge. Minor, long-term impacts from conversion of a small amount of undeveloped land to low intensity recreational use.
Transportation	No impact to transportation network or to commercial and recreational navigation. However, recreationists	Minor, short-term adverse impact due to roadway traffic in the immediate vicinity from construction equipment and personnel. Minor, long-term adverse impacts from vehicle traffic generated by users of the proposed Project

Resource	No Action Alternative	Proposed Alternative
	would travel farther distances on local roadways, in comparison to the Proposed Alternative, to reach public accesses to the Missouri River.	and increase in recreational boaters at this location. Vehicle and navigation traffic impacts would be minor overall and would be similar to pre-closure conditions at original access.
Air Quality	No impact.	Minor, short-term adverse impacts to air quality during the construction period. Minor, long-term adverse impacts from air emissions associated with occasional operations and maintenance activities would be consistent with pre-closure conditions at original access. Traffic would not result in significant vehicle queues. No impact to regional air quality or attainment status.
Noise	No impact.	Minor, short-term noise impacts associated with construction activities. Minor, intermittent noise impacts associated with operations and maintenance activities would be consistent with pre-closure conditions at original access.
Minerals and Energy Resources	No impact.	No impact.
Groundwater	No impact.	Minor, short-term impacts due to potential for contaminant releases associated with construction equipment operation and maintenance. Minor, long-term impacts from operations and maintenance activities at the proposed access. BMPs would be utilized to avoid or minimize impacts from runoff, sedimentation, and contaminant release during construction and operation.
Surface Waters	No impact.	Permitted impact of 0.55 acre of fill into Missouri River. Construction activities would not be scheduled during high river flow periods. Potential impacts mitigated by effective use of BMPs and adherence to SWPPP and applicable permitting requirements. No compensatory mitigation was required for stream impact.
Water Quality	No impact.	Minor, short-term impacts due to potential for contaminant releases associated with construction equipment operation and maintenance.

Resource	No Action Alternative	Proposed Alternative
		Minor, short-term impacts to Missouri River due to bank and channel sediment disturbance. Minor, long-term impacts from operations and maintenance activities at the proposed access. BMPs would be utilized to avoid or minimize impacts from runoff, sedimentation, and contaminant release during construction and operation.
Floodplains	No impact.	No impacts on floodplain elevations are anticipated. No impacts to the spur levee are anticipated. Following construction, disturbed areas would be restored to pre-construction grades and contours, as practical. Project design is in accordance with accepted floodplain management practices and would adhere to applicable permitting requirements.
Wetlands/Waters of the U.S.	No impact.	Permitted impact of 1.04 acres of fill into jurisdictional wetlands. Potential impacts mitigated by effective use of BMPs and adherence to applicable permitting requirements. Compensatory mitigation will be accomplished by generating 6.89 wetland mitigation credits at the Plowboy Bend Mitigation Site.
Aquatic Resources	No impact.	Minor, short-term impacts to aquatic life during construction activities. Minor indirect impacts due to potential stormwater runoff. Minor, long-term impacts from operations and maintenance would be associated with turbidity and accidental releases and would be addressed through adherence to BMPs.
Vegetation	No impact.	Minor, long-term impacts to approximately 2.5 acres of forest, scrub-shrub, and old field vegetation. In addition, there would be permanent impact to approximately 1.04 acres of jurisdictional forested, scrub-shrub, and emergent wetlands. Other herbaceous and forested areas within the footprint may be disturbed during construction activities but would be reseeded or allowed to naturally revegetate following construction. Impacts would be mitigated in accordance with USACE requirements.
Wildlife	No impact.	Minor, long-term impacts due to potential vehicle collisions with wildlife, and permanent displacement of small amount of forested wetlands (0.59 acres)

Resource	No Action Alternative	Proposed Alternative
		and forest (1.68 acres) that would result in fragmentation and loss of forage and cover for wildlife associated with forested habitat. Minor, localized displacement of wildlife occurring within footprint and adjacent areas during the construction period and operations and maintenance activities. Impacts would be similar to pre-closure conditions at original access.
Invasive Species	No impact.	Disturbance associated with construction activities may increase the establishment of invasive species in the Project footprint and surrounding areas. In addition, use of watercraft can spread aquatic invasive species in the Missouri River. However, these impacts would be minor considering the limited areas of construction disturbance, already heavily utilized and invaded landscape and river, integrated invasive species management programs, and proposed restoration of disturbed areas with non-invasive vegetation.
Protected/Sensitive Species	No impact.	The Project may affect, but is not likely to adversely affect, the Indiana bat, northern long-eared bat, gray bat, and the pallid sturgeon. There would be no effect to any other protected or sensitive species.
Socioeconomics and Environmental Justice	No impacts to demographics, socioeconomic conditions, community services, or environmental justice populations. However, without local public access to the Missouri River, area residents and businesses would continue to lack the potential economic benefits associated with public boating and fishing access.	Short-term increases in employment, payroll, and tax payments during construction would result in minor beneficial direct and indirect economic impacts. There would be no negative impacts to socioeconomic resources or low income or minority populations. Minor, long-term beneficial impacts from re-establishment of Missouri River access in an area currently lacking public access. Potential for growth of recreational boating and fishing in the region, increased tourism, and benefits to local businesses that cater to these industries. Public safety agencies could benefit from having access to a boat ramp located near I-70 during incident response situations.
Visual Resources	No impact.	Minor, short-term visual discord during the construction period from construction equipment

Resource	No Action Alternative	Proposed Alternative
		and disturbances within Project footprint and temporary laydown area. Minor, long-term impacts from visible alterations associated with the conversion of forested riverbank habitat to a public access. However, views would not detract from overall landscape due to distance, intervening vegetation, and topography.
Cultural and Historic Resources	No impact.	No impact.
Solid and Hazardous Materials/Waste	No impact.	Minor, short- and long-term adverse impacts. Solid and hazardous waste generated during construction, operation, and maintenance would be properly contained and removed to a suitable disposal or recycling facility in accordance with all local, state, and federal regulations.
Public Health and Safety	Minor, adverse impacts until entrance road to original access is permanently closed. Members of the public may attempt to use facilities that are not currently maintained for public use.	Adverse impacts to the health and safety of job site workers during construction and operation would be minor, minimized through the implementation of safety practices, training, and control measures. Moderate, beneficial long-term impacts from the increased reliability and safety, and improved road conditions, parking, and traffic flow associated with a relocated access. Beneficial impacts to public safety agencies, as they would have access to a boat ramp near I-70 for incident response situations. Minor safety impacts from boating operations and congestion would be similar to pre-closure conditions at original access. Minor impacts to the public at original (closed) access would be the same as No Action Alternative.

2.4 Summary of Avoidance, Minimization, and Mitigation Measures

2.4.1 Avoidance and Minimization Measures

MDC evaluated several alternatives for the proposed Project as described in Section 2.1 as well as several proposed Big Muddy NFWR South Unit entrance road alignments and elevations and other considerations noted below. During preliminary design, MDC coordinated with Mike Chapman of the USACE, Kansas City District Hydrologic Engineering Branch. At the request of the USACE, MDC

reoriented the ramp closer to the existing revetment, thereby shortening the length of the ramp by 40 feet. This reorientation decreased impacts to the Missouri River by approximately 0.05 acre.

Further minimization of the wetland impacts along the proposed entrance road included reducing the elevation of the entrance road to avoid borrow requirements that would have impacted additional wetlands. Any shifting of the proposed entrance road north or south of its current alignment would not further minimize wetland impacts since wetland habitat extends along both sides.

In addition to the avoidance measures implemented during alternative design and development, MDC would employ mitigation measures and BMPs to avoid or minimize adverse impacts during proposed Project construction and operation. Mitigation measures and BMPs are discussed in Chapter 3 and summarized below.

- Dust emissions would be minimized through the use of appropriate BMPs such as reducing speed on unpaved roads, covering haul vehicles, and wet suppression.
- Construction vehicles would utilize the existing Cumberland Church Road right-of-way to the furthest extent practicable and would stay within the proposed Project footprint.
- Erosion and sedimentation control BMPs (e.g., silt fences) would minimize potential soil erosion during construction.
- Water pollution control will be accomplished using a SWPPP, which specifies berms, slope drains, ditch checks, sediment basins, silt fences, rapid seeding and mulching and other erosion control devices or methods as needed. These temporary measures employed during construction will be coordinated with planned erosion control features to ensure effective and continuous erosion control. In addition, all construction and proposed Project activities will comply with all conditions of the USACE CWA Section 404/401 permit, MDNR WQC and other governmental agencies' rules and regulations with jurisdiction over WOUS.
- Disturbed areas adjacent to the river would be seeded and stabilized with riprap to reduce bank erosion and subsequent sedimentation. During operation and maintenance activities, riparian tree clearing along the river will be kept to a minimum and conducted in a manner not to disturb root systems supporting banks.
- The Proposed Alternative has been designed in accordance with accepted floodplain management practices. Following construction, disturbed areas would be restored to pre-construction grades and contours, as practical.
- Consistent with EO 13112, MDC would restore disturbed areas with suitable native, non-invasive vegetation to minimize the potential for invasive species to establish.

- Care would be taken to clean all equipment of invasive species (e.g., exotic plant seeds) before entering the proposed Project and before relocating to other locations.
- MDC would implement a spill prevention plan and utilize appropriate construction and area maintenance techniques and BMPs, such as restriction of equipment maintenance and fueling to offsite areas outside the levee system, and appropriate management of incidental and accidental releases in accordance with standard practices and regulatory requirements, to minimize the risk of surface water and groundwater impacts associated with routine maintenance and construction activities.
- Construction matting would be used to maintain construction access and minimize damage in wetlands and soft soils.
- River stages would be monitored to advise construction crews of potential flooding in the vicinity of construction activities. Construction schedules would be set to coincide with low risk periods and allow for sufficient time for removal of construction equipment in advance of predicted flood events.
- If a bald eagle nest is encountered during construction, the USFWS would be contacted immediately per the National Bald Eagle Management Guidelines. The National Bald Eagle Management Guidelines would be followed throughout the construction, operation, and maintenance of the proposed action.
- Although pallid sturgeon spawning habitat was not detected within the proposed Project footprint, heavy disturbance would be avoided during the spring spawning season for pallid sturgeon (mid-May through mid-June).
- Tree clearing activities would be limited to the period between November 1, 2020 and March 31, 2021, to avoid disturbance of nesting and roosting wildlife, including federally listed bats.
- If necessary, closure of recreational facilities would be coordinated with the managing entities, and prior notice would be given.
- In the event previously existing contamination is encountered, MDC would dispose of or mitigate any hazardous materials uncovered during construction in accordance with applicable federal, state, and local requirements.
- Customary workplace safety standards as well as the establishment of appropriate BMPs and job site safety plans would describe how job safety will be ensured during the proposed Project.
- As per USACE Section 404 permit special conditions, if any previously unknown historic or archeological remains or other unanticipated discoveries are encountered while

accomplishing the activity authorized by the permit, MDC would immediately stop construction and notify USACE and USFWS of what was found. In addition, federal and state coordination would be initiated to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places (NRHP).

- During operation of the proposed Project, vegetation along the entrance road will be maintained to avoid potential sight restrictions. The proposed boat ramp will be cleaned as necessary for safe and convenient launching.
- Adequate enforcement for inappropriate activities like vandalism, litter, fish and wildlife code violations, off road use by vehicles, etc. will be provided.
- During periods of high water, the proposed access will be closed for public safety.
- A wire cable fence will be installed on the OWLD-maintained spur levee to discourage public access to the levee.
- A riparian buffer will be maintained along the shoreline as appropriate or necessary. When appropriate, the river bank and boat ramp will be maintained and protected with riprap, revetment, hard points, dikes, gradient structures, etc.
- Streambank stabilization practices will be inspected annually and MDC Design and Development Division will be notified if corrective and/or maintenance activities are deemed necessary.
- The use of herbicides, mowing, grazing, and haying will be carefully evaluated and applied in a manner that minimizes or eliminates impacts to stream channels and water quality.
- Trash receptacles will be placed in convenient locations for access users, and fishing line collection and disposal will be encouraged.

2.4.2 Compensatory Mitigation

Although MDC took efforts to avoid and minimize impacts to WOUS associated with the proposed Project, it was determined that a total of 1.04 acres of wetlands will be unavoidably impacted by the proposed Project associated with construction of the entrance road, and a Section 404 permit was executed by the USACE for these impacts. The wetland impacts were comprised of 0.59 acres of palustrine forested wetland (PFO) habitat and 0.45 acres of palustrine emergent wetland (PEM)/palustrine scrub-shrub wetland (PSS) habitat.

MDC considered several potential candidate mitigation site locations for the proposed Project during its development. MDC originally proposed to mitigate for the wetland impacts through the construction of a wetland mitigation site on the Scrivner Road CA in Cole County, Missouri. However, it was later determined that that location could not be used as a mitigation area for the

proposed Project due to concerns that development of a wetland at that site would be difficult due to landscape position, and because it was preferred by USFWS that the mitigation for the proposed Project remain within the floodplain of the Missouri River. The existing MDC-owned Taylors Landing Access parcel was also considered, but it was determined to not be a good candidate for use as mitigation since a majority of the parcel is already wetland or is wooded. Moreover, mitigating on the adjacent USACE-owned Big Muddy NFWR land was not considered a good candidate for mitigation since the land is already part of the Missouri River Mitigation Project.

MDC determined the best candidate for wetland mitigation on an MDC-owned area within the same hydrologic unit code (HUC)-8 watershed as the proposed Project footprint [Missouri River Mainstem – Glasgow to Hermann Basin (10300102)] was on the Plowboy Bend CA, approximately 11 miles downstream of the proposed Project (Figure 1-1). The proposed mitigation work would expand an existing 0.54-acre floodplain wetland complex at Plowboy Bend CA in a 10.34-acre footprint currently used for agricultural row crop production. The plan would generate 6.98 wetland mitigation credits at the mitigation site by creating 4.64 acres of forested wetland, 2.25 acres of emergent/scrub-shrub, and planting 3.11 acres of bottomland prairie vegetation buffer serving as wildlife habitat (Amec Foster Wheeler 2017; Appendix D).

Mitigation measures mandated by the May 22, 2018 executed USACE Section 404 Individual Permit, the April 16, 2020 permit modification, and the MDNR Section 401 WQC for the proposed Project are included in Appendix E.

CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section describes the baseline environmental conditions potentially affected by the proposed Project and provides an assessment of potential project-related impacts on the environmental resources identified. For this analysis, the proposed Project includes the proposed entrance road, parking area and parking pad, and boat ramp, as well as the temporary laydown area as identified in Chapter 2 (see Section 2.2.2 and Figure 2-1). The study area is defined as the area that may be affected by the proposed Project activities and includes all land within a 1-mile radius of the proposed Project (Figure 3-1). Where the potential effects of the proposed Project extend beyond the 1-mile radius, a larger study area was used for that specific resource analysis and is defined in the appropriate subsection. For example, the socioeconomic analysis considered data from counties and associated municipalities that extend beyond the 1-mile radius, as this is the area where most of the construction workforce would be located. All appropriate environmental factors potentially influenced by the proposed Project were taken into consideration for this analysis. Those resources not potentially influenced by the proposed Project were eliminated from further evaluation, allowing for a focused environmental review.

Thus, this EA does not contain detailed discussions of resources not found within the study area, or that would not be impacted by either of the alternatives. These include:

- Coastal and Estuary Areas. The proposed Project is located entirely in an inland location and coastal and estuary areas are absent.
- Wild and Scenic Rivers. No wild and scenic rivers designated under the Wild and Scenic Rivers Act of 1968 are present in the study area.
- Climate Change. Given the scope of the construction and operation of the proposed access relocation, there would be no substantive emissions of greenhouse gases and therefore no change to measures of climate such as temperature, precipitation, or wind. Thus, the proposed Project would have no direct or indirect impact on regional climate change.

Impacts may be beneficial or adverse and may apply to the full range of natural, aesthetic, historic, cultural, and socioeconomic resources within the study area and vicinity. Impact severity is dependent upon their relative magnitude and intensity and resource sensitivity. In this document, four descriptors are used to characterize the level of impacts. In order of degree of impact, the descriptors are as follows:

- No Impact (or "absent") – Resource not present or affected by project alternatives under consideration.

- Minor (or "SMALL") – Environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource.
- MODERATE – Environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource.
- LARGE – Environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

3.1 Topography, Geology and Soils, Prime Farmland

3.1.1 Affected Environment

3.1.1.1 Topography and Geology

The proposed Project is located within the Lower Missouri River Alluvial Plain Landtype Association (LTA) within the Missouri River Alluvial Plain subsection of the Ozark Highlands ecoregion section (Nigh and Schroeder 2002). The Lower Missouri River Alluvial Plain LTA occupies the Missouri River alluvial plain from north of Arrow Rock, Missouri (approximately 25 miles west of the proposed Project) to St. Charles. In general, the LTA consists of a river channel half of its former width and of a relatively narrow alluvial plain restricted by bluffs cut into Ozark bedrock materials, primarily dolomites and limestones. Considerable loess and other sediments have been washed down from surrounding upland areas onto the alluvial plain. Soils are dominated by loamy, well-drained alluvium that was historically timbered. Today, this region is over 95 percent in row crops and levee-protected to varying heights (Nigh and Schroeder 2002; USFWS 2011).

The proposed Project footprint lies within the Missouri River floodplain that is approximately 1.5 miles wide, with the river on the east side adjacent to the bluffs. The floodplain is underlain with approximately 50 to 100 feet of alluvial sediments consisting of sand, gravel, silt and clay (USFWS 2011). The size of the alluvial materials typically increases with depth; finer-grained materials directly underlie the land surface and coarser sands and gravels are found at greater depth. The sands and gravels typically have high permeability and can produce useable quantities of water (alluvial aquifer) (Missouri Geological Survey 2020b).

The bedrock in the study area (a 1-mile radius around the proposed Project) is Mississippian Age Burlington-Keokuk limestone that consists of white-gray medium to coarsely crystalline limestone (Starbuck 2017). The upper section (separated as the Keokuk Limestone in some areas) includes abundant chert. Karst features, such as caves, springs, solution voids and gaining streams, have been observed in the area (FHWA and MoDOT 2004). However, due to the alluvial formations present at the proposed Project footprint, the risk of karst landforms to develop is low, and no karst features have been identified. Although some sand and gravel mines are located within the

study area, none are known within the proposed Project footprint (Missouri Geological Survey 2020a).

The intensity and frequency of the earthquakes within the study area are reflected in the Seismic Hazard Maps for the Conterminous United States (USGS 2014). The common earthquake measurement is referred to as the Peak Ground Acceleration (PGA). The PGA is a measurement of the strength of ground movement. The seismic hazard map for Missouri depicts the study area as within a seismic hazard zone with a less than 2 percent chance of exceeding a peak horizontal acceleration of 8-10 percent of gravity within the next 50 years.

Based on a review of the U.S. Geological Survey (USGS) website that contains information on faults and associated folds in the United States that are believed to be sources of earthquakes with a magnitude greater than 6 during the Quaternary Period (the past 2,580,000 years), there are no known faults of this age located within the study area (USGS 2020a).

3.1.1.2 Soils

The study area is generally defined as an alluvial floodplain with intermittent limestone or sandstone bluffs. Loess deposits, a wind blown silty material, ranging from 10 feet to more than 90 feet deep, overlay the limestone bedrock forming hills and bluffs adjacent to the floodplain (USFWS 2011).

Most of the surface soils in the proposed Project footprint consist of low permeability clay. Sandy soils are present closer to the river and scour hole (FHWA and MoDOT 2004). According to the U.S. Department of Agriculture Natural Resources Conservation Service (USDA NRCS) Soil Survey of Cooper County, floodplain alluvial soils in the study area are soil associations containing the Haynie, SansDessein, and Grable soil series. Haynie and Grable soils are moderately well drained, to well drained loamy soils and are well suited to cultivated crops, pasture, trees, and wildlife habitat. They are used mostly for cultivated crops. SansDessein soils are very deep, poorly drained clay soils formed in alluvium. Usually the presence of the SansDessein Series is an indicator of prime farmland when drained (Baker 1998; USDA NRCS 2020a).

Specific soil types found within the proposed Project footprint are listed in Table 3-1.

Table 3-1. Soils Types within Proposed Project Footprint

Soil Type	Acres Within Proposed Project Footprint[1]	Acres Within Temporary Laydown Area	Prime Farmland if Drained
SansDessein silty clay, 0 to 2 percent slopes, occasionally flooded	0.14	0.14	Yes

Soil Type	Acres Within Proposed Project Footprint[1]	Acres Within Temporary Laydown Area	Prime Farmland if Drained
Grable silt loam, loamy substratum, 0 to 2 percent slopes, frequently flooded	0.30	0.0	No
SansDessein silty clay, 0 to 2 percent slopes, frequently flooded	0.44	0.0	No
Haynie silt loam, 0 to 2 percent slopes, frequently flooded	1.83	0.0	No
Haynie-Treloar-Blake complex, 0 to 2 percent slopes, frequently flooded	0.42	0.0	No
Water	0.46	0.0	No
Total	**3.60**	**0.14**	

[1]Includes entrance road, parking area, and boat ramp

Source: USDA NRCS 2020c

3.1.1.3 Prime Farmland

The 1981 Farmland Protection Policy Act (FPPA) (7 CFR Part 658) requires all federal agencies to evaluate impacts to prime and unique farmland prior to permanently converting to land use incompatible with agriculture. Prime farmland soils, as determined by the USDA NRCS, have the best combination of physical and chemical characteristics for producing crops suitable for the area. Additional factors in the prime farmland designation include favorable climate, adequate and dependable water supply, acceptable soil pH, acceptable salt/sodium content, and the soil is not excessively eroded or saturated with water. Criteria for defining and delineating these lands are determined by the appropriate state or local agencies in cooperation with USDA.

According to the USDA NRCS Soil Survey, the majority of the proposed Project footprint is comprised of soils that are not classified as prime farmland (approximately three [3] acres) (USDA NRCS 2020c). However, there are some portions of the proposed entrance road (0.14 acre) and laydown area (0.14 acre) that are comprised of a soil type (SansDessein silty clay, 0 to 2 percent slopes, occasionally flooded) that is considered prime farmland if drained. These portions of the proposed Project footprint are within existing right-of-way for an abandoned section of Cumberland Church Road. In addition, they are located within the Missouri River floodplain, are not protected from flooding, and are not currently drained or farmed.

3.1.2 Environmental Consequences

3.1.2.1 No Action Alternative

Under the No Action Alternative, no changes would occur to existing geologic conditions and soil characteristics or uses within the proposed Project footprint. Without maintenance, the condition of the existing (closed) Taylors Landing Access would continue to deteriorate as sediment accumulates on the entrance road, parking area, and boat ramp. The increased sedimentation in these areas would result in minor impacts to soil resources.

3.1.2.2 Proposed Alternative

The Proposed Alternative would result in minor changes to the geology and topography of the area as a result of ground disturbance for proposed Project construction. Grading and construction activities have the potential to disturb soil stability and increase erosion. Inevitably there would be some loss of upper soil layers and soil capacity, as well as a small increase in impervious surfaces. However, impacts to soil resources associated with construction activities are expected to be minor. A SWPPP would be developed in accordance with MDC's MDNR Land Disturbance Operating Permit and associated BMPs would be implemented to minimize erosion during clearing and site preparation. BMPs would vary according to site conditions, but would typically include use of silt fences, straw waddles, anti-tracking pads, and sedimentation basins. All disturbed areas of the proposed Project footprint would be restored and seeded with a non-invasive seed mix or would be otherwise stabilized.

Excavation of borrow from within the proposed Project footprint, grading, and backfilling would result in minor, short-term disturbances at the surface in the immediate vicinity. No earth-moving or clearing is anticipated within the laydown area. Therefore, there would be no impacts to underlying geologic features within the proposed Project footprint.

During operations of the proposed Project, motorized watercraft in the Missouri river could cause shoreline erosion from increased wave action. However, the proposed Project is a relocation of an existing access and the increase in the number of watercraft on the river would be minor, as other boat ramps are available in the region.

A portion of the proposed entrance road would be constructed in an area with soil considered prime farmland if drained, according to the USDA NRCS Soil Survey. The temporary laydown area is also comprised of this soil type. However, these areas are within existing right-of-way for an abandoned section of Cumberland Church Road, and, according to the NRCS, construction within an existing right-of-way purchased on or before August 4, 1984 is an activity that is not subject to the FPPA. Therefore, because Cumberland Church Road was constructed before 1984 (USGS 1952) and the proposed Project footprint is not drained, proposed Project construction would not result in the conversion of prime farmland soils subject to FPPA.

Additionally, the amount of prime farmland soils impacted by the proposed Project (0.14 acre) is minimal compared to the amount of prime farmland and farmland of statewide importance (approximately 370 acres) and amount of prime farmland if drained (approximately 500 acres) within the study area. Conversion of this right-of-way would not impact regional agriculture or crop production. Therefore, there would be no impact to prime farmland soils, and coordination with the NRCS via submittal of the Form AD 1006 is not necessary.

In summary, based on the limited extent of disturbance and the implementation of BMPs and mitigation measures, impacts to geology and soils would be short-term and minor.

As described for the No Action Alternative, minor impacts to soil resources would occur under this alternative due to sediment accumulation at the original Taylors Landing Access location.

3.2 Land Use and Recreation

3.2.1 Affected Environment

3.2.1.1 Land Use

The proposed Project is located in an unincorporated area of Cooper County, Missouri, northeast of the Village of Wooldridge and south of the I-70 Bridge (Figure 1-1). Boonville, the County Seat, is the largest community in Cooper County and lies approximately 10 miles to the west of the proposed Project. Land uses in Cooper County generally consist of rural residential, agricultural, and concentrated urban-type land use patterns located in the incorporated cities and towns. In the study area, most land is undeveloped or agricultural land that is actively farmed for crops. Unincorporated Cooper County does not have zoning or a comprehensive plan. Public lands within the study area include the original MDC-owned Taylors Landing Access, the Big Muddy NFWR, Katy Trail State Park, and the Rocheport Cave CA, as discussed in Section 3.2.1.2 below.

The National Land Cover Database (NLCD) is based on aerial/satellite observations of large areas using a spatial resolution of 30-meter pixels and is useful for gaining a general understanding of land cover in a region. Areas of land cover type within the study area are shown in Table 3-2 and Figure 3-1. According to the NLCD, land use within the study area is dominated by cultivated crops (859 acres), wetlands (580 acres), and deciduous forest (534 acres). The approximately 3.7-acre proposed Project footprint (proposed entrance road, parking area, and boat ramp combined with temporary laydown area) is dominated by deciduous forest (1.7 acres).

Table 3-2. Land Cover within the Proposed Project Footprint[1] and Study Area

Land Cover Class	Proposed Project (acres)	Temporary Laydown Area (acres)	Study Area (One-mile Radius) (acres)
Barren Land (Rock/Sand/Clay)	0.21	0	34.52

Land Cover Class	Proposed Project (acres)	Temporary Laydown Area (acres)	Study Area (One-mile Radius) (acres)
Cultivated Crops	0	0	858.93
Deciduous Forest	1.68	0	534.15
Developed, High Intensity	0	0	3.34
Developed, Low Intensity	0	0.14	32.45
Developed, Medium Intensity	0	0	11.13
Developed, Open Space	0	0	101.40
Emergent Herbaceous Wetlands[2]	0.45	0	260.93
Grassland/Herbaceous	0.25	0	16.33
Mixed Forest	0	0	3.34
Open Water	0.19	0	340.30
Pasture/Hay	0	0	86.93
Shrub/Scrub	0.23	0	5.34
Woody Wetlands[2]	0.59	0	318.60
Total	**3.60**	**0.14**	**2,607.69**

[1]Land cover data from NLCD is based upon aerial/satellite observations of large areas and does not reflect site-specific field observations

[2] Wetland delineations were completed for affected wetlands and more accurate impacts are included in Section 3.8.1 Wetlands

Source: Homer et al. 2015

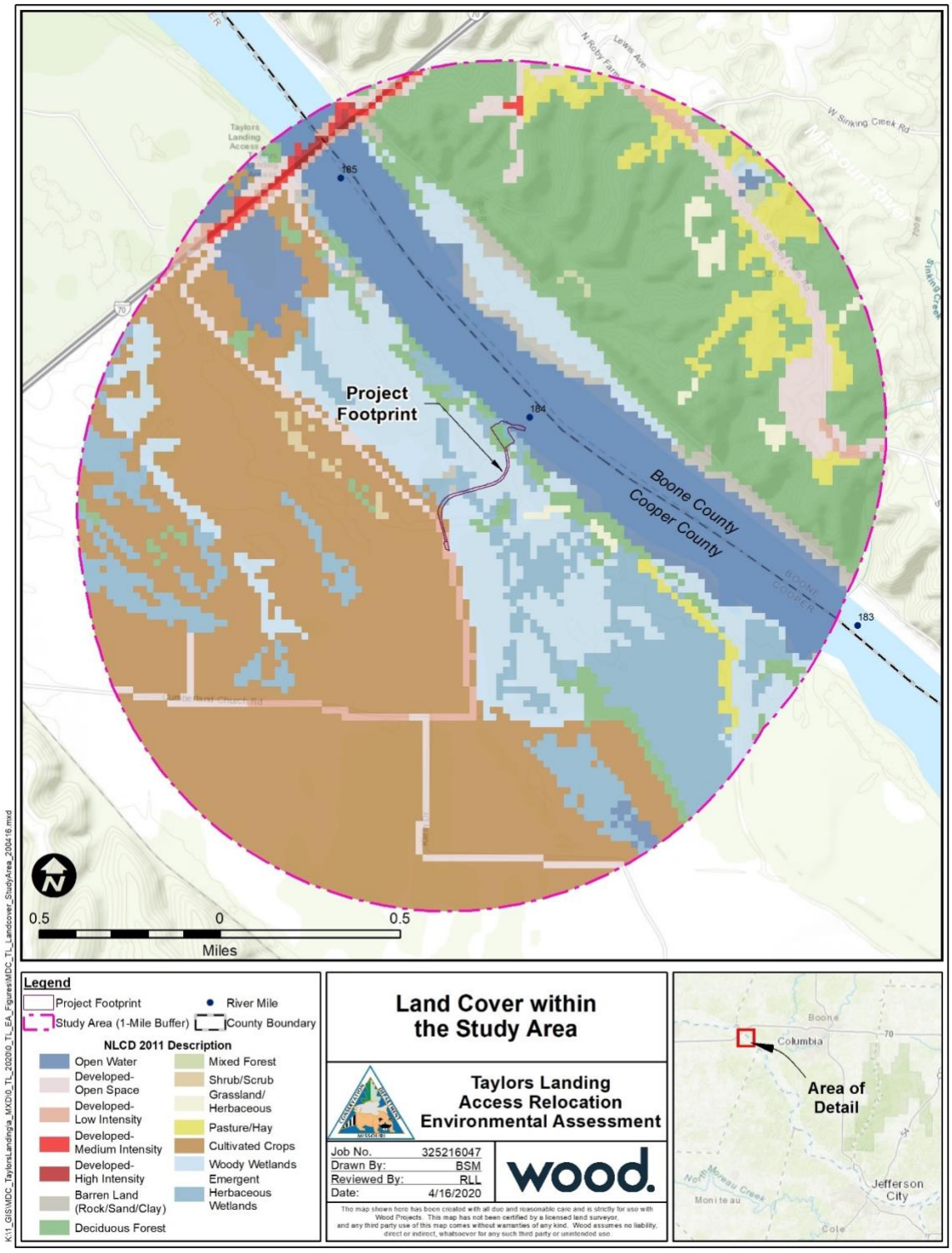

Figure 3-1. Land Cover Within the Study Area

3.2.1.2 Recreation

Parks, recreation, and natural areas within the study area are shown in Figure 3-2 and are described in the following subsections.

3.2.1.2.1 Big Muddy NFWR

The Project lies within the Big Muddy NFWR. The Big Muddy NFWR extends along the floodplain of the Missouri River from Kansas City to St. Louis and is comprised of 11 units that total more than 17,600 acres (see Figure 1-3). The Big Muddy NFWR was established on Sept. 9, 1994 by the USFWS for the development, advancement, management, conservation, and protection of fish and wildlife habitats and to provide compatible public uses, including hunting, fishing, wildlife observation and photography, and collection of wild berries, mushrooms, and nuts. The refuge units encompass river features, such as islands, chutes, bends, and tributary confluences that were once common but are now rare because of changes to the Missouri River and its floodplain to promote navigation and minimize flooding. Current refuge management focuses on reconnecting the Missouri River and its tributaries to their floodplains, restoring hydrology, returning native vegetation, reducing invasive species, and offering a variety of wildlife-dependent recreation opportunities (USFWS 2014a). Information on watershed-management goals of the Big Muddy NFWR system in included in Section 3.7.1.

A portion of the Big Muddy NFWR is owned by the USACE and a portion is owned by the USFWS; however, the entire area is managed as one unit by the USFWS. In 1986, Congress passed the Water Resources Development Act that authorized the USACE Missouri River Bank Stabilization and Navigation Fish and Wildlife Mitigation Project (Mitigation Project). The Mitigation Project is designed to compensate for fish and wildlife habitat losses that resulted from past channelization efforts on the Missouri River. Meanwhile, the USACE acquired the land for the Overton Bottoms North Unit of the Big Muddy NFWR in 1998 from private owners after the area experienced extensive flooding in 1993 and 1995. In 2010, under the authority of the Fish and Wildlife Coordination Act, the USACE and USFWS entered into a Federal Real Estate Use Agreement. The Real Estate Use Agreement added Overton Bottoms South and Cora Island Units to the Big Muddy NFWR and also included Overton Bottoms North. The areas are considered by the USACE as part of the Mitigation Project (USFWS 2014a).

A notable feature of these units includes an extensive scour hole (approximately 40 acres) just west of the Missouri River located underneath I-70 and extending both north and south of the highway. The NFWR is available for passive day use only. There are no developed trails or interpretive features; no picnicking is allowed on site and primitive camping is allowed in designated areas only. Portions of the area are still used for agricultural purposes.

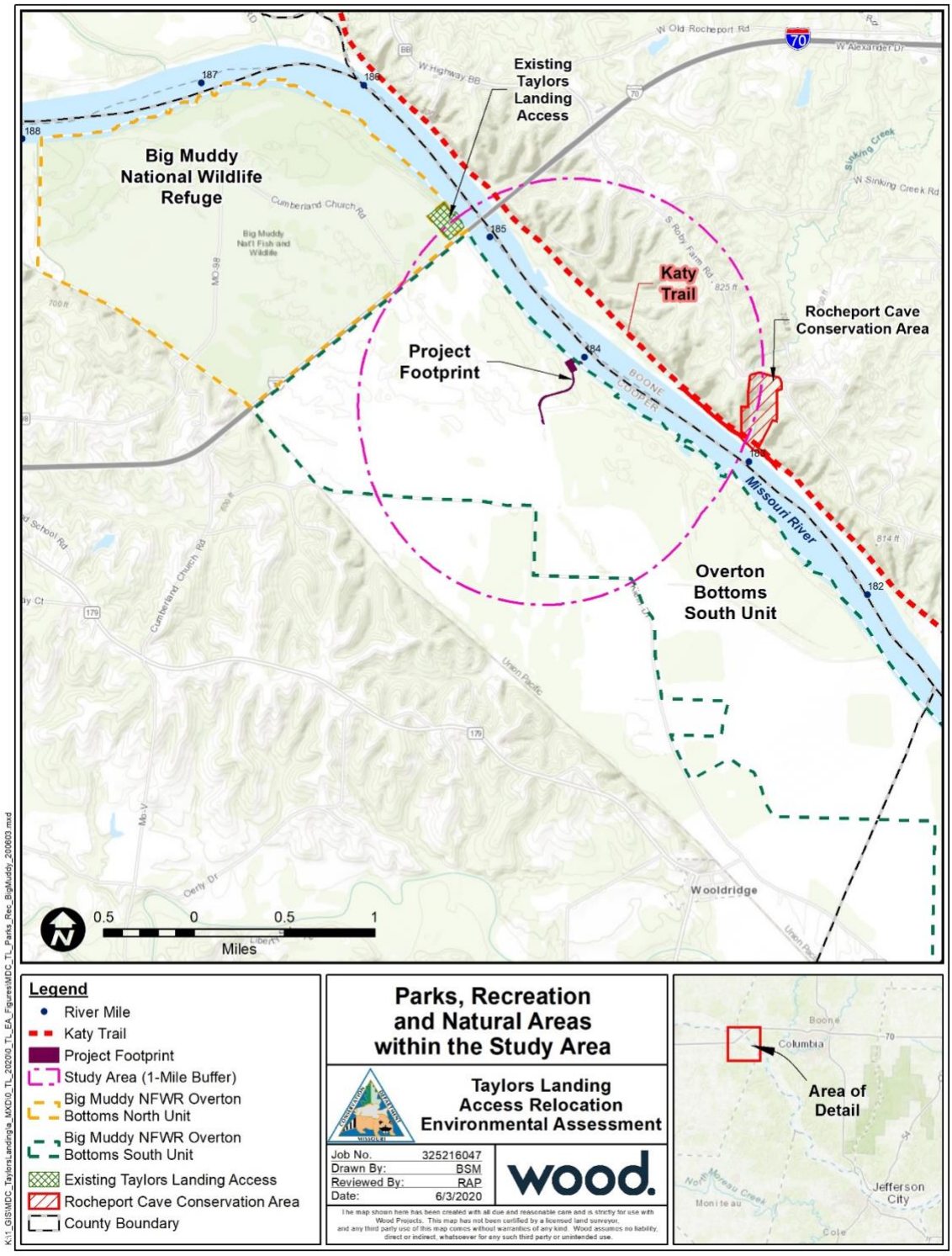

Figure 3-2. Parks, Recreation, and Natural Areas Within the Study Area

3.2.1.2.2 Original Taylors Landing Access

The original Taylors Landing Access site is located on the right descending bank of the Missouri River at RM 185 in Cooper County. The access was built on an MDC-owned parcel of land which is approximately nine and one-half (9.5) acres in size and is surrounded by the Overton Bottoms North Unit of the USFWS Big Muddy National NFWR. The North Unit is on land owned by the USACE. The original access consists of a single lane boat ramp, an aggregate parking area that can accommodate approximately eight vehicles and boat trailers, and an area for primitive camping, all of which are accessed by a 1,600-foot-long aggregate entrance road (Cooper County Road referred to as Overton Road) off State Route 98 (Figure 1-2, see photos in Appendix G).

MDC purchased the existing Taylors Landing Access property with LWCF dollars in 1965, with the boat ramp facility constructed in 1972. Since its construction, the existing access has been frequently closed due to flood damage and frequent inundation following rain events (see Section 1.1). After a significant flood in 2011, the existing access was once again closed to the public due to flood damage and has not since been reopened. The entrance road has required a high level of maintenance, including annual removal of silt, repair of washouts, and reapplication of aggregate. Changes in management of the floodplain adjacent to the access have increased flooding since the area was incorporated into the Big Muddy NFWR in 1994.

3.2.1.2.3 Katy Trail State Park

The Katy Trail lies on the opposite side of the Missouri River over 1,500 feet from the proposed Project. The Katy Trail State Park is a hiking and biking trail that traverses the state of Missouri for approximately 225 miles from St. Charles to Clinton. The Katy Trail was built on the former corridor of the Missouri-Kansas-Texas Railroad (known as the Katy). The trail is still being developed from St. Charles to Machens. The entire trail is part of the American Discovery Trail and has been designated as a Millennium Legacy Trail. The segment between St. Charles and Boonville is part of the Lewis and Clark National Historic Trail (MDNR 2020a).

3.2.1.2.4 Rocheport Cave Conservation Area

The 51-acre Rocheport Cave CA is closed to the public due to the presence of a cave on the property that provides habitat for federally endangered Indiana bats and gray bats. Rocheport Cave CA is located approximately one (1) mile southeast of the proposed Project, on the opposite (east) side of the Missouri River.

3.2.2 Environmental Consequences

3.2.2.1 No Action Alternative

Under the No Action Alternative, there would be no changes or impacts to land use within the study area. Under this alternative MDC would not reopen the existing Taylors Landing boat ramp, and, thus, there would be no public access on this section of the Missouri River. This would result

in moderate, long-term adverse impacts to recreation activities (fishing, boating, and canoeing) for the region, because boat ramp spacing would remain at 24 miles between access points in this location.

3.2.2.2 Proposed Alternative

Under the Proposed Alternative, the Taylors Landing Access relocation to the Overton Bottoms South Unit of the Big Muddy NFWR would provide moderate beneficial impacts to recreation in the region by ensuring long-term public boat and canoe access to the Missouri River near the I-70 bridge. As discussed in Section 1.3, a public access on the right descending bank in this river reach is an important benefit because the two nearest MDC boat ramps, Franklin Island CA (RM 195) and Providence Access (RM 171), are on the left descending bank. A location near I-70 would provide recreational benefits given its proximity to a major travel corridor for the public and provision of accessibility from both sides of the river, thereby supporting the high level of public use. The Proposed Alternative would be consistent with MDC's former boating access plan (MDC 2004) by increasing opportunities for Missouri recreational users to enjoy Missouri's floatable and boatable waterways and spacing boat ramps every eight to ten river miles. The inclusion of an ADA-compliant parking space would increase opportunities for disabled citizens to recreate, as well. In addition, the proposed Project is in an area where access would be more reliable and safer for users than the original location.

The Proposed Alternative would convert approximately 3.6 acres of undeveloped NFWR land (primarily deciduous forest and wetlands) and open water (Missouri River) to low intensity developed land by constructing a boat ramp, aggregate parking area and entrance road, and a small concrete parking pad. However, the proposed boat ramp and parking area would remain as recreational use, and approximately 300 feet of the proposed 2,026-foot-long entrance road would be constructed on existing Cumberland Church Road right-of-way. In addition, construction of the proposed access is a relocation of an existing 9.5-acre access that is approximately one (1) mile north on the Big Muddy NFWR. Ownership of the original access site would likely be transferred to another public entity, the boat ramp, entrance road, and other man-made features would be removed, and the site would be restored to natural, pre-existing conditions. Therefore, permanent land use changes would be minor.

During construction of the proposed Project, there may be minor impacts to hunting and/or wildlife observation activities in the NFWR immediately surrounding the proposed Project footprint due to noise and presence of construction vehicles and personnel. However, construction activities would cease and/or be scheduled around major hunting seasons (e.g., opening day of firearms deer and turkey seasons) to minimize effects. In addition, these impacts would be short-term, intermittent, and localized, and recreators could use other areas of the refuge during this period. Other land use activities in the study area, such as agricultural practices,

would not be interrupted during or after construction. In addition, recreational activities on the Katy Trail, located across the river from the proposed Project, and other recreational facilities within the study area would not be affected by proposed Project construction or operation. Construction activities would occur over a short period of time, would not disrupt biking or hiking on the Katy Trail, and would be far enough away that visual or audible impacts to the recreational experience would be negligible. During operation of the access, no meaningful adverse effects to recreational opportunities or areas are anticipated.

In conclusion, although there would be some disruption to recreational activities during construction, these effects would be short-term and localized, and other land uses would not be affected. Long-term impacts from conversion of a small amount of undeveloped land to low intensity recreational use would be minor. Moderate regional beneficial impacts would include increased recreational opportunities, including increased boating access and potential availability of the original access site for hunting, wildlife watching, and other recreational activities.

3.3 Transportation

3.3.1 Affected Environment

3.3.1.1 Traffic and Roadways

The proposed Project is located on the west bank of the Missouri River on the northeastern boundary of Cooper County, Missouri. The primary transportation infrastructure in the vicinity of the proposed Project consists of a network of local roadways and state highways that feed into I-70, a major east-west Interstate Highway with average annual daily traffic (AADT) of 19,323 vehicles and the only high-capacity (4-lane) roadway in the study area (MoDOT 2019a). I-70 is located approximately one (1) mile northwest of the proposed Project and provides a connection between Columbia and Boonville, the closest population centers.

Access to the proposed Taylors Landing Access would be provided via Cumberland Church Road, an undivided, gravel/aggregate road with an AADT of 8 vehicles (MoDOT 2019a). Existing traffic on Cumberland Church Road consists of those accessing agricultural fields and a small number of residences. From I-70, which the majority of Taylors Landing Access users would likely utilize, vehicles would take MO-179 (AADT of 600 vehicles) southeast for approximately 1.4 miles to Cumberland Church Road. Local traffic coming from the south could also access Cumberland Church Road via MO-179 from the opposite direction (AADT of 445 vehicles) or State Highway V (AADT of 67 vehicles) (MoDOT 2019a). Both MO-179 and State Highway V are two-lane paved roadways.

3.3.1.2 Commercial and Recreational Navigation

The proposed Project is located near RM 184 along a federally authorized and maintained navigation channel, a 735-mile length of the Missouri River between Sioux City, Iowa and St. Louis, Missouri. This stretch of the river includes a navigation channel measuring nine feet deep and 300 feet wide, and it is the only navigable waterway in the region capable of carrying commercial goods and products. While the current commercial use of the river has seen a significant decline since the 1980s, some industries still use this thoroughfare to transport products including agricultural products, chemicals, petroleum products, manufactured goods, and basic manufacturing materials such as gravel and sand (USACE and USFWS 2018).

For many years, sand and gravel have dominated the commodities moving on the Missouri River. Since 2000, sand and gravel has represented greater than 85 percent of the commodities shipped on the Missouri River. Unlike commercial traffic, which is more likely to travel regionally or nationally, 91 percent of sand and gravel tonnage on the Missouri River travels less than 10 miles (USACE 2018). The reason for the relatively shorter trips is because much of the sand and gravel is dredged from the bottom of the river, and then moved to the nearest dock or sand plant for transit to local markets. Between RM 130 and RM 250, there are approximately 10,754 dredging-related vessel trips (defined as a one-way vessel movement; a tug pushing a barge counts as two vessel trips) annually, or approximately 50 trips per day (at 216 operating days per year) (USACE 2011). However, the majority of these trips are limited to areas on the river within a few miles upstream of onshore sand plants because empty barges are typically moved upstream to dredge locations, and loaded barges are returned downstream to the plant to save time and fuel costs (USACE 2011). Capital Sand Company operates the closest sand plant to the proposed Project location, approximately two (2) miles upstream, near the town of Rocheport.

Other vessels on the Missouri River include recreational watercraft, such as motorboats, canoes, and kayaks. However, as the closest public access points, Franklin Island Conservation Area (RM 195) and Providence Access (RM 171) are located 10 or more river miles from the proposed Project site, recreational vessel traffic in the study area is generally down from years when the original Taylors Landing Access was in operation.

3.3.2 Environmental Consequences

3.3.2.1 No Action Alternative

Under the No Action Alternative, there would be no proposed Project-related changes to the transportation networks in the study area. However, without replacing the original Taylors Landing Access, boat ramp spacing in the vicinity would remain at 24 river miles, requiring local recreationists to travel a longer than average distance on the local roadway network in order to reach a public access point.

3.3.2.2 Preferred Alternative

3.3.2.2.1 Traffic and Roadways

Impacts from construction of the proposed Project would temporarily increase roadway traffic in the immediate vicinity of the study area as a result of additional traffic associated with the transport of construction equipment and personnel. MDC estimates between 15 and 20 workers would be needed to support the construction activities, with total vehicle trips estimated at up to 50 per day, including workforce personal vehicles and construction equipment. The increase in traffic would be localized to the immediate vicinity of the work site and would vary over the approximately 13-month construction period depending on the stage of activities. Impacts would be greatest along Cumberland Church Road, where construction traffic would result in notable increases compared to current levels. However, these impacts would be minor, as they would be short-term and would not result in volumes large enough to cause significant delays or affect the general operation of the roadway. Once past Cumberland Church Road, the construction traffic volume is expected to disperse into the surrounding road network and have negligible effects on these roads and associated traffic conditions.

Following construction, users of the relocated Taylors Landing Access would also generate traffic on local roads that access the facility. Based on past usage of the original Taylors Landing location, and adjusting for increases in the local population, it is estimated that the proposed public access site would have approximately 13,000 users annually, or an average of 36 users per day (MDC 2011; Missouri Census Data Center 2020). Although the original access had primitive camping and the proposed access does not, this estimate was for users whose trip to the river was the only purpose for their trip. With a conservative estimate of one user per vehicle, this would result in an additional 36 vehicle visits per day (or 72 one-way trips), on average. Again, Cumberland Church Road would experience the greatest impacts, with AADT increasing by approximately tenfold. Due to this increase in vehicle traffic, Cumberland Church Road may require more frequent maintenance; however, Cooper County receives County Aid Road Trust (CART) funding from MDC to ensure public roads leading to MDC areas are maintained and the public has adequate access.

As the total number of vehicle trips would still remain relatively low, and they would be seasonal and intermittent over the course of the day, traffic on Cumberland Church Road would continue to operate in free-flow conditions and would not result in significant delays or an increase in vehicle queues. On higher volume roads, traffic would assimilate into existing traffic patterns and would have a negligible impact effects on these roads and associated traffic conditions. Therefore, although there would be a moderate seasonal increase in traffic on Cumberland Church Road, overall impacts to traffic and roadway systems under the Preferred Alternative would be minor because the total number of vehicles would remain low and regional traffic impacts would be negligible.

3.3.2.2.2 Commercial and Recreational Navigation

Under the Proposed Alternative, a new 290-foot-long, 16-foot-wide concrete boat ramp would be installed on the Missouri River, with approximately 0.55 acre of the ramp extending into the river channel. As the width of the Missouri River is over 1,000 feet at the proposed Project location and the ramp would be angled downstream, close to the shoreline, the addition of the ramp would result in a minimal navigational hazard to vessels in the river channel.

In addition, users launching motorboats, kayaks, and canoes from the Taylors Landing Access would contribute to vessel traffic on the river. Based on data from a Missouri River Public Use Assessment, and adjusting for increases in the local population, it is estimated that 3,400 to 4,000 recreational watercraft would be launched from the public access site annually, with an average of approximately 10 per day (Sheriff et al. 2011; Missouri Census Data Center 2020). This number could be higher depending on the season but would be limited by the size of the facility, which would provide parking for approximately 30 trailered vehicles. The increase in the number of recreational boaters may lead to a greater potential for conflicts with commercial navigation and dredging operations. However, as the proposed Project is a relocation of a former public access point, the level of vessel traffic would be similar to that experienced when the former access was still in use. There have not been issues with excessive vessel traffic in the area in the past, and the width of the navigational channel is sufficient to allow large and small vessels ample room for navigation. Commercial navigation on the Missouri River consists primarily of sand and gravel barges traveling within a few miles of onshore sand plants. Sand and gravel dredging activities and associated barge navigation are likely minimal within the study area because, as discussed in Section 3.3.1.2, it is downstream of the sand plant and loaded barges are not typically moved upstream past the proposed Project to the sand plant site. Therefore, impacts to commercial and recreational navigation would be minor.

Furthermore, as discussed above, commercial navigation and associated wave action on the Missouri River is minimal and is primarily associated with sand and gravel dredging operations upstream of the proposed Project. The proposed boat ramp is designed to angle downstream, which aids in preventing silt accumulation and allows the ramp to better withstand the change in velocities of the river. The original Taylors Landing boat ramp, located approximately 1 mile upstream on the Missouri River, is nearly 50 years old and is still largely structurally intact (see photos in Appendix G). Therefore, potential navigation traffic wake would have negligible impacts to the structure and longevity of proposed Project facilities.

3.4 Air Quality

3.4.1 Affected Environment

Air quality refers to the concentration of air contaminants in a specific location. National Ambient Air Quality Standards (NAAQS) established by the Clean Air Act (CAA) require the U.S. Environmental Protection Agency (EPA) monitor pollutants considered harmful to public health and the environment. The U.S. Environmental Protection Agency (EPA) established the NAAQS for the following major air pollutants, which are known as criteria pollutants: carbon monoxide (CO), nitrogen dioxide (NO_2), ozone, particulate matter (PM) (PM less than 10 and 2.5 microns in aerodynamic diameter [PM_{10} and $PM_{2.5}$]), sulfur dioxide (SO_2), and lead. The EPA has established primary standards designed to protect public health, including the health of "sensitive" populations, such as asthmatics, children, and the elderly; and secondary standards designed to set limits to protect public welfare, including protection against decreased visibility, and damage to animals, crops, vegetation, or buildings for each of the criteria pollutants. Locations that meet NAAQS are designated "attainment" areas and locations that fail to meet NAAQS are designated as "non-attainment" areas. For the purposes of planning and maintaining ambient air quality with respect to the NAAQS, EPA has developed Air Quality Control Regions (AQCRs), interstate areas that share a common airshed.

The proposed Project is located within the Northern Missouri Intrastate AQCR (#137), which covers the northern half of the state. This AQCR does not include the metropolitan areas of Kansas City and St. Louis. The Northern Missouri Intrastate AQCR is in attainment for all criteria pollutants (EPA 2020a).

3.4.2 Environmental Consequences

3.4.2.1 No Action Alternative

Under the No Action Alternative, the original Taylors Landing Access would remain closed and would not be relocated. Therefore, there would be no proposed Project-related construction activities or construction-related emissions. Project-related environmental conditions in the study area with respect to air quality are not expected to change. Therefore, there would be no impacts to air quality under this alternative.

3.4.2.2 Proposed Alternative

During construction of the proposed Project, there would be a short-term, localized increase in emissions from operation of vehicles or heavy equipment. During operation of the relocated access, there would be a localized increase in emissions from outboard motor operation and

vehicle traffic to and from the proposed Project. However, the Project is a relocation of an existing access; therefore, impacts within the study area would be negligible.

Under the Proposed Alternative, transient air pollutant emissions would occur during the construction and operations and maintenance of the proposed access. Construction-related air emissions would be primarily related to emissions from the operation of internal combustion engines. MDC estimates that construction would occur intermittently five days per week for approximately 8-10 hours each day during the estimated 13-month construction period. Equipment that could be utilized include excavators, loaders, skid steer, tractors, forklifts, dump trucks, and various pickup trucks, trailers, and crew trucks.

Combustion of gasoline and diesel fuels by internal combustion engines (vehicles, construction equipment, etc.) would generate local emissions during construction activities. Emissions from construction equipment would result in minor short-term local effects on air quality due to the relatively low number of construction vehicles and short construction period. In addition, new emission control technologies and fuel mixtures have significantly reduced equipment emissions. Therefore, with adherence to equipment maintenance requirements, and continued improvement of emission control measures and fuel blends, emissions related to the combustion of gasoline and diesel fuels by internal combustion engines would be short-term, localized, and minor.

Construction activities can result in short-term increases in fugitive dust at the construction site and on gravel roads leading to the site, and they can result in equipment-related particulate emissions in and around the proposed Project footprint. The potential for generation of fugitive dust is greatest during dry periods, high wind conditions, and during periods of intense construction activity. Increases in fugitive dust concentrations would be most noticeable at the construction site and in the immediate vicinity; however, ambient concentrations of particulate matter could increase in off-site areas in the short-term. Dust emissions would be minimized through the use of appropriate BMPs such as reducing speed on unpaved roads and wet suppression. In addition, equipment-related particulate emissions can be minimized if the equipment is well-maintained.

People living, working, or recreating near the proposed Project footprint may be subject to the impacts of construction dust and fuel emissions. However, as discussed above, these impacts are generally localized and would only occur during the estimated 13-month construction phase. In addition, the nearest residences are farmsteads approximately 0.5 mile from the proposed Project. Consequently, the impacts from construction are short-term, localized, and minor.

Operational emissions are limited to periodic use of equipment for maintenance of vegetation along the entrance road and parking area, fugitive dust from traffic on the aggregate entrance road, and a localized increase in emissions from outboard motor operation and from vehicle traffic to and from the proposed Project; none of which are anticipated to impair air quality in the region.

During the summer months when boat ramp usage is at its highest, it is possible that more than one vehicle would be waiting to use the launch ramp, creating unnecessary engine idling in the parking area. Excessive idling combined with poor summer air quality conditions caused by dry weather and stagnation events increases the impact of air pollution on public health. However, potential idling at the boat ramp would be for short periods and would be intermittent. Also, as discussed in Section 3.3.2.2, the total number of vehicle trips on Cumberland Church Road would increase but would remain relatively low, and traffic would continue to operate in free-flow conditions and would not result in significant delays or vehicle queues.

In summary, impacts to air quality from fugitive dust and fuel emissions would be minor, localized, and mostly limited to the construction period. Minor air emissions associated with operations and maintenance activities would be consistent with operational conditions at the original access, one (1) mile north of the proposed Project. Therefore, there would be no impact to regional air quality or attainment status.

3.5 Noise

3.5.1 Affected Environment

Sound is measured in logarithmic units called decibels (dB). Given that the human ear cannot perceive all pitches or frequencies of sound, noise measurements are typically weighted to correspond to the limits of human hearing. This adjusted unit of measure is known as the A-weighted decibel (dBA) which filters out sound in frequencies above and below human hearing. A noise level change of 3 dBA or less is barely perceptible to average human hearing. However, a 5 dBA change in noise level is clearly noticeable. The noise level associated with a 10 dBA change is perceived as being twice as loud; whereas the noise level associated with a 20 dBA change is considered to be four times as loud and would therefore represent a "dramatic change" in loudness.

Land uses in the study area include recreational, transportation, residential, and agricultural areas. Due to its rural nature, typical background noise levels are anticipated to range between 35 and 50 dBA in the majority of the study area, whereas higher trafficked areas, such as the I-70 corridor, may have background noise levels ranging from 43 to 72 dBA (EPA 1974). Primary sources of noise in the study area include transportation-related noise emissions from commercial and recreational vessels on the Missouri River, and vehicle traffic along I-70 and smaller local roads. In addition, periodic noise may be generated from agricultural activities and vegetation maintenance along levees and utility corridors.

Sensitive noise receptors in the study area include recreationists on the Missouri River and users of the Big Muddy NFWR and Katy Trail. The Katy Trail is located approximately 0.3 miles northeast

of the proposed Taylors Landing boat ramp at its closest point, on the opposite side of the river. The closest residence is also located east of the Missouri River, over 0.5 miles from the proposed Project.

The day-night sound level (Ldn), expressed in dBA, is the 24-hour average noise level with a 10-dBA correction penalty for the hours between 10 p.m. and 7 a.m. to account for the increased sensitivity of people to noises that occur at night. The EPA noise guideline recommends outdoor noise levels do not exceed Ldn of 55 dBA, which is sufficient to protect the public from the effect of broadband environmental noise in typical outdoor and residential areas. These levels are not regulatory goals but are "intentionally conservative to protect the most sensitive portion of the American population" with "an additional margin of safety" (EPA 1974). The U.S. Department of Housing and Urban Development (HUD) considers an Ldn of 65 dBA or less to be compatible with residential areas (HUD 1985).

3.5.2 Environmental Consequences

3.5.2.1 No Action Alternative

Under the No Action Alternative, MDC would not implement the proposed relocation of the Taylors Landing Public Boating Access. Therefore, there would be no project-related impacts to noise receptors.

3.5.2.2 Proposed Alternative

Under the Proposed Alternative, noise emissions would occur in conjunction with the short-term use of construction equipment and increased workforce traffic during the construction period, as well as long-term public use of the access road, parking area, and boat ramp once the facility is operational.

Equipment needed for construction would include excavators, loaders, skid steer, tractors, forklifts, dump trucks, and various pickup trucks, trailers, and crew trucks. Typical noise levels from this equipment is expected to be 85 dBA or less at 50 feet from the construction equipment (FHWA 2016). There is no dock or associated pilings for the proposed Project, and, therefore, no pile driving activities would occur during construction activities. Based on straight line noise attenuation, it is estimated that noise levels associated with typical construction equipment utilized within the proposed Project footprint would attenuate to 55.1 dBA or less at the Katy Trail and 50.2 dBA or less at the nearest residence. Therefore, while maximum construction noise levels experienced by users of the Katy Trail may be just over the EPA guideline of 55 dBA, they would fall below the HUD guideline of 65 dBA. Additionally, construction noise would attenuate to levels below both EPA and HUD guidelines at all residences. Recreationists on the NFWR and the Missouri River in close proximity to the proposed Project (less than 500 feet from construction equipment) have the potential to experience construction noise levels exceeding both the EPA

and HUD dBA guidelines. However, boaters would only be exposed to these noise levels for a brief duration as they passed the proposed Project location. Additionally, construction noise would be intermittent and generally limited to weekdays during daylight hours over the approximately 13-month construction period.

Workforce traffic traveling to and from the proposed Project and the transportation of trucks and construction equipment would generate intermittent traffic noise on local roadways in the vicinity of the Project, including MO-179 and Cumberland Church Road; however, due to the relatively small scale of the workforce (ranging from 15 to 20 personnel per day), such noise impacts would be infrequent and minor. Similarly, following construction, users of the proposed Taylors Landing Access would also generate traffic noise on local roads that access the facility. Based on past usage of the original Taylors Landing location, and adjusting for increases in the local population, it is estimated that the proposed public access site would have approximately 13,000 users annually, or an average of 36 users per day (MDC 2011; Missouri Census Data Center 2020). Even assuming one user per vehicle, the noise impact of an additional 36 vehicle trips per day, on average, would be intermittent and minor.

During operation of the facility, the most common source of noise would be from motorboats launched from the boat ramp. Per Missouri Statute 306.090, the maximum permissible noise level for a recreational motorboat is 86 dBA at a distance of 50 feet. Based on straight line noise attenuation, motorboat noise from the edge of the boat ramp would attenuate to 56.1 dBA at the closest portion of the Katy Trail, slightly above the EPA guideline of 55 dBA but below the HUD guideline of 65 dBA, and 51.2 dBA at the nearest residence, below both EPA and HUD recommendations. Recreationists on the NFWR in close proximity to the ramp may temporarily experience noise levels exceeding both the EPA and HUD dBA guidelines during motorboat launch. However, motorboat noise is consistent with existing conditions along the river, and once on the river boaters would disperse and assimilate into the existing navigational traffic patterns with imperceptible changes in noise level at sensitive receptors. Noise from facility maintenance activities such as mowing and vegetation trimming would be infrequent and at levels similar to or less than those associated with motorboat noise. Given the nature of the Proposed Alternative and the distance between the proposed Project location and sensitive noise receptors, noise impacts from implementation of the proposed Project would be intermittent and minor.

3.6 Minerals and Energy Resources

3.6.1 Affected Environment

There is a history in the study area of extraction of energy resources such as coal and petroleum, but most of that activity has ceased due to the lack of economic production (FHWA and MoDOT 2004). Other mineral resources present in the study area are mostly limited to the mining of

adjacent bluffs for limestone and sandstone materials used for construction such as rock, gravel, and sand. Some limestone is mined for agricultural uses. There is some mining of clays and shale for brick production.

As noted in Section 3.3.1.2, sand and gravel are mined or dredged from the floodplain and the river regularly (USFWS 2011). Capital Sand Company, Inc. has an existing 2016 USACE permit for dredging sand and gravel from several reaches of the Missouri River, including the Jefferson City segment, which is within the study area (RM 180.65 - RM 184.75). The company is authorized to dredge 1,350,000 annual tons of material from the Jefferson City segment of the Missouri River (RM 130.20 – RM 249.65). The permit expires on December 31, 2020 and is currently under review for renewal and an increase to 1,450,000 annual tons of material from the Jefferson City segment. The regulated activities consist of the hydraulic removal of sediment from the riverbed and the return discharge of processed material to the river (USACE 2020).

In 2011, the Corps of Engineers completed a Final Environmental Impact Statement and issued a Record of Decision for commercial dredging activities on the Missouri River. This document disclosed environmental impacts associated with the 2011 permit decisions and ongoing re-issuance of dredging permits (USACE 2011). The selected alternative in the Final Environmental Impact Statement and Record of Decision contains certain tonnage and locale restrictions on dredging, in addition to a monitoring program and adaptive management framework to limit dredging-related impacts (USACE 2020).

There are two overhead transmission powerlines owned by Co-Mo Electric Cooperative that cross the Overton Bottoms South Unit of the NFWR in the study area north and south of the proposed Project footprint. Co-Mo Electric Cooperative is headquartered in Tipton, Missouri, and provides service to members in Benton, Camden, Cole, Cooper, Miller, Moniteau, Morgan, Pettis, and Saline Counties. The transmission lines in the study area both link to a substation located approximately two (2) miles southwest of the proposed Project on MO-179. No pipelines or other underground utilities are known to occur in the vicinity of the proposed Project footprint.

3.6.2 Environmental Consequences

3.6.2.1 No Action Alternative

Under the No Action Alternative, there would be no proposed Project-related construction activities or access operations. There would be no change in currently approved and permitted sand and gravel operations or impacts to energy resources.

3.6.2.2 Proposed Alternative

Under the Proposed Alternative, proposed Project construction activities would not impact river dredging or electric transmission lines. Construction of the relocated boat ramp would

permanently impact only 0.55 acre of the Missouri River, and construction activities are more than 900 feet from the nearest transmission line.

Operation and maintenance of the proposed access also would not impact electric transmission in the study area due to the distance of transmission lines from the proposed Project. However, if the number of recreational boaters increases in this stretch of the Missouri River due to the relocation and re-opening of the Taylors Landing Access, there may be a greater potential for conflicts with sand and gravel operations in the river. However, the 300-foot width of the Lower Missouri River navigation channel is assumed sufficient to allow large vessels, such as tugs, tows, or barges, as well as smaller recreational vessels to maneuver around the commercial dredging vessels if necessary (USACE 2011). In addition, the proposed Project is a relocation of an existing public access and the USACE takes river navigation traffic into account when considering dredge permits; therefore, there would be no impacts to sand and gravel dredging operations from operation of the proposed access relocation.

3.7 Water Resources

3.7.1 Affected Environment

The proposed Project is located along the right-descending bank of the Missouri River within the Lower Missouri-Moreau Watershed (HUC-8: 10300102). The Missouri River is one of the longest rivers in the United States (2,355 miles) and one of the Nation's most developed. The river's natural hydrology below Sioux City, Iowa, has been altered by intense regulation of water releases at mainstem tributaries and dams. By the time river water reaches the study area it has been used for navigation, power generation, and flood control (USFWS 2011). Detailed information regarding this watershed can be found in *The State of Our Missouri Waters, Lower Missouri-Moreau River Watershed* (MDNR 2014).

The proposed Project study area is part of the Big Muddy NFWR system and shares the same primary watershed-management goals. Primary goals are to restore portions of the acquired areas to a natural floodplain condition, including bottomland forests, improve and restore wetland values, improve fishery and wildlife resources, and to provide additional public areas for fish and wildlife-dependent recreation (USFWS 2011). Eventually the entire Big Muddy NFWR system could include up to 60,000 acres of floodplain and associated land. A refuge of this size would reflect the USFWS ecosystem approach to management and would help threatened and endangered species recovery, neotropical migrant bird and interjurisdictional fish conservation, biological diversity, and fish and wildlife-dependent public recreation. The NFWR system also supports and complements the MDC 10-year fisheries strategic plan for the Missouri River and the USACE Missouri River Bank Stabilization and Navigation Fish and Wildlife Mitigation Project authorized by the Water Resources Development Act of 1986 (USFWS 2013a).

3.7.1.1 Groundwater

The alluvial aquifers beneath the floodplain of the Missouri River are some of Missouri's most valued water resources. These aquifers are capable of yielding from 500 to more than 2,000 gallons of water per minute to properly designed and developed wells and are widely used for private, public, industrial, and agricultural purposes. Groundwater in the Lower Missouri-Moreau Watershed is a significant source of drinking water for local municipalities and many private wells.

The alluvial materials of the Missouri River valley are composed of clay, silt, fine to coarse sand and fine to medium gravel. The clay or silt cap overlying the more permeable sands and gravels, where present, retards infiltration of surface water. The Mississippi and Missouri river alluvium receives recharge from four sources: infiltration from the river; from bedrock adjacent to and underlying the alluvium; from precipitation falling upon the floodplain; and from downward leakage of water from streams flowing across the alluvium (MDNR 2020b).

In the study area north of the Missouri River, there are no high yield, potable bedrock aquifers available. South of the Missouri River, there are two major aquifers that underlie the region, the St. Francois and Ozark aquifers. These aquifers average 500 feet in thickness, ranging between 200 feet and 700 feet. Most wells deep enough to reach the St. Francois aquifer also produce from the shallower and more prolific Ozark aquifer. In the Lower Missouri-Moreau Watershed an estimated 5,191 private domestic wells provide an estimated 1.5 million gallons of water annually for domestic uses (MDNR 2014).

Groundwater is considered a primary water source for wetlands in the study area. In proximity to the Missouri River, groundwater levels fluctuate in response to river levels. For example, the scour hole (Figure 3-3) is fed by groundwater and quickly responds to changes in river levels. Wetlands west of the setback levee, however, have a higher surface elevation above typical groundwater levels and receive water primarily through precipitation (FHWA and MoDOT 2004). Karst features including sinkholes, caves and springs are present in some portions of the study area, and direct groundwater contamination is possible through these features (MDNR 2014). However, no karst features are known to occur within the proposed Project footprint.

No water wells are located within the proposed Project footprint. No water source protection areas or community water supplies occur within the study area (MDNR 2020c). There is one private groundwater well within the 1-mile study area; however, it is approximately 0.8 mile east of the Project on the opposite side of the Missouri River (MDNR 2007).

3.7.1.2 Surface Water

The proposed Project lies within and adjacent to the right-descending bank of the Missouri River within the Lower Missouri-Moreau Watershed (HUC-8: 10300102).

The Missouri River flows 2,341 miles from its headwaters in Montana to the confluence with the Mississippi River near St. Louis, Missouri—approximately 184 miles downstream of the proposed Project. It drains 529,350 square miles through parts of seven states including: Montana, North Dakota, South Dakota, Iowa, Nebraska, Kansas, and Missouri. Dam construction and channelization along the Missouri River has fragmented the river into four units: a free-flowing reach upstream of the dams; the reservoirs; remnant floodplains between the reservoirs; and a channelized reach below the most downstream reservoir. The proposed Project is in the most downstream unit characterized by channelization and dredging to maintain a navigation channel. Annual stream flow in the Missouri River upstream of the proposed Project (at Boonville, Missouri) is 70,680 cubic feet per second (cfs) and is greater than 29,600 cfs for 90 percent of the time (USGS 2020b). Sand is the dominant substrate in the Lower Missouri River.

The reach of the Missouri River within the project area has an OHWM at elevation 572.4 feet above mean sea level and a channel width of approximately 1,400 feet. This reach of the Missouri River has levees running adjacent to both banks to help maintain the navigation channel. The proposed boat ramp is located at the northern end of a rock revetment. The banks along this reach are steep but moderately stable.

In addition to the Missouri River, three unnamed streams are shown on USGS National Hydrography Dataset maps (USGS 2020c) along the right-descending bank south of the proposed Project footprint (Figure 3-3). Two of the unnamed streams are shown flowing into the Missouri River approximately 1,900 feet southeast of the proposed Project footprint, and an additional unnamed stream is located approximately 1,600 feet southwest of the proposed laydown area. Other unnamed tributaries in the study area are shown flowing into the Missouri River on the opposite side of the river from the proposed Project (USGS 2020c). The proposed Project does not cross any of these unnamed streams.

Other surface waters in the Lower Missouri-Moreau Watershed include 11 lakes ranging in size from 50 acres to 197 acres, totaling 1,014 lake acres, and 3,445 miles of major streams. Other large streams include the Moreau River and Moniteau, Petite Saline, Perche, Cedar, Hinkson and Auxvasse creeks. A large scour hole under I-70 (Figure 3-3) lies approximately 0.6 mile north of the proposed Project. A much smaller scour or bank notch (see photos in Appendix G), which may have been created by the USACE for potential shallow water habitat as part of the Missouri River Mitigation Project, lies approximately 125 feet north of the proposed Project. This area does not appear to hold water once floods have receded and does not contain emergent vegetation. Surface water sources, including the Missouri River at Boonville and Jefferson City and Fayette Lake #3 provide drinking water supply (MDNR 2014). The majority of surface water withdrawn in the watershed is used by electrical power plants from the Missouri River.

In support of the proposed Project and CWA permitting, WOUS delineations were performed in the vicinity of the proposed Project footprint in April 2013. The two unnamed blueline streams southeast of the proposed Project footprint and three open water ponds shown on NWI maps were not encountered in the field. The field wetland delineations identified only the Missouri River (i.e., Stream 1) and one wetland (i.e., Wetland 1) within the proposed Project footprint (see Wetlands Section 3.8.1). The Missouri River is listed as a Section 10 navigable waterway and is therefore a jurisdictional water. The WOUS report is provided in Appendix D.

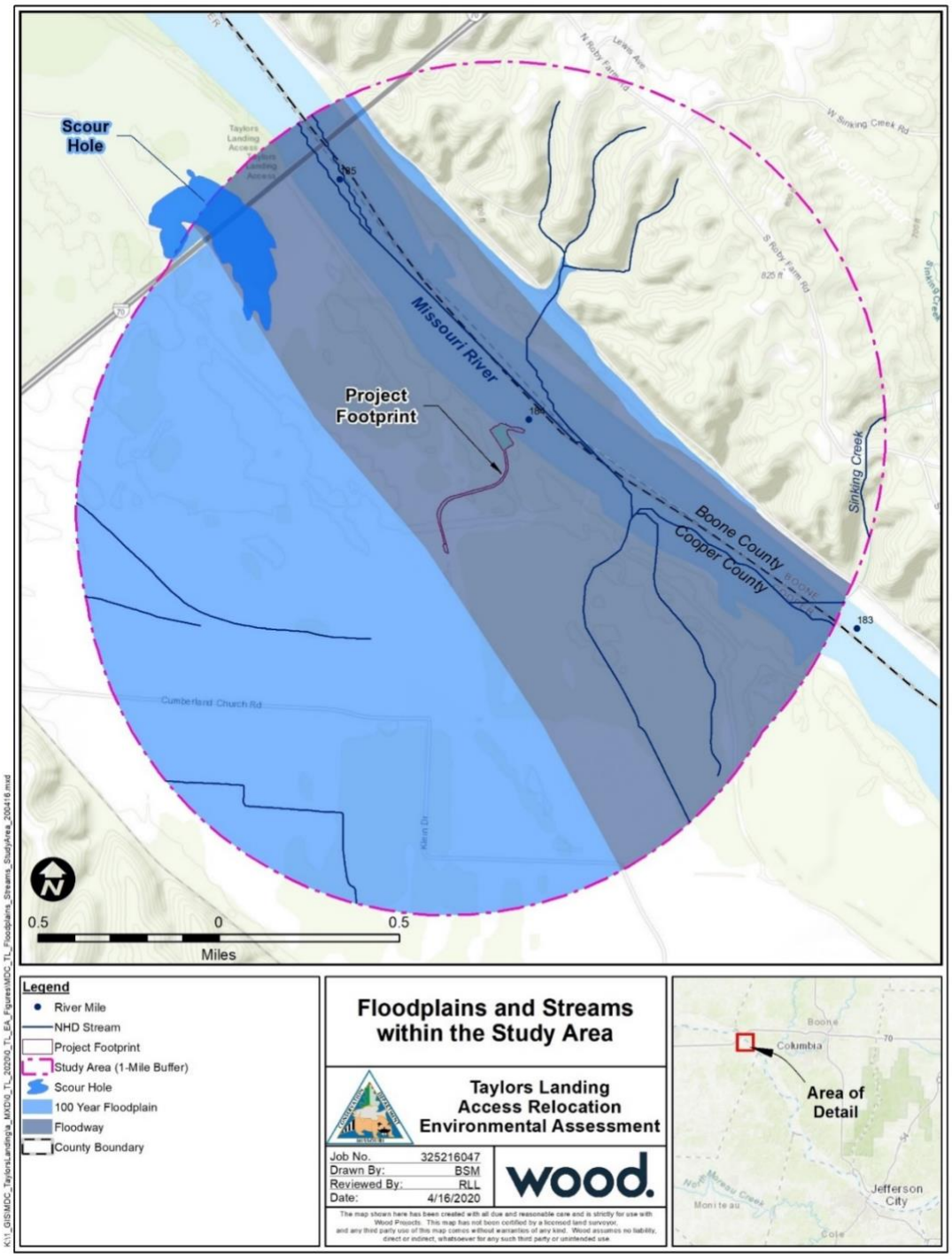

Figure 3-3. Floodplains and Streams Within the Study Area

3.7.1.3 Water Quality

The Lower Missouri-Moreau Watershed is located in central Missouri and includes the municipalities of Boonville, Columbia, Jefferson City, Fulton, and surrounding communities. Several streams within this watershed are impaired due to high bacteria levels and low dissolved oxygen levels. Acid mine drainage from historic coal mining has impacted several streams. Population growth (approximately 14 percent between 2000 and 2010) resulted in development and land disturbance, which impacts water quality in multiple ways, and is expected to continue. Agricultural activities including row crop agriculture and livestock operations are also present, which negatively impact water quality due to nutrient loading and sedimentation. Specifically, several confined animal feeding operations conduct land application of their wastes in the watershed leading to higher nutrient inputs. Sedimentation, eroding streambanks, and lack of adequate riparian buffers have also been observed (MDNR 2014).

The Missouri Clean Water Commission has established safe use designations for individual watercourses. The Missouri River's designated uses include: Irrigation, Livestock and Wildlife Watering, Protection of Warm Water Aquatic Life and Human Health – Fish Consumption, Boating and Canoeing, Drinking Water Supply and Industrial (MDNR, 10 Code of State Regulations [CSR] 20-7, Stream Classifications and Use Designation). Section 303(d) of the CWA requires each state identify waters that do not meet water quality standards for beneficial use and for which adequate water pollution controls are not in place. Waters not meeting beneficial use are considered impaired. None of the stream reaches within the study area are listed on the Missouri 303(d) list of impaired waters (MDNR 2018).

Prior to the initiation of any construction, a WQC is required for any project that involves discharge of dredged material or the placement of fill into WOUS. This certification is a joint process through the state and the USACE Section 404 permit program of the CWA. During this process, the state of Missouri has the authority to issue WQCs under Section 401 of the CWA verifying that the project will not violate water quality standards. Since this project involves the placement of fill into WOUS, a Section 404 CWA permit was submitted to and approved by the USACE and MDNR (Appendix E).

3.7.1.4 Floodplains

The proposed Project footprint is located within the FEMA mapped 100-year Missouri River floodplain (Figure 3-3). Floodplains are the adjacent areas of a river that are periodically inundated by floodwaters. The floodplain subject to a one (1) percent chance of flooding in any given year is referred to as the 100-year floodplain.

Floodplains are important natural resources that provide numerous benefits, including temporary floodwater storage, decreasing soil erosion by reducing flow velocity and retaining water-borne

silt and sediment, and trapping sediments, pollutants and excess nutrients, thereby improving water quality. Undisturbed floodplains typically support diverse floral and faunal habitats that provide many fish and amphibian species with spawning areas and migratory birds with resting, feeding and nesting habitats (FHWA and MoDOT 2004).

The Missouri River and its floodplain have undergone dramatic changes in the past 200 years. The pre-development river was a complex of chutes, sloughs, backwaters, sandbars, braided channels, bottomland forests, and wetlands resulting in a diversity of riverine and floodplain habitats. In the Lower Missouri River (Sioux City, Iowa, to the mouth at St. Louis), floodplain forests were reduced from 76 percent of the floodplain vegetation in the 19th century to 13 percent by 1972. During the same period, cropland increased from 18 percent to 83 percent. These changes likely resulted from channel modifications and extensive water control development structures designed to protect agricultural fields and communities (USFWS 2011). Private and chartered levee and drainage districts provide and maintain services and facilities that help control excessive water levels. The services and facilities are paid for by the beneficiaries through annual assessments (USFWS 2011).

As discussed in Section 1.1, USFWS established the Big Muddy NFWR in 1994 to restore natural floodplain habitat for fish and wildlife throughout the Missouri River corridor. In the Overton Bottoms South Unit, the levees that were breached during the 1993 and 1995 floods were rebuilt, but they were set back at least 2,200 feet west of the riverbank. Only some portions remain of the original levee next to the riverbank, and it serves no purpose related to flood control. A spur levee that runs perpendicular to the river between the setback levee and a portion of the original levee was also built during the time of the setback levee construction and is now maintained by the OWLD (Figure 2-1).

Executive Order (EO) 11988 requires federal agencies "…avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative." The EO is not intended to prohibit floodplain development in all cases, but rather to create a consistent government policy against such development under most circumstances (U.S. Water Resources Council 1978). The EO requires that agencies avoid the 100-year floodplain unless there is no practicable alternative. Additionally, FEMA regulations require a "no-rise condition", that is, construction, operation, and maintenance activities do not create an increase in floodway surcharge. This requirement is regulated in Missouri by SEMA.

3.7.2 Environmental Consequences

3.7.2.1 No Action Alternative

Under the No Action Alternative, no planned construction would occur that would potentially impact water resources, require site excavation or groundwater pumping, or affect floodplains or the existing flood control levee system. No impacts to water resources would occur under this alternative.

3.7.2.2 Proposed Alternative

3.7.2.2.1 Groundwater

Under the Proposed Alternative, impacts to groundwater would be minimal because construction activities would not require deep excavation or dewatering of groundwater. Consequently, implementation of the proposed Project would not impact groundwater levels or availability.

Potential water quality impacts to shallow groundwater can potentially occur at construction sites as a result of contaminant releases associated with construction equipment operation and maintenance. As discussed in Section 3.7.1.3, clay and silt alluvial materials in the Missouri River floodplain overlay the bedrock and protect groundwater in this location. Also, the use of appropriate BMPs would prevent and minimize the potential for contaminant releases. These BMPs include restriction of equipment maintenance and fueling activities to appropriate offsite areas, measures to avoid spills, and management of incidental and accidental releases in accordance with standard practice and regulatory requirements. Additionally, there are no water source protection areas or community water supplies within the study area, and the closest known groundwater well is approximately 0.8 mile from the proposed Project footprint.

There would be potential for minor impacts on groundwater resulting from the operation of the proposed Project. Implementation of appropriate BMPs would minimize the risk of groundwater impacts associated with routine maintenance activities.

Potential groundwater impacts associated with the proposed Project would be short-term, minor, and minimized through implementation of the construction procedures and mitigation measures.

3.7.2.2.2 Surface Water

Direct impacts to surface waters associated with proposed Project activities include those actions associated with the placement of fill within an identified stream or open water. The only stream that would be impacted under the Proposed Alternative is the Missouri River (Stream 1) (Figures 3-4 and 3-5). The construction of the proposed 290-foot-long by 16-foot-wide concrete single-lane boat ramp and aggregate parking area would require 573 cubic yards of riprap and 87 cubic yards of concrete be placed within 0.55 acre of the river along 375 linear feet of the right descending bank. However, approximately 147 cubic yards of the riprap that is to be deposited would be excavated from an existing USACE revetment within the river (Revetment no. 192.65)

and redeposited for the construction of the proposed boat ramp. Therefore, only 0.03 acre of the proposed boat ramp footprint would extend beyond the toe of the existing rock revetment and would be new stream impact. The total new stream impact would be along 120 feet of the channel with 74 cubic yards of clean rock fill. The proposed parking area below the OHWM would also lie on a rock base. The proposed Project would not directly impact either the large scour hole under I-70 or the smaller scour hole/bank notch approximately 125 feet north of the proposed Project.

Indirect impacts to the Missouri River may be expected to occur from construction activities in proximity to the river that result in sedimentation within aquatic habitats. Such effects may include localized water quality alteration (e.g., increased turbidity) and/or flow alteration. BMPs, including implementation of erosion and sediment control measures such as silt fences, would be used to avoid or minimize impact to surface waters from runoff and sedimentation during construction. Disturbed areas adjacent to the river would be seeded and stabilized with riprap to reduce bank erosion and subsequent sedimentation. No other streams or open waters would be impacted either temporarily or permanently. Use of existing improved roadways during construction that cross spanned surface waters would not result in impact beyond normal use of these roadways. Wetlands impacts are discussed in Section 3.8.2.

The proposed Project footprint lies in the Missouri River floodplain and is prone to potential flooding from the Missouri River. River stages would be monitored to advise construction crews of potential flooding in the vicinity of construction activities. Construction schedules would be set to coincide with low risk periods and allow for sufficient time for removal of construction equipment in advance of predicted flood events.

Potential indirect impacts to surface waters during the operation of the proposed Project would be limited to periodic maintenance activities, motor vehicles parking and driving on the boat ramp, and outboard motor use within the river. Impacts would be similar to the original Taylors Landing Access (pre-closure) operations and maintenance activities. At a normal high water elevation, the closest parking spot would be approximately 200 feet from the river. BMPs implemented in association with operations activities would minimize potential operation and maintenance impacts. For example, riparian tree clearing along the river would be kept to a minimum and conducted in a manner not to disturb root systems supporting banks.

Mitigation measures mandated by the May 22, 2018 executed USACE Section 404 Individual Permit for the proposed Project (Appendix E) would be implemented. In summary, both direct and indirect impacts to surface waters during construction would be short-term and minor. BMPs would be utilized to avoid or minimize impacts from runoff, sedimentation, and contaminant release during construction and operation.

3.7.2.2.3 Water Quality

The MDNR, Water Protection Program granted a WQC for individual CWA Section 401 for the proposed Project on May 1, 2018. MDNR has issued MDC a general State Operating Permit MO-R 100007 on July 1, 2017 that authorizes land disturbance activities for five years. To prevent contamination of streams, wetlands, ponds, and other water impoundments adjacent to the proposed Project footprint, construction specifications will require procedures be followed in accordance with the Missouri State Operating Permit.

Water pollution control would be accomplished using a SWPPP, which specifies berms, slope drains, ditch checks, sediment basins, silt fences, rapid seeding and mulching and other erosion control devices or methods as needed. These temporary measures employed during construction would be coordinated with planned erosion control features to ensure effective and continuous erosion control. In addition, all construction and proposed Project activities will comply with all conditions of the USACE CWA Section 404/401 permit, MDNR WQC and other governmental agencies' rules and regulations with jurisdiction over WOUS.

During operations and maintenance of the proposed Project, impacts to water quality could include increased turbidity from outboard motors, fuel discharged from watercraft into the Missouri River and spills or leaks associated with the transfer and storage of gasoline near waterbodies. However, the proposed Project is a relocation of an existing access; therefore, the proposed Project would likely not increase these potential impacts. The number of watercraft using the proposed ramp may increase, but a substantial increase in use is not expected because other ramps occur along the Missouri River in the region. Additionally, use of BMPs as described in Section 2.4.1 would avoid or minimize impacts during operation.

In summary, both direct and indirect impacts to surface water quality during construction would be short-term and minor. BMPs would be utilized to avoid or minimize both short- and long-term impacts from potential runoff, sedimentation, and contaminant release during construction and operation of the proposed Project. Therefore, impacts to water quality from the Proposed Alternative would be minor.

3.7.2.2.4 Floodplains

Avoidance of the floodplain is not possible for the Proposed Alternative. MDC's application for a Floodplain Development Permit with SEMA for the proposed Project is pending.

The Proposed Alternative has been designed in accordance with accepted floodplain management practices. Construction of the proposed entrance road and parking area would be above the OHWM (elevation 572.4) using earth fill from the proposed Project footprint; no earth fill would be brought in from outside sources. Rock fill and aggregate road surfacing would be brought in to be used under the boat ramp and for the entrance road and parking area driving surfaces. Any soil displaced by construction and not used for borrow will be transported out of

the floodplain. The portions of the proposed parking area and boat ramp below the OHWM will lie on a rock base. Therefore, based on proposed Project design and because proposed Project activities would not proceed until a Floodplain Development Permit is secured, no rise of the floodplain or impact to flood control efforts is expected to result from the proposed Project.

Following construction, disturbed areas would be restored to pre-construction grades and contours, as practical. Two 24-inch and one 18-inch HDPE pipes would run underneath the proposed entrance road to allow for ordinary water flow within the floodplain. During major flood events, water would flow over the entrance road, allowing for normal floodplain ecosystem function. No impacts to the spur levee are anticipated because the proposed Project would cross it on existing right-of-way for an abandoned section of Cumberland Church Road.

Operation and maintenance of the proposed Project would be similar to practices at the original access and are not anticipated to impact floodplains. Flooding (and associated maintenance) of the proposed Project entrance road within the Overton Bottoms South Unit is expected to be much more infrequent than at the original access location immediately north of I-70 in the Overton Bottoms North Unit. The I-70 bridge structure and the fill used to construct the interstate approaches to the river tend to act as a barrier to flood waters moving downstream, thus causing increased duration, frequency, and extent of flooding upstream of the interstate. Backwater is defined as "the maximum increase in flood elevation that a bridge creates over that which would have existed in the absence of the bridge" (FHWA and MoDOT 2004). Based on observed high-water marks and hydraulic modeling, the backwater created by the existing I-70 bridge and interstate approaches during the 1993 flood was approximately 2.63 feet higher than normal flood elevation would have been without the bridge, at a point 1.3 mile upstream (FHWA and MoDOT 2004). In addition, the presence of the NFWR Overton Bottoms North Unit floodplain upstream of the proposed Project allows for temporary floodwater storage, thereby potentially diminishing flooding impacts to downstream areas, including the proposed Project footprint, by distributing excess water over larger areas.

In summary, no impacts to floodplain elevations are anticipated. Although the proposed Project occurs within 100-year floodplain, design is in accordance with accepted floodplain management practices and no rise of the floodplain or impact to flood control efforts is expected. As such, the proposed Project would be consistent with EO 11988. There would be minor loss of floodplain and wetland habitat, and the gravel entrance road may cause negligible interference with cross drainage and/or flooding or drainage congestion in adjacent areas during periods of high precipitation. However, the proposed project would not alter the overall ecosystem function of the floodplain habitat area because water would flow over the proposed entrance road during major flood events. In addition, the proposed construction would not substantially induce flooding on downstream or upstream structures or communities.

3.8 Wetlands/Waters of the U.S.

3.8.1 Affected Environment

The USACE regulates the discharge of fill material into WOUS including wetlands, pursuant to Section 404 of the CWA (33 USC 1344). Additionally, EO 11990 (Protection of Wetlands) requires federal agencies to avoid, to the extent possible, adverse impact to wetlands.

The 1987 USACE Wetlands Delineation Manual defines wetlands as "*areas inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions*." This definition supports the three criteria that must be met for a determination of jurisdictional wetlands according to the USACE: (1) wetland hydrology (subject to inundation or saturation near the surface for a period during the growing season), (2) hydrophytic vegetation (vegetation cover dominated by plants adapted to wet conditions), and (3) hydric soils (soils with characteristics that developed due to saturated conditions). In typical situations, all three criteria must be present for an area to be classified as a jurisdictional wetland.

National Wetland Inventory (NWI)-mapped wetland areas within the 1-mile radius study area are shown in Table 3-3 and Figure 3-4. A majority of the study area along the Missouri River floodplain is mapped within the following NWI wetland types:

- Forested (PFO) wetlands are mapped in the central portion of the proposed Project footprint;
- Scrub/shrub (PSS) wetlands are mapped along the western portions of the proposed Project footprint;
- Emergent (PEM) wetlands are mapped within the eastern portion of the proposed Project footprint; and
- Two ponds are mapped southeast of the proposed Project footprint and more are scattered within the uplands across the Missouri River. One small pond is mapped within the proposed Project footprint.

Table 3-3. NWI Wetlands within One Mile of Proposed Project

NWI Wetland Type	Study Area (ac)
Emergent	194.4
Forested	109.8
Scrub Shrub	139.9
Open Water	310.7
Total	**754.8**

Source: USFWS 1986

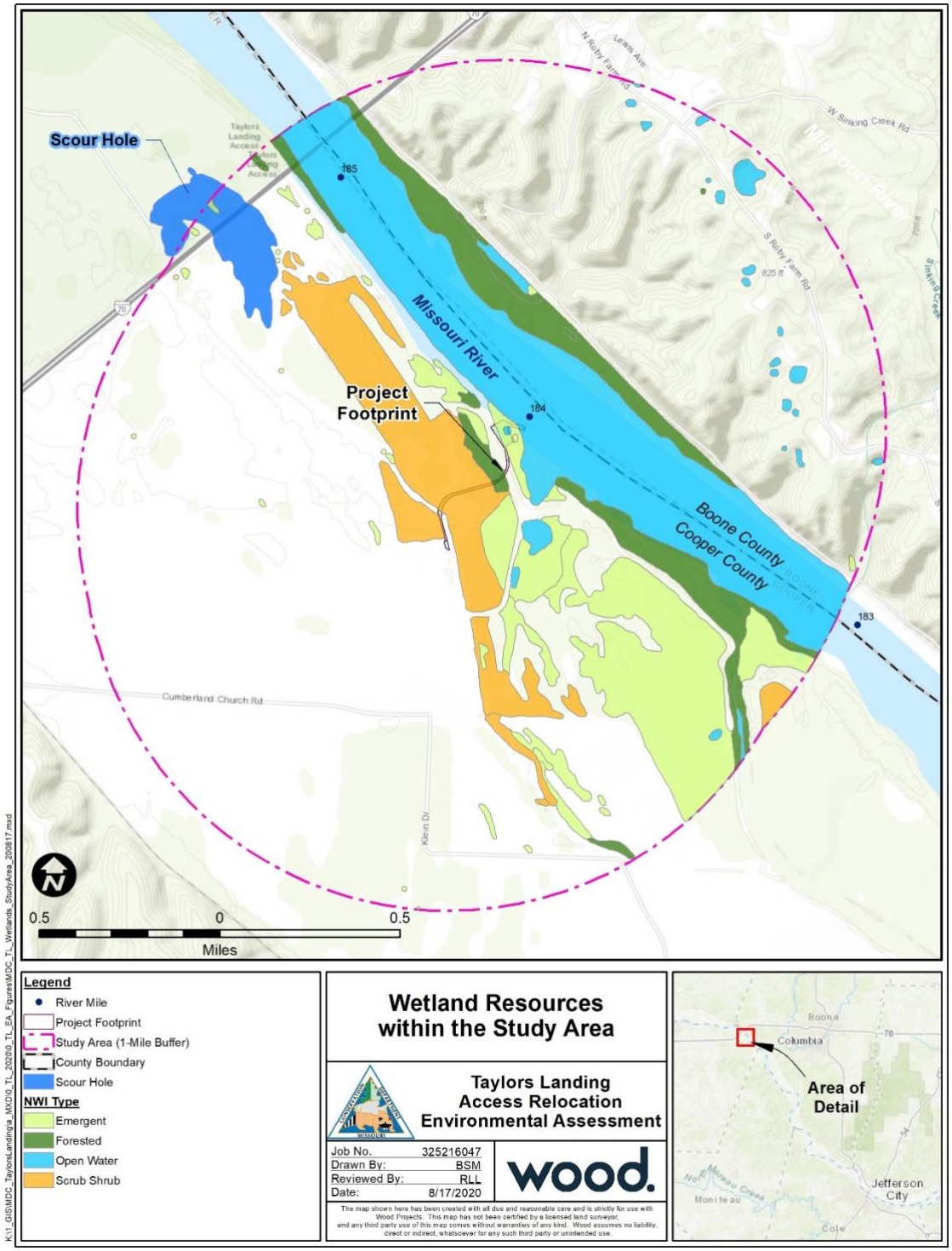

Figure 3-4. NWI Mapped Wetlands Within the Study Area

However, the NWI map of wetlands and deepwater habitats within the study area was photo interpreted using 1:58,000 scale, color infrared imagery from 1986 (USFWS 1986), and NWI maps can include inaccuracies and require field verification. In the years since the NWI map was produced, scouring and deposition of sand and silt has occurred extensively within the proposed Project footprint and has likely altered the landscape, habitats, and soils.

WOUS delineations of the proposed Project footprint were performed by MDC in April 2013 to ensure compliance with Sections 404/401 of the CWA and to support proposed Project permitting following the August 2010 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (Version 2.0). Locations of wetland data points, wetland delineation datasheets, and photographs are included in Appendix D. According to the delineation, five non-hydric soil mapping units underlie the project area: Grable silt loam, Haynie silt loam, Haynie-Waldon complex, Sarpy fine sand and Waldon silty clay loam. Several of the NWI mapped wetlands, including three ponds, as well as the two unnamed blueline streams southeast of the proposed Project footprint, were not encountered in the field. As discussed above, this is likely because the NWI mapping was created from 1986 imagery, and conditions in the study area floodplain have since been altered due to several major flood events.

The field wetland delineation identified the Missouri River (Stream 1) and one wetland (Wetland 1) within the proposed Project footprint:

- Stream 1 – The Missouri River is described in Section 3.7.1.2. The Missouri River is listed as a Section 10 navigable waterway and is therefore a jurisdictional water.
- Wetland 1 – Wetland 1 is located within the western half of the proposed Project footprint, north of the spur levee (Figure 3-5). The western portion of the wetland is a combination PEM/PSS wetland dominated by an herbaceous layer of rough cocklebur (*Xanthium strumarium*), Virginia wildrye (*Elymus virginicus*), buttercup (*Ranunculus* sp.), Canadian horseweed (*Conyza canadensis*), and curly dock (*Rumex crispus*) and a shrub layer of cottonwood (*Populus deltoides*), silver maple (*Acer saccharinum*), and boxelder (*A. negundo*). The eastern portion of the wetland is a PFO wetland dominated by a canopy of silver maple, boxelder, and red mulberry (*Morus rubra*), an understory of silver maple and boxelder and an herbaceous layer of shoreline sedge (*Carex hyalinolepis*), crookedstem aster (*Symphyotrichum prenanthoides*), Pennsylvania smartweed (*Polygonum pensylvanicum*) and buttercup. Most of the trees in the wetland are 8-10 inches diameter-at-breast-height (DBH), with some scattered mature cottonwoods with diameters greater than 20 inches DBH. Although Wetland 1 is mapped within non-hydric soils, soil samples within the wetland generally indicated a depleted, very dark grayish brown (10YR 3/2) matrix with dark yellowish brown (7.5 YR 4/6) concentrations. The wetland is located inside the setback levee and, therefore, receives regular flood waters from the Missouri River. Although no surface or groundwater was present during the site visit, primary indicators of hydrology present included water marks, sediment deposits, inundation visible on aerial

imagery and a sparsely vegetated concave surface. Wetland 1 is within the 100-year floodplain and is therefore hydrologically connected to the Missouri River and likely a jurisdictional water.

Within the proposed Project, wetland delineation data points taken both along the spur levee and in the forested riparian corridor adjacent to the river did not indicate the presence of hydric soils or wetland hydrology (Appendix D).

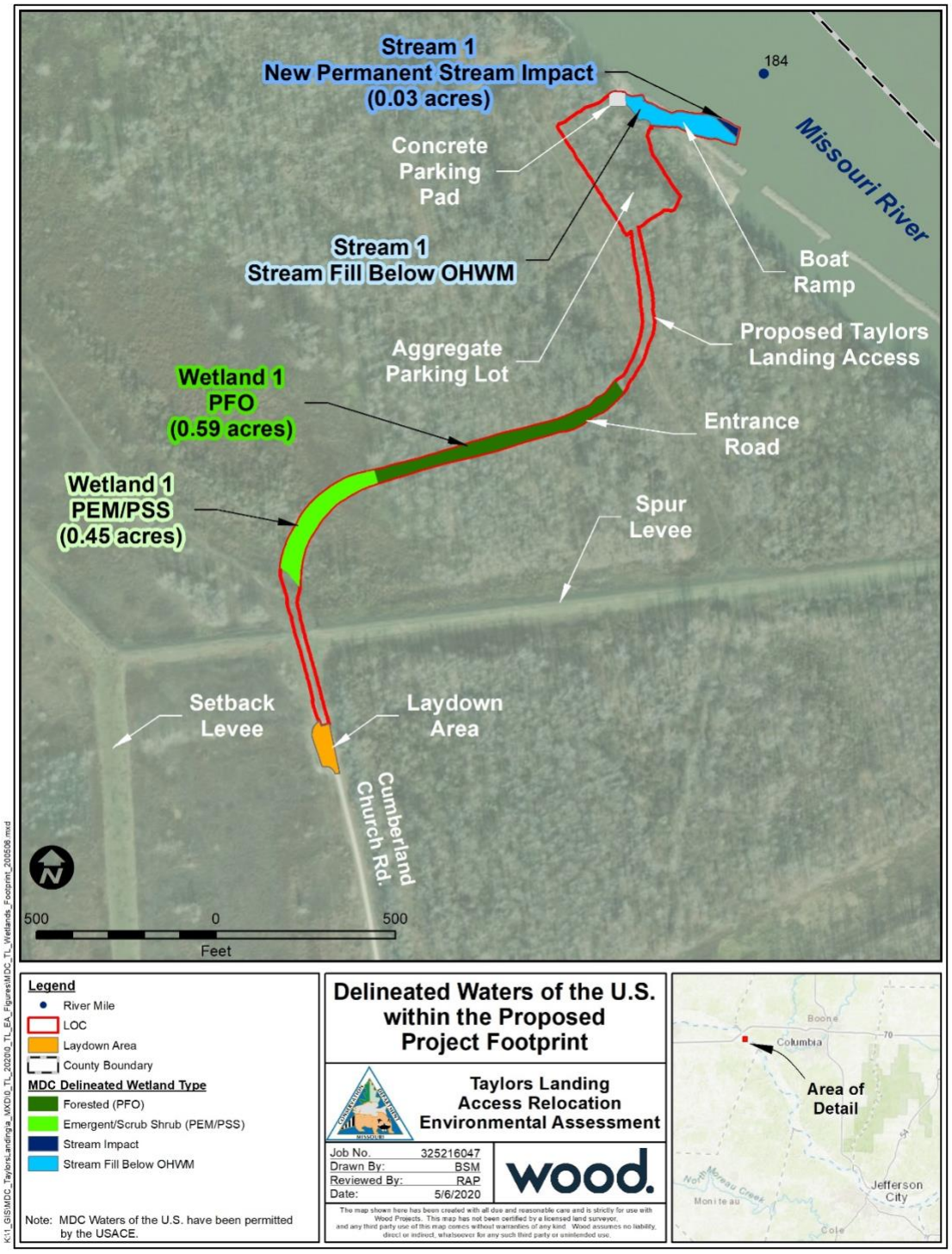

Figure 3-5. Jurisdictional Waters of the U.S. Within the Proposed Project Footprint

3.8.2 Environmental Consequences

3.8.2.1 No Action Alternative

Under the No Action Alternative, the original Taylors Landing Access would not re-open, and no new construction activities would take place in association with the proposed Project. Therefore, there would be no impacts to wetland resources under this alternative.

3.8.2.2 Proposed Alternative

Under the Proposed Alternative, MDC anticipates that construction of the proposed Project will result in the permanent discharge of 2,289 cubic yards of earthen material as fill into approximately 1.04 acres of jurisdictional wetlands and 573 cubic yards of riprap and 87 cubic yards of concrete into 0.55 acres of the Missouri River. Approximately 147 cubic yards of the riprap would be excavated from an existing USACE revetment within the river; therefore, only 0.03 acre of the proposed boat ramp footprint would be new stream impact. The total new stream impact would be along 120 feet of the channel with 74 cubic yards of clean rock fill. Impacts to WOUS within the proposed Project footprint are shown in Table 3-4 and Figure 3-5.

On May 22, 2018, USACE Kansas City District executed a Section 404 Individual Permit for the proposed Project (NWK 2014-00271). In February 2020, in coordination with USACE, MDC revised the proposed Project entrance road design (lowering the elevation) (Appendix C) so that it would no longer require a borrow area for earth fill. It had been determined previously that the permitted borrow area contained wetlands and soils that were not conducive for use as construction fill. All borrow material required for the lower elevation road design would be taken from the construction footprint. The revised entrance road plans were submitted to USACE on March 9, 2020 for modification of the permit and the modification was approved on April 16, 2020.

According to the Special Condition (p) of the executed permit and permit modification (Appendix E), compensation for the 1.04 acres of wetlands impacts will be accomplished by generating 6.89 wetland mitigation credits at the Plowboy Bend CA, located in Moniteau County, Missouri along the right descending bank of the Missouri River approximately 11 miles downstream of the Taylors Landing Access Relocation proposed Project footprint. A Compensatory Wetland Mitigation Plan was prepared to satisfy the mitigation requirements associated with impacts to wetlands from the proposed Project (Amec Foster Wheeler 2017). Figure 1-1 shows the location of the proposed Taylors Landing Access Project in relation to the proposed Mitigation Site at Plowboy Bend CA. No compensatory mitigation was required for the stream impact.

Table 3-4. Delineated Waters of the U.S. and Impacts within the Proposed Project Footprint

Feature	Type	Status	Impact		Length	Area (acres)	Fill Type
Stream 1 (Missouri River)	Perennial	Jurisdictional	Boat ramp (290-ft-long, 16-ft-wide concrete boat ramp and rock base) and parking area	Below OHWM	375	0.55	Concrete and clean riprap rock
				New Impact	120	0.03	
Wetland 1	Forested	Jurisdictional	Entrance road		N/A	0.59	Earth fill, HDPE pipe
Wetland 1	Emergent-Scrub/Shrub	Jurisdictional	Entrance road		N/A	0.45	Earth fill, HDPE pipe
				Total Permanent Impact	**375 feet**	**1.59 acres**	

Note: Jurisdictional wetlands impacts have been reduced due to entrance road design modifications since original USACE permitting. USACE approved a permit modification on April 16, 2020. This table represents modified permitted impacts.

The proposed mitigation work would expand an existing 0.54-acre floodplain wetland complex at Plowboy Bend CA in a 10.34-acre footprint currently used for agricultural row crop production. The plan would generate the credits by creating 4.64 acres of forested wetland, 2.25 acres of emergent/scrub-shrub, and 3.11 acres of a bottomland prairie vegetation buffer serving as wildlife habitat (Appendix F).

It should be noted that the modified proposed entrance road design resulted in a smaller actual impact to both emergent-scrub/shrub and forested wetlands in the proposed Project footprint than the originally permitted entrance road design (1.04 acres versus 1.91 acres). However, MDC will move forward with the approved mitigation plan under the original executed permit with no reduction in acreages constructed.

During proposed Project construction activities, erosion control measures would be used to avoid impacts to adjacent wetland resources. BMPs such as silt fencing and use of matting would be implemented to further reduce indirect wetland impacts where feasible. To minimize impacts, construction vehicles would utilize the existing Cumberland Church Road right-of-way to the furthest extent practicable and would stay within the proposed Project footprint. Temporary laydown would be at an existing gravel parking area at the end of Cumberland Church Road (Figure 3-5). Upon completion of construction, vegetated areas would be restored as close to their original state as practicable and in accordance with applicable permits. Herbaceous vegetation along the impacted areas will be seeded and mulched to minimize soil runoff.

The operations and maintenance activities associated with this proposed Project would be similar to operations and maintenance activities for the original Taylors Landing Access. Maintenance activities would include occasional tree clearing and mowing within the entrance road right-of-way and parking area.

In summary, the proposed Project would result in the permanent loss and fragmentation of 1.04 acres of wetlands and 0.55 acre of stream. There would also be some minor, short-term, and/or indirect impacts associated with construction and operation of the proposed Project. However, these impacts would be mitigated in accordance with and above the USACE Section 404 and MDNR Section 401 permit requirements.

3.9 Aquatic Resources

3.9.1 Affected Environment

The aquatic fauna of the Missouri River has undergone rapid change in response to the habitat modifications from bank stabilization and creation of a navigation channel. The most abundant large fishes in the Missouri River are longnose gar (*Lepisosteus osseus*), shortnose gar (*L. platostomus*), gizzard shad (*Dorosoma cepedianum*), common carp (*Cyprinus carpio*), bighead carp

(*Hypophthalmichthys nobilis*), silver carp (*H. molitrix*), river carpsucker (*Carpoides carpio*), smallmouth buffalo (*Ictiobus bubalus*), bigmouth buffalo (*I. cyprinellus*), channel catfish (*Ictalurus punctatus*), flathead catfish (*Pylodictis olivaris*), white bass (*Morone chrysops*), and freshwater drum (*Aplodinotus grunniens*). The largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), black crappie (*Pomoxis nigromaculatus*), and white crappie (*P. annularis*) are abundant in oxbows and backwaters. Other species characteristic of this stretch of the Missouri River include chestnut lamprey (*Ichthyomyzon castaneus*), shovelnose sturgeon (*Scaphirhynchus platorynchus*), paddlefish (*Polyodon spathula*), skipjack herring (*Alosa chrysochloris*), goldeye (*Hiodon alosoides*), blue sucker (*Cycleptus elongatus*), and blue catfish (*I. furcatus*). Minnows are the most abundant group of small fishes in the Missouri River. The speckled chub (*Macrhybopsis aestivalis*), sicklefin chub (*M. gelida*), silver chub (*M. storeriana*), flathead chub (*Platygobio gracilis*), emerald shiner (*Notropis atherinoides*), river shiner (*N. blennius*), silverband shiner (*N. shumardi*), and channel shiner (*N. wickliffi*) are especially characteristic. A greater relative abundance and species composition of fishes have been collected within Missouri River side channels than fishes caught in the main channel (USFWS 2014a). The federally endangered pallid sturgeon has been documented to occur in shallow water habitats within the Missouri River near the Big Muddy NFWR (see Section 3.11).

About 142 species of macroinvertebrates are known to occur in the mainstem of the lower Missouri River, nearly half of which belong to the three primary insect orders found in flowing waters: Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies). About 170 species are known to occur in off-channel wetlands, 132 of which are unique to wetlands and not found in the mainstem (USGS 2010). A macroinvertebrate study performed on the lower Missouri River contained relatively higher numbers of these three taxa typical of moderately good water quality and habitat. In contrast, sites downstream from the study area contained lower numbers of caddisflies and greater numbers of pollution tolerant oligochaetes (Poulton et al. 2003).

Channelization and other human activities on the lower Missouri River have led to a decline in diversity of mussels, but mussels that live in mud, sand, and gravel riverbed habitats still occur in the river. Common mussel species that may occur in the study area include the threeridge (*Amblema plicata*), mapleleaf (*Quadrula quadrula*), butterfly (*Ellipsaria lineolata*), and washboard (*Megalonaias nervosa*) mussels. The fragile (*Leptodea fragilis*) and pink papershell (*Potamilus ohiensis*) also have adapted to the muddy waters of the Missouri River (Bruenderman et al. 2002).

Biological surveys of the large scour hole just west of the Missouri River in Overton Bottoms North and South Units have documented its value as a fishery (colonized by Missouri River fishes) and as turtle habitat. This scour hole was created during previous flood conditions and is only connected to the Missouri River during high water level periods. Turtles found within this habitat have included the red eared slider (*Trachemys scripta elegans*), false map turtle (*Graptemys pseudogeographica*), common snapping turtle (*Chelydra serpentine*), midland smooth softshell

turtle (*Apalone mutica*), spiny softshell turtle (*A. spinifera*), and the western painted turtle (*Chrysemys picta*) (FHWA and MoDOT 2004).

Additional information on federally threatened and endangered aquatic species as well as state-listed species of concern that may occur within the study area is provided in Section 3.11.

3.9.2 Environmental Consequences

3.9.2.1 No Action Alternative

Under the No Action Alternative, the original Taylors Landing Access would not re-open, and no new construction activities would take place in association with the proposed Project. Therefore, there would be no impacts to aquatic resources under this alternative.

3.9.2.2 Proposed Alternative

The Proposed Alternative would have potential for limited impact to aquatic organisms during short-term construction of the boat ramp along the shoreline of the Missouri River. Construction activities are not expected to impact aquatic biota other than minor, short-term displacement. Mobile aquatic species such as fish and turtles would generally avoid construction activity at the boat ramp and would recolonize subsequent to construction. Less mobile aquatic organisms such as mussels and macroinvertebrates may be permanently impacted from placement of in-stream riprap and boat ramp construction. Given the small area of aquatic habitat disturbance (0.55 acres) that is expected to be impacted due to the construction of the boat ramp, these impacts are considered minor.

Although the proposed Project would permanently displace 0.55 acre of open water habitat in the Missouri River, the boat ramp would be placed at the end of an existing revetment within deep water habitat, and construction of the ramp is not expected to affect shallow water fish spawning habitat. Overall impacts to aquatic species in the river associated with construction activities would be minor and mostly short-term.

Impacts to aquatic habitat would also include permanent displacement of approximately 0.59 acres of forested wetlands and approximately 0.45 acres of palustrine emergent scrub-shrub wetlands within the proposed Project footprint. Wetland impacts would be mitigated by expansion of an existing floodplain wetland complex at Plowboy Bend CA (within the Missouri River floodplain, see Section 3.8.2) by creating 4.64 acres of forested wetland, 2.25 acres of emergent/scrub-shrub, and 3.11 acres of a bottomland prairie vegetation buffer (Appendix F).

Indirect impacts associated with proposed construction activities include the potential for sediment to be transported into the adjacent Missouri River resulting in an increase in local turbidity and sediment load, which have potential to temporarily impact aquatic biota. Implementation of the erosion and sediment control measures specified in the SWPPP would

control runoff into adjacent waterways and as designed would be protective of the aquatic environment. Any indirect sedimentation into surrounding waterways would quickly attenuate with time, distance, and water volume, and there would be no permanent adverse impacts to resident aquatic biota or existing habitat.

As described in Section 3.7.2, MDC recognizes the potential risks of flooding during construction activities (and the risk to impacts on aquatic organisms) and would develop a daily monitoring system to advise construction crews of potential flooding of construction sites. This management system would be used to schedule construction activities to coincide with low risk, low river flow periods and allow for sufficient time for removal of construction equipment in advance of predicted flood events. BMPs such as restriction of equipment maintenance and fueling activities to lands outside the setback levee, measures to avoid spills, and management of incidental and accidental releases in accordance with standard practice and regulatory requirements would avoid and minimize the potential for such releases.

The primary issues related to impacts on the aquatic environment from operation of the proposed Taylors Landing Access would be related to accidental releases of contaminants and increased turbidity from operation of watercrafts in the river. Boats may interact with the aquatic environment by a variety of mechanisms, including propeller contact, turbulence from the propulsion system, and waves produced. In turn, each of these impacting mechanisms may have multiple effects on the aquatic ecosystem (Asplund 2010), including increased turbidity. However, the proposed Project is a relocation of an existing access, the proposed Project would not likely increase the number of watercraft on the river because other accesses to the Missouri River occur in the region, and use of BMPs would avoid or minimize impacts during both construction and operation.

Overall, impacts to aquatic resources would be avoided and minimized through use of BMPs and adherence to the SWPPP that are designed to be protective of the aquatic environment, resulting in minor and short-term impacts during construction. Permanent impacts to wetland habitat would be mitigated in accordance with USACE requirements. Likewise, impacts associated with operations and maintenance would be associated with turbidity and accidental releases, and impacts would be addressed through adherence to BMPs. Potential impacts to terrestrial species that use wetland habitats are discussed in Section 3.10.2.

3.10 Terrestrial Resources

3.10.1 Affected Environment

3.10.1.1 Vegetation

The proposed Project is located within the Interior River Valleys and Hills (72) Level III ecoregion. The Interior River Valleys and Hills ecoregion is made up of many wide, flat-bottomed, terraced valleys, forested valley slopes, and dissected glacial-till plains. In contrast to the generally rolling to slightly irregular plains in adjacent ecological regions to the north, east, and west (northwest only in Missouri), where most of the land is cultivated for corn and soybeans, less than half of this area is in cropland, about 30 percent is in pasture, and the remainder is in forest. This region is generally a transitional area between the more forested areas in the Ozarks, and the flatter plains and more extensive cropland of regions to the north (Chapman et al. 2002).

Within the Interior River Valleys and Hills ecoregion, the proposed Project is located in the River Hills (72f) Level IV ecoregion. The landscape of this ecoregion includes smooth to moderately dissected, forested river side-slopes and bluffs, some loess-covered hills, and areas with karst features. This region, which lies along the Missouri River as well as the Mississippi River, is a transition zone between the loess-covered and till-covered plains to the north (Ecoregion 40) and the lighter colored, rocky soils of the more dissected interior Ozark Highlands (39) regions.

The River Hills are less forested than interior areas in the Ozarks. Ridges and valleys have a deep soil mantle, but the steep slopes are stony with frequent rock outcrops. Loess, which can be thick in some areas, mantles the ridges and uplands. Deep, sandy and silty, moderately to poorly drained alluvium covers the river valleys. Paleozoic bedrock is relatively resistant to erosion along the Missouri River, and consequently the Missouri River alluvial valley is relatively narrow in this region, a contrast to the wide plain of neighboring 47d ecoregion. Land cover throughout this region is varied, with row crops, improved pasture, woodland, and oak and mesic mixed hardwood forests (Chapman et al. 2002).

The USGS and the U.S. Department of the Interior mapped and characterized terrestrial plant communities within the Big Muddy NFWR Overton Bottoms South Unit in 2013, based on aerial photographs and field data (Struckhoff 2013). According to this map, plant communities within the proposed Project footprint include midwestern cottonwood/black willow forest within the proposed parking area, cottonwood floodplain woodland and herbaceous old field within the proposed entrance road area, and sandbar willow shrubland along the spur levee (Struckhoff 2013). The midwestern cottonwood/black willow forest is dominated by cottonwood (*Populus deltoides*) with varying amounts of willow (*Salix* spp.). Cottonwood floodplain woodland has the following characteristics: 1) canopy of cottonwoods and other species with a cover below 60

percent, or if higher, 2) a poorly developed understory and shrub layer, and 3) a diverse ground flora dominated by bottomland grasses, such as prairie cordgrass (*Spartina pectinata*) and sedges (*Carex* spp.). Herbaceous old fields are dominated by herbaceous vines, ragweed (*Ambrosia* spp.), and non-native grasses such as foxtail (*Setaria viridis*) and barnyard grass (*Echinochloa crus-galli*). Sandbar willow shrubland is dominated by willows and cottonwood and is characterized by a low canopy comprised of small diameter stems (Struckhoff et al. 2011). Vegetation within the jurisdictional wetland areas of the proposed Project footprint is described in Section 3.8.1.

According to the NLCD, the approximately 3.7-acre proposed Project footprint (proposed Project area combined with temporary laydown area) is dominated by deciduous forest (1.7 acres) with some emergent and forested wetlands, scrub-shrub, and herbaceous vegetation. Areas of land cover type within the proposed Project footprint and study area are shown in Table 3-2 and Figure 3-1. In some areas of the Overton Bottoms South Unit, former crop fields have been supplanted by dense early growth floodplain forest dominated by cottonwood and willow. As these forests age, species composition changes to include white mulberry (*Morus alba*), silver maple, boxelder, sycamore (*Platanus occidentalis*), and a few mast bearing hardwoods such as pin oak (*Quercus palustris*) and bur oak (*Q. macrocarpa*). Areas not dominated by forest include species of aster (*Aster* sp.), smartweed, sunflower (*Helianthus* sp.), goldenrod (*Solidago* sp.), Reed canary grass (*Phalaris arundinacea*), Johnson grass (*Sorghum halepense*), and other annual and perennial herbaceous plants typical of disturbed sites (USFWS 2014a). In general, forests found on the refuge include narrow bands of large cottonwoods along the Missouri River and dense, young stands of riparian species such as cottonwood, willows, sycamore, boxelder, ash (*Fraxinus* sp.), and silver maple in disturbed areas such as former cropland or recently flooded land (USFWS 2014a).

3.10.1.2 Wildlife

The Overton Bottoms South Unit of the Big Muddy NFWR contains a mix of old field, emergent wetlands, open water, and early successional bottomland forest habitats. Flooding within the unit is frequent on the lower elevations as evidenced by open water and scouring. The variable habitat of terrestrial, wetland, and aquatic ecosystems within the study area support a diverse mix of wildlife species. Big Muddy NFWR management efforts for mammals consist of protecting and restoring habitat to native vegetation that supports healthy populations of native species. Hunting is allowed under statewide regulation to provide recreation but also to prevent overpopulation of species. For management of aquatic species, the NFWR staff form partnerships with other agencies, including the USACE, MDC, and the USGS to construct, manage, monitor and assess shallow water habitat types that were largely lost as a result of human manipulation of the Missouri River and associated floodplain. Examples of important habitat types targeted for restoration include side channels, sand bars, oxbow lakes, marshes, and other shallow habitat features (USFWS 2014a).

Within the proposed Project footprint, the closest waterbody is the Missouri River. There are also forested wetland and emergent wetland habitats in the study area within the floodplain of the Missouri River. Riparian zones along the Missouri River support a diverse wildlife community that is dependent or associated with water and characterized by various mammal species, waterfowl, wading birds, shorebirds, birds of prey, migratory songbirds, and herpetofauna (snakes, frogs, toads, turtles, and salamanders).

Mammal species expected to occur in the study area include white-tailed deer (*Odocoileus virginana*), eastern cottontail (*Sylvilagus floridanus*), opossum (*Didelphis virginiana*), eastern gray squirrel (*Sciurus carolinensis*), fox squirrel (*S. niger*), white-footed mouse (*Peromyscus leucopus*), deer mouse (*P. maniculatus*), eastern mole (*Scalopus aquaticus machrinoides*), coyote (*Canis latrans*), groundhog (*Marmota monax*), beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), river otter (*Lontra canadensis*), bobcat (*Lynx rufus*), striped skunk (*Mephitis mephitis*), raccoon (*Procyon lotor*), red fox (*Vulpes vulpes*), big brown bat (*Eptesicus fuscus fuscus*), and tri-colored bat (*Perimyotis subflavus*). Nine-banded armadillo (*Dasypus novemcinctus*) are expanding their range northward, and feral hogs have the potential to expand into habitat found on the NFWR as well (USFWS 2014a). A cave that is used by bats, including the federally listed Indiana bat (*Myotis sodalis*) and gray bat (*Myotis grisescens*) is located approximately one (1) mile southeast of the proposed Project. Federally listed bat species are further discussed in Section 3.11.

Bird species expected to occur in the study area include a mix of habitat generalists, songbirds and raptors that prefer bottomland forest and scrub-shrub, and water-dependent species, such as red-winged blackbird (*Agelaius phoeniceus*), Brewer's blackbird (*Euphagus cyanocephalus*), indigo bunting (*Passerina cyanea*), brown-headed cowbird (*Molothrus ater*), tufted titmouse (*Baeolophus bicolor*), black-capped chickadee (*Poecile atricapillus*), blue-gray gnatcatcher (*Polioptila caerulea caerulea*), American goldfinch (*Carduelis tristis tristis*), American robin (*Turdus migratorius*), Canada goose (*Branta canadensis*), mallard (*Anas platyrhynchos*), wood duck (*Aix sponsa*), ring-billed gull (*Larus delewarensis*), eastern wood-pewee (C*ontopus virens*), American crow (*Corvus brachyrhynchos*), fish crow (*C. ossifragus*), blue jay (*Cyanocitta cristata*), common grackle (*Quiscalus quiscula*), common yellowthroat (*Geothlypis trichas brachidactylus*), Carolina wren (*Thryothorus ludovicianus ludovicianus*), belted kingfisher (*Megaceryle alcyon*), downy woodpecker (*Picoides pubescens*), red-bellied woodpecker (*Melanerpes carolinus*), song sparrow (*Melospiza melodia*), tree swallow (*Tachycineta bicolor*), northern cardinal (*Cardinalis cardinalis*), broad-winged hawk (*Buteo platypterus platypterus*), red-shouldered hawk (*Buteo lineatus lineatus*), red-tailed hawk (*Buteo jamaicensis borealis*), barred owl (*Strix varia*), and great-horned owl (*Bubo virginianus*). Bald eagles (*Haliaeetus leucocephalus alascensis*) and American white pelicans (*Pelecanus erythrorhynchos*) are winter species of this area, and bald eagles also nest in the study area vicinity.

Waterfowl have historically used the Missouri River and its floodplain for resting, feeding, and nesting. Their concentration numbers and locations vary from year to year due to shifts in climate and habitat conditions; however, numbers are greatest during the spring and fall migrations (USFWS 2014a). Review of the USFWS's Information for Planning and Consultation (IPaC) database (https://ecos.fws.gov/ipac/) resulted in identification of eight (8) migratory birds of conservation concern that have the potential to occur near proposed Project: bald eagle, blue-winged warbler (*Vermivora pinus*), eastern whip-poor-will (*Antrostomus vociferous*), Kentucky warbler (*Oporornis formosus*), lesser yellow legs (*Tringa flavipes*), red-headed woodpecker (*Melanerpes erythrocephalus*), rusty blackbird (*Euphagus carolinus*), and wood thrush (*Hylocichla mustelina*). Information regarding threatened and endangered species in the study area can be found in Section 3.11.

Some of the herpetofauna (reptiles and amphibians) species expected to occur in the study area include three-toed box turtle (*Terrapene carolina triunguis*), small-mouthed salamander (*Ambystoma texanum*), and central newt (*Notophthalmus viridescens louisianensis*). Frogs and toads expected near the project footprint include American toad (*Bufo americanus*), gray tree frog (*Hyla versicolor*), northern spring peeper (*Pseudacris crucifer*), southern leopard frog (*Lithobates sphenocephala*), northern cricket frog (*Acris crepitans*), and bullfrog (*Lithobates catesbeianus*). Snakes expected to occur near the project site include eastern hog-nosed snake (*Heterodon platirhinos*), northern water snake (*Nerodia sipedon sipedon*), midland brown snake (*Storeria dekayi wrightorum*), orange-striped ribbon snake (*Thamnophis proximus proximus*), and eastern garter snake (*T. sirtalis*).

3.10.1.3 Invasive Species

Certain non-native species are considered invasive and pose a significant threat to the natural environment. Executive Order (EO) 13112, Invasive Species (February 3, 1999) directed federal agencies to prevent the introduction of invasive species (both plants and animals), control their populations, restore invaded ecosystems and take other related actions. EO 13751 issued on December 8, 2016, amends EO 13112 and directs actions by federal agencies to continue coordinated federal prevention and control efforts related to invasive species. This order incorporates considerations of human and environmental health, climate change, technological innovation, and other emerging priorities into federal efforts to address invasive species; and it strengthens coordinated, cost efficient federal action.

The proposed Project footprint is in an area characterized by regular inundation and sedimentation due to recurrent flooding. Waterways and their floodwaters facilitate range expansions by transporting both aquatic and terrestrial invasive species to new areas.

The Big Muddy NFWR began a program of invasive species inventory, mapping, and control in 2004. The invasive weed inventory and mapping assists in 1) reviewing and prioritizing control

efforts in keeping with habitat management goals and objectives, 2) eradicating newly discovered invasive species (early response), and 3) reducing the spread of economically damaging species to neighboring properties/croplands (USFWS 2014a). Several plants have been found on the Big Muddy NFWR and are state-listed as noxious weeds (USDA NRCS 2020b). In Missouri, the term "noxious" refers to the weed's ability to cause economic harm to the State's agriculture industry and to the high level of difficulty associated with controlling or eradicating the species. Noxious weeds on the NFWR include: musk thistle (*Carduus nutans*); Canada thistle (*Cirsium arvense*); common and cut-leaved teasels (*Dipsacus fullonum* and *D. laciniatus*); purple loosestrife (*Lythrum salicaria*); kudzu (*Pueraria lobata*); and Johnson grass.

Some of the most invasive non-native plant species found on the refuge include: garlic mustard (*Alliaria petiolata*); Japanese hops (*Humulus japonicus*); Morrow's and Amur honeysuckles (*Lonicera morrowii* and *L. maackii*); reed canarygrass; common reed (*Phragmites australis*); autumn olive (*Elaeagnus umbellata*); Russian olive (*E. angustifolia*); and *Sericea lespedeza*.

Missouri aquatic resources, including the Missouri River, are threatened by migration of non-native aquatic species into open-ended river systems, and by their accidental or intentional release into other public and private waters. Missouri's Aquatic Nuisance Species Management Plan provides a framework for how future efforts regarding prevention, control, and mitigation of the effects of aquatic nuisance species in Missouri can be organized (MDC 2007).

Asian carp species have become a problem in the Missouri River. The common carp was introduced into the Missouri River over 100 years ago and is now one of the most widespread and abundant large fishes in Missouri. During the 1970s, bighead and silver carp were imported into the United States for use in aquaculture production of food fishes and biological control of plankton in aquaculture ponds and sewage treatment lagoons. Within ten years, bighead and silver carp escaped confinement and spread to the waters of the Mississippi River basin and other large rivers. Today, these carp species are found in 23 states, and their population numbers are increasing exponentially. They compete directly with native aquatic species for food and habitat (USFWS 2014a).

Zebra mussels (*Dreissena polymorpha*), also originating from Asia, are another invasive aquatic species that occur in the Missouri River. Zebra mussels have a tremendous negative impact on aquatic ecosystems, changing the quality of the water, outcompeting native freshwater mussels, and reducing the plankton available that form the basis for fish life. Zebra mussels spread to lakes and rivers by overland transport on boats, motors, trailers, docks, aquatic plants, pumps and other equipment (MDC 2020d).

3.10.2 Environmental Consequences

3.10.2.1 No Action Alternative

Under the No Action Alternative, the original Taylors Landing Access would not re-open, and no new construction activities would take place in association with the proposed Project. Therefore, there would be no impacts to terrestrial resources under this alternative.

3.10.2.2 Proposed Alternative

3.10.2.2.1 Vegetation

Construction activities (entrance road and parking lot) carried out in support of the proposed Project would permanently displace approximately 2.5 acres of a mixture of deciduous cottonwood/black willow forest, cottonwood woodland and old field, and sandbar willow shrubland vegetation (see Table 3-2). In addition, there would be permanent impact to USACE jurisdictional WOUS, including 0.45 acres of palustrine emergent scrub-shrub (PEM/PSS) wetlands vegetation and 0.59 acres of palustrine forested wetlands vegetation (PFO). The approximately 0.14-acre temporary laydown area is a gravel parking lot and no vegetation would be impacted.

Permanent impacts to forest vegetation would include the approximately 0.59 acres of forested wetlands and approximately 1.68 acres of cottonwood/black willow forest. However, because these forested areas have been disturbed by former cultivation and/or recent flooding, and due to the small amount of forest area affected relative to the surrounding available forested area within one (1) mile of the proposed Project (approximately 853 acres, Table 3-2), overall impacts are expected to be minor and would be mitigated in accordance with USACE requirements. Tree removal within the proposed Project footprint would occur during the winter, between November 1, 2020 and March 31, 2021, to avoid disturbance of nesting and roosting wildlife. Other permanently impacted vegetation is approximately 0.5 acres of old field and scrub-shrub previously disturbed vegetation.

Vegetation along the Missouri River shoreline would be cleared for installation of the 16-foot-wide concrete boat ramp and for installation of riprap to stabilize the banks approximately 100 feet on each side of the proposed ramp. However, shoreline vegetation in this area is sparse due to frequent flooding and variable water levels.

In areas that are adjacent to the aggregate entrance road and parking area, tree clearing activities would convert old field and forested land to herbaceous vegetation that would be regularly mowed and maintained by MDC personnel. Vegetated areas that are disturbed during construction activities would be reseeded with a native, non-invasive seed mix or allowed to naturally revegetate following construction. The entrance road would be maintained to avoid potential sight restrictions and to prevent conditions that might otherwise hinder regular

maintenance (such as sod/grass encroachment into the normal driving lanes, woody vegetation encroachment on shoulders or in ditches, tree canopy encroachment over road corridor, etc.).

In summary, impacts to existing vegetation as a result of construction of proposed access facilities would be minor and would be mitigated in accordance with USACE and MDNR WQC requirements.

3.10.2.2.2 Wildlife

The permanent displacement and fragmentation of vegetated wildlife habitat from construction of the entrance road, parking area, and boat ramp would be a potential long-term impact to wildlife, including some migratory birds of conservation concern. Permanent impacts to and fragmentation of forest and wetland wildlife habitat would include conversion of approximately 0.59 acres of forested wetlands, approximately 0.45 acres of palustrine emergent scrub-shrub wetlands, and approximately 1.68 acres of cottonwood/black willow forest to an entrance road and boat ramp. Tree removal within the proposed Project footprint would occur during the winter, between November 1, 2020 and March 31, 2021, to avoid disturbance of nesting and roosting wildlife. Because these habitat areas have been disturbed by former cultivation and/or recent flooding, and due to the small amount of forest and wetland habitat affected relative to the surrounding available forested and wetland areas within one (1) mile of the proposed Project (approximately 853 acres and 261 acres, respectively, as shown in Table 3-2), overall impacts are expected to be minor and would be mitigated in accordance with USACE requirements.

Wetland impacts would be mitigated by expansion of an existing 0.54-acre floodplain wetland complex at Plowboy Bend CA (within the Missouri River floodplain, see Section 3.8.2) in a 10.34-acre footprint currently used for agricultural row crop production. The plan would generate the credits by creating 4.64 acres of forested wetland, 2.25 acres of emergent/scrub-shrub, and 3.11 acres of a bottomland prairie vegetation buffer serving as wildlife habitat (Appendix F).

The Proposed Alternative would not affect any known shorebird nesting habitat, as the bank of the Missouri River within the proposed Project is steep (see photos in Appendix G) and frequently flooded. The proposed Project would not affect any sand or gravel bars or mudflats along the river. However, there would be permanent impacts to a small amount of shorebird feeding habitat along the Missouri River shoreline.

Operational mortality would increase with the Proposed Alternative as a boat ramp and entrance road in the proposed Project footprint would increase traffic volumes on Cumberland Church Road and new roadway would result in a greater incidence of vehicle-animal collisions. However, the proposed entrance road is not linear and would have an aggregate surface; therefore, traffic speeds would be limited and would likely result in minimal collisions with wildlife in comparison to a paved road. Also, because the proposed Project is a relocation of an existing access, vehicle collisions with wildlife would not increase significantly, although the new entrance road would be

used more consistently due to a potential decrease in flooding and associated road closure at the new location.

Noise or harassment from watercraft on the river may cause some wildlife to vacate nests, leaving eggs or young vulnerable to predators. Because the proposed Project is a relocation of an existing access, the number of watercraft on the river would not likely increase since there are other accesses to the Missouri River in the region, and noise levels of the nearby I-70 interstate would likely exceed motorboat noise, impacts would be minor.

Periodic maintenance of the proposed access would include vegetation management along the entrance road and surrounding the parking area and boat ramp facilities. Potential impacts to wildlife include the localized displacement of mobile faunal during vegetation management activities. Vegetation maintenance activities would be occasional and would be consistent with the operation and maintenance of the original Taylors Landing Access located with the NFWR. Thus, impacts to wildlife from operation and maintenance are expected to be negligible.

The proposed Project is a relocation of an existing access within the NFWR along the right descending bank of the Missouri River, only one (1) mile downstream, the boat ramp and other man-made features at the original access would be removed, and the site would be restored to natural, pre-existing conditions. Due to the abundance of available forest and wetlands habitat in the vicinity (approximately 853 acres and 261 acres, respectively, Table 3-2) and the short-term nature of impacts associated with construction activities, impacts to wildlife associated with those habitats under the Proposed Alternative would be minor and mostly short-term.

3.10.2.2.3 Invasive Species

Construction activities have the potential for increasing the establishment of invasive species in the proposed Project footprint and surrounding lands by disturbing ground, removing established vegetation, and introducing invasive species from outside sources during the transport and use of machinery and materials. Activities that result in ground disturbance have the effect of clearing in-situ vegetation or otherwise exposing bare ground which may be opportunistically colonized by invasive species that have competitive advantages over native species in disturbed conditions. The removal of established vegetation by complete eradication or simply cutting back creates an opportunity for fast growing invasive species to establish and potentially outcompete native vegetation. Transport of materials by truck and watercraft and the use of machinery from areas well outside the Project location have the potential to introduce foreign terrestrial and aquatic invasive species which may be unintentionally moved from one area to another.

Proposed Project activities that have the potential for causing ground disturbance include clearing established vegetation and/or spreading invasive species from the use of machinery and equipment from locations outside the proposed Project footprint. However, areas that would be cleared and maintained are relatively small and previously disturbed, and the NFWR and MDC

have integrated invasive species management programs for control of invasive plant species. These management programs include measures to verify outside materials such as seed mixes and straw do not contain seeds of invasive species and require the cleaning of equipment before being used on different areas.

In addition, use of watercraft can spread aquatic invasive species to the Missouri River from other infested water bodies. However, impacts associated with the proposed Project would be minor considering that this would be a relocation of an existing access, the Missouri River is already heavily utilized and invaded by invasive aquatic species, and that the NFWR and MDC have integrated invasive species management programs, including public education campaigns, for the spread of aquatic invasive species.

Due to adherence to the MDC integrated invasive species management program, and because there are invasive species already established within the study area, impacts from invasive species associated with the proposed Project would be minor. Also, care would be taken to clean all equipment of invasive species (e.g., exotic plant seeds) before entering the proposed Project and before relocating to other locations. As a preventative measure and when problems with invasive plants or aquatic invasive species are detected during operations of the proposed access, MDC would post signs at the access that would highlight the potential problems associated with the species.

3.11 Protected/Sensitive Species

3.11.1 Affected Environment

The ESA 16 USC §§ 1531-1544 was enacted to conserve the ecosystems upon which endangered and threatened species depend, and to conserve and recover those species. An endangered species is defined by the ESA as any species in danger of extinction throughout all or a significant portion of its range. Likewise, a threatened species is likely to become endangered within the foreseeable future throughout all or a significant part of its range. Critical habitats, essential to the conservation of listed species, also can be designated under the ESA. The ESA establishes programs to conserve and recover endangered and threatened species and makes their conservation a priority for federal agencies. Section 7 of the ESA requires federal agencies to consult with the USFWS when their proposed actions may affect endangered or threatened species and/or their critical habitats.

The Fish and Wildlife Coordination Act requires that federal agencies consult with the USFWS, the National Marine Fisheries Service, and State wildlife agencies for activities that affect, control or modify waters of any stream or bodies of water, in order to minimize the adverse impacts of such actions on fish and wildlife resources and habitat. This consultation is generally incorporated into

the process of complying with Section 404 of the Clean Water Act, NEPA or other federal permit, license or review requirements.

In compliance with Section 7(c) of the ESA, as amended, a listing of federally threatened or endangered species currently classified or proposed for classification that may occur within the proposed Project was obtained from the USFWS IPaC in March 2020 (USFWS 2020a). In addition, a Missouri Heritage Review was conducted on January 21, 2020 to obtain records regarding state-listed species and other protected lands and resources that could potentially be impacted by the proposed Project. As shown in Table 3-5, a total of seven federally and state-listed species were identified that are known or expected to occur on or near the proposed Project: flathead chub (*Platygobio gracilis*); lake sturgeon (*Acipenser fulvescens*); pallid sturgeon (*Scaphirhynchus albus*); Topeka shiner (*Notropis topeka* [=*tristis*]); gray bat; northern long-eared bat (*Myotis septentrionalis*); and Indiana bat. There are 15 other species of conservation concern that have the potential to occur in the study area (Table 3-5). Habitat requirements and impacts of the proposed Project are discussed for each federally and state-listed species in the following sections.

Although the bald eagle (*Haliaeetus leucocephalus*) was removed from the Federal List of Endangered and Threatened Species in August 2007, it continues to be protected under the Bald and Golden Eagle Protection Act (BGEPA) (16 USC §§ 668–668d) and by the Migratory Bird Treaty Act (MBTA) (16 USC §§ 703–712). The study area contains nesting and wintering habitat for the bald eagle.

Table 3-5. Protected Species Potentially Occurring Within or Near the Proposed Project

Common Name	Scientific Name	Federal Status	State Status/Rank	Known within Vicinity of Proposed Project
Aquatic (Fish and Mollusks)				
Lake sturgeon	*Acipenser fulvescens*	--	LE	Yes
Highfin carpsucker	*Carpiodes velifer*	--	S2	Yes
Western silvery minnow	*Hybognathus argyritis*	--	S2	Yes
Brassy minnow	*Hybognathus hankinsoni*	--	S3	Yes
Plains minnow	*Hybognathus placitus*	--	S2	Yes
Ghost shiner	*Notropis buchanani*	--	S2	Yes
Trout-perch	*Percopsis omiscomaycus*	--	S1?	Yes
River darter	*Percina shumardi*	--	S3	Yes
Flathead chub	*Platygobio gracilis*	--	LE	Yes
Pallid sturgeon	*Scaphirhynchus albus*	LE	LE	Yes
Sturgeon chub	*Macrhybopsis gelida*	--	S3	Yes
Topeka shiner	*Notropis topeka (=tristis)*	LE	LE	No

Common Name	Scientific Name	Federal Status	State Status/Rank	Known within Vicinity of Proposed Project
Mammals				
Silver-haired bat	*Lasionycteris noctivagans*	--	S3	Yes
Gray bat	*Myotis grisescens*	LE	LE	Yes
Little brown bat	*Myotis lucifugus*	--	S2	Yes
Northern long-eared bat	*Myotis septentrionalis*	LE	LE	Yes
Indiana bat	*Myotis sodalis*	LE	LE	Yes
Tri-colored bat	*Perimyotis subflavus*	--	S2	Yes
American badger	*Taxidea taxus*	--	S3	Yes
Birds				
Bald eagle	*Haliaeetus leucocephalus*	P	S3	Yes
Plants				
Bergia	*Bergia texana*	--	S2	Yes
Umbrella flatsedge	*Cyperus diandrus*	--	S1	Yes

Federal or State Status:
LT = Listed Threatened; LE = Listed Endangered; P = Protected
State Rank:
S1 – Critically imperiled in the state; S2 – Imperiled in the state; S3 – Rare and uncommon in the state;
? – Denotes inexact or uncertain ranks
Source: USFWS 2020a and MDC 2020c

3.11.1.1 Federally and State-Listed Species Descriptions

3.11.1.1.1 Flathead Chub

The flathead chub is state-listed as endangered in Missouri. In big rivers, this species prefers continuously turbid waters where the current is swift and the bottom is composed of sand and fine gravel. Historically the flathead chub inhabited the entire Missouri River and some of its tributaries, as well as the Mississippi River between the Missouri's mouth and the Arkansas state line. In the 1940s, this species made up 31 percent of small fishes in the river, but by the 1980s, it comprised only 1.1 percent. Currently, the species is nearly extirpated in the state. The rapid decline of the flathead chub coincided with the construction of a system of six large reservoirs on the Missouri River upstream of the state. The dams changed the flow and altered the bed load and turbidity of the water (MDC 2020a). The flathead chub is historically known to exist within the areas subject to disturbance by the proposed Project (MDC 2020c); however, this species is not likely present as it is nearly extirpated.

3.11.1.1.2 Lake Sturgeon

The lake sturgeon is state-listed as endangered in Missouri. Lake sturgeon spend their entire life cycle in freshwater and are widely distributed in North America. Lake sturgeon are found in three drainages: the Mississippi River, the Great Lakes, and the Hudson Bay. It occurs in the Mississippi

River Basin from the upper Mississippi River and its major tributaries to the southern border of Arkansas (NatureServe 2020). Lake sturgeon in Missouri historically occurred in the Mississippi, Missouri, and lower Osage rivers (MDC 2006). A recovery program initiated by MDC has stocked approximately 150,000 hatchery-reared Lake Sturgeon into the lower Missouri River at several sites in Missouri (Steffenson et al. 2014). Suitable aquatic habitat for the lake sturgeon, including strong current over gravel and sand substrates, may exist within the area subject to disturbance by the proposed Project.

3.11.1.1.3 Pallid Sturgeon

The pallid sturgeon is federally and state-listed as endangered. Pallid sturgeon are bottom-oriented, large river obligate fish inhabiting the Missouri and Mississippi rivers and some tributaries from Montana to Louisiana. This species occupies large, turbid, free-flowing riverine habitat and occurs in strong current over firm gravel or sandy substrate (USFWS 2014b). The loss of pallid sturgeon habitat is attributed to the modification of large rivers through river channelization, impoundment, and bank stabilization and through overharvest (USFWS 2014b). These changes alter the flow, temperature, turbidity of the river, negatively impacting pallid sturgeon numbers (USFWS 2020b). In response to the decline in pallid sturgeon populations, a recovery plan was implemented in 1993 by the USFWS (USFWS 1993). Restoration efforts include captive breeding and restocking of juveniles. Suitable aquatic habitat for the pallid sturgeon, including strong current over gravel and sand substrates, may exist within the area subject to disturbance by the proposed Project. A small scour or bank notch on the Missouri River bank approximately 125 feet north of the proposed Project footprint may contain marginal spawning habitat for the pallid sturgeon. There is no designated critical habitat for the pallid sturgeon in the study area.

3.11.1.1.4 Topeka Shiner

The Topeka shiner is a small minnow that lives and breeds in graveled pools of low-order prairie streams in the Great Plains states of South Dakota, Minnesota, Nebraska, Iowa, Kansas and Missouri. It was listed as federally endangered in 1999 as a result of significant population declines due primarily to alteration of prairie stream hydrology and habitat degradation. Guided by two successive 10-year management plans (MDC 1999, 2010), MDC staff conducts annual surveys, implements habitat improvements, and conducts research on the Topeka shiner. MDC personnel have also successfully reared the species and recently initiated the first Topeka shiner reintroductions within the state (USFWS 2018). Suitable habitat (gravel pools of low-order stream) for the Topeka shiner does not exist with the area subject to disturbance by the proposed Project, and there is no designated critical habitat for the Topeka shiner in the study area.

3.11.1.1.5 Gray Bat

The primary range of the federally and state-endangered gray bat is concentrated in the cave regions of Alabama, Arkansas, Kentucky, Missouri and Tennessee, with smaller populations found

in adjacent states. Missouri contains about 20 percent of the total population of gray bats. The gray bat is one of the few species of bats in North America that inhabit caves year-round, occupying cold hibernating caves or mines in winter and warmer maternity caves during summer (USFWS 2009). Gray bats are known to forage primarily over rivers, streams, and reservoirs and in forested areas near their caves, where they capture a variety of insects (USFWS 1982). Most of the known gray bat caves in Missouri are south of the Missouri River, particularly in the Ozarks, although a few exist north of the river, including Rocheport Cave, which is a gray bat maternity cave that lies within the study area approximately 0.9 mile southeast of the proposed Project. There is no designated critical habitat for the gray bat; however, suitable foraging habitat for the gray bat may exist within the area subject to disturbance by the proposed Project.

3.11.1.1.6 Northern Long-eared Bat

The northern long-eared bat was federally listed as threatened on April 2, 2015 and it is listed in Missouri as endangered. The USFWS published the Final 4(d) Rule for the Northern Long-Eared Bat in the Federal Register on January 14, 2016. The Northern long-eared bat 4(d) Rule prohibits incidental take that may occur from tree removal activities within 150 feet of a known occupied maternity roost tree during the pup season (June 1 to July 31) or within a 0.25 mile of a hibernation site, year around (USFWS 2016). The USFWS has not designated critical habitat for the northern long-eared bat.

In summer months, northern long-eared bats roost singly or in colonies within cavities, underneath bark, crevices, or hollows of both live and dead trees that typically have a diameter at breast height greater than or equal to 3 inches. Northern long-eared bats appear to be opportunistic, selecting trees based on the presence of cavities, crevices, or peeling bark. Northern long-eared bats emerge at dusk to forage below the canopy of mature forests on hillsides and roads, and occasionally over forest clearings and along riparian areas (USFWS 2020c; USFWS 2019b). Non-forested foraging habitats may include adjacent emergent wetlands and edges of agricultural fields, old fields, and pastures. Northern long-eared bats typically occupy their summer habitat from mid-May through mid-August (USFWS 2019b).

Suitable summer habitat for the northern long-eared bat includes a wide variety of forested lands to roost, forage, and travel. This includes forests containing potential roosts such as woodlots, fencerows, riparian forests, and other wooded corridors. These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure. Individual trees may be considered suitable habitat when they exhibit characteristics of suitable roost trees and are within 1,000 feet of other forested habitat. In winter, the northern long-eared bat hibernates underground in caves or other manmade structures such as mines. During the fall and spring, they utilize entrances of caves and the surrounding forested areas for swarming and staging (USFWS 2020c).

Because the proposed Project is approximately one (1) mile from Rocheport Cave, a northern long-eared bat winter hibernaculum, potentially suitable bat roost trees in the vicinity of the proposed Project footprint may be used during the fall swarming period. However, a habitat assessment was conducted that indicated that, after avoidance measures used for placement of the proposed entrance road alignment, only one potential bat roost tree, a cottonwood snag, would need to be removed for the proposed Project. This tree was removed in January 2014 while bats were in hibernation, in coordination with the USFWS and under USFWS and USACE supervision (see Appendix A).

3.11.1.1.7 Indiana Bat

The Indiana bat is found throughout much of the eastern half of the United States and has been listed as a federally endangered species since March 11, 1967. It is also listed in Missouri as endangered. According to the 2019 Range-Wide Indiana Bat Summer Survey Guidelines, "suitable summer habitat for Indiana bats consists of a wide variety of forested/wooded habitats where they roost, forage, and travel and may also include some adjacent and interspersed non-forested habitats such as emergent wetlands and adjacent edges of agricultural fields, old fields and pastures. This includes forests and woodlots containing potential roosts (i.e., live trees and/or snags greater than 5 inches DBH (12.7 centimeters) that have exfoliating bark, cracks, crevices, and/or hollows" (USFWS 2019b). Other summer habitat may include riparian zones, bottomlands, floodplains, wooded wetlands, and adjacent upland forests (USFWS 2007). Tree species that Indiana bats have been known to roost and establish maternity colonies in include hickory (*Carya* sp.), oak (*Quercus* sp.), elm (*Ulmus* sp.), ash (*Fraxinus* sp.), maple (*Acer* sp.), and poplar (*Populus* sp.) trees. Some tree species, primarily hickories, and to a lesser extent, oaks provide adequate bark characteristics in living trees. Space between exfoliating bark and the trunk of the tree appears to be the primary characteristic needed for bats to use a particular tree (USFWS 2007). According to the USFWS, the closest documented Indiana bat summer roost site is 14 miles from the proposed Project.

Indiana bat critical habitat, used for winter hibernation and designated by USFWS on September 24, 1976, consists of 11 caves and two mines in six states including six caves in Missouri [41 FR 41914]. Although Rocheport Cave, located within the study area, is a known Indiana bat hibernaculum, it is not designated as critical habitat for Indiana bats. Critical habitat (caves or other potential winter hibernacula) for the Indiana bat is not located within the proposed Project study area.

As part of the CWA Section 404 permit process, a habitat assessment survey for the Indiana bat was performed by MDC personnel in November 2013 within and immediately adjacent to the proposed Project footprint, using the USFWS 2013 Range-wide Indiana bat Summer Survey Guidelines (USFWS 2013b). Trees that were determined as potentially suitable for summer Indiana bat habitat included cottonwood trees with furrowed bark; silver maples, boxelders, oaks,

persimmon (*Diospyros virginiana*), black willow (*Salix nigra*), or white mulberry trees with peeling bark, cracks, cavities, or crevices in the trunks; or snags (dead trees) with cavities at a height suitable for roosting.

A seven-acre stand of large, mature cottonwoods with over 20 potentially suitable bat roost trees crosses the proposed Project footprint. Within this stand, one potentially suitable Indiana bat roost tree was identified within the proposed Project footprint, and four additional potentially suitable roost trees were adjacent to the Project footprint. The tree within the proposed Project footprint was a large (greater than 20 inches diameter at breast height) cottonwood snag with flaking bark that had the top broken out. From the 2013 habitat survey, no caves or potential winter hibernacula for the Indiana bat were identified within or in the immediate vicinity of the proposed Project.

3.11.2 Environmental Consequences

3.11.2.1 No Action Alternative

Under the No Action Alternative, the original Taylors Landing Access would not re-open, and no new construction activities would take place in association with the proposed Project. Therefore, there would be no impacts to protected/sensitive species under this alternative.

3.11.2.2 Proposed Alternative

3.11.2.2.1 Aquatic Species

Suitable aquatic habitat for the federally and state-endangered pallid sturgeon and state-endangered lake sturgeon may exist within the proposed Project footprint in the Missouri River. No suitable habitat exists for the Topeka shiner, and the flathead chub is not likely to exist within the proposed Project footprint.

Under the Proposed Alternative, construction of the boat ramp on existing rock revetment would permanently convert 0.55 acre of habitat from a silty sand shoreline to a rip rap shoreline and would likely cause short-term turbidity increases during installation. Pallid sturgeon and lake sturgeon may occur near the proposed Project footprint due to the presence of strong current over sand substrate. The proposed Project activities may cause minor, short-term, and rare behavioral responses by some individuals while activities are in progress. However, MDC did not identify highly suitable spawning habitat for the pallid sturgeon in the proposed Project footprint, as it is in a deep water location at the toe of an existing revetment with no shallow water habitat. In addition, heavy disturbance would be avoided during the spring spawning season (mid-May through mid-June), and river levels are typically too high to allow construction activities during this time period, as well. However, crevices in the rock revetment and a small scour or bank notch north of the proposed Project may offer some pallid sturgeon spawning habitat that could be indirectly affected by construction activities. However, the small scour is located over 100 feet

north of the proposed Project footprint, and by adhering to BMPs for stream projects, any potential adverse impacts to pallid and lake sturgeon and other sensitive aquatic species would be minor. MDC concluded, and the USFWS concurred on August 19, 2014, that the proposed Project does not necessitate seasonal spawning restrictions for the pallid sturgeon (see Appendix A). Therefore, MDC has determined that the proposed Project "*may affect, but is not likely to adversely affect,*" the pallid sturgeon. Additional consultation with USFWS will be conducted in association with the proposed Project grant proposal.

3.11.2.2.2 Mammals

There were no caves or mines within or adjacent to the proposed Project footprint. Additionally, no designated Indiana bat, northern long-eared bat, or gray bat critical habitat locations are located within the study area. Therefore, no impact is expected to hibernacula or designated critical habitat for the Indiana bat, northern long-eared bat, or gray bat.

The proposed Project involves the removal of trees from a forested wetland/riparian area that may be used by federally listed bats as a travel corridor for foraging, roosting, and potentially as maternity roosts (except for the gray bat, which uses only subterranean habitat for maternity roosts). Proposed Project construction activities may cause minor, temporary, and rare behavioral responses by some individuals while the activities are in progress, much like public use activities may cause. However, most construction activities including tree removal would be conducted in the winter months when bats are in hibernation.

In addition, a habitat assessment was conducted that indicated that, after avoidance measures used for placement of the proposed entrance road alignment, only one potential Indiana bat roost tree, a cottonwood snag, would need to be removed for the proposed Project. This tree was removed in January 2014 while bats were in hibernation, in coordination with the USFWS and under USFWS and USACE supervision (see Appendix A). Other tree removal in the proposed Project footprint will be conducted between November 1 and March 15 when bats are hibernating and would not potentially be using trees in the Project footprint. Therefore, by adhering to BMPs for development projects, any potential adverse impacts to bats and other sensitive mammal species would be minor.

The proposed Project would permanently displace a small amount of potential foraging and roosting habitat for listed bats, including approximately 0.59 acres of forested wetlands, 0.45 acres of emergent scrub-shrub wetlands, and 1.68 acres of cottonwood/black willow forest. However, due to the small amount of forest and wetland habitat affected relative to the surrounding available forested and wetland areas within one (1) mile of the proposed Project (approximately 853 acres and 261 acres, respectively, as shown in Table 3-2), overall impacts are expected to be minor and would be mitigated in accordance with USACE requirements. The USFWS concurred on January 2, 2014 that this Project "*may affect, but is not likely to adversely affect,*" the Indiana bat

and northern long-eared bat (Appendix A). As part of the USACE Section 404 permit public notice response in October 2015, the USFWS concurred that the proposed Project "*may affect, but is not likely to adversely affect*," the Indiana bat, northern long-eared bat, and the gray bat. Additional consultation with USFWS will be conducted in association with the proposed Project grant proposal.

3.11.2.2.3 Birds

Initial field investigations did not identify bald eagles or their nests within the proposed Project footprint or immediate vicinity. If a nest is encountered during construction, the USFWS would be contacted immediately per the National Bald Eagle Management Guidelines. The National Bald Eagle Management Guidelines would be followed throughout the construction, operation, and maintenance of the proposed action; thus, impacts to bald eagles are expected to be avoided.

3.11.2.2.4 Summary

In conclusion, based on placement of the proposed Project footprint to minimize removal of potential Indiana bat roost trees, removal of one unavoidable potential Indiana bat roost tree under USFWS supervision, and removal of all remaining trees in the winter, MDC determined and the USFWS concurred that this project "*may affect, but is not likely to adversely affect*" the Indiana bat, northern long-eared bat, and gray bat (see Appendix A). Additionally, based on use of BMPs for stream projects, avoidance of heavy construction activities during the spring spawning season, and lack of pallid sturgeon spawning habitat in the proposed Project footprint, MDC determined and USFWS concurred that the proposed Project does not necessitate seasonal spawning restrictions for the pallid sturgeon. Therefore, MDC has determined that the proposed Project "*may affect, but is not likely to adversely affect*" the pallid sturgeon. Additional consultation with USFWS will be conducted in association with the proposed Project grant proposal.

Should any federally listed, candidate, proposed, or other protected species be encountered during proposed Project construction activities, MDC or any of its agents shall immediately cease activities and notify the USFWS Missouri Ecological Services Field Office. Activities shall not resume until notified by the Field Office.

3.12 Socioeconomics and Environmental Justice

3.12.1 Affected Environment

The proposed Project is located in northeastern Cooper County, across the Missouri River from Boone County, between the cities of Boonville and Columbia. Given the nature of the proposed actions, the area of interest for socioeconomic and environmental justice analysis is defined as the three census block groups falling within the 1-mile radius study area. These block groups encompass the project footprint, as well as all areas that may be indirectly impacted by increased traffic or noise. As the study area spans Cooper and Boone counties, these two counties and the

state of Missouri are included as appropriate secondary geographic areas of reference. Comparisons at multiple spatial scales provide a more detailed characterization of populations that may be affected by the proposed actions, including any environmental justice populations (e.g., minority and low-income). Demographic and economic characteristics of populations within the study area were assessed using the 2014-2018 American Community Survey 5-year estimates provided by the U.S. Census Bureau (USCB) (USCB 2020a).

3.12.1.1 Demographics and Socioeconomic Conditions

Demographic characteristics of the study area and of the secondary reference geographies are summarized in Table 3-6. The census block groups within the study area have a total resident population of 3,127 and are predominantly characterized by low-density rural residential development. Cooper County is predominantly rural, with a resident population of 17,622, while Boone County, which includes the city of Columbia and its suburbs, has a resident population of 176,515. Since 2010, the population within the block groups that make up the study area has experienced an overall population decline of 12.4 percent, in notable contrast to the population growth experienced by Boone County (8.5 percent) and the state of Missouri (1.7 percent). During this same period, the population of Cooper County essentially remained the same, experiencing population growth of just 0.1 percent.

Approximately 95 percent of the population within the study area block groups is white; correspondingly, minority populations are relatively small. Minorities in the study area include: Hispanic or Latino (2.4 percent), Asian (0.7 percent), Black or African American (0.4 percent), some other race (0.1 percent), and persons who identified as two or more races (1.1 percent). Minority population percentages in the study area are generally comparable to or less than those of the reference geographies (Table 3-6).

Table 3-6. Demographic Characteristics

	Block Group 1, Census Tract 9501, Cooper County	Block Group 3, Census Tract 18.05, Boone County	Block Group 3, Census Tract 18.03, Boone County	Cooper County, Missouri	Boone County, Missouri	Missouri
Population[1,2]						
Population, 2018 estimate	1,055	736	1,336	17,622	176,515	6,090,062
Population, 2010	1,156	1,128	1,286	17,601	162,642	5,988,927
Percent Change 2010-2018	-8.7%	-34.8%	3.9%	0.1%	8.5%	1.7%
Racial Characteristics[1]						
Not Hispanic or Latino						
White alone, 2018 (a)	92.8%	100.0%	94.5%	88.0%	79.0%	79.6%
Black or African American, 2018 (a)	0.2%	0.0%	0.9%	6.3%	8.8%	11.5%
American Indian and Alaska Native, 2018 (a)	0.1%	0.0%	0.0%	0.3%	0.2%	0.4%
Asian, 2018 (a)	0.9%	0.0%	1.0%	0.2%	4.5%	1.9%
Native Hawaiian and Other Pacific Islander, 2018 (a)	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%
Some Other Race alone, 2018 (a)	0.3%	0.0%	0.0%	0.2%	0.2%	0.2%
Two or More Races, 2018	1.1%	0.0%	1.6%	2.9%	3.9%	2.3%
Hispanic or Latino, 2018	4.5%	0.0%	2.0%	1.9%	3.4%	4.1%
Housing and Income[1]						
Housing units, 2018	453	433	656	7,508	76,185	2,775,635
Median household income, 2014-2018	$ 65,764	$ 67,857	$ 54,044	$ 48,750	$ 54,043	$ 53,560
Persons below poverty level, 2014-2018	5.5%	0.4%	3.4%	11.9%	18.3%	14.2%

(a) Includes persons reporting only one race.

Sources: [1]USCB 2020a; [2]USCB 2011

The median household income in the block groups that make up the study area ranges from $54,044 to $67,857, consistent with or higher than the median household income for Cooper and Boone counties ($48,750 and $54,043, respectively) and the state of Missouri ($53,560) (Table 3-6). Correspondingly, the percentage of the study area population falling below the poverty level is 3.4 percent, notably lower than the surrounding counties and the state, where 11.9 to 18.3 percent of the population are living below the poverty level.

3.12.1.2 Community Services

Community facilities and services include public or publicly funded facilities such as police protection and other emergency services (ambulance/fire protection), schools, hospitals and other health care facilities, libraries, day care centers, churches, parks, and community centers. To identify facilities and emergency services that could be potentially impacted by proposed project activities, the area of interest has been identified as the study area (within a 1-mile radius of the proposed Project) or the service area of various providers, where applicable.

Based on a review of aerial imagery and online information, there are no community facilities and services available within a 1-mile radius of the proposed Project footprint, other than public recreation facilities such as the Big Muddy NFWR and the Katy Trail (see Section 3.2). While the study area is relatively undeveloped, more extensive community services, including schools, churches, and healthcare facilities, can be found in the cities of Columbia, approximately 7 miles to the east of the Project site, and Boonville, approximately 10 miles to the west.

Police protection for the proposed Project site is provided by the Cooper County Sheriff's Department, headquartered in Boonville, Big Muddy NFWR Federal Wildlife Officers, and MDC conservation agents. The Missouri State Highway Patrol also serves the study area, responding to incidents that take place along I-70 and on the Missouri River (Water Patrol Division). Fire protection for Cooper County is provided by six stations located within the Cooper County Fire Protection District. The nearest Cooper County fire station is located within 3 miles of the proposed Project site, on MO-179.

3.12.1.3 Environmental Justice

On February 11, 1994, President Clinton signed EO 12898 Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. EO 12898 mandates some federal-executive agencies to consider environmental justice as part of NEPA. Environmental justice has been defined as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income (EPA 2018) and ensures that minority and low-income populations do not bear disproportionately high and adverse human health or environmental effects from federal programs, policies, and activities.

Guidance for addressing environmental justice is provided by the Council on Environmental Quality's (CEQ) Environmental Justice Guidance under the National Environmental Policy Act (CEQ 1997). The CEQ defines minority as any race and ethnicity, as classified by the USCB, that is: Black or African American; American Indian or Alaska Native; Asian; Native Hawaiian and Other Pacific Islander; some other race (not mentioned above); two or more races; or a race whose ethnicity is Hispanic or Latino (CEQ 1997).

Identification of minority populations requires analysis of individual race and ethnicity classifications as well as comparisons of all minority populations in the region. Minority populations exist if either of the following conditions is met:

- The minority population of the impacted area exceeds 50 percent of the total population.
- The ratio of minority population is meaningfully greater (i.e., greater than or equal to 20 percent) than the minority population percentage in the general population or other appropriate unit of geographic analysis (CEQ 1997).

Low-income populations are those with incomes that are less than the nationwide poverty level, which is determined annually by the USCB and varies by the size of family and number of related children under 18 years of age. The 2019 USCB Poverty Threshold for an individual is an annual income of $13,300, and for a family of four it is an annual household income of $26,370 (USCB 2020b). A low-income population exists if either of the following two conditions is met:

- The low-income population exceeds 50 percent of the total population.
- The ratio of low-income population significantly exceeds (i.e., greater than or equal to 20 percent) the appropriate geographic areas of analysis.

Total minority populations (i.e., all non-white and Hispanic or Latino racial groups combined) comprise approximately 20 percent of the population of Missouri. Boone County is very similar to the state in this regard (21 percent), while Cooper County is somewhat less racially diverse, with total minority populations accounting for approximately 12 percent of the population. Less than 5 percent of people living within the study area are minorities, with percentages for individual block groups ranging from zero to 7.2 percent of the population. Thus, none of the block groups within the study area have minority populations that either exceed 50 percent of the total population or exceed the minority percentage of any of the reference geographies. Therefore, they do not meet the criterion for consideration as minority population groups subject to environmental justice considerations.

The percentage of the low-income individuals in Missouri, or those living below the nationwide poverty level, is approximately 14 percent. Cooper County has a slightly lower percentage of low-income individuals (12 percent), while Boone County has a higher percentage (18 percent) than the state. Notably lower than these reference geographies, just 3.4 percent of people living within

the study area are considered low-income, with percentages for individual block groups ranging from 0.4 to 5.5 percent of the population. As none of the block groups within the study area have low-income populations that either exceed 50 percent of the total population or exceed that of any of the reference geographies, they do not meet the criterion for consideration as low-income population groups subject to environmental justice considerations.

3.12.2 Environmental Consequences

3.12.2.1 No Action Alternative

Under the No Action Alternative, MDC would not implement the proposed relocation of the Taylors Landing Access. Therefore, there would be no change in local demographics, socioeconomic conditions, or community services associated with the construction and operation of the facility, and there would be no impacts to environmental justice populations. However, without local public access to the Missouri River, area residents and businesses would continue to lack the recreational opportunities and potential economic benefits associated with public boating and fishing access in this stretch of the river.

3.12.2.2 Proposed Alternative

3.12.2.2.1 Demographics and Economic Conditions

Under the Proposed Alternative, demographic and employment characteristics of the study area and surrounding counties are not expected to change significantly in response to the minor increase in workforce personnel. Proposed construction activities would occur over approximately 13 months and would entail the use of a construction workforce totaling between 15 and 20 workers at a given time. It is anticipated that the majority of these workers would be drawn from the labor force that currently resides in the region. Following construction, staff would be present onsite for vegetation and facility maintenance, repairs, and regulation enforcement, for an average of approximately 5 total man-hours per day. In both cases, given the relatively small workforce and that most workers would likely be drawn from the existing labor force, impacts to demographics and local employment would be minor.

Capital costs associated with the implementation of the proposed Project, including the purchases of materials and supplies, workforce payrolls, and procurement of additional services, are anticipated to be approximately $950,000. During operation, annual operating costs for would be approximately $17,000. Additionally, secondary impacts associated with the multiplier effects of construction and operation activities, such as expenditure of the wages earned by the workforce, would have direct economic benefits to the local area and surrounding community. The proposed Project also has the potential to benefit the local economy by providing river access for recreational boating and fishing, as detailed in Section 1.3. The new access point, located in an area currently lacking adequate public river access, has the potential to support the growth of

recreational boating and fishing in the region, increase tourism, and benefit local businesses that cater to these industries. However, given the relatively small magnitude of the proposed facility, the beneficial economic impacts associated with construction and operation would be minor in relation to the regional economy.

3.12.2.2.2 Community Services

Direct impacts to community facilities occur when a community facility is displaced or access to the facility is altered. Construction and operation of the proposed Taylors Landing Access would not result in the displacement of any community facilities nor impede access to any facilities. Therefore, there would be no direct impacts to community facilities or services under the Preferred Alternative.

Indirect impacts occur when a proposed action or project results in a population increase that would generate greater demands for services and/or affect the delivery of such services. As the proposed Project construction and maintenance would not result in notable impacts to local demographics, increased demands for services such as schools, churches, and healthcare facilities are not anticipated. In the event of an emergency at the site, local law enforcement, fire, and/or EMS response would likely be required. However, given the relatively small magnitude of the proposed facility, emergency incidents associated with use of the access are anticipated to be an infrequent occurrence and would not have a notable impact on the demand for emergency services in the area. Additionally, public safety agencies, Federal Wildlife Officers, and MDC conservation agents could benefit from having access to a boat ramp located near I-70 during incident response situations.

3.12.2.2.3 Environmental Justice

Under the Preferred Alternative, the construction and operation of the Taylors Landing Public Boating Access could result in impacts to nearby residents, including increased traffic along access routes and increased background noise levels. However, these impacts would be intermittent and minor given the nature of the Proposed Alternative and the distance between residences and the proposed Project footprint. In addition, the proposed Project would not result in any substantial long-term emissions or releases of air pollutants, noise, or hazardous materials that would have a direct impact on human health or welfare. As impacts to area residents would be minimal and no minority or low-income populations subject to environmental justice considerations were identified in the block groups within the study area, the construction and operation of the proposed Project would have no disproportionate adverse impacts on environmental justice populations.

3.13 Visual Resources

3.13.1 Affected Environment

Visual resources are the various components of the landscape that contribute to the visual character of a place. These components can be natural or human-made and are collectively referred to as the viewshed. Within the study area, the visual environment is comprised predominantly of the Overton Bottoms/Missouri River landscape, a scenic resource characterized by the presence of steep bluffs on the east side of the river and the Big Muddy NFWR west of the river. On the eastern side of the river, the Manitou Bluffs rise abruptly from the river's edge to a height of more than 150 feet. The steep bluffs are comprised of undeveloped wooded areas, dissected by deep forested stream valleys. West of the river, the NFWR is comprised of primarily herbaceous and scrub/shrub vegetation with some sparsely wooded areas. The study area also includes rolling rural landscapes characterized by agricultural land and small, non-contiguous developed areas such as residences and farmsteads.

Visible manmade features in the study area include the I-70 corridor and associated Rocheport Bridge, which crosses the Missouri River approximately one (1) mile upstream of the proposed Project location. Transmission towers and cleared utility corridors are also prominent, with power lines crossing the river both to the north and south of the proposed boat ramp.

The viewshed of certain facilities, such as dwellings, churches, schools, and outdoor recreation sites can be vulnerable to visual modifications in the surrounding landscape. Sensitive visual receptors in the study area include recreationists on the Missouri River, NFWR, and users of the Katy Trail, which is situated just east of the river at the base of the bluffs. Additionally, there are a small number of residences located at the top of the bluffs.

Overall, the viewshed within the study area is of good quality. While areas of the natural landscape have been altered by the development of roadways, overhead transmission lines, and levees, much of the landscape remains natural and undeveloped, with the Missouri River and adjacent bluffs providing aesthetically pleasing views.

3.13.2 Environmental Consequences

3.13.2.1 No Action Alternative

The No Action Alternative would not introduce or remove any features in the landscape; therefore, there would be no impacts to visual resources.

3.13.2.2 Proposed Alternative

The proposed Project would result in both short-term and long-term impacts to visual resources. During the approximately 13-month construction period, there would be some visual discord from

existing conditions due to an increase in personnel and construction equipment coupled with disturbances within the proposed Project footprint and temporary use area. These areas may experience visual alterations associated with the removal of vegetation, ground disturbance, and the creation of dust during construction. However, this would be contained within the immediate vicinity of the construction activities and would only last until all project activities have been completed and the disturbed areas have been seeded and mulched. Because of their short-term nature, construction-related impacts to local visual resources would be minor.

Long-term impacts consist of the visible alterations associated with the conversion of forested riverbank habitat to an aggregate parking lot and entrance road, and the addition of a concrete boat ramp extending into the river. These proposed Project actions would remove vegetation and introduce additional manmade features into a predominantly natural visual setting. However, the aggregate, riprap, and concrete materials used near the shoreline would be visually similar to the existing rock revetment currently in place at this location. Additionally, the low profile of the new construction, the lack of buildings or tall structures, and the surrounding forested vegetation would limit the visibility of the proposed Project components. Direct views would be limited to those traveling on the Missouri River and motorists nearing the end of Cumberland Church Road, the majority of which would be Taylors Landing Access users. The proposed Project may also be within the viewshed of recreationists along a segment of the Katy Trail and residents living on the bluffs on the east side of the river. However, due to distance, intervening vegetation, and topography, views would be minimal and would not detract from the overall landscape.

Implementation of the Preferred Alternative would result in long-term visual alterations to a small segment of riverbank on the Missouri River. However, as the new features would consist of aggregate and concrete materials, visually similar to existing rock located along the bank, they would remain compatible with the natural landscape. The facility would be maintained with a clean and landscaped appearance and would not detract from the scenic landscape. Furthermore, due to its rural location, public visibility would be minimal. For these reasons, impacts to visual resources under the Proposed Alternative would be minor.

3.14 Cultural and Historic Resources

3.14.1 Affected Environment

Section 106 of the NHPA, as amended, and implemented by 36 CFR Part 800, requires federal agencies to consider effects of their actions on historic properties. Historic properties are defined as archeological sites, standing structures, or other historic resources listed in, or eligible for listing in, the NRHP. For the proposed Project, the area of potential effect is defined as the lands potentially disturbed by the proposed entrance road, parking area, and boat ramp construction, and land potentially affected by the construction laydown area.

Cooper County, Missouri, was originally home to the Osage and other groups of indigenous people. Occupation of Missouri by Native Americans began more than 10,000 years ago. Many styles of stone tools and pottery, dating from 1,000 to 10,000 years B.C.E., have been found at sites along the Missouri River, as well as burial mounds and evidence of Native American villages. In Cooper County, a study of cultural resources on a refuge unit ridge overlooking the Missouri River found remnants of a Late Archaic to Early Woodland occupation, as well as Late Woodland pottery (USFWS 2014a).

In prehistoric times, the Missouri River likely served as a major route for the movement of people. It also served this function for Spanish explorers, the first Europeans to enter the Missouri basin, and British and French fur traders. Many early settlements of Europeans became established along the river in Missouri (National Research Council 2002).

Inhabitants from Kentucky and Tennessee began settling the Cooper County area around 1816, introducing southern culture and lifestyles such as large plantations and slavery. By the mid 1800s, Cooper County and several other counties along the Missouri River became a thriving agricultural area known as "Little Dixie." Cooper County and the surrounding area produced such crops as hemp, tobacco, and cotton. There were also several Civil War battles in the area (Mid-Missouri Regional Planning Commission 2017).

During April 2014, a Phase I Cultural Resource Survey was conducted for the proposed Project footprint and 20-acre vicinity (ERC 2014). A records and literature review produced no evidence of the presence of previously reported potentially significant cultural resources within the proposed Project footprint and vicinity. There are no currently listed NRHP properties within or near the proposed Project boundaries, and no NRHP property is threatened directly or indirectly by the proposed Project actions. There are no recorded archaeology sites within or adjacent to the proposed Project. The 1877 atlas map of the area illustrates several structures in the vicinity of, but not within, the proposed Project footprint. The structures are not shown on the 1897 atlas map and, therefore, it was concluded that they were destroyed or removed.

The field investigation was carried out under mixed surface visibility conditions in herbaceous, shrub-scrub, and forested areas that required both pedestrian survey and shovel testing as defined in the methods section of the report. A controlled test unit in the small area of the proposed Project that was not made by river movement in the last 150 years, cut bank profiles, and numerous deep rodent burrows allowed for interpretation of potential for deeply buried resources. The field investigation found no evidence of the presence of prehistoric occupation within the proposed Project footprint. Historic resources within the proposed Project footprint and vicinity include roads, levees, and utilities that are not considered potentially significant resources (ERC 2014).

3.14.2 Environmental Consequences

3.14.2.1 No Action Alternative

Under the No Action Alternative, MDC would not implement the proposed relocation of the Taylors Landing Public Boating Access and no associated construction or operation activities would occur. Therefore, there are no impacts to cultural and historic resources under this alternative.

3.14.2.2 Proposed Alternative

Under the Proposed Alternative, no impacts to cultural resources are anticipated from either the construction or operation of the proposed Project. A records and literature review produced no evidence of the presence of previously reported potentially significant cultural resources within the area of potential effect. Archaeological investigations involving pedestrian survey and the excavation of shovel test pits performed in support of the proposed Project did not result in the identification of any NRHP eligible archaeological sites within the area of potential effect. There are no structures within the proposed Project footprint. Consequently, no impacts to historic properties would occur under the proposed Project.

MDC initiated formal consultation with the MDNR SHPO and Native American tribes requesting review and comments. MDC received concurrence from the MDNR SHPO on April 18, 2014 that there will be "no historic properties affected" by the proposed Project (Appendix A).

Concurrent with public notice of this Draft EA, the USFWS initiated formal consultation with Native American tribes that have expressed potential interest in archaeological resources located in the county or region of the proposed Project, including the following:

- Iowa Tribe of Kansas and Nebraska
- Iowa Tribe of Oklahoma
- Kaw Indian Nation of Oklahoma
- Miami Tribe of Oklahoma
- Osage Nation
- Ponca Tribe of Nebraska
- Ponca Tribe of Oklahoma
- Sac and Fox Tribe of the Missouri in Kansas and Nebraska
- Sac and Fox Tribe of the Mississippi in Iowa
- Sac and Fox Nation of Oklahoma

Any received correspondence will be incorporated into the Final EA upon receipt.

As per USACE Section 404 permit special conditions, if any previously unknown historic or archeological remains or other unanticipated discoveries are encountered while accomplishing the activity authorized by the permit, MDC would immediately stop construction and notify USACE and USFWS of what was found. Federal and state coordination would be initiated with the SHPO to determine if the remains warrant a recovery effort or if the site is eligible for listing in the NRHP.

3.15 Solid and Hazardous Materials/Waste

3.15.1 Affected Environment

Solid waste consists of a broad range of materials that include refuse, sanitary wastes, contaminated environmental media, scrap metals, nonhazardous wastewater treatment plant sludge, nonhazardous air pollution control wastes, various nonhazardous industrial waste, and other materials (solid, liquid, or contained gaseous substances). The EPA (2020b) defines hazardous waste as a waste with properties that make it dangerous or capable of having a harmful effect on human health or the environment. Hazardous waste is generated from many sources, ranging from industrial manufacturing process wastes to batteries and may come in many forms, including liquids, solids gases, and sludges. They can be generated through the disposal of commercial products, such as cleaning fluids or pesticides, or manufacturing processes. Improper management and disposal of hazardous substances can lead to pollution of groundwater or other drinking water supplies and the contamination of surface water and soil.

Management of hazardous material and solid waste is primarily regulated by the Resource Conservation and Recovery Act which governs the disposal and cleanup of solid and hazardous wastes, and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) which regulates cleanup at sites contaminated with hazardous substances and pollutants or contaminants. CERCLA established the National Priorities List of contaminated sites and the "Superfund" cleanup program. According to ER 1165-2-132, Hazardous, Toxic and Radioactive Waste includes any material listed as a "hazardous substance" under CERCLA.

Because the proposed Project would occur within the Big Muddy NFWR in an area that has remained undeveloped (with the exception of the road, levee, and revetment construction), a Phase I preliminary site assessment for the presence of hazardous materials was determined to not be necessary. Instead, a review of regulated facilities for hazardous materials within study area was conducted by searching online records at the EPA NEPA Assist Tool (EPA 2020c) and Missouri Environmental Site Tracking and Research Tool (MDNR 2020d). This review did not identify any hazardous or solid waste sites within the study area.

3.15.2 Environmental Consequences

3.15.2.1 No Action Alternative

Under the No Action Alternative, MDC would not implement the proposed relocation of the Taylors Landing Access. Therefore, no impacts would result from solid or hazardous wastes associated with the Project.

3.15.2.2 Proposed Alternative

Under the Proposed Alternative, construction, operation, and maintenance activities would generate varying amounts of solid waste. Land clearing wastes, excess soil, construction debris, and any other solid waste generated during construction would be trucked offsite for disposal at a licensed waste management facility. During operation, relatively small amounts of waste from trash receptacles, litter pickup, and maintenance activities would also be transported offsite to a suitable recycling or disposal facility. No restroom facilities are planned, and thus there would be no generation of sanitary waste.

Hazardous materials would not be generated as a result of construction or operation and maintenance activities associated with the proposed Project. Hazardous materials intrinsic to the operation of vehicles and equipment, such as petroleum products, oils, and other fluids, would not be stored onsite. Vehicle servicing would be performed offsite, with all vehicles maintained to minimize leaks. Any materials classified as hazardous waste that are used at the Project site during construction or maintenance would be properly contained and removed to a suitable disposal or recycling facility in accordance with all local, state, and federal regulations.

MDC does not anticipate encountering previously existing contamination but would dispose of or mitigate any hazardous materials uncovered during construction in accordance with applicable federal, state, and local requirements. In the event of an unanticipated discovery of hazardous materials, MDC would contact the MDNR.

Implementation of the Proposed Alternative would not create a significant hazard to the public or the environment in connection with the transportation, use, or generation of hazardous materials or hazardous wastes. Overall, impacts would be minor as both solid and hazardous waste associated with the construction, operation, and maintenance of the facility would be properly contained and removed to a suitable disposal or recycling facility in accordance with all local, state and federal regulations.

3.16 Public Health and Safety

3.16.1 Affected Environment

The Occupational Safety and Health Administration (OSHA) is the federal agency responsible for assuring worker health and safety standards. OSHA has adopted numerous regulations pertaining to worker safety, contained in CFR Title 29. These regulations set standards for safe workplaces and work practices. MDC construction, operations, and maintenance activities adhere to OSHA regulations and MDC health and safety policies, including the Resource Management Manual, District Work Plan, and the MDC Missouri River Accesses Plan. Safety of visitors and staff are MDC's highest priority in daily operations.

The MDC Area Road Construction Policy states that roads and associated vehicle parking areas will be designed to safely and cost-effectively satisfy planned use needs and will include all appropriate signs necessary for safe traffic use. All roads will be constructed according to needs outlined in the approved area plan. Construction will be to standards designated by the MDC Infrastructure Management Branch, with emphasis on user safety.

MDC has a goal to maintain compliance with current ADA accessibility guidelines at their facilities. In addition, MDC facilities and recreational areas are routinely evaluated to ensure sites are safe for visitor use. Facility maintenance is directed toward providing a safe and comfortable environment for area and facility users, economical and efficient operation, and prevention of problems. Maintenance would be conducted with enough frequency to make an area safe and inviting to the public, and access maintenance would be performed by personnel who are thoroughly trained in MDC Motorboat Access Maintenance Standards. Roads are maintained to avoid potential sight restrictions, and boat ramps are cleaned as necessary for safe and convenient launching.

MDC conservation agents provide visitor assistance and work with county law enforcement agencies and USFWS personnel to ensure public safety on MDC lands and facilities. USFWS, Missouri State Highway Patrol, and MDC conservation agents also provide water safety and enforcement patrols on the Missouri River as their budgets allow. MDC staff conduct numerous water safety programs and public announcements to educate children and visitors about ways to be safe on Missouri Rivers.

All MDC public accesses lie outside of flood protection levees so they are subject to periodic flooding and the associated maintenance problems the flooding creates. Access maintenance/repairs related to flooding conducted by MDC personnel include removing silt/debris from roads, parking lots, privies, and boat ramps; re-graveling the roads and parking

lots; reinforcing boat ramps with rip-rap; repairing/replacing concrete boat ramps; repairing/replacing signs; filling in scoured areas; etc. (MDC 2014).

The U.S. CFR contains regulations governing the safe operation of boats in Title 33: Navigation and Navigable Waters. This includes regulations about the carriage and use of personal floatation devices (33 CFR 175.11 et seq.), visual distress signals (33 CFR 175.101 et seq.), and proper ventilation systems (33 CFR 175.201). The state of Missouri also has boating regulatory statutes in place, including regulation of safety inspections, licensing, required equipment, personal flotation devices, age restrictions, etc.

3.16.2 Environmental Consequences

3.16.2.1 No Action Alternative

Under the No Action Alternative, MDC would not implement the proposed relocation of the Taylors Landing Access. The original access would not re-open, and no new construction activities would take place in association with the proposed Project. Occasional inspection activities by MDC and USFWS personnel at the closed Taylors Landing Access would continue.

Prolonged flooding has made Cumberland Church Road that leads to the original access impassable, and it is no longer safe for vehicular traffic. For safety reasons, Big Muddy NFWR supports the closure of Cumberland Church Road to vehicular traffic on Overton Bottoms North Unit of the refuge, past Diana Scour Road. Until this road is permanently closed, members of the public may attempt to access the closed Taylors Landing facility, thus risking their health and safety by using facilities that are not currently maintained for public use. Therefore, the No Action Alternative may have minor adverse impacts on public health and safety.

3.16.2.2 Proposed Alternative

Under the Proposed Alternative, potential public health and safety impacts would be associated with the use of construction and heavy equipment; potential exposure to hazardous materials used during construction, such as fuels, lubricants, solvents, and herbicides; and construction traffic entering and traveling across the proposed Project footprint. Risks during construction, operations, and maintenance activities would be minimized by adhering to OSHA regulations and training and MDC health and safety policies, including the Resource Management Manual, District Work Plan, and the MDC Missouri River Accesses Plan. Given the low population density of the area, safety risks during construction would be limited to onsite construction workers.

The proposed aggregate entrance road is designed with two 10-foot-wide travel lanes with 4-foot-wide shoulders to safely accommodate projected traffic. Expanding the vehicle boat trailer parking to accommodate approximately 30 trailered vehicles, compared to approximately eight (8) trailered vehicles at the original access, would ensure safe traffic flow and adequate parking

spaces to meet current use levels on most days. Providing a concrete ADA accessible parking space would improve access to recreation opportunities at Taylors Landing for persons with disabilities. Additionally, both public safety agencies, USFWS personnel, and conservation agents could benefit from having access to a boat ramp located near I-70 for incident response situations.

During operation of the proposed Project, vegetation along the entrance road would be maintained to avoid potential sight restrictions. During periods of high water, the proposed access would be closed for public safety. The proposed boat ramp would be cleaned as necessary for safe and convenient launching. Adequate enforcement for inappropriate activities like vandalism, litter, fish and wildlife code violations, off road use by vehicles, etc. would be provided. A wire cable fence would be installed on the OWLD-maintained spur levee under this alternative to discourage public access to the levee.

The proposed Project would be more reliable and safe than the original Taylors Landing Access because the original access location was frequently flooded which at times would result in closure of the entrance road. In addition, a large headcut is progressing northward from the scour hole under I-70 that would eventually compromise the original Taylors Landing entrance road. Relocating the access to an area with less flooding would alleviate the high level of maintenance (and associated worker risk) required to keep the original site open for public use, resulting in moderate beneficial impacts to public health and safety.

Although the Proposed Alternative may increase boat congestion on this stretch of the Missouri River in comparison to the No Action Alternative, the proposed Project is a relocation of an existing public access point that had no problems with congestion on the river when it was operating. The width of the navigational channel is sufficient to allow large and small vessels ample room for navigation. In addition, public boating safety education programs and compliance with Missouri boating safety statutes would reduce the risks and associated impacts.

In conclusion, there would be short-term, minor adverse impacts to public health and safety for workers during construction of the proposed Project and long-term, minor adverse impacts from operations and maintenance activities and local increases in watercraft congestion. In addition, as discussed under the No Action Alternative, until Cumberland Church Road leading to the original Taylors Landing Access is permanently closed on the Overton Bottoms North Unit, there would be minor adverse impacts from the public attempting to access the original access. However, there would be moderate, beneficial long-term impacts under the Proposed Alternative from the increased reliability and safety and improved road conditions, parking, and traffic flow associated with a relocated access on the Overton Bottoms South Unit.

CHAPTER 4 – CUMULATIVE IMPACTS

This section discusses cumulative adverse impacts to the region's environment that could result from construction and operation of the proposed Project. The CEQ regulations (40 CFR §§ 1500-1508) implementing the procedural provisions of the NEPA of 1969, as amended (42 USC § 321 et seq.) define cumulative impact as: "…the impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR § 1508.7). Baseline conditions reflect the impacts of past and present actions and therefore these actions are considered part of the baseline and are not addressed separately in the cumulative effects analysis.

4.1 Environmental Resources Considered for Cumulative Effects Analysis

For this project, the full range of environmental resource issues was considered for inclusion in the cumulative effects analysis. The proposed action consists of relocating the existing Taylors Landing Public Boating Access. As has been described in prior subsections of this EA, environmental resources with the potential to be directly or indirectly affected by project activities is generally low. Accordingly, such resources as air quality, geology/soils, floodplains, levee systems, cultural resources, recreation, socioeconomics, hazardous materials/waste, and safety are not included in this analysis as these resources are either not adversely affected or the effects are considered to be minimal. As a result, primary resource categories considered in the cumulative effects assessment include water and aquatic resources, wetlands, navigation, and transportation.

4.2 Geographic Area of Analysis

The appropriate geographic area over which past, present, and future actions could reasonably contribute to cumulative effects is variable and dependent on the resource evaluated. Because potential impacts associated with the proposed Project are extremely localized and do not exert a notable geographic extent, a 1-mile radius of the proposed Project, the study area shown in Figure 3-1, was considered appropriate for consideration in this analysis. This geographic area encompasses the proposed Project construction footprint identified in Chapter 2.

4.3 Identification of "Other Actions"

Past, present, and reasonably foreseeable future actions identified within the geographic areas of analysis that have the potential to exert a notable effect (historical, continuing, or future) on environmental resources are listed in Table 4-1. These actions were initially identified as having the potential to, in aggregate and in conjunction with the impacts of the proposed action, result in larger, and potentially significant adverse impacts to the resources of concern. Importantly, actions listed as having a timing that is "past" or "present" inherently have resulted in environmental impacts that are integrated into the base condition for each of the resources analyzed in Chapter 3. However, these actions are included in this discussion to provide for a more complete description of their characteristics, and to consider the continuing effects of these actions in the reasonably foreseeable future timeframe.

Actions that are not reasonably foreseeable are those that are based on mere speculation or conjecture, or those that have only been discussed on a conceptual basis. These can include projects that have not been approved by the proper authorities or have not yet submitted license/permit applications.

Table 4-1. Summary of Other Actions

Actions	Description	Timing and Reasonable Foreseeability
Establishment and Management of Big Muddy National Fish and Wildlife Refuge	Big Muddy NFWR was established by the USFWS in 1994 to restore natural floodplain habitat for fish and wildlife throughout the Missouri River corridor.	Past, Present, Reasonably Foreseeable Future
Missouri River Bank Stabilization and Navigation Project	Construction and maintenance of levee systems to promote navigation in the river and flood protection adjacent to the river.	Past, Present, Reasonably Foreseeable Future
Commercial Sand and Gravel Dredging on Missouri River	Capital Sand Company, Inc. has an existing 2016 USACE permit for dredging sand and gravel from the Missouri River – Jefferson City segment. The permit is under review for renewal and 7% increase in dredged material.	Past, Present, Reasonably Foreseeable Future

Historic and Existing Land Uses	On-going agricultural activities on adjacent landscapes previously disturbed by widespread deforestation, drainage, and soil disturbance to promote cultivation. Also includes construction and maintenance of various infrastructure projects including roads, utilities, transmission lines, residences, and recreational facilities.	Past, Present, Reasonably Foreseeable Future
Replacement of Interstate 70 bridge over the Missouri River	Replacement of the bridge (Rocheport Bridge) that carries Interstate 70 over the Missouri River connecting Columbia and Boonville, Missouri.	Reasonably Foreseeable Future

4.3.1 Establishment and Management of Big Muddy National Fish and Wildlife Refuge

As discussed in Section 3.2.1.2, the proposed Project lies within the Big Muddy NFWR, which was established by the USFWS in 1994 to restore natural floodplain habitat for fish and wildlife throughout the Missouri River corridor. Current refuge management focuses on reconnecting the Missouri River and its tributaries to their floodplains, restoring hydrology, returning native vegetation, reducing invasive species, and offering a variety of wildlife-dependent recreation opportunities (USFWS 2014a). The NFWR system also supports and complements the MDC 10-year fisheries strategic plan for the Missouri River. A portion of the Big Muddy NFWR is owned by the USACE, including the proposed Project footprint, and a portion is owned by the USFWS; however, the entire area is managed as one unit by the USFWS.

The NFWR is available for passive day use only. There are no developed trails or interpretive features; no picnicking is allowed on site, and primitive camping is allowed in designated areas only. Portions of the area are still used for agricultural purposes.

Effects of this action are sufficiently included in the base condition as described in the Affected Environment of Chapter 3. No new or distinct future activities or improvements are identified that would alter the base condition as described in Chapter 3.

4.3.2 Missouri River Bank Stabilization and Navigation Project

The USACE Missouri River Bank Stabilization and Navigation Fish and Wildlife Mitigation Project was authorized by the Water Resources Development Act of 1986 (USFWS 2013a). This act completed channelization of most of the Missouri River downstream of Sioux City, Iowa via a combination of dikes, revetments, and other engineering structures. The USACE has the responsibility for the operation and maintenance of the structures and bank stabilization projects within the study area.

The stretch of the river within the study area includes a navigation channel measuring nine feet deep and 300 feet wide, and it is the only navigable waterway in mid-Missouri capable of carrying commercial goods and products. While the commercial use of the river has seen a decline since the 1980s, some industries still use this thoroughfare to transport products including sand and gravel, agricultural products, chemicals, petroleum products, and manufactured goods (USACE and USFWS 2018).

In the study area, the levees that were breached in 1993 and 1995 were rebuilt, but they were set back at least 2,200 feet west of the riverbank. Only some portions remain of the original levee next to the riverbank, and it serves no purpose related to flood control. The spur levee that runs perpendicular to the river between the setback levee and a portion of the original levee is maintained by the OWLD.

The construction and maintenance of a federal navigation project on the Missouri River have altered the physical habitat for fish, invertebrates, and plants. Stream flow has shifted from free flowing to impounded, and the natural hydrology and physical structure of the channel has been altered. As a result, the river has changed from a meandering, flowing system that was connected to its broader floodplain, to a system that provides for reliable water levels in support of multi-use objectives including navigation, flood control, and recreation. The levees have also had an effect on flood extent, wetlands, natural habitats, and associated wildlife. However, setting the levees back within the NFWR has allowed for an increase in natural habitats along the Missouri River in this location.

Effects of this action are sufficiently included in the base condition as described in the Affected Environment of Chapter 3. No new or distinct future activities or improvements are identified that would alter the base condition as described in Chapter 3.

4.3.3 Commercial Sand and Gravel Dredging on Missouri River

As discussed in Section 3.6.1, sand and gravel are mined or dredged from the Missouri River and its floodplain regularly. Capital Sand Company, Inc. has an existing 2016 USACE permit for dredging sand and gravel from several reaches of the Missouri River, including the Jefferson City

segment, which is within the study area (RM 180.65 - RM 184.75). The company is currently authorized to dredge 1,350,000 annual tons of material from the Jefferson City segment of the Missouri River (RM 130.20 – RM 249.65). The regulated activities consist of the hydraulic removal of sediment from the riverbed and the return discharge of processed material to the river (USACE 2020).

Capital Sand Company's dredging permit expires on December 31, 2020 and is currently under review for renewal and an increase (7%) to 1,450,000 annual tons of material from the Jefferson City segment.

4.3.4 Historic and Existing Land Uses

Historic and existing land use within the study area are a collective set of actions that primarily include recreational uses, agricultural uses, and utility and transportation infrastructure. Such past and ongoing uses have had an effect in conversion and modification of natural vegetative cover types and fragmentation of ecological communities within the natural landscape. Large expanses of agricultural land are readily apparent within a 1-mile radius of the proposed Project and such land uses have effectively reduced the environmental quality to a relatively low level, given the repeated and recurring disturbances associated with cultivation practices.

In addition to agricultural land uses, a developed transportation and utility infrastructure consisting of roadways, railroads, and transmission and pipeline ROWs has been constructed and continues to be maintained, which has the effect of creating narrow corridors of developed ROW even within otherwise undeveloped lands. As such these land uses have had the prior effect of fragmenting the landscape. The proposed Project is located on federal NFWR land managed by USFWS, adjacent to the Missouri River, and it crosses over a spur levee and is in the vicinity of a federally managed setback levee.

While localized changes to this setting may occur over time, such changes are predominantly associated with the refuge landscape and do not have the potential to exert notable impacts to the environmental resources under consideration. Similarly, while on-going agricultural land uses will continue to impact undeveloped landscape and prevent them from natural recovery, no new habitat alteration or land conversion is expected to occur in the foreseeable future. Therefore, effects of this collective set of actions are sufficiently included in the base condition as described in the Affected Environment of Chapter 3.

4.3.5 Replacement of Interstate 70 Bridge over Missouri River

MoDOT is planning to construct a new six-lane I-70 bridge over the Missouri River that will replace the existing four-lane bridge (Rocheport Bridge) that was built in 1960. The bridge is located approximately 1 mile north of the proposed Project. Construction of the I-70 bridge replacement

project is expected to begin in 2022 (MoDOT 2020a) and should not overlap with construction of the proposed Project, which should be complete by 2022.

MoDOT has completed a NEPA re-evaluation of the 2005 Second Tier Final EA, Finding of No Significant Impact (FONSI), and Final Section 4(f) Evaluation of Section of Independent Utility 3 for the replacement of the I-70 Missouri River Bridge near Rocheport (MoDOT 2020b). Due to the amount of time that has passed since the initial evaluation (FHWA and MoDOT 2004) and the more defined project limits, the NEPA re-evaluation of the previous studies for the Rocheport Bridge was required and was prepared in compliance with NEPA. The re-evaluation found that MoDOT does not anticipate permanent impacts to the original Taylors Landing Access. However, the access could be used temporarily for staging or for river access during construction of the new bridge (MoDOT 2020b). Because the proposed Taylors Landing Access Relocation Project was in early planning stages, the re-evaluation did not determine if there would be impacts to a new access if relocated.

According to the NEPA re-evaluation, impacts to wetlands and floodplains would occur as a result of the proposed bridge replacement project, and Section 404/401 permitting would be required. In addition, detailed flood studies would be required as part of the final roadway and bridge design, and the bridge would be designed to FEMA standards (MoDOT 2020b). Sedimentation from construction may occur but appropriate BMPs would be incorporated to minimize these impacts.

The I-70 bridge NEPA re-evaluation determined that the proposed bridge reconstruction would likely have an effect on gray bat, Indiana bat, and the northern long-eared bat due to the presence of summer roosting habitat within the NEPA study area. Biological assessments for these species are being completed. The review also indicated that the project may have an effect on the pallid sturgeon due to the documented presence of the species in close proximity to the proposed project site. The USFWS IPaC review did not indicate critical habitat for the pallid sturgeon at the bridge location. However, MDC's preliminary heritage records for the area indicated use by pallid sturgeon upstream of the side channel (chute outlet) which is located approximately 2,000 feet upstream of the bridge. Based on coordination with USFWS, however, there has been no documentation of spawning upstream of the bridge for several years. The side channel is no longer considered a spawning site, and there are no known records for pallid sturgeon spawning in the vicinity of the bridge (MoDOT 2020b). As design progresses, MoDOT will assess habitat for the pallid sturgeon to further ascertain potential impacts and will continue to coordinate with the USFWS on the biological conclusions in compliance with Section 7 of the ESA (MoDOT 2020b). Other impacts to Overton Bottoms North and South units of the NFWR could include permanent fill for additional lanes and portions of the resource around the bridge would be temporarily closed during bridge construction.

4.4 Analysis of Cumulative Impacts

To address cumulative impacts from the proposed Project, the existing environment was considered in conjunction with the environmental impacts presented in Chapter 3. The combined impacts of the incremental actions are defined by the CEQ as "cumulative impact" in 40 CFR 1508.7 and may result from other individually minor but collectively significant actions taking place over a period of time.

For this proposed Project, the full range of environmental resource issues was considered for inclusion in the cumulative effects analysis. However, the cumulative effects analysis should only focus on those resources that may be subject to aggregate or "overlapping" impact from both the proposed action and other actions. In this case, because a proposed slight increase in sand and gravel dredging operations and the I-70 bridge replacement were the only foreseeable future actions that that have potential impacts that have not previously been integrated and characterized as the base condition (Chapter 3), they are the only actions that must be evaluated in the cumulative effects analysis.

Proposed Alternative construction and operation activities combined with a possible increase in sand and gravel dredging could potentially affect water quality, aquatic ecology, and navigation in the Missouri River. However, sand and gravel dredging operations already occur in the vicinity of the proposed Project, and impacts related to the proposed increase would be minor.

For impacts to navigation, if Capital Sand Company's dredge permit increase is approved by USACE there would potentially be a 100,000-ton increase in dredging activities within the Jefferson City segment of the Missouri River. On average, each open dry cargo barge has a capacity for approximately 1,500 tons of sand and gravel (IHS Markit 2009). Therefore, there could potentially be an additional 66 barges per year within a 120-river-mile stretch of the Missouri River. This would not result in a significant impact on river navigation. In addition, the USACE takes potential impacts to water resources, aquatic ecology, and river navigation into account when considering dredge permits; therefore, there would be no significant cumulative impacts to these resources from the combined effect of a potential increase in sand and gravel dredging and construction and operation of the proposed Project.

Further, the environmental resources potentially affected by the proposed Project and those potentially affected by the I-70 bridge replacement are for the most part, disjunct and non-overlapping (both spatially and temporally). Because of the attenuating effects of distance and likely non-overlapping schedules for project construction, noise/ and air emissions, visual alterations and other impacts associated with construction-related activities would not result in additive effects.

Although impacts to wetlands and water resources would occur as a result of construction of the proposed bridge replacement project combined with the Proposed Alternative, Section 404/401 permitting and compliance with Section 7 of the ESA would be required, and appropriate BMPs and compensatory mitigation would be incorporated to minimize and mitigate impacts. As such, none of the environmental resources considered would be vulnerable to an additively greater environmental impact in consideration of the proposed Project coupled with the I-70 bridge replacement.

There would be a temporary increase in local traffic associated with construction vehicles for both the proposed Project and the I-70 bridge replacement project. This would result in minor cumulative transportation impacts; however, these impacts would not overlap in time and would be short-term and limited to the construction phases of each project. Therefore, no significant cumulative effects would occur as a result of the Proposed Alternative.

CHAPTER 5 – COMPLIANCE WITH ENVIRONMENTAL QUALITY STATUTES

Compliance with environmental quality statutes is summarized in Table 5-1.

Table 5-1. Compliance with Environmental Protection Statutes and Other Environmental Requirements

Federal Policies	Compliance*
Archaeological and Historic Preservation Act, 16 USC 469, et seq.	Full compliance
Clean Air Act, as amended, 42 USC 1857h-7, et seq.	Full compliance
Clean Water Act, 33 USC 1857h-7, et seq.	Partial compliance
Endangered Species Act, 16 USC 1531, et seq.	Partial compliance
Federal Water Project Recreation Act, 16 USC 460l-1(12), et seq.	Not applicable
Fish and Wildlife Coordination Act, 16 USC 601, et seq.	Full compliance
Land and Water Conservation Fund Act, 16 USC 460/-460/-11, et seq.	Not applicable
National Environmental Policy Act, 42 USC 4321, et seq.	Partial compliance
National Historic Preservation Act, 16 USC 470a, et seq.	Partial compliance
River and Harbors Act, 33 USC 403, et seq.	Full compliance
Watershed Protection and Flood Prevention Act, 16 USC 1001, et seq.	Not applicable
Wild and Scenic Rivers Act, 16 USC 1271, et seq.	Not applicable
Flood Plain Management (EO 11988)	Partial compliance
Protection of Wetlands (EO 11990)	Full compliance
Farmland Protection Act	Full compliance
Executive Order 13112 Invasive Species	Full compliance

*Full compliance – Having met all requirements of the statute for the current stage of planning.
Partial compliance – Requires further coordination with appropriate agency.

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CHAPTER 6 – LIST OF PREPARERS

The following personnel contributed to this report:

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Appendix A

Coordination

October 2020

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Appendix B

Public and Agency Outreach

October 2020

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B.1. Responses to Public Notice for CWA Section 404 Permit

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B.2. Section 404 Permit - MDC Response to Agency and Public Comments

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Appendix C

Taylors Landing Access Relocation

Construction Plans

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Appendix D

Waters of the U.S. Delineation

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Appendix E

CWA Section 404 Executed Permit and Approved Permit Modification

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Appendix F

Plowboy Bend Conservation Area Wetland Mitigation Plan

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Appendix G

Proposed Taylors Landing Access Relocation

Photographic Log

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