September 2021 version; Contains greenhouse gas quantification and assessment as well as adaptation and resiliency information

December 2022 version

Environmental Assessment Worksheet

This most recent Environmental Assessment Worksheet (EAW) form and guidance documents are available at the Environmental Quality Board's website at**:** https://www.eqb.state.mn.us**/** The EAW form provides information about a project that may have the potential for significant environmental effects. Guidance documents provide additional detail and links to resources for completing the EAW form.

Cumulative potential effects can either be addressed under each applicable EAW Item or can be addressed collectively under EAW Item 21.

Note to reviewers: Comments must be submitted to the RGU during the 30-day comment period following notice of the EAW in the *EQB Monitor*. Comments should address the accuracy and completeness of information, potential impacts that warrant further investigation and the need for an EIS.

1. Project title:

Reno Bottoms (Mississippi River, Pool 9) Floodplain Forest and Backwater Restoration

2. Proposer:

Contact person: Neil Rude
Title: Mississippi River Habitat Specialist
Address: 1801 S. Oak Street
City, State, ZIP: Lake City, MN 55041
Phone: 651-299-4025
Fax:
Email: neil.rude@state.mn.us

3. RGU:

Contact person: Kathy Metzker
Title: ER Project Manager, MN DNR
Address: 500 Lafayette Road
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Phone: 651-259-5694
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Email: Kathleen.metzker@state.mn.us

4. Reason for EAW Preparation: (check one)

Required:
☐ EIS Scoping
XX Mandatory EAW

Discretionary:
☐ Citizen petition
☐ RGU discretion
☐ Proposer initiated

If EAW or EIS is mandatory give EQB rule category subpart number(s) and name(s):
Minnesota Rules, part 4410.4300, subpart 27

5. Project Location:

- County: Houston
- City/Township: Jefferson
- PLS Location (¼, ¼, Section, Township, Range): SE ¼ Sec. 23 and NE ¼ Sec. 23, T 101 N., R 4W.
- Watershed (81 major watershed scale): Mississippi River
- GPS Coordinates: 43°32'12.35"N, 91°16'44.17"W (approximate project centerpoint)
- Tax Parcel Number: 07.0135.000

At a minimum attach each of the following to the EAW:

- County map showing the general location of the project;
- U.S. Geological Survey 7.5 minute, 1:24,000 scale map indicating project boundaries (photocopy acceptable); and
- Site plans showing all significant project and natural features. Pre-construction site plan and post-construction site plan.
- List of data sources, models, and other resources (from the Item-by-Item Guidance: *Climate Adaptation and Resilience* or other) used for information about current Minnesota climate trends and how climate change is anticipated to affect the general location of the project during the life of the project (as detailed below in item 7. Climate Adaptation and Resilience).

Figures and Attachments

- Figure 1. Project location in Houston County, Minnesota.
- Figure 2. U.S. Geological Survey 7.5 minute, 1:24,000 scale map of the project boundaries.
- Figure 3. 1890s Land Cover map of general project area.
- Figure 4. 1890s Mississippi River Commission survey map of general project area.
- Figure 5. 1929 aerial image of the general project area.
- Figure 6. 1938 aerial image of the general project area.
- Figure 7. Photos of silver maple mortality in the general project area.
- Figure 8. Annual growing season flood duration in the general project area.
- Figure 9. Proportional abundance of floodplain forest species grouped according to days flooded per growing season (from De Jager et al., 2012).
- Figure 10. Proposed project concept 1 map.
- Figure 11. Proposed project concept 2 map.
- Figure 12. Examples of containment berms for hydraulic placement of dredged material.
- Figure 13. Examples of projects using hydraulic dredging and placement for floodplain forest enhancement.
- Figure 14. Examples of outflow structures/culverts used with hydraulic placement of dredged material.
- Figure 15. Reno Bottoms HREP project access road configurations.
- Figure 16. Example of a similar floodplain forest enhancement project in Pool 9 (Iowa) in the Conway Lake HREP project.
- Figure 17. Example of a similar floodplain forest restoration project in Pool 10 (Iowa) and natural regeneration of silver maple in at the McGregor Lake HREP project.
- Figure 18. Example of willow stakes/spikes for erosion control and long-term stabilization.
- Figure 19. Dredge cut configurations for the project based on the Reno Bottoms HREP project.
- Figure 20. FEMA 100 year floodway map.
- Figure 21. Karst features in the general project area.
- Figure 22. Springs located in the general project area.

6. Project Description:

a. Provide the brief project summary to be published in the *EQB Monitor*, (approximately 50 words).

The project includes dredging accumulated sediments from an approximately 5 acre area of a backwater in Upper Pool 9 of the Mississippi River to create deep lentic aquatic habitat for fishes. Dredged material will be used to increase land elevation in ~5 acres of floodplain to facilitate the re-establishment of forest killed by flooding and changing hydrology to restore floodplain forest and promote natural regeneration.

b. Give a complete description of the proposed project and related new construction, including infrastructure needs. If the project is an expansion include a description of the existing facility. Emphasize: 1) construction, operation methods and features that will cause physical manipulation of the environment or will produce wastes, 2) modifications to existing equipment or industrial processes, 3) significant demolition, removal or remodeling of existing structures, and 4) timing and duration of construction activities

The Reno Bottoms area is a floodplain forest and backwater complex in Pool 9 of the Upper Mississippi River (UMR) in Southeast Minnesota. The proposed project is in Houston County, ~5 miles south of Reno, MN and just north of the MN/IA border near the U.S. Army Corps of Engineers (USACE) owned boat access at Millstone Landing (Figures 1 and 2). The project is on USACE-owned land incorporated into the U.S. Fish and Wildlife Service (USFWS) Upper Mississippi River National Wildlife and Fish Refuge (UMRNWFR).

Historically, the Reno Bottoms area was a traditional floodplain river system with a mosaic of habitat types depending on elevation and fluvial processes that created the landforms. Historic surveys from the 1890s indicate that the general project area was a mix of floodplain forest, wet meadow, backwaters and flowing channels with varying floodplain elevations (Figure 3), and the floodplain forest habitat was dominated by stands of green ash (*Fraxinus pennsylvanica*) and silver maple (*Acer saccharinum*; Figure 4). The UMR Lock and Dam system was created in the mid-1930s and permanently altered the hydrology of the entire UMR, inundating floodplain forest and increasing hydrologic connectivity between the main channel and floodplain habitats. Sometime between the 1890s and 1930s, historical aerial photographs indicate the general project area was cleared of trees and tilled for agriculture/livestock (Figure 5); land use of the Reno Bottoms was similar to the general project area. Construction of Lock and Dam 9 (LD9) in 1937 flooded much of the habitat in the Reno Bottoms area. USACE and USFWS/UMRNWFR acquired much of the floodplain lands, and agricultural processes stopped (Figure 6). Formerly agricultural areas were left for natural regeneration of floodplain forest species. Stands of silver maple established on much of this habitat. Floodplain forest and backwater habitats in the Reno Bottoms area post-Lock and Dam were considered healthy despite the impacts of LD9 to the hydrology of the Reno Bottoms area.

Floodplain forest habitat quality in the Reno Bottoms area has drastically declined because of changing hydrology brought by climatic changes in the last 30 years. The area now experiences an increase in frequency of inundation (flooding) and longer periods of inundation. Increased water on the floodplain is a major stressor on floodplain forest health. Large tracts of floodplain forest (primarily silver maple) have died due to increasing days of inundation (Figures 7 and 8), especially in the last 15 years. Research indicates floodplain forest species diversity declines with increasing days of inundation (De Jager et al., 2012; Figure 9), and some areas can no longer support established stands of trees because of flood related stress. The invasion of reed canary grass (*Phalaris arundinacea*; RCG) due to changing hydrology further compounds the declining floodplain forest health. Invasion by RCG is brought on by tree mortality and loss of overstory which allows RCG to establish in the understory, and dense stands of RCG form and inhibit or nearly eliminate any natural

regeneration of floodplain forest tree species; modelling indicates RCG invasion will continue with further loss of floodplain forest and climatic effects on hydrology (De Jager et al., 2024).

Backwater habitat has also declined in quality during this period because of significantly more water moving through the floodplain. Depth in backwaters has been lost due to increased sedimentation rates and erosion of existing islands/landforms from wind and wave action. The current backwater habitat has limited ability to support lentic fishes and aquatic organisms. In particular, deep lentic habitat that provides critical overwintering habitat for many backwater fishes has been lost; lentic fishes require wintering areas that are generally >5ft in depth with water velocity <0.01 m/s. Reduced depths allow for greater sediment resuspension from wind and wave action, and suspended sediments reduce potential for growth of submersed aquatic vegetation (Delaney and Larson, 2024).

With the declining habitat value for both floodplain forest and backwater habitats, MN DNR is proposing a restoration project in the Reno Bottoms area of Upper Pool 9 in the UMR. The project is to restore floodplain forest habitat, while improving aquatic habitat. The project will remove accumulated alluvium sediments (e.g., silt/sand/clay) from the bed of the backwater area by dredging. That material will be placed on floodplain forest land to elevate the existing ground by ~3ft. Elevating the floodplain forest ground will reduce the duration and frequency of inundation and promote natural regeneration of floodplain forest species, and deepening of the backwater will create deep lentic habitat for fishes and other aquatic organisms.

This project is in collaboration with the Upper Mississippi River Restoration (UMRR) Habitat Rehabilitation and Enhancement Project (HREP) for the Reno Bottoms area that is conducted by USACE (Attachment A). Both projects will capitalize on each respective project and will create a larger network of habitat improvement and restoration in the Reno Bottoms area.

Project Concept: Restoration of floodplain forest habitat in the form of island recreation/enhancement and backwater enhancement through dredging has been implemented with many HREP projects throughout the UMR since the 1980s, including in Pool 9. As stated previously, floodplain forest health is severely degraded (Figure 7), with high potential for invasion by invasive species (DeJager et al., 2024). Due to these ongoing issues in Pool 9 the general project area was identified for restoration by the UMR Pool Plans (River Resources Forum 2004). The UMR Pool Plans were developed by state and federal resource management agencies in partnership with citizen groups and non-government organizations to identify resource issues/concerns and locations where management actions were needed. The UMRNWFR Comprehensive Conservation Plan (USFWS, 2006) identifies the project area of the refuge as important and has specific goals and objectives for the area with the UMRNWFR Habitat Management Plan (USFWS, 2019). The MN DNR proposed a project for floodplain forest restoration and backwater enhancement to the Lessard Sams Outdoor Heritage Council, and that process also led to a joint effort to propose the Reno Bottoms area for a UMRR HREP project; both projects were funded.

The MN DNR proposed project will elevate existing degraded floodplain forest habitat to an elevation sufficient to reduce the days of inundation on the landscape to promote floodplain forest health and natural regeneration of floodplain forest species. The material to elevate the floodplain forest will be dredged from a nearby backwater to restore deep lentic backwater habitat in support of fishes and other aquatic organisms (Figure 10 and 11). The proposed project will utilize previously used floodplain forest restoration and backwater restoration construction techniques developed by UMRR HREP projects.

The proposed project will restore floodplain forest habitat by reducing days of inundation at the project site to levels that mimic pre-lock and dam hydrology to promote diverse floodplain forest habitat (overstory and understory; De Jager et al., 2012; Figure 9) and ecological function. The floodplain forest habitat post-project will be more resilient to potential future changing hydrology/climate (De Jager et al., 2019) through both changes to topography and greater species diversity (including hard-mast producing species like swamp white oak, *Quercus bicolor*). The more resilient and diverse floodplain forest habitat will provide substantial benefits to wildlife in the area such as tree-roosting bats, songbirds, neotropical migratory birds, and small mammals. Restoring floodplain forest also benefits terrestrial habitat connectivity. Substantial forest loss has resulted in large gaps in forest canopy cover in the Reno Bottoms area, and these gaps make floodplain forest-dependent species traverse longer distances between suitable habitats. Furthermore, elevated floodplain forest habitat should provide improvements for nesting turtles (reduced inundation), amphibians, and pollinator species (depending on understory species). Existing dead trees on site will be incorporated into the soils to create micro-topographies and microhabitats to promote greater diversity in habitat and the species that will occupy the site post-restoration; use of trees on site promotes long-term carbon storage at the site compared to other removal efforts (e.g., burning of dead trees).

Restoring the floodplain forest habitat through elevation enhancement requires dredging of sediments from backwater habitat. This portion of the proposed project will create deep lentic habitat, and critical overwintering habitat for lentic fishes. Deepening the area will create/restore historic habitat that was once present at the site. Shallow lentic areas have high biological oxygen demand (BOD) with warm water temperatures, which leads to anoxic conditions. Conversely, high velocity areas like side channels have ample oxygen, but water temperatures are very cold and fish need to be continuously swimming, resulting in them depleting energy reserves and dying. Overwintering habitat is a 'goldilocks' zone where oxygen is high (sufficient depth and volume to reduce BOD, >5 ft), velocity is low (<0.01 m/s), and temperatures are warm (>1°C), and fishes cue in on these areas for winter survival (Palesh and Anderson, 1990). Based on previous research and restoration projects, creating critical overwintering habitat in this location will substantially improve fish habitat and fish/aquatic resources (including submersed vegetation diversity).

Project Design and Description: The proposed project (Figures 10 and 11) has two options for configuration of floodplain forest restoration, with the final option selected during design. Each option is similar in size, but allows for more potential for a less-impactful option (if one is deemed more impactful); 5.41 acres for option 1, and 5.93 acres for option 2. The target elevation for floodplain forest habitat is ~625 ft (NAVD 88), which will reduce days of inundation to <30 days. This elevation will support diverse floodplain forest species (De Jager et al., 2012; Figure 9) while being resilient to future changing hydrology (De Jager et al., 2019). Dead trees within the project site will be cut and placed, then using in-situ material (material on the site) a berm will be created using heavy equipment. This will create a ponding area for sediments to dry, and more importantly, not flow back into the backwater dredged area (Figure 12). The berm dimensions will be dependent on dredging and placement methodology; two options for placement of dredge material are available. One option is hydraulic placement of dredge material, where sediments are removed from the backwater (upper end of Ice Haul Slough) and pumped to the placement site in a slurry of water and sediment through a pipe. The area is filled with water/sediment and allowed to periodically run off after sediments have settled out of the water column (Figure 13), or allowed to dry and decant without runoff. Sediment settlement rates depend on sediment type, but typically sand is out of suspension in one minute, silts are one hour, and clays are 24 hours. If runoff is required, outflow structures will be required to slowly drain water out of the area (Figure 14); water draining may occur continuously or after a settling time, but water quality will be monitored during the process. The second option is mechanical placement of material by transporting sediments to the area using

trucks or heavy equipment, which can utilize an existing access road at the site from the UMRR HREP project (Figure 15); runoff and spillage of dredge sediments will be monitored to reduce impacts to the temporary road and its footprint. The material would be placed within the berms and allowed to dry/decant as needed. Following placement using either technique, the area would be seeded/planted with an appropriate floodplain forest seed mix (Attachment B), and areas may be left as bare mineral soil to allow for establishment of floodplain forest species via natural regeneration (Figure 16 and 17). Mixing of soils with heavy equipment after the drying period may be necessary to level/even berm height to placed soils, particularly with mechanical placement. Hydraulic placement (Figure 17) does not likely require mixing of soils, because mixing occurs during the pumping process. Moving the outflow pipe multiple times during construction (every ~10,000 cu yd) will mix soils sufficiently and create micro-habitats of differing soil types for more diverse floodplain forest species (Figure 17). Exterior berms will be shaped to be level with the fill area, and stabilized using an appropriate seed mix, or willow (*Salix*) stakes to prevent erosion during high water periods (Figure 18). Long-term management of the floodplain forest resources will be conducted by USACE foresters (Attachment C).

Dredging of the backwater habitat will be done with shallow-draft equipment (~3ft drafting depth) for either hydraulic or mechanical methods. Mechanical dredging will excavate with a typical heavy equipment bucket and transfer to barge or truck for placement. Hydraulic dredging uses a cutter head dredge and excavates sediment by creating a slurry of water and sediment to be hydraulically pumped to the placement site. The backwater will be dredged to 614 ft (NAVD 88) resulting in at least 6ft of water depth at low control pool (LCP), for a total area of 4.6 acres. These designs will provide sufficient depth for critical overwintering areas with the desired water quality metrics for overwintering fishes. The deepest portion of the dredge area will be in the middle of the dredge footprint, and the areas nearest to existing shorelines will be a 5:1 side slope (Figure 19) to prevent sloughing, and provide habitat diversity for fishes and other aquatic organisms (more diversity of submersed vegetation); 5:1 side slopes are preferred by the UMRNWFR for targeting lentic species of greatest conservation need based on their HMP (USFWS, 2019). At current designs for depth and side slope, ~33,000 cubic yards of sediment will need to be dredged to raise the floodplain forest area three feet. Dredged sediments are estimated to have a shrinkage factor of 20% based on USACE core sediment analyses, and this shrinkage factor is calculated in the estimates for dredge material placement/amounts (Attachment D).

The major actions of the restoration project will include: 1) permitting and design; 2) dead tree felling and placement; 3) in situ berming of material; 4) dredging of backwater habitat for sediment and placing sediment on the floodplain forest habitat; 5) drying of sediment and mixing of material (if needed); 6) vegetation planting and erosion control of floodplain forest area; 7) long-term forest management by USACE (Attachment C).

Construction will begin with dead tree removal during the winter months to avoid impacting tree-roosting bat populations (see Item 14.c). During the summer months (June/July), after the eagle restriction period, containment berms will be constructed using heavy equipment; equipment (excavator or bulldozer) can be delivered to the site by road (truck-able) or by water (barge), and equipment will be staged on site near the access road but will not impact public boat ramp use. Following berm construction, dredging will commence after the fish spawning exclusion period (March 1 to June 1); the dredging equipment will be shallow draft and floated in (>2 feet above channel bottom), or loaded using the HREP access road to avoid impacting mussel resources in the area. Dredging will be either mechanical or hydraulic as described previously, and dredging operations will take approximately 30-40 working days (assuming 8-10hr days) as most operations can dredge 750-1000 cubic yards per day. Dredged material will be placed inside the berms through methods described previously (hydraulic or mechanical); berms will be monitored throughout the

construction period for integrity to limit the potential for breaching. Once material is placed, berms will be stabilized with willow stakes and/or seeding. Material will be allowed to decant/dry over the course of several weeks depending on conditions; decanting following the construction season may be necessary. Berms will be shaped to mix soils and create a more natural topography in the transition zone from berm material to placement material. The area will be planted with an appropriate seed mix and will be allowed to regenerate naturally with floodplain forest tree species; light-seeded species like silver maple and cottonwood (*Populus deltoides*) will establish first (Figure 16 and 17), and future tree planting management (conducted by USACE) may be necessary to establish specific desired floodplain forest species (e.g., swamp white oak) that may not be present at the project site as a natural seed source. However, the floodplain forest restoration area will have the proper days of inundation to support higher elevation species like swamp white oak.

Construction will be carried out during low water periods since flooded conditions would not be conducive to either construction method. All disturbed areas in the floodplain forest will receive erosion control measures that will be installed concurrently with construction activities within any SWPPP requirements. Any sensitive features that are on site will be clearly outlined or marked and will be off-limits to construction if necessary. Project boundaries will be staked prior to construction activities. Monitoring during construction will include evaluating compliance with appropriate equipment maintenance, equipment cleaning, use of haul roads, and identifying BMPs and techniques that minimize impact; this will be covered in the SWPPP. Any use of existing roads on site for transport of equipment will be returned to pre-project conditions, or better. After construction is completed, the area will be monitored by USACE staff for floodplain forest response/resources, and aquatic areas will be surveyed for fisheries resources by MN DNR.

c. Project magnitude:

Table 1. Project magnitude estimates.

Description	Number
Total Project Acreage	10
Linear project length	0
Number and type of residential units	0
Residential building area (in square feet)	0
Commercial building area (in square feet)	0
Industrial building area (in square feet)	0
Institutional building area (in square feet)	0
Other uses – specify (in square feet)	n/a
Structure height(s)	n/a

d. Explain the project purpose; if the project will be carried out by a governmental unit, explain the need for the project and identify its beneficiaries.
The MN DNR proposed this project as it directly addresses the systemic issues of floodplain forest loss and habitat fragmentation in the UMR and restoration of floodplain forests is a priority action item in the USACE UMR Systemic Forest Stewardship Plan (USACE, 2012), and the Ecological Status and Trends of the Upper Mississippi System 2022 report (USGS, 2022) states that the ecosystem as a whole will benefit from floodplain forest restoration. Furthermore, this area was identified as a priority area for restoration by the UMR Pool Plans (River Resources Forum, 2004), and the UMRNWFR Comprehensive Conservation Plan (USFWS, 2006) identifies the project area of the refuge as important and has specific goals and objectives for the area with the UMRNWFR Habitat Management Plan (USFWS, 2019). Restoration in this area aligns with addressing the habitat issues in Pool 9 identified in the Habitat Needs Assessment II (USGS, 2018). Allocation of State of MN funds for restoration in this area demonstrates commitment by the State to improving habitat in this highly impacted area (federally funded projects also demonstrate this commitment).

Restoration of floodplain forests provides rich habitat for wildlife, reduces soil erosion, improves water quality, and provides a scenic and recreational landscape. The proposed project incorporates a variety of floodplain forest restoration components such as: increasing tree species diversity, reintroducing a hard mast component in floodplain forest communities, improving wildlife habitat, incorporating innovative restoration measures by use of dredge materials for increasing topographic diversity, and managing and controlling invasive species. Additional benefits of the project include the beneficial use of dredge materials to improve aquatic habitat and ecosystem function; improvements to fish habitat will improve species diversity, growth, and reproduction of fishes. Beneficiaries of the project include the UMRNWFR, USACE, and MN DNR and the stakeholders and constituents that recreate in or around the project area. This restoration project is strongly supported by multiple state and federal agencies, and collaborating together to create a larger area of habitat restoration with two separate projects and funding sources, state (MN, this project) and federal (UMRR HREP), benefits the UMR system as a whole.

The project lends itself to the adaptive management process by incorporating a variety of restoration measures as well as post-project monitoring to measure their effectiveness, thereby informing future floodplain forest restoration efforts. Floodplain forest restoration in this location will allow for direct comparison with other floodplain forest restoration techniques being used in adjacent areas by partner organizations and agencies (e.g., USACE and USFWS).

e. Are future stages of this development including development on any other property planned or likely to happen? Yes
If yes, briefly describe future stages, relationship to present project, timeline and plans for environmental review.
Upper Pool 9 is a Priority Area of Concern for the USFWS, and floodplain forest restoration is being planned for additional acres in this area. The current (unconstructed) UMRR HREP project is nearing construction start (anticipated 2026) which is managed by USACE. Because this area is in such need of restoration, other projects are likely to happen in the general Reno Bottoms area, but are not officially planned. Any new/future projects would require a federal environmental assessment, and planning would be conducted by USACE.

f. Is this project a subsequent stage of an earlier project? No
If yes, briefly describe the past development, timeline and any past environmental review.

7. Climate Adaptation and Resilience:

a. Describe the climate trends in the general location of the project (see guidance: *Climate Adaptation and Resilience*) and how climate change is anticipated to affect that location during the life of the project.
The MN DNR Minnesota Climate Explorer tool indicates that the climate in Houston County Minnesota has reflected the following general trends since 1985, and is predicted to show the following trends until the end of the 21st Century:

Table 2. Historic and projected climate trends for Houston County Minnesota.

Climate Variable	Overall Historical Trend, 1895-2024	Expected Trend, 1980-2099
Average Temperature (annual)	warming	continued warming
Maximum Temperature (annual)	increasing	continued increasing
Minimal Temperature (annual)	increasing	continued increasing
Precipitation (annual)	increasing	continued increasing
Palmer Drought Severity Index (PDSI)	more wet periods than dry periods	not available

Temperature and precipitation trends were projected using the University of Minnesota climate modelling tool. Eight different climatic models (BCC-CSM1-1, CCSM4, CMCC-CM, CNRM-CM5, GFDL-ESM2M, IPSL-CM5A-LR, MIROCS, and MRI-CGCM3) were developed by different institutions and modeled under different emissions scenarios to generate a range of projected values. See Attachment E for the results of all the variables listed above for Houston County, Minnesota for the remainder of the 21st century (see Attachment E for more detailed information on the models and their methods/assumptions).

The EPA CREAT Climate Scenarios Projection Map for Houston County Minnesota projects that there will be an increase in 100-year storm intensity of approximately 3.3 to 26.3% depending on whether the modeled scenario is 'not as stormy' or 'stormy'.

Increasing precipitation in the Mississippi River basin in recent years significantly impacted river water levels and will likely continue with projected future climatic conditions. An increasing trend of total river flows within the area have had increasingly significant impacts on floodplain vegetation (Van Appledorn et al., 2021; De Jager et al. 2024). Increased water surface elevations associated with the increased flow rates on the river have resulted in longer and more frequent periods of flood stress for trees due to chronic inundation. Higher frequencies of growing season flooding have also led to tree decline and death over the last three or four decades, with exceptionally high water between 2016 and 2019 causing widespread mortality throughout the lower elevation forested areas in the interior of Reno Bottoms. Generally, low elevation forests that have been killed by chronic high water in the study area have converted to marsh or wet meadow habitat types (De Jager et al., 2019; Van Appledorn et al., 2021; De Jager et al., 2024)

Floodplain forest regeneration is also impacted by altered hydrology, and small seedlings are particularly vulnerable to even short periods of overtopping. In general, natural regeneration of trees is mostly absent within the project area, and it is thought that in many areas chronic high water during the growing season is preventing seedlings from getting tall enough to avoid overtopping. Once overtopped, seedlings generally die, so high growing season water levels are almost certainly preventing effective establishment of new tree seedlings. Thus, altered hydrology related to increased flows has probably caused a shift to higher elevation forests dominated by increasingly older trees without a viable cohort of regeneration. In areas with no viable regeneration, conversion to herbaceous (non-tree) cover types is also likely to occur though at a slower rate than in areas killed by flooding; these areas are expected to continue to convert to invasive RCG in the project area (De Jager et al., 2024).

b. For each Resource Category in the table below: Describe how the project's proposed activities and how the project's design will interact with those climate trends. Describe proposed adaptations to address the project effects identified.

Table 3. Projected climate impacts on proposed project activities.

Resource Category	Climate Considerations	Project Information	Adaptations
Project Design	Increasing precipitation and subsequent increased duration and frequency of inundation periods and days of inundation of floodplain forest habitat.	The project will elevate existing floodplain forest habitat to elevations that will support a diversity of floodplain forest tree species by reducing the days of inundation (< 30d).	
Land Use	N/A – land use pre and post project will be unchanged.	None	N/A
Water Resources	Addressed in item 12	Addressed in item 12	Addressed in item 12
Contamination/Hazardous Materials/Wastes	N/A – project will not generate any contamination or hazardous materials	None	N/A
Fish, wildlife, plant communities, and sensitive ecological resources (rare features)	Addressed in item 14	Addressed in item 14	Addressed in item14

8. **Cover types:** Estimate the acreage of the site with each of the following cover types before and after development:

Table 4. Cover types before and after project.

Cover Types	Before (acres)	After (acres)
Wetlands and shallow lakes (<2 meters deep)	5	0
Deep lakes (>2 meters deep)	0	5
Wooded/forest	0	5
Rivers/streams	0	0
Brush/Grassland	5	0
Cropland	0	0
Livestock rangeland/pastureland	0	0
Lawn/landscaping	0	0
Green infrastructure TOTAL (from table below*)	0	0
Impervious surface	0	0
Stormwater Pond (wet sedimentation basin)	0	0
Other (describe)	0	0
TOTAL	10	10

Table 5. Green infrastructure before and after project.

Green Infrastructure*	Before (acreage)	After (acreage)
Constructed infiltration systems (infiltration basins/infiltration trenches/ rainwater gardens/bioretention areas without underdrains/swales with impermeable check dams)	0	0
Constructed tree trenches and tree boxes	0	0

Green Infrastructure*	Before (acreage)	After (acreage)
Constructed wetlands	0	0
Constructed green roofs	0	0
Constructed permeable pavements	0	0
Other (describe)	0	0
TOTAL*	0	0

Table 6. Tree coverage before and after project.

Trees	Percent	Number
Percent tree canopy removed or number of mature trees removed during	95 (dead)	N/A
Number of new trees planted	0 (natural regeneration) or TBD	N/A

9. Permits and approvals required: List all known local, state and federal permits, approvals, certifications and financial assistance for the project. Include modifications of any existing permits, governmental review of plans and all direct and indirect forms of public financial assistance including bond guarantees, Tax Increment Financing and infrastructure. *All of these final decisions are prohibited until all appropriate environmental review has been completed. See Minnesota Rules, Chapter 4410.3100.*

Table 7. Permits and approvals needed to complete the proposed project.

Unit of Government	Type of Application	Status
US Army Corps of Engineers	Section 404 Permit	To be obtained
US Army Corps of Engineers	Section 408 Permit	To be obtained
US Army Corps of Engineers	NEPA, utilizing joint application form for activities affecting water resources in Minnesota (below)	To be obtained
US Army Corps of Engineers	Report of Availability (ROA), Project Review	To be obtained
US Army Corps of Engineers	Determination of Availability (DOA), Project Review	To be obtained

Unit of Government	Type of Application	Status
US Army Corps of Engineers	Section 106 of National Historic Preservation Act	Issued, Attachment F
US Fish and Wildlife Service	Special Use Permit	To be obtained
US Fish and Wildlife Service	Section 7/IPAC Consultation/Concurrence	To be obtained, Attachment G
MN State Historic Preservation Office	Project Approval of No Impact to Historic Properties	Issued, Attachment F
MN DNR	Natural Heritage Information System Data	Issued, Attachment H
MN DNR	Public Waters Permit	To be obtained
MN Board of Water & Soil Resources	Joint Application Form for Activities Affecting Water Resources in Minnesota (No Loss, Attachment B)	To be obtained
MPCA	NPDES/SDS Construction Stormwater Permit	To be obtained
MPCA	Dredge Material Management Permit	To be obtained
MPCA	401 Water Quality Certification	To be obtained
MPCA	Stormwater Pollution Prevention Plan (SWPPP)	To be obtained
Houston County	Shoreland Zoning Permit	To be obtained
Houston County	Permits or approvals for other work related to project	To be obtained

Cumulative potential effects may be considered and addressed in response to individual EAW Item Nos. 10-20, or the RGU can address all cumulative potential effects in response to EAW Item No.22. If addressing cumulative effect under individual items, make sure to include information requested in EAW Item No. 21.

10. Land use:

a. Describe:

i. Existing land use of the site as well as areas adjacent to and near the site, including parks and open space, cemeteries, trails, prime or unique farmlands.
The project area is located within the UMRNWFR McGregor District. The floodplain forest

enhancement lands are owned by USACE (fee title lands), but the lands occur within the UMRNWFR per a cooperative agreement between USACE and USFWS. Surface waters (Ice Haul Slough) are within the UMRNWFR (fisheries managed by MN DNR). Land use at the project site is public land used for fishing, boating, hunting, and other water and floodplain related activities. The UMRNWFR primary vision for the area is to have a beautiful, healthy floodplain forest and pool complex that supports abundant and diverse native fish, wildlife, and plants for the enjoyment and thoughtful use of current and future generations. The UMRNWFR was created as a refuge for fish, wildlife, and plants and a breeding place for migratory birds; UMRNWFR identifies the Reno Bottoms area as part of the migratory bird flyway, which is a globally significant waterway for waterfowl and shorebirds of North America.

Adjacent to the project area is a USACE owned and operated boat landing (Millstone Landing); Visgers Landing (USFWS owned and operated boat landing) is nearby. A privately owned farm is located west of the project area across highway 26, about 0.25 miles from the project.

ii. Plans. Describe planned land use as identified in comprehensive plan (if available) and any other applicable plan for land use, water, or resources management by a local, regional, state, or federal agency.

The project area is in a location identified under an inter-jurisdictional environmental operating plan for the UMR (Pool Plans; River Resources Forum, 2004). The UMR Pool Plans were developed by state and federal resource management agencies in partnership with citizen groups and non-government organizations to identify resource issues/concerns and locations where management actions were needed. The UMRNWFR Comprehensive Conservation Plan (USFWS, 2006) identifies this area of the refuge as important and has specific goals and objectives for the area with the UMRNWFR Habitat Management Plan (USFWS, 2019). Similarly, the UMR Systemic Forest Stewardship Plan (USACE, 2012) identifies this area as a location to improve forest resources and restoration is important for the overall UMR ecosystem (USGS, 2022). This restoration project aligns with the habitat issues identified in Pool 9 by the Habitat Needs Assessment II (USGS, 2018) by a large inter-agency working group. The proposed project aligns and supports many facets of the aforementioned management plans and reports for the UMR system, and is supported by multiple state and federal agencies.

Specific resources for the UMRNWFR for the Reno Bottoms general area can be found in Attachment I (developed from the Reno Bottoms HREP coordination).

iii. Zoning, including special districts or overlays such as shoreland, floodplain, wild and scenic rivers, critical area, agricultural preserves, etc.

The project area is within the UMRNWFR as stated previously. No special use areas are designated by the UMRNWFR in the project area. The project area is within the shoreland district of the Mississippi River (remote shoreland classification) and Ice Haul Slough (general development shoreland classification). The project area is located entirely below the ordinary high water line (OHWL; 627.7 NGVD 1929, 627.6 NAVD 88), so a public waters permit will address floodplain regulations, but Houston County will be provided information as a courtesy to ensure they can comment and document compliance with floodplain ordinances administered at the county level. The project area is located within the FEMA Regulatory Floodway (Zone AE: Figure 20). Zone AE indicates that the floodway was determined with Base Flood Elevations (BFE; 635 NAVD 88), and that the area must be kept free of any encroachment so that the 1% annual exceedance can be carried without substantial increases in flood heights (No-Rise Certification will be required).

iv. If any critical facilities (i.e. facilities necessary for public health and safety, those storing hazardous materials, or those with housing occupants who may be insufficiently mobile) are proposed in floodplain areas and other areas identified as at risk for localized flooding, describe the risk potential considering changing precipitation and event intensity.
N/A

b. Discuss the project's compatibility with nearby land uses, zoning, and plans listed in Item 9a above, concentrating on implications for environmental effects.
The project is compatible with existing nearby land uses, zoning, USFWS and USACE management plans (Item 10.ii.a).

The MN DNR will comply with applicable provisions and zoning ordinances in the project area during construction of the project.

The project is compatible with the Reno Bottoms HREP project in the larger area, and is complimentary to restoration features on that project creating a larger and more robust complex of habitat with improved resilience, diversity, and redundancy (USGS, 2018; Bouska et al., 2019)

Environmental effects of the project that could affect nearby residents will be discussed under those items specifically addressing the environmental effects (e.g., noise, dust, etc.). Stormwater management will be addressed under Item 12.b.i.2. No other incompatibilities were identified.

c. Identify measures incorporated into the proposed project to mitigate any potential incompatibility as discussed in Item 10b above and any risk potential.
N/A

11. Geology, soils and topography/land forms:

a. Geology - Describe the geology underlying the project area and identify and map any susceptible geologic features such as sinkholes, shallow limestone formations, unconfined/shallow aquifers, or karst conditions. Discuss any limitations of these features for the project and any effects the project could have on these features. Identify any project designs or mitigation measures to address effects to geologic features.
The project area is located within the Mississippi River floodplain (Pool 9). No sinkholes, shallow limestone formations, aquifers or karst features occur within the project area (Figures 21-23).

General geologic history of the Upper Mississippi River is that the most recent significant event occurred at the end of the Pleistocene glaciations, approximately 10,000 years ago. Tremendous volumes of glacial meltwater, primarily from the Red River Valley's glacial Lake Agassiz, eroded the pre-glacial Minnesota and Mississippi River valleys. As meltwaters diminished, the deeply eroded river valleys aggraded substantially to about the present-day levels. Prior to impoundment, the broad floodplain of the river was characterized by depressions, secondary channels, natural levees, islands, and shallow lakes. Since impoundment, a relatively thin veneer of silts, clays, or sands has been deposited over most of the river bottom within the pool. The sedimentation of fines (clay and silt) is generally greater in the slow-moving backwater areas than in the major side channels and main channel portions of the impounded area.

b. Soils and topography - Describe the soils on the site, giving NRCS (SCS) classifications and descriptions, including limitations of soils. Describe topography, any special site conditions relating to erosion potential, soil stability or other soils limitations, such as steep slopes, highly

permeable soils. Provide estimated volume and acreage of soil excavation and/or grading. Discuss impacts from project activities (distinguish between construction and operational activities) related to soils and topography. Identify measures during and after project construction to address soil limitations including stabilization, soil corrections or other measures. Erosion/sedimentation control related to stormwater runoff should be addressed in response to Item 12.b.ii.

Soils in the project area are bottomland soils of alluvial origin. Alluvial bottomlands have soils made up of layers or lenses of sand, clays and silts deposited following periodic flooding. In areas of annual flooding, there is little soil development since humus material is removed or covered annually. A grey layer of sticky fine clay with blue-green mottling from reduced iron is present in all bottomland soils. It indicates poor internal drainage and anaerobic soil conditions. Generally, alluvial soils have been in place long enough for trees and other plants to grow but are located in frequently flooded areas and may change with riverine processes over time.

Geotechnical and environmental borings for the project area were conducted in 2019 and boring logs and environmental contaminant data can be found in Attachment J. Borings indicate the surface sediments are dominated by typical alluvium sediments consisting of silts, sands and clays.

Topography of the project area is typical of Upper Mississippi River floodplain habitat. Annual flooding is common, and some locations may be poorly drained. Floodplain elevations range from ~620-623ft above mean sea level (Figures 24 and 25). The dredge material placed on the floodplain forest enhancement (raised to ~626ft) site will be of similar soil types, with a mix of silts, sand, and clays. Existing dredge cut elevations are ~618.5-620ft and will be dredged to ~614ft (Figure 19).

The soil types derived from the USDA Web Soil Survey map (Figure 26 and 27) indicate that floodplain soils are primarily dominated by Comfrey silty clay loam (channeled), with a small amount of Shiloh silty clay (ponded). Water is also listed as a soil type in the larger project area.

Table 8. Soils found in the general project area according to USDA Web Soil Survey.

Soil Symbol	Soil Unit Name	Slope (%)	Hydrologic Group	Hydric Rating	Farmland Classification	Acres in Project Area	Percent of Project Area
W	Water				Not prime farmland	33.0	55.8
606	Shiloh silty clay, ponded	0 to 1	C/D	Yes	Not prime farmland	1.1	42.3
1860	Comfrey silty clay loam, channeled	0 to 2	B/D	Yes	Not prime farmland	25	42.3

- NOTE: For silica sand projects, the EAW must include a hydrogeologic investigation assessing the potential groundwater and surface water effects and geologic conditions that could create an increased risk of potentially significant effects on groundwater and surface water. Descriptions of water resources and potential effects from the project in EAW Item 12 must be consistent with the geology, soils and topography/land forms and potential effects described in EAW Item 11.
  N/A.

12. Water resources:

a. Describe surface water and groundwater features on or near the site in a.i. and a.ii. below.

i. Surface water - lakes, streams, wetlands, intermittent channels, and county/judicial ditches. Include any special designations such as public waters, shoreland classification and floodway/floodplain, trout stream/lake, wildlife lakes, migratory waterfowl feeding/resting lake, and outstanding resource value water. Include the presence of aquatic invasive species and the water quality impairments or special designations listed on the current MPCA 303d Impaired Waters List that are within 1 mile of the project. Include DNR Public Waters Inventory number(s), if any.

The proposed project area is in Houston County, MN in upper Pool 9 (28-0001-00) of the UMR within the Ice Haul Slough (28-0001-05) general area, in the Lower Mississippi River HUC-8 watershed (07060001). The project is in a floodplain depression that was permanently inundated by the construction of LD9 in 1937. All the surface water has been retained as public waters of the State of Minnesota. The area has experienced substantial sedimentation since construction of the lock and dam due to the effects of impoundment and tributary inputs from surrounding watersheds.

The entire project area is below the OHWL (627.7 NGVD 1929, 627.6 NAVD 88), and is considered wetland habitat (Figures 28 and 29). Floodplain forest area is considered a Type 7 wetland (wooded swamp; Circular 39 system) with a small amount of Type 6 wetland (shrub swamp), and is currently in poor condition because of the loss of forest habitat. The backwater area is a Type 4 wetland (inland deep fresh marsh) and Type 5 wetland (inland open fresh water), with the dredging area being Type 5. The backwater and floodplain forest habitat and wetland types will be enhanced but stay within the same classification.

The project area is located within the FEMA Regulatory Floodway (Zone AE; Figure 20). The 35% project designs were evaluated using a HEC-RAS model as part of FEMA compliance to determine floodway No-Rise certification. Initial modeling results indicate that the project will not trigger flood stage impacts (greater than 0.004 ft; Attachment K); final modeling will be required at 95% designs for the project (prior to construction) for official certification of no-rise conditions.

MPCA lists Pool 9 as an impaired water for polychlorinated biphenyls (PCBs) and mercury.

ii. Groundwater – aquifers, springs, seeps. Include: 1) depth to groundwater; 2) if project is within a MDH wellhead protection area; 3) identification of any onsite and/or nearby wells, including unique numbers and well logs if available. If there are no wells known on site or nearby, explain the methodology used to determine this.

No springs or seeps, wells, or karst features were identified in the project area according to the MN DNR Spring Inventory (Figures 21, 22, and 23).

Groundwater level at the project area is generally equivalent to the elevation of Pool 9 low control pool (LCP; ~620 ft at project site) except during flooding where elevations vary depending on river discharge. In general, seeps and artesian upwellings occur along the edges of the floodplain but generally above 630ft in elevation.

b. Describe effects from project activities on water resources and measures to minimize or mitigate the effects in Item b.i. through Item b.iv. below.

i. Wastewater - For each of the following, describe the sources, quantities and composition of

all sanitary, municipal/domestic and industrial wastewater produced or treated at the site.

1) If the wastewater discharge is to a publicly owned treatment facility, identify any pretreatment measures and the ability of the facility to handle the added water and waste loadings, including any effects on, or required expansion of, municipal wastewater infrastructure.
The proposed project will not produce any sanitary, municipal/domestic, or industrial wastewater.

2) If the wastewater discharge is to a subsurface sewage treatment systems (SSTS), describe the system used, the design flow, and suitability of site conditions for sucha system. If septic systems are part of the project, describe the availability of septage disposal options within the region to handle the ongoing amounts generated as a result of the project. Consider the effects of current Minnesota climate trends and anticipated changes in rainfall frequency, intensity and amount with this discussion. N/A

3) If the wastewater discharge is to surface water, identify the wastewater treatment methods and identify discharge points and proposed effluent limitations to mitigate impacts. Discuss any effects to surface or groundwater from wastewater discharges, taking into consideration how current Minnesota climate trends and anticipated climate change in the general location of the project may influence the effects.
N/A

ii. Stormwater - Describe changes in surface hydrology resulting from change of land cover. Describe the routes and receiving water bodies for runoff from the project site (major downstream water bodies as well as the immediate receiving waters). Discuss environmental effects from stormwater discharges on receiving waters post construction including how the project will affect runoff volume, discharge rate and change in pollutants. Consider the effects of current Minnesota climate trends and anticipated changes in rainfall frequency, intensity and amount with this discussion. For projects requiring NPDES/SDS Construction Stormwater permit coverage, state the total number of acres that will be disturbed by the project and describe the stormwater pollution prevention plan (SWPPP), including specific best management practices to address soil erosion and sedimentation during and after project construction. Discuss permanent stormwater management plans, including methods of achieving volume reduction to restore or maintain the natural hydrology of the site using green infrastructure practices or other stormwater management practices. Identify any receiving waters that have construction-related water impairments orare classified as special as defined in the Construction Stormwater permit. Describe additional requirements for special and/or impaired waters.
The purpose of the project, as described in Item 6, is to restore floodplain forest and backwater habitat in the project area. The restoration will allow for better floodplain forest habitat and natural regeneration of floodplain forest species, and backwater habitat will produce substantial overwintering habitat for fishes and other aquatic organisms. It is estimated that about 10 acres of disturbance will occur at the project site between both habitat types (5 acres dredged, 5 acres elevation enhancement).

Minimal runoff from the project site is expected during construction, and no runoff is expected after project completion. The potential for breaching of the containment berms during construction is estimated to be low based on results of previous projects, but berms will be monitored for integrity to reduce this risk and pathway for additional runoff. In the event the berms are breached/damaged they will be rapidly rebuilt and fortified, and any

sediment placement would be stopped until berms are functional. In general, minimal water leakage occurs through berms, and if it does it is typically clean water that has been filtered through berm soils. Improvements to habitat should reduce long-term impacts of any stormwater/river flooding by increasing resilience of each habitat type, especially to changing climate and hydrology in the area (USGS, 2018; Bouska et al., 2019). Diversity in floodplain forest species may improve sediment/stormwater retention in the area and backwater habitat will be protected, in-part, from some overland flows during flooding and provide resilience to aquatic organisms during these events.

A NPDES permit will be required, along with an associated SWPPP for project construction. Floodplain forest site preparation will establish perimeter berms of in-situ material on site (scraping/earth movement to create berm), silt fencing will be deployed around the construction area. Berm height will need to be determined by the contractor and engineers; in general, it is expected a 4ft high berm will need to be created to hold material for any hydraulic placement (a small berm may be needed for mechanical placement activities). Side slopes of berms will be roughly 3:1 (Figure 12). Following placement of material and subsequent drying of soils/material, final grading and seeding will minimize erosion at the site; berms will be shaped to be level with the fill area to reduce any future ponding effects, outflow structures will be removed, and the berms will be fortified with additional willow plantings/stakes for added long-term stability and habitat diversity. Very little on-site erosion is expected throughout construction because the erodible material is well above LCP elevations and will not be subject to riverine erosive flows. No net increase in stormwater runoff quantity will result from the project post-construction. Dredging activities will cause increased turbidity downstream, but it is unavoidable and will be temporary. The project SWPPP will be developed, but in-water BMPs used to minimize the consequences of turbidity include speed to complete the work as quickly as possible, and downstream sediment barriers such as a turbidity fence/curtain to limit movement of disturbed sediments out of the backwater habitat. In the floodplain forest area, berms with proper sizing and slope will be used to reduce water/sediment leakage and berms will be inspected for integrity. Seeding and willow plantings on the exterior of the area will prevent additional long-term erosion and sedimentation concerns during high water periods; additional BMPs and construction methods to reduce soil erosion and sedimentation are listed in Item 14.

The environmental effect of the project will be a temporary loss of submersed aquatic vegetation and the physical disruption and removal of sediments and invertebrates that inhabit the site, though recolonization will likely occur quickly, such as within one year. Both mechanical and hydraulic dredging have been used in other habitat projects on the UMR where fine sediments are removed, and techniques have been developed to minimize resuspension of fine sediments and in-water effects. For mechanical dredging, these techniques include slowly lowering the bucket into the water in an open position, thus allowing for water to flow out of the bucket as it begins to cut into the sediment; the bucket is then inverted back into the closed position while in the sediment and it is slowly lifted free of the sediment. A storage barge will be adjacent to the attached barge supporting the backhoe and there is little chance for sediment spillage back into the water. Hydraulic dredging involves a cutter head that cuts through sediment and creates a slurry of sediment and water that is pumped to the fill location for dewatering. Much of the sediment is captured by the pumping technique to minimize sediment plume. Dewatering can be contained within the berms through decanting methods, or a physical outflow can be created; granular material settles out of water in around one minute, fine/silt materials settle out within an hour, and suspended clays can take up to 24 hrs.

Climate change projections for Houston County, Minnesota include increased precipitation variability, with the possibility of more intense storms (Attachment E). The existing conditions at the project site are poorly suited to withstand potentially more frequent and/or larger storm events, as they will be subject to higher flood frequency and duration, while current/recent hydrology changes have destroyed much of the former habitat. Increasing elevation of floodplain forest, and deepening backwaters will create a more resilient and diverse habitat to withstand future changes in climate and hydrology.

iii. Water appropriation - Describe if the project proposes to appropriate surface or groundwater (including dewatering). Describe the source, quantity, duration, use and purpose of the water use and if a DNR water appropriation permit is required. Describe any well abandonment. If connecting to an existing municipal water supply, identify the wells to be used as a water source and any effects on, or required expansion of, municipal water infrastructure. Discuss environmental effects from water appropriation, including an assessment of the water resources available for appropriation. Discuss how the proposed water use is resilient in the event of changes in total precipitation, large precipitation events, drought, increased temperatures, variable surface water flows and elevations, and longer growing seasons. Identify any measures to avoid, minimize, or mitigate environmental effects from the water appropriation. Describe contingency plans should the appropriation volume increase beyond infrastructure capacity or water supply for the project diminish in quantity or quality, such as reuse of water, connections with another water source, or emergency connections.

The project is not expected to appropriate any substantial surface water, and no groundwater. If unforeseen circumstances occur where water may need to be appropriated, the project proposer will consult with a MN DNR hydrologist and apply for appropriate water appropriation permits. Other UMR dredging activities have not required an appropriations permit. No surface or groundwater resources would be affected by changes in precipitation totals or patterns, changes to surface area, or changes in growing seasons.

iv. Surface Waters

a) Wetlands - Describe any anticipated physical effects or alterations to wetland features such as draining, filling, permanent inundation, dredging and vegetative removal. Discuss direct and indirect environmental effects from physical modification of wetlands, including the anticipated effects that any proposed wetland alterations may have to the host watershed, taking into consideration how current Minnesota climate trends and anticipated climate change in the general location of the project may influence the effects. Identify measures to avoid (e.g., available alternatives that were considered), minimize, or mitigate environmental effects to wetlands. Discuss whether any required compensatory wetland mitigation for unavoidable wetland impacts will occur in the same minor or major watershed and identify those probable locations.

The wetland types (Figures 28 and 29) in the project area are Type 7 and 6 (wooded swamp, and shrub swamp; floodplain forest habitat) and Type 5 (inland open fresh water; backwater habitat). The proposed project will enhance the wetland types within the project area but generally will not change the classification. Due to the increased inundation frequencies and durations since construction of LD9, the floodplain forest (Type 7 and 6) is currently degraded in terms of its ability to support floodplain forest species (the silver maple has experienced 100% recent mortality) and is prone to future invasion of invasive species (e.g., RCG). Fill (fine material) will be placed on the Type 7 and 6 wetlands, to improve and restore the

function of a typical Type 7 wetland in the area (before construction of the lock and dam). Roughly 30,000 – 35,000 cubic yards of sediment will be dredged from the Type 5 wetland and placed into the Type 7 wetland, but the total acreage of each wetland type is anticipated to remain unchanged. Project managers will work with Wetland Conservation Act (WCA) and USACE regulatory staff, and a Technical Evaluation Panel (TEP) will be consulted if necessary.

It is not anticipated that enhancement of wetland habitat in the area will have any negative impacts to the watershed or general habitat, and it is expected to dramatically improve habitat in the area. Changing hydrology and climatic conditions are problematic for the habitat and ecosystem in the project area and improvement to the habitat types will provide long-term resilience for ecosystem function in the area (USGS, 2018; Bouska et al., 2019).

b) Other surface waters- Describe any anticipated physical effects or alterations to surface water features (lakes, streams, ponds, intermittent channels, county/judicial ditches) such as draining, filling, permanent inundation, dredging, diking, stream diversion, impoundment, aquatic plant removal and riparian alteration. Discuss direct and indirect environmental effects from physical modification of water features, taking into consideration how current Minnesota climate trends and anticipated climate change in the general location of the project may influence the effects. Identify measures to avoid, minimize, or mitigate environmental effects to surface water features, including in-water Best Management Practices that are proposed to avoid or minimize turbidity/sedimentation while physically altering the water features. Discuss how the project will change the number or type of watercraft on any water body, including current and projected watercraft usage.
The project affects approximately 5 acres of backwater habitat and 5 acres of floodplain forest habitat directly through construction activities. Pool 9 is considered a reservoir by impoundment from LD9. Aquatic plants would be removed during construction, but natural seed banks should reestablish vegetation within one year post construction, and a greater diversity in species may be realized (Delaney and Larson, 2024). The project will use various BMPs such as silt fencing in the floodplain forest habitat to reduce sediments and erosion, and any dredging activities will use the process explained in Item 12.b.ii (stormwater) to minimize any additional sedimentation in the area.

The project is anticipated to increase the amount of use for watercraft in the area as more boats will likely occupy the area for various improved angling opportunities; little to no boat activity is in the area currently because of the degraded habitat, but it is expected that this will likely increase to 10-15 boats/week. A substantial increase in winter angling is anticipated following creation of high quality overwintering habitat, which is largely absent from the area. We anticipate ice angling effort to increase from near zero to at least 100+ hours/acre during winter ice fishing periods (normally December to March); nearby parking/access will allow for easy public access to the project area.

This project, in conjunction with the larger UMRR-HREP project, will create a large network of substantially improved backwater habitat for aquatic organisms, and floodplain forest work will greatly improve forest resources in the general area and provide habitat for various floodplain forest inhabitants.

13. Contamination/Hazardous Materials/Wastes:

a. Pre-project site conditions - Describe existing contamination or potential environmental hazards on or in close proximity to the project site such as soil or ground water contamination, abandoned dumps, closed landfills, existing or abandoned storage tanks, and hazardous liquid or gas pipelines. Discuss any potential environmental effects from pre-project site conditions that would be caused or exacerbated by project construction and operation. Identify measures to avoid, minimize or mitigate adverse effects from existing contamination or potential environmental hazards. Include development of a Contingency Plan or Response Action Plan.
Five sediment core samples were taken by USACE in Fall 2019 within the proposed dredge area and were analyzed for contaminants (Attachment J). Samples were tested for a standard suite of chemicals (polycyclic aromatic hydrocarbons (PAHs), Pesticides, PCBs, and Inorganics), and no PAHs, pesticides, or PCBs were detected at levels above the MPCA SQT Level I management category; MPCA SQT Level I is a sediment quality target that indicates chemical concentrations that are intended to identify contaminant concentrations below which harmful effects on sediment dwelling organisms (i.e., benthic invertebrates) are unlikely to be observed. Only one inorganic (Nickel) was detected within the MPCA SQT Level I management category, which was only slightly above (29 mg/kg) the MPCA SQT Level I of 23 mg/kg; all other samples were well below the 23 mg/kg threshold. Based on these analytical results, excavated sediments from the proposed dredge area are suitable for reuse. Dredged sediments will be incorporated into floodplain forest habitat, and eventually covered with floodplain forest species and will not be easily bioavailable for humans or other organisms.

b. Project related generation/storage of solid wastes - Describe solid wastes generated/stored during construction and/or operation of the project. Indicate method of disposal. Discuss potential environmental effects from solid waste handling, storage and disposal. Identify measures to avoid, minimize or mitigate adverse effects from the generation/storage of solid waste including source reduction and recycling.
The proposed project is not expected to generate substantial amounts of solid waste. The project will use natural fine sediments and granular material from within the project site for construction purposes. The contractor will be responsible for hauling any construction-generated wastes off site to appropriate solid waste management facilities. In doing so, the contractor would also be responsible for adhering to MN DNR's protocols and procedures addressing proper decontamination, transportation, and disposal of any waste to minimize the possibility of spread of invasive or noxious species.

c. Project related use/storage of hazardous materials - Describe chemicals/hazardous materials used/stored during construction and/or operation of the project including method of storage. Indicate the number, location and size of any new above or below ground tanks to store petroleum or other materials. Indicate the number, location, size and age of existing tanks on the property that the project will use. Discuss potential environmental effects from accidental spill or release of hazardous materials. Identify measures to avoid, minimize or mitigate adverse effects from the use/storage of chemicals/hazardous materials including source reduction and recycling. Include development of a spill prevention plan.
There are no storage tanks on site. The construction, monitoring, and maintenance of the proposed project have limited potential for releases of toxic or hazardous substances. Vehicular fluid from typical construction and operational machinery is the only likely source of toxic or hazardous materials.

Petroleum fuels, oils, and lubricants will be used by earthmoving equipment and dredges. Accidental fuel spillage from tanks or during refueling, and leakage reaching the ground may occur and is

limited to construction machinery. A Spill Prevention and Countermeasure Plan (SPCC Plan) will be prepared prior to the construction phase of the project. The SPCC Plan will include measures and methods to minimize the potential for spills and mitigation plans to contain spills. Also, the SPCC Plan will include a site-specific Health and Safety Plan for use by workers during construction. Equipment operators are instructed to take precautions when refueling equipment. Refueling will be conducted away from surface waters and equipment will be regularly inspected and repaired to prevent inadvertent loss of fuels, oils, or other hazardous fluids. Spills will be reported to the Minnesota Pollution Control Agency (MPCA), and any other authorities that may have interest (e.g., USACE or USFWS).

d. Project related generation/storage of hazardous wastes - Describe hazardous wastes generated/stored during construction and/or operation of the project. Indicate method of disposal. Discuss potential environmental effects from hazardous waste handling, storage, and disposal. Identify measures to avoid, minimize or mitigate adverse effects from the generation/storage of hazardous waste including source reduction and recycling.
Sludge, animal waste and ash material will not be generated during construction or operation of the proposed project. General construction wastes will be managed by the contractor. Fueling of vehicles will be done off-site or with fuel transport vehicles.

14. Fish, wildlife, plant communities, and sensitive ecological resources (rare features):

a. Describe fish and wildlife resources as well as habitats and vegetation on or in near the site.
The Reno Bottoms area is a mix of marsh wetlands, floodplain forests, side channels, and backwater lakes that provide important habitat and recreational opportunities. The mixed habitat resembles what the Mississippi River looked like prior to lock and dam construction and provides a unique opportunity to rehabilitate and preserve a portion of the UMR. The forest, marsh, backwaters, and flowing water areas provide vital habitat to many fish and wildlife species. However, changes in land use, climate, and establishment of invasive species have led to declines in many of these habitats, particularly floodplain forest habitat as a substantial portion of trees (mainly silver maple) have died and natural regeneration is limited because of invasive species proliferation, and high inundation frequency and duration (see Item 6.b for description of problems).

Fish: Over 90 species of fish are present in Pool 9 of the Mississippi River, including both game and non-game species. Within the general project area backwater (Ice Haul Slough area) sunfish (*Lepomis* sp.), bass (*Micropterus* sp.), crappie (*Pomoxis* sp.), yellow perch (*Perca flavescens*), northern pike (*Esox lucius*), bowfin (*Amia calva*), and gar (*Lepisosteus* sp.) are present. Additionally, the area contains various cyprinids (*Notropis* sp., *Pimepheles* sp., etc.), buffalo (*Ictiobus* sp.), and suckers (*Catostomidae* family). During summer months and high water periods (+3 ft above LCP) fish occupy the project area backwater. Few fish are found during normal water levels because of the lack of depth; semi-annual seining efforts catch young-of-year panfish and cyprinid species. During winter periods, almost no fish occupy the backwater (based on fall backwater electrofishing sampling) as it is too shallow for overwintering habitat and the area nearly freezes to the bottom; in addition, dissolved oxygen is very low because of lack of water volume, and high BOD from the sediments.

Wildlife: In general, the floodplain habitat of Upper Pool 9 contains an abundant wildlife population and many potential species may use the project area at any point in time. Below is a list of major species that could be present.

A wide range of birds may be present including waterfowl, songbirds, shorebirds and raptors and forest habitat provides critical nesting areas for many migratory species. Waterfowl species (both dabblers and divers) may be present in the general project area depending on seasons and water

level/depth in the area; ring-necked ducks (*Aythya collaris*), canvasbacks (*Aythya valisineria*), bufflehead (*Bucephala albeola*), common goldeneye (*Bucephala clangula*), ruddy duck (*Oxyura jamaicensis*), and scaup (*Aythya affinis*) use the deeper areas of the backwaters, while mallards (*Anas platyrhynchos*), widgeon (*Anas americana*), blue-winged teal (*Anas discors*), green-winged teal (*Anas carolinensis*), gadwall (*Mareca strepera*), northern pintail (*Anas acuta*), northern shoveler (*Spatula clypeata*), and wood duck (*Aix sponsa*) use the shallower areas. Canada Goose (*Branta canadensis*) and American coot (*Fulica americcana*) may also be found in the general project area.

Numerous bottomland forest bird species may be present in the general project area. Depending on the season, breeding populations of blue-gray gnatcatcher (*Polioptila caerulea*), veery (*Catharus fuscescens*), wood thrush (*Hylocichla mustelina*), warbling vireo (*Vireo gilvus*), yellow-throated vireo (*Vireo flavifrons*), northern parula (*Setophaga Americana*), American redstart (*Setophaga ruticilla*), prothonotary warbler (*Protonotaria citrea*), yellow-throated warbler (*Setophaga dominica*), cerulean warbler (*Setophaga cerulean*), acadian flycatcher (*Empidonax virescens*), red-eyed vireo (*Vireo olivaceus*), Kentucky warbler (*Geothlypis Formosa*), summer tanager (*Piranga rubra*), scarlet tanager (*Piranga olivacea*), and eastern wood-pewee (*Contopus virens*) may be present at the project site. Furthermore, many raptors use the river valley as a flyway, and a number of these species, such as hawks, owls, and bald eagles (*Haliaeetus lecocephalus*), over-winter in these floodplain areas.

White-tailed deer (*Odocoileus virginianus*) use the area as a food source and wintering area. Many small carnivores such as red fox (*Vulpes vulpes*), raccoon (*Procyon lotor*), and weasel (genus *Mustela*) also use the area. Larger carnivores such as bobcat (*Lynx rufus*) and coyote (*Canis latrans*) are infrequent visitors but have been reported. Smaller mammals such as beaver (*Castor Canadensis*), muskrat (*Ondatra zibethicus*), shrews (family *Soricidae*), moles (family *Talpidae*), bats (family *Vespertillionidae*), eastern cottontail rabbits (*Sylvilagus floridanus*), squirrels (family *Sciuridae*), and mice species (family *Cricetidae*) may be present.

The general project area may be home to several amphibian and reptile species. Common species typically found in off channel areas of the floodplain include fox snake (*Pantherophis vulpinus*), tiger salamander (*Ambystoma tigrinum*), American toad (*Anaxyrus americanus*), gray treefrog (*Hyla versicolor*), green frog (*Lithobates clamitans*), snapping turtle (*Chelydra serpentine*), painted turtle (*Chrysemys picta*), common map turtle (*Graptemys geographica*), Eastern hognose snake (*Heterodon platirhinos*), and northern leopard frog (*Lithobates pipiens*). There are no known amphibian or reptile surveys in the study area. Amphibians and reptiles typical for Pool 9 would be expected to inhabit the study area. Blanchard's cricket frog (*Acris blanchardi*) is not found within 1 mile of the project area, but some individuals have been found in tributary ponds >3 miles from the project area. The habitat may be suitable for the species and avoidance may be warranted.

Aquatic vegetation: The project area backwater habitat has sparse to moderate aquatic vegetation density and diversity. Various submersed species are found such as pondweeds (*Potomogetan* sp.; sago, river, flatstem, narrowleaf, and curly leaf), Eurasian water milfoil (*Myriophyllum spicatum*), coontail (*Ceratophyllum demersum*), waterweeds (*Elodea* sp.), yellow water stargrass (*Heteranthera dubia*), and wild celery (*Vallisineria americana*). Floating-leaved vegetation is very sparse with a few individuals of white waterlily (*Nymphaea odorata*) and American lotus (*Nelumbo lutea*). Emergent vegetation fringe is dominated by river bulrush (*Bolboschoenus fluviatilis*) with some arrowheads (*Sagittaria* sp.) and smartweeds (*Polygonum* sp.). Vegetation has been surveyed semi-annually with a visual-based aquatic habitat quality index survey developed for the UMR backwaters by MN DNR.

Floodplain forest: The project area is a monotypic stand of silver maple (*Acer saccharinum*) that is characterized by >90% mortality; silver maple age class diversity is also low at the site. The dead standing trees are mostly devoid of any bark at present (Figure 7). The understory is mainly leafy beggarticks (*Bidens frondosa*), rice cut grass (*Leersia oryzoides*), and cocklebur (*Xanthium*

strumarium), but with encroaching RCG stands, and the area is thought to be quite vulnerable to future RCG invasion (De Jager et al. 2024). Natural regeneration of floodplain forest species is severely limited, likely due to the changing hydrology and inundation at the project site. Estimated annual growing season days of inundation at the project site is >45d (Figure 8).

Before European settlement, the larger Reno Bottoms area was typical of floodplain forest habitats with a diversity of tree species depending on elevation/inundation. Following settlement, much of the land cover change was driven by agricultural development and timber harvesting. In 1937 when LD9 was constructed, hydrology and inundation patterns changed and altered the area from agricultural to a wetted floodplain forest habitat. Erosion over time from elevated water levels impacted tree species composition, and acreage of floodplain forest has been declining. Changing hydrology in the past 20 years has dramatically impacted the floodplain forest and large tracts of former forest are now dead. These areas are now being invaded by RCG and severely limiting natural regeneration of floodplain forest species; higher densities of aggressive RCG occur in areas with more open canopies. Forest succession modelling of the area indicates continual loss of acreage and species diversity for the next 50 years (De Jager et al., 2019).

Mussels: No mussels are present within the project site (dredging area; Attachment L). Numerous mussel drag sled surveys were conducted in the general area by USACE in 2021 (Attachment M). Substantial mussel resources were found in Minnesota Slough (channel east of the project area), but fewer mussels were found in the southern portions of the Ice Haul Slough area (over a mile south of the project area in an area with more flowing water). Impacts to mussel populations from dredging would be minimized by using a truck-able dredge accessed using the temporary access road, or by accessing the area when water levels are higher than LCP; access through Minnesota Slough and Ice Haul Slough will only be allowed if the drafting depth between the hull and slough bottom is >2 feet, in order to avoid impacting sensitive mussel resources.

b. Describe rare features such as state-listed (endangered, threatened or special concern) species, native plant communities, Minnesota Biological Survey Sites of Biodiversity Significance, andother sensitive ecological resources on or within close proximity to the site. Provide the license agreement number (LA- N/A) and/or correspondence number (MCE 2022-00358-02) from which the data were obtained and attach the Natural Heritage Review letter from the DNR. Indicate if any additional habitat or species survey work has been conducted within the site and describe the results.

The MN DNR Natural Heritage Information System (NHIS) database was queried in November 2022 and updated in July 2025 to assess whether state or federally listed species have been documented in the vicinity of the proposed project. The NHIS database will be queried prior to project construction to receive up to date information on sensitive species. The data associated with this assessment is included in the NHIS correspondence assigned number ERDB 2022-00358-02; the NHIS letters from 2022 and 2025 are included in Attachment H.

The NHIS query identified a Site of *Moderate* Biodiversity adjacent to the proposed project (Figure 30). Sites ranked as *Moderate* contain occurrences of rare species and/or moderately disturbed native plant communities, and/or landscapes that have a strong potential for recovery. Indirect impacts to such sites, such as spread of invasive species, should be considered during project design and implementation.

According to the NHIS query, the state-listed species summarized in Table 9 are known to occur within an approximate one-mile radius of the project.

Table 9. Minnesota state-listed species found within a one-mile radius of the general project area according to the NHIS query.

Common Name	Scientific Name	Group	State Status
Pallid Shiner	*Hybopsis amnis*	Fish	Endangered
Black Buffalo	*Ictiobus niger*	Fish	Threatened
Paddlefish	*Polydon spathula*	Fish	Threatened
Timber Rattlesnake	*Crotalus horridus*	Reptile	Threatened
Catchfly Grass	*Lerrsia lenticularis*	Plant	Threatened
Gray's Sedge	*Carex grayi*	Plant	Special Concern
Pirate Perch	*Aphredoderus sayanus*	Fish	Special Concern
Blue Sucker	*Cycleptus elongatus*	Fish	Special Concern
Warmouth	*Lepomis gulosus*	Fish	Special Concern
Yellow Bass	*Morone mississippiensis*	Fish	Special Concern
Muskingum Sedge	*Carex muskingumensis*	Plant	Special Concern
Green Dragon	*Arisamea dracontium*	Plant	Special Concern
Swamp White Oak	*Quercus bicolor*	Plant	Special Concern

According to the NHIS query, the following federally protected species are known to occur within an approximate one-mile radius of the project.

Table 10. Federally-listed species found within one-mile radius of general project area according to NHIS query.

Common Name	Scientific Name	Group	Federal Status
Higgins Eye	*Lampsilis higginsii*	Mussel	Endangered

The USFWS Information for Planning and Consultation (IPaC) website was consulted on August 1, 2024 to identify the potential presence of federally listed threatened or endangered species within the project area (Attachment G).

Table 11. USFWS IPaC query of federally-listed species in the general project area.

Common Name	Scientific Name	Group	Federal Status	IPaC Determination
Higgins Eye	*Lampsilis higginsii*	Mussels	Endangered	May Affect
Monarch Butterfly	*Danaus plexippus*	Insect	Candidate	No Effect
Salamander Mussel	*Simpsonaias ambigua*	Mussels	Proposed Endangered	May Affect
Sheepnose Mussel	*Plethobasus cyphyus*	Mussels	Endangered	May Affect
Tricolored Bat	*Perimyotis subflavus*	Mammal	Proposed Endangered	Not Likely to Adversely Affect
Whooping Crane	*Grus americana*	Bird	Experimental Population, Non-Essential	May Affect
Northern Long-Eared Bat	*Myotis septentrionalis*	Mammal	Endangered	May Affect, Not Likely to Adversely Affect

High Potential Zones (HPZ) for the federally endangered Rusty Patch Bumble Bee (*Bomba affinis*) indicate that the species is present in Houston County, MN. However, the project area is delineated in a Low Potential Zone for this species (Figure 31). The closest HPZ is in Wisconsin, and generally any HPZ is located on top of Mississippi River blufflands, and not within the floodplain.

c. Discuss how the identified fish, wildlife, plant communities, rare features and ecosystems may be affected by the project including how current Minnesota climate trends and anticipated climate change in the general location of the project may influence the effects. Include a discussion on introduction and spread of invasive species from the project construction and operation. Separately

discuss effects to known threatened and endangered species.

Fish: The proposed project may have temporary adverse impacts to fishes in the vicinity of the project area. Construction activities may cause disturbances to fishes in the area, but fishes (and other aquatic organisms) are generally mobile and are expected to avoid and move away from these areas. In general, aquatic habitat of the project area is poor and high diversity and abundance of fishes is not present.

Wildlife: The proposed project may have minor temporary adverse impacts on wildlife in the vicinity of the project area. Causes of temporary impacts to wildlife may include increased noise and human activity during construction. Many species, even those accustomed to human proximity, could temporarily abandon habitats near the proposed project area until the work is completed. These individuals may move to abundant similar habitat adjacent to the project area. Any tree clearing activities will be during winter periods and high visibility of construction crews and will likely cause wildlife to relocate to nearby areas; any organisms that utilize dead trees for their life histories will be temporary displaced, but ample dead trees devoid of bark are present throughout the entire Reno Bottoms area and directly adjacent to the project area, providing nearby habitat alternatives. Elevation enhancement construction activities will also induce individuals to move out of the area. The project is not anticipated to impact the migratory flyway and breeding areas for waterfowl and shorebirds on the UMRNWFR during construction periods, and it is anticipated the project may improve these aspects with more diversified habitat and aquatic and forest restoration. The temporary impacts are not expected to irreparably harm wildlife individuals or populations, especially since the area is of low value for wildlife that inhabit floodplain forest habitats.

Aquatic vegetation: Aquatic vegetation in the project area is sparse to moderate in density. Construction activities in and around aquatic vegetation will remove or disrupt individual plants due to mechanical removal and/or mechanical damage. There will be temporary impacts to the aquatic vegetation community, but the backwater habitat not subject to construction activities (shallow fringes) will remain intact and provide an abundant seed source for revegetation the following growing season. Furthermore, added habitat diversity will likely lead to more species diversity in the project area.

Floodplain forest: The current forest habitat is almost completely dead (silver maple), with an understory of invasive species, and grasses and shrubs. Little to no bark remains on the dead trees. Felling/cutting of dead trees should have minimal impact on the existing forest environment and the species that may be inhabiting the dead trees. Understory species will be temporarily removed during construction, but seeding/planting post construction should restore more diverse tree and understory species with minimal invasive species. The removal of trees as part of this project constitutes a very small acreage in a much larger area of dead and living forest and the ~5 acre impact of tree removal will not result in complete removal of dead trees and snags from the larger area.

Mussels: No mussels are present in the project dredging area, but some are in the general vicinity. There is unlikely to be any impacts to mussels in the general vicinity of the project.

Invasive Species: The introduction and spread of invasive species during construction is a potential with any construction project. To minimize the spread of invasive species, construction equipment will be cleaned before arriving on site, and cleaned upon leaving the site, per DNR Operational Order 113 – Invasive Species Prevention and Management.

The project plan to allow for natural regeneration of floodplain forest species (mostly light-seeded tree species like cottonwood or silver maple) is expected to be successful based on recently

constructed projects in the UMR (see Figures 16 and 17). However, the potential for invasive species establishment is still possible. Invasive RCG as mentioned in previous Items has become established in the Reno Bottoms area and causes many issues but mainly it inhibits natural regeneration of floodplain forest tree species. Similarly, woody invasives like buckthorn (*Rhamnus cathartica*) and black locust (*Robinia pseudoacacia*) have been problematic and are undesirable as floodplain forest species in certain UMR restoration projects (particularly restoration projects older than 10 years). Other invasives such as Japanese hops (*Humulus japonicus*), birdsfoot trefoil (*Lotus corniculatus*), and crown vetch (*Coronilla varia*) have the potential for invasion based on other restoration projects on the UMR and throughout MN. In order to reduce the long-term potential for invasion of invasive or unwanted species (e.g., stinging nettle; *Urtica dioica*) in the floodplain forest restoration area, USACE has developed a reforestation plan in the event that natural regeneration of floodplain forest tree species does not work as expected (Attachment C). Detailed short-term (natural regeneration) and long-term (planting) management objectives were established along with specific treatments for cluster planting of tree species, and shrub species, while also providing information for invasive species management in the event they proliferate.

Vectors for aquatic invasive species are limited to construction equipment which will be cleaned according to MN DNR invasive species protocols (see above Operational Order 113). It is not anticipated that construction would be a source for any aquatic invasive species, but invasion in the future may be possible and state and federal agencies will address those issues when needed.

State- and Federally-Listed Species:
Three state-listed fishes were identified in the vicinity of the project area based on the NHIS query. Black buffalo and paddlefish (State-Threatened) are very unlikely to occur in the project area because of the current shallow lentic habitat; paddlefish are typically found in main-stem habitats and large deep lentic type habitats, and Black buffalo may occupy both main-stem habitats and backwaters, but typically not shallow backwaters like the current project area. Both paddlefish and black buffalo could possibly benefit from the proposed project through the increase of deep lentic habitat in the area. Pallid shiner (State-Endangered) may occur in the general project area. However, these fishes are quite rare, and it is suspected that field documentation of these fish may have been a misidentification with more common channel shiner (*Notropis wickliffi*) or mimic shiner (*Notropis volucellus*); a long-term resource monitoring program of USGS in Pool 8 has only found 21 Pallid shiners from 1991-2024 (over 7000 sites sampled with a variety of gear). Furthermore, Pallid shiner prefer sand or gravel bars which do not exist in the project area and tend to avoid heavily silted habitats, which is primarily what the backwater habitat is in the project area. Following project completion, the improved habitat may be beneficial for Pallid shiner if present in the area (see Attachment N).

Four state-listed (special concern) fish species were listed as being possibly present, based on previous records, in backwater sloughs of the UMR in and around the general project area. The blue sucker (*Cycleptus elongatus*) is found in the main channel and side channel habitats with swift flows which are not present at the project location. Yellow bass (*Morone mississippiensis*) are rare and on the northern extent of their range on the UMR system, and very unlikely to be present at the project location. Pirate perch (*Aphredoderus sayanus*), and warmouth (*Lepomis gulosus*) occupy backwater habitats of the UMR and may be present in the general project area as these species prefer still locations with little to no flow with mucky or silty bottoms. Impacts to these species are not anticipated during construction, and completion of the project will provide more preferred habitats especially with the 5:1 side slopes of the dredge area which are preferred by the UMRNWFR for targeting these special concern lentic species of greatest conservation need based on their HMP (USFWS, 2019). Furthermore, creation of essential overwintering habitat will benefit these lentic species (including yellow bass if present) during critical winter periods (Attachment N).

Timber rattlesnake (*Crotalus horridus*) is a state-listed (threatened) reptile that may be present within one mile of the project site. This species typically occupies bluff habitat and is unlikely to occur within the UMR floodplain based on a consultation with MN DNR non-game biologists.

Four state-listed plants were identified in the vicinity of the project area based on the NHIS query. Catchfly grass (threatened) was surveyed for in the project area by a qualified surveyor. Plants were found directly adjacent to the proposed elevation enhancement floodplain forest habitat polygons. Catchfly grass plants are located in a small area that still contains live silver maple trees with canopy cover/shading. The area with Catchfly grass will be avoided by not allowing construction activities near the location; berms are adjacent to the location, but berm material will not be sourced from Catchfly grass areas and no outflow structures or piping will be near those areas. The remaining special concern species (Gray's sedge, muskingum sedge, green dragon, and swamp white oak) have not been documented at the project site, but it is possible they are present (e.g., sapling swamp white oak may be found west of the project area in higher elevation areas). Following project construction, many of these species will benefit from fewer days of inundation and will support more diverse floodplain species with better canopy cover. If seed is available for these species, they could be incorporated into seed mix, or long-term forest management (USACE; Attachment C).

Seven federally-listed species were identified as possibly occurring in the general project vicinity, based on the IPaC (USFWS) and NHIS (MN) queries. Three federally listed mussel species could potentially be found in the project vicinity: sheepnose mussel; salamander mussel; and Higgins eye. However, sheepnose and salamander mussels have not been collected within the project area in recent history. The USACE conducted a skimmer dredge mussel survey in August 2021 in the general project area to evaluate potential species and impacts for the larger HREP project. Two live Higgins eye individuals were collected, one each along Transect 1 and 19, respectively (Attachment M). Transect 1 was within Minnesota Slough, and Transect 19 was along the UMR main channel shoreline. Utilization of the HREP access road or high water access for equipment will eliminate impacts to potential listed mussels in the vicinity of the project area; no federally listed mussels were found in the project area and habitat within the project area is not conducive to mussels (MN DNR; Attachment K). It is very unlikely that these listed mussel species (or any mussels) have moved into the project area since the 2021 survey because the habitat in the project area and dredge area is not mussel habitat (Attachment L).

Two bat species were identified as possibly being in the general project vicinity and may be impacted by project construction. The northern long-eared bat (endangered) is a medium-sized bat that hibernates in caves and mines in the winter, and in the summer roosts singly or in colonies under the bark or in cracks and crevices of trees. The northern long-eared bat is relatively widespread, however it is listed as an endangered species because populations are being sharply reduced by a fungal pathogen that causes white-nose syndrome. The pathogen causes the bat to come out of hibernation prematurely. In the eastern United States, northern long-eared bat populations have been reduced by more than 90 percent. However, because of the mature trees found in the study area, while most are dead without bark, there is a possibility northern long-eared bats may be found roosting on the site. The tricolored bat (proposed endangered) is a small insectivorous bat that is distinguished by its unique tricolor fur that often appears yellowish to nearly orange. The tricolored bat tends to hibernate in caves, mines and tunnels, specifically in deeper portions of the hibernacula where temperatures and humidity are higher. This species was once common throughout central and eastern United States but has recently been heavily impacted by white-nose syndrome, resulting in an estimated 90% decline in species numbers. Similar to northern long-eared bat, the tricolored bat could utilize mature trees found throughout the study area for roosting.

The monarch butterfly (proposed endangered) is known for long-distance migrations based on the presence of milkweed (their larval host plant). This species' overwintering sites in Mexico and California have indicated a decline. The area around Pool 9 contains milkweed, but none is known to be found at the project site. The project is not expected to have an impact on the monarch butterfly as they are a mobile species that can vacate the area during construction.

Whooping cranes may stop within Pool 9 during their spring and fall migration to summering areas in Canada. Whooping cranes within the general project area are part of a non-essential experimental population, which means the population is not essential for the continued existence of the species. It is unlikely project activities will impact this species.

Houston County, MN is expected to see increased temperatures, increased variability in precipitation patterns, and possibly increased intensity and severity of storm events due to climate change. Without the proposed project, such changes could result in increasing floodplain forest loss due to changing hydrology/climate, and increased abundance of invasive species (RCG). Continued loss of floodplain forest habitat will further impact the wildlife and resources in the area. Continued sedimentation as a result of changing hydrology will further degrade backwater habitats and result in more resuspension of sediments in the project area, decreasing submersed aquatic vegetation and associated species (fishes, invertebrates, etc.). The proposed project is restoring both aquatic and floodplain forest habitat in a severely degraded ecosystem, and it is expected that there may be temporary negative impacts to some species; however, once completed, the project will provide substantial benefits to the ecosystem and provide long-term resiliency to the ecosystem and its inhabitants.

d. Identify measures that will be taken to avoid, minimize, or mitigate the adverse effects to fish, wildlife, plant communities, ecosystems, and sensitive ecological resources.
To minimize the spread of non-native invasive plant species, construction equipment will be cleaned before arriving on site and cleaned again upon leaving, per DNR Operational Order 113 – Invasive Species Prevention and Management. The project site will be monitored during and after construction for the occurrence of non-native invasive plant species and control measures will be applied as necessary to prevent establishment.

Standard BMPs will be used to minimize impacts to organisms inhabiting the project site. Frequent site visits by MN DNR staff will be done during active construction. Signage for any sensitive species will be implemented when needed, and construction crews will be made aware of sensitive species and avoidance plans for the species.

Fish: No work will be conducted in water/wetlands where fish may occur during the fish spawning exclusion period from March 1 to June 1 for non-trout streams/lakes in this region of Minnesota. Avoidance of black buffalo and pallid shiner potential spawning habitat is recommended until June 15 and July 31, respectively. However, based on expertise by MN DNR fisheries biologists, the standard spawning exclusion period is sufficient based on very low likelihood of these species being present during construction and the fact that suitable spawning habitat does not exist in the project area (Attachment N).

Wildlife: Non-game specialists will be consulted as needed for recommendations to protect non-game and game wildlife on the site during construction. No specific exclusion periods exist at this point. Silt fencing around berms will be used to prevent access (e.g., turtles) to material for potential nesting; silt fencing will be removed following project construction as the area may provide enhanced turtle nesting areas after restoration. Blanchard's cricket frog is not currently found in the project area; however, avoidance tactics may be warranted such as reduction of construction

activities near the water/land interface (which will not be affected by construction activities), avoiding work during April to September, and a survey for the species prior to construction (April-June).

Aquatic vegetation: See above Operational Order 113 for preventing spread of aquatic vegetation. Construction (dredging) will occur during the growing season period for aquatic vegetation. BMPs for reducing impacts to aquatic vegetation during construction include staying within the dredge footprint, and avoiding excessive dredge movement and propellor thrust to reduce resuspension of sediments onto vegetation on the perimeter of the project area and downstream. The area is generally low in submersed and floating leaved aquatic vegetation; emergent vegetation will be very minimally impacted.

Floodplain forest: Felling of dead trees for construction access will occur during winter months (November 15 to April 14) to avoid impacts to bats (see state and federally listed species). Plant biologists will be consulted for potential impacts to grasses and shrubs in the area (state listed species), but BMPs such as staying in the confines of designated construction zones, and reducing the footprint of disturbed grounds with construction access routes will be implemented. Due to the limited number of live trees in the area, it is a priority to maintain the health of the living trees. Invasives (RCG) will likely be buried by dredged sediments. Earthen berms will be protected with silt fencing to prevent runoff of sedimentation. Following construction, the area will be seeded with a seed mix including desirable species where the ground was disturbed or bare mineral soil is present. Long-term management of the floodplain forest will be conducted by USACE (Attachment C, and see Item 14.c).

Mussels: Access for construction equipment will be through the HREP access road, or during high water to eliminate or reduce impacts to mussels during access. BMPs will be developed to reduce potential impacts to mussels during construction activities such as staying within the dredge footprint, and avoiding excessive dredge movement and propellor thrust to reduce resuspension of sediments to downstream areas where mussels may be present. Silt fence or turbidity fences may be utilized to contain sediments if warranted.

State- and Federally-Listed Species: To protect the northern long-eared bat and tricolored bat, removal of trees will occur during winter periods (November 15 to April 14). Tree clearing for construction during this winter period would avoid any take of these species, and would avoid pup roosting season.

A 660-ft buffer will be used for any active bald eagle (*Haliaeetus leucocephalus*) nests on the project site. Currently, no bald eagle nests are present at the project site (March 2025; Figure 32). If bald eagles move into the area, activity in the area will be avoided from January 15 to July 1.

Higgins eye, salamander mussel, and sheepnose mussel will be avoided by use of the HREP access road for equipment, and high water access routes developed by USACE as part of the HREP avoidance plan (Attachment M) which is being duplicated for this project.

No work will be conducted in water/wetlands where fish may occur during the fish spawning exclusion period from March 1 to June 1 for non-trout streams/lakes in this region of Minnesota. Avoidance of black buffalo and pallid shiner potential spawning habitat is recommended until June 15 and July 31, respectively. However, based on the expertise of MN DNR fisheries biologists, the standard spawning exclusion period is sufficient based on very low likelihood of these species being present during construction and that suitable spawning habitat does not exist in the project area (Attachment N).

Non-game biologists from MN DNR indicate that timber rattlesnakes (state threatened) are unlikely to occur in the floodplain habitat during construction as this species prefers bluff habitat. The recommendation is to alert construction crews of the species and if one is encountered contact non-game staff for relocation.

State-listed plants will be avoided (Catchfly Grass) or a takings permit may be required, but surveys indicate the plant is on the edge of the project area and therefore avoidance is possible. Catchfly grass plants are located in a small area that still contains live silver maple trees with canopy cover/shading. The area with Catchfly grass will be avoided by not allowing construction activities near the location; berms are adjacent to the location, but berm material will not be sourced from Catchfly grass areas and no outflow structures or piping will be near those areas. Other species are not likely to occur on site, but an avoidance plan will be made with BMPs.

15. Historic properties:

Describe any historic structures, archeological sites, and/or traditional cultural properties on or in close proximity to the site. Include: 1) historic designations, 2) known artifact areas, and 3) architectural features. Attach letter received from the State Historic Preservation Office (SHPO). Discuss any anticipated effects to historic properties during project construction and operation. Identify measures that will be taken to avoid, minimize, or mitigate adverse effects to historic properties.

A cultural/historic properties survey was conducted by Bear Creek Archeology and EOR to satisfy the requirements for identifying cultural resources in the project area (Attachment F). The survey followed guidelines set under the Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulation 36 CFR 800. The survey also followed guidelines set by the Minnesota State Historic Preservation Office (SHPO).

No known occurrences of archeological, historical, or architectural resources were found within the vicinity of the project based on desktop and field surveys.

16. Visual:

Describe any scenic views or vistas on or near the project site. Describe any project related visual effects such as vapor plumes or glare from intense lights. Discuss the potential visual effects from the project. Identify any measures to avoid, minimize, or mitigate visual effects.

The scenic view of the project location would be temporarily affected during construction due to the presence and operation of construction equipment. No vapor plumes would result from the project. Work is expected to be conducted during daylight hours so there will be minimal artificial light or glare.

Visual impacts following construction and bare mineral soil will be temporary, but obvious. That will quickly change following establishment of vegetation.

Currently the project location is an aesthetically poor view because of the near 100% tree mortality. Following restoration of floodplain forest, the viewscape should drastically improve to a more natural floodplain forest view.

17. Air:

a. Stationary source emissions - Describe the type, sources, quantities and compositions of any emissions from stationary sources such as boilers or exhaust stacks. Include any hazardous air

pollutants, criteria pollutants. Discuss effects to air quality including any sensitive receptors, human health or applicable regulatory criteria. Include a discussion of any methods used assess the project's effect on air quality and the results of that assessment. Identify pollution control equipment and other measures that will be taken to avoid, minimize, or mitigate adverse effects from stationary source emissions.
There are no stationary sources of air emissions created by the proposed project or its use in the future.

b. Vehicle emissions - Describe the effect of the project's traffic generation on air emissions. Discuss the project's vehicle-related emissions effect on air quality. Identify measures (e.g. traffic operational improvements, diesel idling minimization plan) that will be taken to minimize or mitigate vehicle-related emissions.
Minor and temporary effects to air quality in the immediate project area from vehicle emissions would occur during construction, including emissions from on-site construction vehicles. These effects would only occur during the construction period, which is expected to be approximately 60 days. No special mitigation measures are proposed.

c. Dust and odors - Describe sources, characteristics, duration, quantities, and intensity of dust and odors generated during project construction and operation. (Fugitive dust may be discussed under item 17a). Discuss the effect of dust and odors in the vicinity of the project including nearby sensitive receptors and quality of life. Identify measures that will be taken to minimize or mitigate the effects of dust and odors.
Construction activities will create minor dust and odors during daytime operations. Any potential dust or odors would be localized to the project site; therefore, it is not anticipated to affect any nearby sensitive receptors or the area quality of life. No mitigation measures have been proposed.

18. Greenhouse Gas (GHG) Emissions/Carbon Footprint

a. GHG Quantification: For all proposed projects, provide quantification and discussion of project GHG emissions. Include additional rows in the tables as necessary to provide project-specific emission sources. Describe the methods used to quantify emissions. If calculation methods are not readily available to quantify GHG emissions for a source, describe the process used to come to that conclusion and any GHG emission sources not included in the total calculation.
The proposed project is a floodplain forest and backwater restoration. Greenhouse gas (GHG) emissions would be generated during construction, through the use of construction equipment such as excavators/bulldozers, dump trucks, dredges, barges/tows and various small equipment (chainsaws, etc.). Greenhouse gases would also be generated by hauling and personnel vehicles, from supplies and equipment hauled to and from the project site and from workers commuting. Because the proposed project is a restored ecosystem and there is no permanent infrastructure or ongoing operations, no operational GHG emissions are anticipated. Construction is slated to begin in summer 2026 and finish before the end of 2027. For this assessment, construction GHG emissions included:

- On-road vehicle emissions: haul trucks
- On-road vehicle emissions: commuter vehicles
- Off-road vehicle emissions (terrestrial): earth-moving equipment (excavators, loaders, bulldozers, etc.)
- Off-road vehicle emissions (aquatic): dredging equipment

On-road vehicle emissions include those generated by the haul trucks, which will bring needed

equipment and supplies to the project site. Depending on dredging methodology, haul trucks will be used to move the 30,000+ cubic yards of dredge material from the backwater access site to floodplain forest placement (0.5 mile), or hydraulic pumps will be used to pump material (0.25 mile) to the floodplain forest placement site. Haul trucks would travel an estimated 1500 miles (3000 loads) in moving dredge material to the placement site. Hydraulic placement would require a diesel pump located on the dredge to be running during dredging operations. Dredging equipment would be running during daylight hours from July 15 to November 15; approximately 750-1000 cubic yards can be dredged per day.

Emission estimates for gasoline and diesel commuter vehicles are shown in Table 12 below. The on-road vehicle emissions are estimated to be 111.2 metric tons.

Table 12. Estimated emissions from on-road equipment. EPA emission factors for greenhouse gas was derived from (https://www.epa.gov/system/files/documents/2025-01/ghg-emission-factors-hub-2025.pdf) and the CO2e values were calculated from the equation $CO_2e = 1*CO_2+25*CH_4+298*N_2O$.

Estimated Emissions for Project							Emission Factors			Emissions (metric ton)			
On-road Equipment	**No. Vehicles**	**Days**	**Miles Round Trip**	**Total Miles**	**Miles per Gal**	**Gals**	**CO_2 kg/mile**	**CH_4 g/mile**	**N_2O g/mile**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Diesel Haul Trucks	2	N/A	N/A	3000	6	500	10.21	0.0095	0.0431	30.62	0.000028	0.00013	31.05
Gasoline Commuter Vehicles	3	60	50	9,000	15	600	8.78	0.0079	0.0012	79.01	0.000071	0.00011	80.11
									Totals	**109.6**	**0.00010**	**0.00024**	**111.2**

Off-road vehicle emissions include those generated by construction equipment that will be used on the project site for construction. This includes earthmoving equipment such as excavators, bulldozers, and dredging equipment. There are potential differences in the specific equipment utilized based on the contractor selected to complete the work. Both hydraulic and mechanical dredging operations were included in the dredging equipment assessment, where mechanical dredging assumes two trucks hauling sediments from the backwater to the placement site, and hydraulic dredging assumes a diesel pump running during all dredging operations.

The off-road vehicle emissions will be in operation for the duration of the project construction. For the purposes of this assessment, the proposer estimated there will be about 60 days of active construction. Construction is assumed to take place for approximately 8 hours per day; however, this may vary depending on day length.

Based upon these assumptions, carbon emissions related to construction equipment emissions are estimated to be 178.9 metric tons (Table 13).

Table 13. Estimated emissions from on-road equipment. EPA emission factors for greenhouse gases were derived from EPA guidance (https://www.epa.gov/system/files/documents/2025-01/ghg-emission-factors-hub-2025.pdf) and the CO2e values were calculated from the equation $CO_2e = 1*CO_2+25*CH_4+298*N_2O$.

Estimated Emissions for Project						Emission Factors			Emissions (metric ton)			
Off-road Equipment	**No. per Day**	**Hours per Day**	**Total Days**	**Gal. per Hour**	**Gals**	**CO_2 kg/mile**	**CH_4 g/mile**	**N_2O g/mile**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Diesel Construction Equipment (Earth-Moving)	2	8	10	8	1,280	10.21	0.20	0.47	13.07	0.00025	0.00060	19.33
Diesel Construction Equipment (Dredging)	1	8	60	8	3,840	10.21	6.51	0.17	39.20	0.0249	0.00065	40.02
Diesel Construction Equipment (Hauling-Mechanical)	2	8	60	8	7,680	10.21	0.20	0.47	78.41	0.00153	0.00360	79.51
Diesel Construction Equipment (Dredging-Hydraulic	1	8	60	8	3,840	10.21	0.43	0.62	39.20	0.0165	0.00238	40.02
								Totals	**169.9**	**0.0432**	**0.00723**	**178.9**

b. GHG Assessment

i. Describe any mitigation considered to reduce the project's GHG emissions.

ii. Describe and quantify reductions from selected mitigation, if proposed to reduce the project's GHG emissions. Explain why the selected mitigation was preferred.

iii. Quantify the proposed projects predicted net lifetime GHG emissions (total tons/#of years) and how those predicted emissions may affect achievement of the Minnesota Next Generation Energy Act goals and/or other more stringent state or local GHG reduction goals.

No mitigation to reduce the Project's GHG emissions is proposed. Construction-related emissions will be exempt as *de minimus* and they will meet the conformity requirements under Section 176 (c) of the Clean Air Act and 40 CFR 93.153. Predicted GHG emissions related to the project are limited to those generated during construction. There will not be any operational GHG emissions. Project managers will encourage the selected contractor to reduce GHG emissions from construction, which may include minimizing idling equipment or encouraging carpooling to the site by equipment operators.

19. Noise

Describe sources, characteristics, duration, quantities, and intensity of noise generated during project construction and operation. Discuss the effect of noise in the vicinity of the project including

1) existing noise levels/sources in the area, 2) nearby sensitive receptors, 3) conformance to state noise standards, and 4) quality of life. Identify measures that will be taken to minimize or mitigate the effects of noise.

Existing ambient noise in the area is generally low; however, a high use railway (Canadian Pacific Kansas City) is located adjacent to the project site and produces substantial noise when trains pass by. Some noise may be generated from local farming and dairy activities. There are two private residences near the project site that may experience noise during construction activities. Noise from construction activities will be temporary and limited to standard daily working hours. All construction work will adhere to state noise standards. The DNR will establish limited daily working hours to minimize noise disturbance to area residents and wildlife.

20. Transportation

a. Describe traffic-related aspects of project construction and operation. Include: 1) existing and proposed additional parking spaces, 2) estimated total average daily traffic generated, 3) estimated maximum peak hour traffic generated and time of occurrence, 4) indicate source of trip generation rates used in the estimates, and 5) availability of transit and/or other alternative transportation modes.

The project may cause temporary traffic disruptions in the area when construction equipment is brought into and out of the site. Construction will be completed with a small crew with a few trucks, and the crew will be working in the project site with equipment but will not have a large impact on local traffic or parking. It is possible the USACE owned Millstone Landing may be temporarily closed, but likely due to other construction activities (HREP) but not by this project construction. There will not be constant traffic into or out of the project area. No long-term effect to transportation in the area will occur as a result of the proposed project. The proposed habitat restoration project will not result in the need for additional parking spaces or cause an increase in traffic to the area.

b. Discuss the effect on traffic congestion on affected roads and describe any traffic improvements necessary. The analysis must discuss the project's impact on the regional transportation system. *If the peak hour traffic generated exceeds 250 vehicles or the total daily trips exceeds 2,500, a traffic impact study must be prepared as part of the EAW.* Use the format and procedures described in the Minnesota Department of Transportation's Access Management Manual, Chapter 5 *(available at: http://www.dot.state.mn.us/accessmanagement/resources.html)* or a similar local guidance.

The proposed project should have no effect on traffic congestion in the area as the amount of traffic in the area due to the proposed project would be comparable to conditions pre-project. In general traffic in the area is quite low. Therefore, no traffic improvements are necessary.

c. Identify measures that will be taken to minimize or mitigate project related transportationeffects. N/A

21. Cumulative potential effects: (Preparers can leave this item blank if cumulative potential effects are addressed under the applicable EAW Items)

a. Describe the geographic scales and timeframes of the project related environmental effects that could combine with other environmental effects resulting in cumulative potential effects.

Land use: The proposed project would have a permanent beneficial impact on land use throughout the area. Restoration of the floodplain forest habitat through elevation enhancement will return the landscape to the historic functions prevailing in pre-lock and dam conditions, increase potential for public uses (hunting, bird watching, etc.), and allow for better

management opportunities for floodplain forest by USFWS and USACE. Backwater restoration will dramatically improve angling opportunities in the area; waterfowl opportunities may also improve due to increased backwater vegetation diversity and adjacent floodplain forest habitat. The proposed project is compatible with USACE and USFWS priorities for land use.

Soils and topography: The proposed project would have a temporary adverse effect on the soils in the area where earth moving alterations are conducted. This adverse effect would only last for the duration of project construction. Minimal chance of soil loss and erosion is anticipated because of the elevation of the placement site, and work would not be conducted during periods when that site is inundated. After completion, the project would have a permanent beneficial effect on soil and topography in the area for floodplain forest habitat as current conditions are poor and degraded. Backwater habitat is expected to maintain its depth long into the future because of its location and general protection from overland flooding/sedimentation due to the elevated topography of the floodplain forest site.

Water resources: Surface water and water quality would experience short-term temporary impacts during construction. This would be limited in geographic extent to the direct project area and immediately downstream. These effects would be due to dredging activities and disruption of sediments, but techniques would be used to limit those impacts during construction. Wetland habitat types will be enhanced from their degraded state with the proposed project, but wetland type will remain mostly unchanged. Ecological function of wetlands should be dramatically improved following project completion.

Aquatic habitat: The project would have a temporary negative impact on aquatic habitat, which would generally be limited to the extent of project construction activities. Disturbance from construction activities will be limited through BMPs. After completion of the project, aquatic habitat will be greatly improved with creation/restoration of deep lentic habitat that will be utilized by fishes and other aquatic organisms. This area will provide substantially more aquatic habitat diversity than what is currently present in the project area.

Fish, wildlife, plant communities, and rare features: The project would have temporary minor adverse impacts to wildlife due to an increased level of noise and human activity during construction; this area would generally be limited to the project area and immediate surroundings. Fish and other aquatic organisms would experience minor temporary negative impacts due to construction activities (dredging), but previous construction projects indicate individuals will likely move from the dredging activities. Plant communities in the floodplain forest area will be disrupted by earth moving activities but will be replaced with a more diverse floodplain forest species mix (seeding and natural regeneration) following construction. Rare features and listed species will be protected with BMPs for project construction activities to limit any negative impacts. Following completion, a permanent beneficial impact to all species is expected due to restoration of habitats in the area to support diverse species.

Visual, air, and traffic qualities: All of these would experience minor temporary adverse impacts due to construction activities. The geographic extent of these effects would be limited to the project area and its immediate surroundings, and the impacts would last for the duration of construction activities. After completion, the project would result in permanent beneficial impacts on visual qualities due to the restoration of floodplain forest and backwater habitat.

It is expected that the project area, particularly the backwater habitat, would experience permanent increased year-round angling activities, and if so there may be permanent minor impacts to visual, air, noise, and traffic metrics in the area.

b. Describe any reasonably foreseeable future projects (for which a basis of expectation has been laid) that may interact with environmental effects of the proposed project within the geographic scales and timeframes identified above.
To date, MN DNR has no specific plans for additional projects in the area. Following the completion of this and the HREP project, it is unlikely any other federal or state programs are seeking another project in this area. Any potential future project upstream of the site would not interact with the proposed project, and would likely enhance the project as a whole by creating larger tracts of floodplain forest providing a larger network of restored floodplain forest habitats to be utilized by wildlife. Any future projects would require standard permitting routes and use multi-agency collaboration, and would occur on federal-owned properties.

c. Discuss the nature of the cumulative potential effects and summarize any other available information relevant to determining whether there is potential for significant environmental effects due to these cumulative effects.
The construction activities associated with the proposed project are likely to create temporary adverse impacts to land use; soils; topography; water resources; and aquatic habitat, fish, wildlife, and plant communities, as discussed in Item 21.a. above. The proposed project may result in increased angling activity, and if so there may be a minor permanent increase in noise, traffic, air, and visual impacts.

The goal of the proposed project is to restore aquatic and floodplain habitat in the area by deepening part of the backwater of Upper Pool 9 of the Mississippi River and using the dredged sediments to increase the elevation of the floodplain forest in the area. This will provide a permanent benefit to the project area by re-establishing the deep lentic aquatic habitat and floodplain forest hydrology formerly found in the area and allowing regeneration of floodplain forest vegetation.

22. Other potential environmental effects: If the project may cause any additional environmental effects not addressed by items 1 to 19, describe the effects here, discuss the how the environment will be affected, and identify measures that will be taken to minimize and mitigate these effects.
All potential environmental effects have been addressed above.

RGU CERTIFICATION. *(The Environmental Quality Board will only accept **SIGNED** Environmental Assessment Worksheets for public notice in the EQB Monitor.)*

I hereby certify that:

- The information contained in this document is accurate and complete to the best of my knowledge.
- The EAW describes the complete project; there are no other projects, stages or components other than those described in this document, which are related to the project as connected actions or phased actions, as defined at Minnesota Rules, parts 4410.0200, subparts 9c and 60, respectively.
- Copies of this EAW are being sent to the entire EQB distribution list.

Signature  Date 9/29/2025

Title Environmental Review Project Manager