July 2013 version

ENVIRONMENTAL ASSESSMENT WORKSHEET

This Environmental Assessment Worksheet (EAW) form and EAW Guidelines are available at the Environmental Quality Board's website at:
http://www.eqb.state.mn.us/EnvRevGuidanceDocuments.htm. The EAW form provides information about a project that may have the potential for significant environmental effects. The EAW Guidelines provide additional detail and resources for completing the EAW form.
Cumulative potential effects can either be addressed under each applicable EAW Item, or can be addresses collectively under EAW Item 19.
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: Marsh Lake Ecosystem Restoration Project**

2. **Proposer: U.S. Army Corps of Engineers and Minnesota Department of Natural Resources**

Contact person: David Potter
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Contact person: Josh Kavanagh
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Address: 398 Sibley Park Road NE
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Phone: 320.354.5530
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3. **RGU: Minnesota Department of Natural Resources (MNDNR)**
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Title: Environmental Review Project Manager
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City, State, ZIP: St. Paul, MN 55155-4025
Phone: 651.296.5072
Email: environmentalreview@state.mn.us
Include "Marsh Lake Ecosystem Restoration" in subject line

4. **Reason for EAW Preparation: (check one)**

Required:
☐ EIS Scoping
☒ 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):

Minn. Rules Part 4410.4300, Subpart 26, Stream Diversion; and
Minn. Rules Part 4410.4300, Subpart 27.A. Wetlands and Public Waters.

5. Project Location:

Marsh Lake and the Minnesota River act as the border between Big Stone, Lac qui Parle, and Swift Counties. All project activities will be completed on publically owned property. Additional information regarding the project can also be found at the following U.S. Army Corps of Engineers (USACE) web page: U.S. Army Corps of Engineers Marsh Lake Ecosystem Restoration Project Page http://www.mvp.usace.army.mil/Home/Projects/tabid/18156/Article/571148/marsh-lake-ecosystem-restoration-project.aspx

For Construction Activities
County: Swift County, Minnesota
City/Township: Appleton Township
PLS Location: Sections 19, 20, 29, and 30; Township 120N; Range 43W
Watershed (81 major watershed scale): Minnesota River-Headwaters
Division of Waters Number: Marsh Lake #06000100
GPS Coordinates: -96.094190; 45.171272 Decimal Degrees

Tax Parcel Numbers:

STATE OF MINNESOTA	01-0157-000	S/T/R 20-120-43 LOT 1 OF THE E1/2 OF NW1/4
STATE OF MINNESOTA	01-0157-100	S/T/R 20-120-43 ALL OF SECTION 20 EXC. E1/2 OF NE1/4 AND
STATE OF MINNESOTA	01-0152-000	S/T/R 19-120-43 E1/2 OF NE1/4
STATE OF MINNESOTA	01-0155-100	S/T/R 19-120-43 NE1/4 OF SE1/4
STATE OF MINNESOTA	01-0155-200	S/T/R 19-120-43 S1/2 OF SE1/4 EXC WLY 25 FT
STATE OF MINNESOTA	01-0155-300	S/T/R 19-120-43 LOT 3
STATE OF MINNESOTA	01-0220-200	S/T/R 29-120-43 ALL OF SECTION 29 EXC WATER AREA
STATE OF MINNESOTA	01-0220-300	S/T/R 30-120-43 ALL OF SECTION 30 EXCEPT LAKE AREA

County: Lac qui Parle County, Minnesota
City/Township: Lake Shore North Township
PLS Location: Sections 30 and 31; Township 120N; Range 43W
Watershed (81 major watershed scale): Minnesota River-Headwaters
Division of Waters Number: Marsh Lake #06000100
GPS Coordinates: -96.094190; 45.171272 Decimal Degrees

Tax Parcel Numbers:

STATE OF MINNESOTA	20-0161-900	Section 30 Lake Project
STATE OF MINNESOTA	20-0161-901	STATE LAND BEING ALL THAT PART GOVT LOT 2 IN
STATE OF MINNESOTA	20-0162-900	Section 31 Lake Project
STATE OF MINNESOTA	20-0162-901	S1/2NE1/4 & N1/2SE1/4 LESS LAKE PROJECT
STATE OF MINNESOTA	20-0163-000	S1/2NW1/4
STATE OF MINNESOTA	20-0165-900	TRACT IN SW1/4 BEG SE COR SW1/4, WLY 433.81'
STATE OF MINNESOTA	20-0166-000	S1/2SE1/4

Marsh Lake
County: Big Stone County, Minnesota
City/Township: Akron South Township
PLS Location: Sections 7, 8, 9, 10, 13, 14, 15, 16, 17, and 24; Township 120N; Range 44W
Watershed (81 major watershed scale): Minnesota River-Headwaters
Division of Waters Number: Marsh Lake #06000100

County: Lac qui Parle County, Minnesota
City/Township: Lake Shore North Township
PLS Location: Sections 22, 25, and 26; Township 120N; Range 44W
Watershed (81 major watershed scale): Minnesota River-Headwaters
Division of Waters Number: Marsh Lake #06000100

[Minnesota Department of Natural Resources (MNDNR) Environmental Assessment Worksheet (EAW) for Marsh Lake Ecosystem Restoration Project, EAW Attachment A, Project Maps, Map1.]
[U.S. Army Corps of Engineers (USACE) Federal Environmental Assessment (EA) for Marsh Lake Ecosystem Restoration Project, July, 2011: Section 1.5.1, Pages 6-7; Section 1.5.1, Pages 17-18; and Appendix A, Figure 2.]
[USACE Federal Supplemental Environmental Assessment (EA) for Marsh Lake Ecosystem Restoration Project, April, 2016: Appendix A, Figure 1.]

At a minimum attach each of the following to the EAW: add listing for the maps

- County map showing the general location of the project (Refer to EAW Attachment A, Map 1.)

[EAW Attachment A, Project Maps, Map1.]
[USACE Federal EA, July, 2011: Figure 1-1, Page 18.]
[USACE Federal Supplemental EA, April, 2016: Appendix A, Figure 1.]

- U.S. Geological Survey 7.5 minute, 1:24,000 scale map indicating project boundaries (photocopy acceptable) (Refer to EAW Attachment A, Map 2.)

[EAW Attachment A, Project Maps, Map 2.]
[USACE Federal EA, July, 2011: Pages 6-7.]

- Site plans showing all significant project and natural features. Pre-construction site plan and post-construction site plan (Refer to EAW Attachment A, Map 5.)

[EAW Attachment A, Project Maps, Map 1 and Map 5.]
[USACE Federal EA, July, 2011: Figure 1-2, Page 19.]
[USACE Federal Supplemental EA, April, 2016: Appendix A, Figures 2 and 3.]

6. Project Description:

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

Marsh Lake is a 5,000 acre shallow reservoir along the Minnesota River in western Minnesota. The lake is the border between Big Stone and Lac qui Parle Counties, while most of the outlet area of Marsh Lake is located in Swift County. The Marsh Lake Ecosystem Restoration Project includes a new dam access road and embankment, a rock-ramp fishway, restoration of the Pomme de Terre River to its historic channel, a water control/drawdown structure, additional parking areas, and a designated borrow location to be used during project construction. Modifications to the existing dam structure would provide more natural variability in water levels and provide habitat connectivity with the rock-ramp fishway. Resource managers would will also have the ability to periodically drawdown water levels using the water control structure to promote lake habitat conditions.

The Marsh Lake Ecosystem Restoration Project is a cooperative project between the U.S. Army Corps of Engineers, the Minnesota Department of Natural Resources, and the Upper Minnesota River Watershed District.

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.

<u>Project History</u>

For the purposes of this EAW, all elevations used are in NVDG 29 datum. Some U.S. Army Corps of Engineers materials are described using the NAVD 88 datum.

The purpose of the Marsh Lake Ecosystem Restoration Project is to restore the aquatic and riparian ecosystems within the Marsh Lake project area. The Marsh Lake Project area is within the Lac qui Parle Wildlife Management Area (WMA) boundary (refer to EAW Attachment A, Project Maps, Map 1). Lac qui Parle WMA is owned and managed by the Minnesota Department of Natural Resources (MNDNR), Section of Wildlife.

The Marsh Lake Dam is an 11,800 foot (ft.) long rolled earth dam structure with a 112 ft. long concrete overflow spillway with a fixed-crest elevation of 937.6 ft. There is a 2 x 2 ft. vertical lift gate low flow feature with a sill elevation of 932.6 ft. There is also a 90 ft. emergency spillway at elevation 940.0 ft. The U.S. Army Corps of Engineers (USACE) is currently responsible for the Marsh Lake Dam structure.

Since the time of impoundment, Marsh Lake has undergone significant degradation of aquatic habitat due to stressors including high sediment and nutrient loading, a fixed crest dam that prevents low seasonal water levels, high turbidity from wind-driven sediment resuspension, and abundant common carp that increase turbidity and consume submersed aquatic vegetation and macroinvertebrates. Marsh Lake provides an open water area for migratory waterfowl to rest, and islands for nesting colonial waterbirds. Degradation of the Marsh Lake aquatic ecosystem limits habitat suitability for many species of fish and wildlife. The overall habitat conditions are poor with turbid water conditions.

The original construction of the Marsh Lake Dam (1930s) was intended to serve as a flood damage reduction measure and to provide a recreational feature to the region by creating a static pool on the river. The intended flood damage reduction benefits provided by the Marsh Lake Dam are minor due to effectiveness of the downstream Lac qui Parle Dam. Marsh Lake can be a popular recreation destination in the region.

The project was more recently proposed and planned in 2011 and federal and state environmental review processes were completed at that time. Since then, the project has been redesigned. A table comparing the 2011 project and the currently proposed project, along with the reasons for the design changes follows. A Federal Environmental Assessment (EA) and State EAW were completed for the Marsh Lake Ecosystem Restoration Project in 2011. Since that time a number of the project features have been modified, requiring a Federal Supplemental EA (completed in April, 2016) and this EAW. Project features that have been modified, or removed are to reduce project costs and focus on ecosystem benefits. Both the July, 2011 USACE Federal EA and the April, 2016 USACE Federal Supplemental EA for the current design of the Project are referenced throughout this EAW. The USACE Federal Supplemental EA addresses the recent changes and identifies the current project features. Both Federal EAs documents include additional details and information regarding the project and are available as Appendices to those reviewing this EAW. This EAW reflects the currently proposed design of the Marsh Lake Ecosystem Restoration Project, and the project features proposed for construction.

Original Feature	Proposed Modified Feature	Modification Purpose
Rock-ramp fishway at 4% slope	Enlarged rock-ramp fishway at 3% slope	Increase fish passage performance
Restore lower Pomme de Terre River to its historic channel and stabilize with rip-rap	Restore lower Pomme de Terre River to a slight modification from its historic channel and stabilize with riffle structures and natural stabilization methods	Enhance riverine habitat and reduce construction costs
Water control structure with ten bays using stoplogs, located at the existing emergency spillway	Water control structure with six bays using sluice gates, located southwest of the existing emergency spillway, maintenance ramp	Reduce construction and operations/ maintenance costs, and increase public safety
Pomme de Terre River restored to its historic channel through the existing dam embankment/road along 100th	Reroute dam embankment/road along 255th Avenue SW and through agricultural field and	Increase floodplain forest and native prairie benefits; and

Original Feature	Proposed Modified Feature	Modification Purpose
Street SW; road traffic conveyed with a 400 ft. long bridge	across the Pomme de Terre River; eliminate the need for a bridge and remove the old embankment/road	reduce construction and maintenance costs associated with bridge
Borrow site in agricultural field north of existing embankment road	Use additional sources of borrow material and a six acre reserved borrow site	Maximize use of materials from embankment removal; and reduce construction costs
Install gated entrance on west side maintained	Install gated entrance on west side to be open to public seasonally; parking lot added	Increase recreation opportunities
Pedestrian bridge across the fishway and drawdown structure	Foundations for a pedestrian/bicycle trail across the fishway and emergency spillway, to which bridges might be added as part of a future proposal; installation of decking across drawdown structure to also serve as a pedestrian bridge	Reduce construction costs; maintain option for a future bicycle trail
Improvements to Marsh Lake Dam Day Use Facility; a Pomme de Terre River canoe launching/landing point, Marsh Lake to Minnesota River portage, fishing platforms, and additional recreational facilities	Maintain existing recreation features at Marsh Lake Dam Day Use Facility; no additional recreation features proposed	Focus on restoration features; and reduce construction costs
Breach dike at abandoned fish pond	Feature not part of the proposal	Reduce construction costs
Replace three sets of culvert crossings at Louisburg Road with gated culverts	Feature not part of the proposal	Reduce construction costs

(Table adapted from the USACE April, 2016 Supplemental EA, Page 3, Table 1.)

Modifications proposed for the Marsh Lake Ecosystem Restoration Project include that construction will occur in two components. The first component will include construction of the rock-ramp fishway, drawdown structure, embankment features, west parking area, and use of the borrow location. The drawdown structure will be the first feature constructed. The second component will include restoration of the Pomme de Terre River which will need to follow a construction schedule corresponding to mussel rescue and relocation plans. Use of the borrow location will also be necessary to access excavated materials and construction materials during construction. Restoration of the borrow site and agricultural field will occur at the end of the project.

Rock-ramp Fishway

This involves constructing a rock-ramp fishway in place of the existing concrete spillway at a gradual 3% slope using natural stone with a wide sizing variability. The dam structure would have a 30 ft.

wide notch at the top of the fishway with a bottom elevation of 935.5 ft. and a top elevation of 937.6 ft. The existing 2 x 2 ft. vertical lift gate would be removed. Boulder weirs would be spaced 20 ft. apart with each set providing an individual 10-inch drop. The ramp would range in width from 150 ft. at the dam, to 200 ft. at the downstream edge. The fishway would be approximately 300 ft. long with the downstream invert elevation tying into the river bed elevation near 926.0 ft. The ramp would tie into the existing embankment on the east side. On the west side, the ramp would tie into a partially rip-rapped earthen containment embankment, 20 ft. wide and with 1H:4V side slopes. 1,579 cubic yards of large rock or boulders (1.6 ft. diameter and larger boulders for weirs) would be used in the fishway channel. Rip-rap and gravel bedding would be used to line the fishway channel. Rip-rap, rock, and gravel materials would be required to come from an approved commercial facility or site authorized by the USACE and the MNDNR. Approval and clearance by the State Historic Preservation Office (SHPO) for excavation or materials to be used would also be necessary. Concrete footings for a bridge crossing would be constructed to facilitate a potential future bicycle trail. Limited physical adjustment to the rock riffles may need to be made after flows have been stabilized. Temporary coffer dams upstream and downstream of the fishway would also be required. Refer to the USACE April, 2016 Federal Supplemental EA for specifications regarding the coffer dams. [USACE Federal Supplemental EA, April, 2016: Appendix A, Figures 8 to 11.]

Natural-like fishways are effective in re-establishing fish migration routes past dams and other hydraulic obstacles. These fishways simulate natural river channels and the hydraulic conditions that fish have evolved to swim through. This proposed fishway would have a series of arched rock riffles concentrating flow toward the middle of the fishway. Shallow areas on the sides would have slower current velocities and would allow upstream passage by smaller and weaker-swimming fish. The riffles would be made of boulders imbedded into smaller rock, with pools of deeper water between the riffles. Water would flow between the boulders in the riffles at velocities that fish could still swim through. This feature would result in changing habitat types from deep water to riffle habitat. Improvements associated with the Project are anticipated to not result in the need for long-term effects that would require habitat replacement or mitigation.

This feature would be constructed following the installation of the drawdown structure. The drawdown structure could be used to manage flows in the Minnesota River during construction of the rock-ramp fishway.

Restore Pomme de Terre River to Historic Channel

The Pomme de Terre River was previously re-routed from its natural channel to outlet upstream of the Marsh Lake Dam. A major element of this project is to restore the river to its original channel. This project feature is a river restoration of approximately 1.5 miles to restore the lower Pomme de Terre River into its historic channel so it enters the Minnesota River downstream of the Marsh Lake Dam as it did historically. The Project proposes to install two grade control structures of rock riffles located upstream of the abandoned embankment road, between two and 2.5 miles upstream of the confluence with the Minnesota River. Riffles would act to reduce stream velocities and control grade, would cross the entire width of the channel, and be constructed of rock to provide a natural appearance. Riffle materials would be boulders, rip-rap, and gravels. Materials to be used would be required to be from an approved source or commercial facility that has been reviewed

by the SHPO for archeological properties. Riffles would be sloped on the upstream side at 1H:4V and on the downstream side of the crest at 1H:20V. These slopes would provide a drop in the water surface elevation of about 0.7 feet (8 inches). [USACE Federal Supplemental EA, April, 2016: Appendix A, Figures 16, and 22 to 26.]

This restoration feature would use natural bank stabilization techniques, including bioengineered techniques, instead of rip-rap for the Pomme de Terre River channel work. The approach for the Pomme de Terre River restoration is to use toe wood-sod mats. Approximately 1,000 linear feet of the river would be restored using this technique. About 20 ft. of excavation into the bank along the Pomme de Terre River would be needed to anchor the restoration materials. Large trees (coarse woods) would be placed in an interlocking matrix and anchored with boulders. Topsoil or soil mats would be placed to fill the void between trees. Branches, shrubs, and live willow cuttings (fine wood) would be integrated into the matrix. Coarse wood and fine wood materials used to construct the toe wood-sod mats will be identified and acquired either near the construction site from within Lac qui Parle WMA or from a prior approved site, such as from areas cleared for the river restoration itself. The USACE and the MNDNR would oversee that materials used for the toe wood-sod mats are acquired from an approved location and that harvest of those materials would not occur during Northern long-eared bat breeding and roosting seasons, and be away from eagle nest locations. Up to seven plugs would also be constructed at specific points of the river where high flows threaten to breach the bank into a remnant channel. Plugs would be based on this toe wood-sod mat design. Portions of the abandoned Pomme de Terre River channel would need to be excavated to pass flows, including a breach of the dam access road. Also portions of the floodplain would be excavated to serve as the new river channel. [USACE Federal Supplemental EA, April, 2016: Appendix A, Figures 22-24, and 27.]

Winter conditions within Marsh Lake currently favor Common carp, an aquatic invasive species. Water from the Pomme de Terre River maintains an oxygen refugia for carp during the winter. By re-routing the Pomme de Terre River to its historic channel, winter oxygen refugia will be eliminated, and with increasing winterkill conditions in Marsh Lake, carp abundance may be reduced.

Construct Water Control/Drawdown Structure

The water control structure will align with the existing dam embankments and be located west of the fishway and emergency spillway. The structure would consist of upstream retaining walls, the control structure, and downstream wing walls. The control structure would be approximately 113 ft. wide, 82 ft. long, and 18 ft. high with sluice walls that are two ft. wide and 14.5 ft. high. There would be six bays separated by five 1.75 ft. thick by 26 ft. long concrete piers evenly spaced across the spillway. Between piers, there would be two 5 ft. x 6 ft. openings for sluice gates in each sluice wall section. Sluice gates would have a top elevation of 940.0 ft. and a bottom sill elevation of 934.0 ft. A sheetpile cutoff, five ft. high, would be constructed underneath the structure to prevent undermining. Excavation for the structure's outflow channel/tailrace would extend about 650 ft. downstream of the embankment. The approach and tailrace sections to the structure would be lined with a 33-inch layer of rip-rap over 12-inch bedding. Rip-rap and bedding materials would be required to come from an approved commercial facility or areas approved by the USACE and the MNDNR. SHPO approval would be necessary to obtain these materials. Clearance from SHPO is necessary before excavation activities can proceed. Commercially approved facilities need

to provide appropriate documentation to ensure SHPO requirements are met. A 112 ft. long walkway would also be constructed over the water control structure, which is necessary for operating the sluice gates. This would also function as a pedestrian bridge. [USACE Federal Supplemental EA, April, 2016: Appendix A, Figures 4 to 6.]

This drawdown feature requires a temporary coffer dam to be constructed on the lake-side of the dam to allow for proper site preparation and casting-in-place concrete construction under dry conditions. A second coffer dam may also be required downstream of the drawdown structure to reduce the area that is needed to be dewatered and to limit the amount of runoff. Refer to the USACE April, 2016 Federal Supplemental EA for specifications regarding the coffer dams. (USACE Federal Supplemental EA, April, 2016: Appendix A, Figures 3 and 8.) As currently planned, the drawdown structure would be constructed prior to the other proposed project features. A boat access ramp would also be added for maintenance of the structure. This access ramp would be for MNDNR and USACE agency staff only, and would not be available for public use. The 100 ft. long maintenance ramp would extend from the top of the west embankment into Marsh Lake. Rock would be placed in a 33-inch thick layer on top of 12 inches of bedding material. The top eight inches of the rip-rap would be grouted. The ramp would have a 15% slope and would extend from the top of the embankment at elevation 950.0 ft. to the Marsh Lake bottom elevation of 935.0 ft. The emergency spillway would remain unaltered, with an overflow elevation of 940.0 ft. [USACE Federal Supplemental EA, April, 2016: Appendix A, Figures 7 and 28.]

This structure would allow the MNDNR to temporarily lower water levels (i.e., drawdown) on a periodic basis within the Marsh Lake pool in coordination with the USACE to improve fish, wildlife, and aquatic habitat. Following construction, periodic drawdowns could be proposed as described in the Draft Marsh Lake Operation and Management Plan (EAW Attachment C) and using the framework of the USACE Standing Instructions for the Marsh Lake Dam.

Dam Access Road/Embankment

Construction would consist of approximately 5,350 linear feet of embankment/roadway built with a top width matching the existing roadway. The new roadway would allow for two ten ft. travel lanes and three ft. wide shoulders. Where ditching is needed, the ditches would include three ft. wide bottoms and 1V:3H backslopes. Two seepage cutoff areas would be needed. The embankment would be identified in two separate sections, Embankment A and Embankment B. Embankment A would be part of the rerouting of the Pomme de Terre River to its historic channel. Embankment B would be part of the new alignment allowing vehicular access to the dam. The new dam access road alignment would start to the north and follow 255th Avenue SW south over Embankment B, then southeast across an MNDNR-owned agricultural field, then across the existing Pomme de Terre River diversion channel over Embankment A, and then tie into the existing dam embankment and roadway. The new road/embankment would serve as the new dam face. [USACE Federal Supplemental EA, April, 2016: Appendix A, Figures 16 to 20.]

From Embankment A extending east to 240th Avenue SW, the existing embankment road core will be removed to match the elevation of the adjacent ground. An estimated 5,761 linear feet (1.1 mile) of existing roadway will be removed and restored to native vegetation and floodplain. In the western section, embankment removal would restore 3,756 linear feet of connectivity between the river and

its floodplain; and further east removal would restore 2,005 linear feet of native prairie connectivity. A layer of organic topsoil acquired from the proposed borrow site would be added and native vegetation would be seeded with a state-approved seed mix of most predominantly a mesic prairie mix. An existing fiber optic cable located on this section of road would be relocated during road deconstruction and is anticipated to result in minimal additional disturbance.

An 84 ft. x 24 ft. parking area would be constructed on the east side of the Project site along the existing road grade, within previously disturbed areas, avoiding any effect to existing native prairie. Essentially, a small portion of the existing roadway along 100th Street SW would remain in place and be a new parking area. Improvements may result in temporary disturbance to surrounding habitats. [USACE Federal Supplemental EA, April, 2016: Appendix A, Figure 21.]

A 600 ft. long portion of 255th Avenue that accesses Marsh Lake would be deconstructed and restored to natural conditions with topsoil, mulch, and a state-approved prairie seed mix. However, a new access spur road would be constructed that joins the embankment road where it curves and heads southeast toward a primitive Marsh Lake water access. Dam access road and embankment construction will occur in conjunction with road deconstruction, fiber optic cable relocation, and creation of a parking area. These will be addressed as independent project features and their construction will all overlap. This feature will be included as part of the first component construction and is likely to occur in 2017.

[USACE Federal Supplemental EA, April, 2016: Appendix A, Figures 16-21.]

Temporary Borrow Sites

Borrow material would be acquired from a ten-acre designated borrow area in an agricultural field near the new dam embankment/roadway between Embankments A and B. The USACE estimates the need to use approximately 7.28 acres of this ten-acre area. An additional or reserved six-acre borrow area (which is restored prairie) has also been identified and would be used only as and if needed. Borrow sites would be restored to wetlands and prairie using native seed mixes following the removal of material from the borrow site required for project construction. The reserved borrow site is located near the proposed east parking area and could disturb restored prairie areas within the Lac qui Parle WMA. If the site is used, it would be later restored and is anticipated to result in only temporary disturbance through 2018. Prior to excavation, the designated borrow areas would be reviewed and receive clearance for use from the SHPO regarding historic properties. [USACE Federal Supplemental EA, April, 2016: Appendix A, Figure 15.]

The borrow area would be restored to a mosaic of small irregularly shaped vernal pools and uplands and seeded to local native vegetation. Some of the local native vegetation used for seeding may come from the Lac qui Parle WMA or be supplemented with pollinator favorable plant species. Restoration of the borrow area is proposed to include:

- The vernal pools would be less than one acre, hold no more than 18” of water at full pool, and incorporate irregular shorelines with slopes no greater than 8:1.

- As borrow is removed, top soil would be retained to re-cover the excavation site with four inch minimum soil for vegetation re-establishment.
- For reclamation/restoration, a sculpted seeding (i.e., custom wetland and upland seed mixes would be seeded separately on appropriate soils) would be completed with state-approved native species.
- Approved examples for vegetation mixes are state-approved mixes including a Native Prairie Mesic General (35-241) mix for restoration purposes and a Native Construction (32-241) mix for erosion control and soil stabilization.

All of the 72-acre crop field would be restored to wetland and prairie upland habitat with the exception of a ten-acre food plot south of the proposed access road (Embankment A and Embankment B) and not including the road footprint itself. Several activities would occur in this 72-acre existing agricultural field. This entire site would be restored except for a ten-acre food plot which MNDNR Wildlife will maintain and manage. The new embankment road would be constructed through the 72-acre agricultural field. The ten-acre borrow location would be restored using the above-described wetland plans developed by the MNDNR. The remaining portions of the field (except for the ten-acre food plot, the embankment road, and the ten-acre borrow location) would be restored by the MNDNR to native grasses and wetland. This restoration is anticipated to result in approximately 51.92 acres of additional restoration. (Refer to EAW Attachment A, Project Maps.)

[USACE Federal Supplemental EA, April, 2016: Appendix A, Figure 15.]

Construct West Public Access

This project feature would construct a public access and a turnaround parking lot to allow seasonal public access from the west side of the dam as well as a parking lot. The parking lot would be 180 ft. long by 84 ft. wide. The existing 12 ft. wide maintenance road on top of both embankments would also be improved. This site is currently closed with a gate, but would be open during high demand periods, such as during open water fishing season. [USACE Federal Supplemental EA, April, 2016: Appendix A, Figure 14.]

Construction Timing, Duration, and Management

Following completion of the state environmental review processes, construction would be proposed to begin during 2016 depending on the issuance of all required permits and approvals and related decisions. Construction is most likely to begin in approximately May, 2017. Refer to EAW Item No. 8 for the list of required permits and approvals. Construction would proceed in two components with the first component focused on the Marsh Lake Dam features including the embankment and parking lot construction and the installation of the rock-ramp fishway and drawdown structure. Construction requires the use of temporary coffer dams and use of the designated borrow area. The second component would be focused on the Pomme de Terre River restoration. Construction is anticipated to last two to three years, beginning in the winter of 2017. The active drawdown structure, rock-ramp fishway, and new road/embankment can be constructed any time during the open water season based on applicable site conditions and water levels. Construction may be facilitated by using the water control structure after it is built to have a managed drawdown. The drawdown structure would be the first Project feature constructed.

Areas disturbed during construction would be restored to pre-construction conditions or improved through other restoration measures. Construction actions would include the use of Best Management Practices (BMPs) to limit short-term effects. The specific construction methods, including identification of specific BMPs, have not yet been determined but will be included in the final USACE design plan and project specifications for all Project features. Potential BMPs include construction during low-flow periods, use of silt curtains, dewatering of the construction area using coffer dams, limiting the time period for exposed soils, mulch, and control of stormwater flow from any upland areas disturbed during construction. Geotextile would be used to cover temporary coffer dams to manage erosion potential. Any rock rip-rap material used for the project would be clean rock and come from an approved commercial facility and be clear of potential invasive species. Organic topsoil would be stripped from borrow sites and used as necessary to restore and seed using state-approved seed mixes for restoration purposes and erosion control. These mixes generally include a Native Prairie Mesic General (35-241) mix for restoration purposes and a Native Construction (32-241) mix for erosion control and soil stabilization. Prior to and after seeding, restoration sites would be prepared and mulched as specified and approved in final plans and specifications. Seeding would be broadcast or drilled depending on site conditions.

The USACE is responsible for all engineering, construction, and construction oversite of the proposed project. During project construction, the USACE would have an on-site project manager. The MNDNR would be responsible for future operation and maintenance of the ecosystem features including the water control/drawdown structure and the rock-ramp fishway. An MNDNR project manager would need to coordinate all future management activities with the USACE based on a U.S. Army Corps of Engineers Standing Instructions to the Project Manager for Water Control (January, 2016).

c. Project magnitude:

Total Project Acreage:	Includes total footprint
1. Dam Access/Embankment	27.1 acres
2. Borrow Sites	7.28 acres
3. Fishway	2.02 acres
4. Drawdown Structure	3.38 acres
5. Pomme de Terre Re-route	5.11 acres
6. Public Access (West Parking Lot)	0.92 acres
7. Public Access (East Parking Lot)	2.00 acres
8. Existing Embankment	5.59 acres
9. Temporary Coffer Dams	2.54 acres
Linear project length:	
10. Dam Access/Embankment	5,350 feet
11. Borrow Sites	N/A
12. Fishway	300 feet
13. Drawdown Structure	650 feet
14. Pomme de Terre Restoration	7,920 feet

Total Project Acreage:	Includes total footprint
15. Public Access (West Parking Lot)	180 x 84 feet
16. Public Access (East Parking Lot)	84 x 24 feet
17. Existing Embankment	11,800 feet
18. Temporary Coffer Dams	USACE Supplemental EA Figures 3, 19, 20
Number and type of residential units	N/A
Commercial building area (in square feet)	N/A
Industrial building area (in square feet)	N/A
Institutional building area (in square feet)	N/A
Other uses – specify (in square feet)	N/A
Structure height(s)	Multiple (elevations covered above)

[USACE Federal Supplemental EA, April, 2016: Revised Clean Water Act Section 404(b)(1) Evaluation, Table B-1.]

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 purpose of the project is to restore ecosystem functions within Marsh Lake. Improvements in fish, wildlife, and water quality are expected.

The Marsh Lake Ecosystem Restoration Project has been developed as part of a coordinated effort by several public resource agencies including the USACE, the MNDNR, the U.S. Fish and Wildlife Service (USFWS), and the Upper Minnesota River Watershed District. An adaptive management team will be responsible for ongoing project management decisions and includes representatives from all four of these entities. The MNDNR will be primarily responsible for all active water level management and maintenance of the water control structure and fishway. The USACE will continue to own the dam site and oversee all construction and post-construction activities.

The purpose of this project is to return the Marsh Lake area ecosystem to a less degraded and more natural condition by restoring natural functions and processes. Where returning Marsh Lake to complete pre-disturbance conditions may not be feasible, the goal is to partially or fully reestablish the attributes of a naturally functioning and self-regulating system. The objectives of the Project are to: (1) reduce sediment loading to Marsh Lake; (2) restore natural fluctuations to the hydrologic regime of Marsh Lake; (3) restore geomorphic and floodplain processes to the Pomme de Terre River; (4) reduce sediment resuspension within Marsh Lake; (5) increase extent, diversity, and abundance of emergent and submersed aquatic plant growth in Marsh Lake; (6) increase the availability of waterfowl and native fish habitat; (7) restore aquatic habitat connectivity between Marsh Lake, the Pomme de Terre River, and Lac qui Parle Lake; (8) reduce the abundance of aquatic invasive fish species in Marsh Lake; and (9) increase diversity and abundance of native fishes within Marsh Lake and the Pomme de Terre River**.**

This project is designed to restore a more natural and variable hydrologic regime which is important to restoring freshwater aquatic ecosystems within Marsh Lake. On a river floodplain lake like Marsh Lake,

a more natural hydrologic regime includes lower lake levels in some years to provide conditions conducive for aquatic vegetation to establish. In the event the goals in the Marsh Lake Ecosystem Restoration Plan are not achieved through the passive water control structure (i.e., fishway), a water level drawdown structure has been incorporated into the project where water levels could be drawn down according to recommendations and implementation by the adaptive management team. Annual and intra-annual variations in water levels are extremely important to maintain ecosystem functions in these shallow water systems. In other areas, (e.g., the pools in the Upper Mississippi River), variability in water levels has resulted in increased extent, diversity, and abundance of aquatic vegetation, increased food for waterfowl, and improved water quality conditions. The MNDNR, Section of Wildlife has completed other projects to enhance habitat and water quality conditions within shallow lake systems through active water level drawdowns. A clear water system with more aquatic plants would favor native fishes over the non-native Common carp, as well as favor many other native plant and wildlife species.

Overall habitat and water quality conditions within Marsh Lake continue to decline. The proposed project will provide habitat improvement and improve water quality conditions in Marsh Lake. This restoration of ecosystem functions would improve fish and wildlife habitat, water quality, and provide more public use opportunities. Specific beneficiaries include sport anglers, waterfowl hunters, wildlife viewers, and downstream users who benefit from increased water quality downstream through the Minnesota River. Marsh Lake is considered important regionally for fish and wildlife resources.

e. Are future stages of this development including development on any other property planned or likely to happen? Yes or [No]

   If yes, briefly describe future stages, relationship to present project, timeline and plans for environmental review.

Currently, there are no specific plans for additional features associated with the Marsh Lake Ecosystem Restoration Project. As noted in this EAW Item, the project feature involving foundations for a pedestrian/bicycle trail across the fishway and emergency spillway maintains an option for a future bicycle trail.

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

The Works Progress Administration constructed the Marsh Lake Dam and rerouted the Pomme de Terre River into Marsh Lake between 1936 and 1939. The reservoir was initially filled in 1939. The USACE improved the dam between 1941 and 1951 as part of the Lac qui Parle Project. The project was operated by the State of Minnesota until 1950, when operation and maintenance responsibilities were transferred to the USACE.

Originally, the Marsh Lake Project proposal included several recreational features including off shore fishing sites, a bicycle path, and other public use improvements. These recreational features have since been removed because they cannot be funded with the available federal ecosystem project funding. Also, other project features such as the creation of rock islands to reduce wind fetch, breaching of the abandoned fish pond, and the installation of gated culverts along the Louisburg Grade Road have been

removed. The original Project design also included an access route along the existing alignment that included a large bridge over the restored Pomme de Terre River channel. To enhance floodplain benefits and to reduce project costs, the currently proposed access route was identified as described in this EAW.

In 2011, a Federal Feasibility Report and EA, and a State EAW were completed for the project. The federal and state environmental review processes were completed at that time. Project goals are unchanged but due to design changes and project modifications, a Federal Supplemental EA was required. A State EAW is also required due to the nature of the design changes. Project studies and evaluations in 2014 presented design modifications that were able to reduce overall project costs and enhance the overall project's focus on ecosystem restoration. Currently, the Project encompasses three primary features including a drawdown structure for water level management, a passive rock-ramp fishway to replicate a more natural hydrograph and provide fish passage, and restoration of the Pomme de Terre River to its historic channel/floodplain.

The USACE's Federal Supplemental EA prepared in 2015 concluded the federal environmental review procedures with a Finding of No Significant Impact for the current proposal (USACE Federal Supplemental EA, April, 2016: Cover Letter).

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

Land use and land cover resources directly affected by the proposed Project are limited to areas associated with the dam access road realignment, the water control/drawdown structure, rock-ramp fishway, west parking lot, east parking lot, and the re-routed lower Pomme de Terre River. A large agricultural field will also be primarily converted to native prairie and wetlands but a ten-acre food plot will be maintained and managed by the MNDNR. The food plot will be seeded down to corn, soybeans, or other suitable wildlife food sources as determined by the MNDNR. Land use/land cover types that would be affected are generally composed of agriculture/croplands, pasture and hay, emergent wetland vegetation, open water, forested/shrub wetland, floodplain forest, riverine, and tailwater areas. Existing land use and land cover types directly affected by the project would include approximately 107.5 acres, much of which would be restored to native grasses and wetlands. If the proposed project modifications are implemented, the existing land use/land cover type would be displaced with another existing land type as shown in the following tables.

Project Feature	Existing Land Use/Land Cover	Estimated Acreage
Dam access road realignment	Feature, floodplain forest, riverine, lake, grasslands, cropland and pasture	27.1
Borrow site	Cropland, existing roadway	7.28
Rock-ramp Fishway	Riverine, tailwater, lake, feature	2.38
Water control structure	Feature, lake, grasslands, scrub/shrub	5.23
Pomme de Terre River restoration	Riverine, floodplain forest	5.11

West parking lot	Feature, grasslands, pond	0.92
East parking lot	Feature, grasslands	2.0
Existing embankment (removal)	Riverine, floodplain forest	5.59
Prairie/Wetland restoration and Food Plot	Agricultural field	51.92
	TOTAL:	**107.53**

Cover Type	**Before**	**After**	**Cover Type**	**Before**	**After**
Wetlands	4.3	0	Lawn/Landscaping	N/A	N/A
Deep water/Streams	3.1	7.0	Impervious surface	N/A	N/A
Wooded/Forest	4.0	5.9	Stormwater Pond	N/A	N/A
Brush/Grassland	4.3	49.2	Other (embankment and project features)	12.6	35.4
Cropland	79.2	10.0			
			TOTAL	**107.5**	**107.5**

At this time the exact size of the wetland areas that would be created/restored within the proposed 7.28 acre borrow pit area is estimated; and of a total ten-acre borrow pit area, 7.28 acres would be used). The MNDNR could mitigate the full 4.3 acre wetland loss noted above. These areas are included in the tables as upland grassland restoration. The increased connectivity between the Pomme de Terre River and its floodplain would result in an additional increase in wetland habitat not identified in the above table. Bank stabilization and grade control structures added to the Pomme de Terre River could also temporarily displace small wetland areas. However, over the long-term, wetlands associated with the river would be expected to be enhanced by these features.

The re-routed dam access road and embankment would result in some wetland effects. Embankment B would require fill that would displace about one acre of Marsh Lake backwater. Embankment A would displace an additional 0.4 acres of wetland area. Another 0.3 acres of fill may also be necessary to construct a temporary coffer dam. All other acres directly affected by the embankment footprint include uplands that are not native prairie. Due to embankment construction, there may also be loss of hydrologic connectivity to a backwater of Marsh Lake (USACE Federal Supplemental EA, April, 2016: Appendix G). By re-routing the dam access road, hydrologic connectivity (via two, 24-inch diameter culverts) between Marsh Lake and a 13-acre backwater and a 37-acre remnant floodplain would be lost (USACE Federal Supplemental EA, April, 2016: Appendix A, Figure 29). It is not completely understood whether or not this modification will affect the backwater. First, if the water table remains consistently high, the backwater should remain about the same size and would continue to be an open water area. However, if the water table fluctuates or drops significantly, the area may convert to a more emergent wetland cover type. Second, the existing 24-inch culverts are in poor condition, and are plugged with sediment and beaver debris. Lac qui Parle WMA Section of Wildlife Staff assessment is the culverts have been non-functional for a long time so culvert removal may result in little or no change from current conditions. Also upon further investigation and modeling, it has been determined that high water levels in the Pomme de Terre River would flood into this backwater area (due to embankment

removal and restored floodplain) at a greater exceedance level than the culvert via the restored floodplain. This backwater area will be monitored closely following the Project to determine whether there are adverse effects. A water level gauge will be installed and water levels will be recorded monthly throughout the summer (i.e., from May to September) for a period of five years. Secchi transparency and vegetation may also be sampled periodically to assess habitat conditions. If effects are indicated, further options to mitigate those effects will be evaluated. Installing a culvert through Embankment B is not an identified option at this time. Based on the information known to the MNDNR at this time, effects are anticipated to be temporary and limited. Restoring the Pomme de Terre floodplain should provide this wetland area with sufficient water. Additional mitigation could include additional earthwork between the floodplain and the wetland to increase connectivity. (Refer to the USACE Federal Supplemental EA, April, 2016: Appendix G for additional backwater modeling information.)

Any potential effects on backwater habitat would be mitigated along a portion of the Pomme de Terre River downstream of Embankment A to Marsh Lake, which is estimated to be approximately 16 acres. Embankment A would create this 16-acre backwater along the lowermost portion of the Pomme de Terre River. Once the embankments are constructed, this area would function as a backwater. Of the estimated 27.1-acre footprint of the project, an estimated 1.4 acres would result in permanent wetland conversion, 0.3 acres would be affected as a result of a temporary coffer dam, 5.1 acres includes deconstruction and restoration of the existing access road, and the remaining 20.3 acres would involve conversion of existing upland habitats (primarily cropland) to the new embankment and access road. (USACE Federal Supplemental EA, April, 2016: Appendix A, Figure 16).

The primary borrow area has been identified in an existing agricultural field. The area of disturbance is estimated at 7.28 acres. This site has been previously disturbed by existing agricultural use so native prairie will not be affected by the borrow site. Borrow materials for construction may also be mined out of the existing access road during deconstruction and restoration (USACE Federal Supplemental EA, April, 2016: Appendix A, Figure 15). Approval and clearance from the SHPO regarding archaeological resources and effects will be pursued prior to any excavation activities. Upon completion of the project, the borrow sites would be restored to native prairie and wetlands using State approved seed mixes such as a Native Prairie Mesic General (35-241) mix for restoration purposes and a Native Construction (32-241) mix for erosion control and soil stabilization. Wetland or native prairie effects associated with this proposal to acquire construction material are not anticipated. A large agricultural field adjacent to the borrow site location and east of the new embankment road and within Lac qui Parle WMA would be restored to native grasses and wetlands.

The rock-ramp fishway would affect about 1.64 acres of the Minnesota River tailwater below the Marsh Lake dam. Much of the fishway would replace Marsh Lake Dam tailwater with riffle habitat. Another 0.38 acres of the existing feature would include new structure footings. Temporary coffer dams for construction may also be necessary and would result in temporary displacement of approximately 0.36 acres of lake and tailwater.

The water control structure and associated features would permanently displace less than 0.2 acres of Marsh Lake. Around 2.3 acres of wetland downstream of the embankment would be converted into open water in connection with the structure's tailwater. An additional 1.8 acres of fill may be necessary for temporary coffer dams to aid in constructing the water control structure. This fill would be

removed upon completion of the construction of the water control structure. The remaining footprint would alter existing embankment areas and brush/grasslands.

The Pomme de Terre river restoration would temporarily displace around 5.11 acres of river, floodplain forest, and wetland areas but would result in restoring approximately 16 acres of riverine floodplain and wetland areas. The Pomme de Terre River channel requires measures to stabilize and redirect flow through riffle structures and bank stabilization. These measures would occur both as part of project construction and operation. To restore the Pomme de Terre River riffle structures and bank stabilization, toe wood-sod mats are necessary. Use of these mats help direct and control flows within the newly restored channel, and prevent unnecessary erosions. As a result, approximately two acres of existing riverine habitat could be directly affected. These effects should be temporary and mitigated by the resulting habitat restoration and use of naturalized restoration design features.

The east parking area on the corner of 100th Street SW and 240th Avenue SW would be constructed within areas of previous disturbance and along the reclaimed road grade. Effect to wetland areas is not anticipated and disturbance to native prairie will be avoided. The footprint of the east parking area is two acres.

Construction of the west parking area would result in filling less than 0.1 acres of open water areas and would provide opportunities for greater public use and staff access. The remaining project footprint would be within existing embankment and brush/grassland areas.

8. 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.*

Unit of Government	Type of Application	Status
State of Minnesota, MNDNR	Public Waters Work Permit (#2016-0940)	Pending
State of Minnesota, Board of Water and Soil Resources (BWSR)	Wetland Conservation Act (WCA)	Pending
State of Minnesota, Minnesota Pollution Control Agency (MPCA)	Construction Stormwater Permit	Pending
State of Minnesota, MPCA	Section 401 Water Quality Certification	Pending
State Historic Preservation Office (SHPO)	Archeological and Historic Properties review, clearance, and approval	Pending
U.S. Army Corps of Engineers (USACE)	Section 404, Clean Water Act	Completed
U.S. Fish and Wildlife Service	Bald and Golden Eagle Protection Act involvement	Pending
U.S. Fish and Wildlife Service	Northern long-eared bat involvement/concurrence	Pending

The USACE is leading all project construction activities. All project infrastructure would be owned by the USACE and the MNDNR would be responsible for all future operation and maintenance of the rock-ramp fishway and drawdown structure. Permit applications are anticipated to be completed during the final design phase of the Project, prior to construction, and along with or following completion of the environmental review process. The MNDNR is not aware at this time of local permits or approvals that may be required.

[USACE Federal Supplemental EA, April, 2016: Section 6.0 and Table 4.]

Proposed funding for the Marsh Lake Ecosystem Restoration Project is a shared responsibility between the USACE (65%) and the State of Minnesota (35%), with the Upper Minnesota River Watershed District being the primary non-federal sponsor on behalf of the State of Minnesota. A $2,000,000 appropriation has been recommended by the Lessard-Sams Outdoor Heritage Council and funding for project construction is expected to be available after July 1, 2016 through Minnesota's Outdoor Heritage Fund (OHF). There is non-federal funding of $4.6 million dollars. The U.S. Government recently identified the remaining $7.6 million dollars to construct the project. Construction is anticipated to last two to three years, beginning in 2017.

Cumulative potential effects may be considered and addressed in response to individual EAW Item Nos. 9-18, or the RGU can address all cumulative potential effects in response to EAW Item No. 19. If addressing cumulative effect under individual items, make sure to include information requested in EAW Item No. 19

9. Land use:

a. Describe:

i. Existing land use of the site as well as areas adjacent to and near the site, including parks, trails, prime or unique farmlands.

The geographic scope of the Project includes Marsh Lake, adjoining floodplain and shorelines, the confluence of the Pomme de Terre River, Marsh Lake Dam, and Lac qui Parle reservoir (USACE Federal EA, July, 2011: Figure 1-2). Conditions of the Project area are affected by land use in the Upper Minnesota River Watershed Basin. Modification of the hydrology and land use in the Minnesota River Basin has resulted in converting former prairie, streams, and wetlands into an extensively drained agricultural landscape dominated by row crop agriculture.

This Project does not address watershed and water quality management in the Upper Minnesota River Watershed Basin. As identified in the USACE's 2004 Minnesota River Basin Reconnaissance Study report, many of the land use problems in the Marsh Lake Area ecosystem are symptoms of larger watershed issues. Opportunities to further restore and contribute to the sustainability of Marsh Lake Area ecosystems through actions in the greater watershed are being explored in an ongoing USACE Minnesota River Integrated Watershed, Water Quality, and Ecosystem Restoration Study.

The Lac qui Parle WMA is the primary geographic focus of this proposed project due to the presence of USACE owned and operated structures at Lac qui Parle dam and Marsh Lake dam; MNDNR ownership

of WMA lands; and the willingness of the MNDNR and the Upper Minnesota River Watershed District to be the non-Federal project sponsors. Lac qui Parle WMA is approximately 33,000 acres in size. The Marsh Lake Project area includes Marsh Lake, the Pomme de Terre River outlet, the Marsh Lake dam, and the upper portion of the Lac qui Parle reservoir. (Refer to EAW Attachment A, Project Maps, Map 1.)

Big Stone National Wildlife Refuge is located just upstream of Marsh Lake along the Minnesota River. The Big Stone National Wildlife Refuge was established in 1975 and consists of 11,586 acres of tallgrass prairie, wetlands, granite outcrops, and river woodlands. Eleven miles of the Minnesota River flows through the refuge. Lac qui Parle State Park is located along Lac qui Parle Lake immediately downstream of Marsh Lake. The Marsh Lake area is a popular destination for outdoor recreational users and includes many opportunities for hunting, fishing, hiking, skiing, and bird watching. Several State Wildlife Management Areas and Federal Waterfowl Productions Areas are also within close proximity to Marsh Lake.

The Minnesota River is a designated State Water Trail as well as a Minnesota State Wild and Scenic River. A State Water Trail is a designated stretch of river or lake that is mapped and managed especially for canoeing, kayaking, boating and camping. The entire 318 miles of the Minnesota River is designated as a state water trail. The Pomme de Terre River is also a state water trail, and enters the Minnesota River within the Lac qui Parle WMA near the Project site.

As part of the Minnesota State Wild and Scenic Rivers Program, the Minnesota River has two segments classified as “scenic” and one segment classified as “recreational.” The designated stretch of river extends from Lac qui Parle dam to Franklin.

Proposed efforts to maintain safety and public access for water trail use would continue. Coordination within the MNDNR would continue particularly in the event Project construction or activities might limit or preclude water trail activities.

Much of the Marsh Lake watershed contains row crop agriculture. These areas of Swift, Big Stone, and Lac qui Parle Counties would not be considered prime agricultural areas or unique but can be productive and would typically consist of a corn/soybean rotation.

While there is the need for a watershed approach in the area, structural Marsh Lake Project features being pursued now can begin addressing some of the ecosystem issues. Additional measures to reduce sediment loading from sources within the watershed are being investigated and pursued as a part of the Minnesota River Integrated Watershed, Water Quality, and Ecosystem Restoration Study and through other means such as implementation of Federal farm programs.

[USACE Federal EA, July, 2011: Figures 1-2, Page 19; Section 2.8.2, Pages 51-53; Section 2.8.11, Page 73; Section 2.9.1, Page 73-74; Section 2.9.2, Pages 74-75; and Section 2.9.8, Pages 78-90.]

[USACE Federal Supplemental EA, April, 2016: Section 4.3.1, Page 9.]

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 USACE will continue to own the dam structure site (refer to EAW Attachment A, Project Maps, Map 3) and has a flowage easement to elevation 945.0. The MNDNR will continue to own and manage the Lac qui Parle WMA which surrounds Marsh Lake. The MNDNR will be responsible for all water level management and maintenance of the rock-ramp fishway and drawdown structure with oversite from the USACE.

Marsh Lake is within the Minnesota Prairie Conservation Plan core area. Project objectives for Marsh Lake and the Marsh Lake Area support the conservation efforts in this plan. The MNDNR's Long Range Duck Recovery Plan (LRDRP) has a goal of recovering historical breeding and migrating populations of ducks in Minnesota. Further, the LRDRP identifies the need to manage an additional 29 lakes per year for a total of 1,800 lakes to be managed by 2056. The Marsh Lake Ecosystem Restoration Project supports these goals identified in these plans. The Lac qui Parle WMA and surrounding public lands are considered a significant bird conservation area.

The Marsh Lake Ecosystem Restoration Project is identified as a specific goal of the Big Stone County Local Water Plan and the Upper Minnesota River Watershed District Watershed Management Plan to improve water quality in the area. The proposed project as planned is consistent with or compatible with current land uses, zoning, and current/future area plans.

[USACE Federal EA, July, 2011: Section 2.10.2, Page 91.]
[USACE Federal Supplemental EA, April, 2016: Sections 5.3.2, Page 13.]

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

The Marsh Lake Ecosystem Restoration Project is located within the Upper Minnesota River Watershed District. The Watershed District is also a partner and non-Federal project sponsor. The Project is also located in the floodplain of the Minnesota River and is being planned to help improve conditions on the Marsh Lake reservoir. The MNDNR manages all the land around Marsh Lake as within the Lac qui Parle WMA.

Marsh Lake (itself) is not within any state or federally designated wild or scenic river land use districts. The shoreland zoning districts for Swift, Big Stone, and Lac qui Parle Counties extend 1,000 feet from the ordinary high water level for Marsh Lake. All counties designate Marsh Lake as a Natural Environment Lake, the most restrictive classification for shoreland zoning standards.

The Minnesota River is a designated State Water Trail as well as a Minnesota State Wild and Scenic River. A State Water Trail is a designated stretch of river or lake that is mapped and managed especially for canoeing, kayaking, boating and camping. The entire 318 miles of the Minnesota River is designated as a state water trail. The Pomme de Terre River is also a state water trail, and enters the Minnesota River within the Lac qui Parle WMA near the Project site.

As part of the Minnesota State Wild and Scenic Rivers Program, the Minnesota River has two segments classified as "scenic" and one segment classified as "recreational." The designated stretch of river extends from Lac qui Parle Dam to Franklin.

Proposed efforts to maintain safety and public access for water trail use would continue. Coordination within the MNDNR would continue particularly in the event Project construction or activities might limit or preclude water trail activities.

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 Marsh Lake Ecosystem Restoration Project is compatible with and complementary to adjacent land uses and existing conservation plans. Any adverse effects caused by the Project are anticipated to be short term or minor. The Marsh Lake Project supports the goals and purposes in the Minnesota Prairie Plan and Long Range Duck Recovery plan. The Project purposes directly support goals and directions in the Big Stone County Water Plan and the Upper Minnesota River Watershed District Watershed Plan. Enhancing habitat and water quality conditions on Marsh Lake would further enhance environmental conditions and support outdoor public recreation in the area.

Marsh Lake is a Natural Environment Lake according to the MNDNR Shoreland Management classifications. This classification is the most restrictive for zoning purposes, but would likely only affect the use of chemical applications for vegetation control which is not being proposed with this Project. Specific requirements are identified in the individual County Shoreland Management Ordinances. The county zoning requirements result in and require a 1,000 ft. setback from the OHW level.

[USACE Federal Supplemental EA, April, 2016: Sections 4.0 and 5.0, Pages 8-18.]

c. Identify measures incorporated into the proposed project to mitigate any potential incompatibility as discussed in Item 9b above.

Resource agency partners have considered potential effects and the Project has been designed to reduce and limit area disturbance and potential adverse environmental effects. This Project is anticipated to result in restoring critical ecosystem function and be a net improvement to environmental resources in the Project area. Land use in the area is not expected to change. Some land uses and wetland types may change on a small level in relation to the geographic size of the Project.

Some effects would occur to construct the planned project features, but have been designed with mitigation measures to minimize effects. For the Pomme de Terre River and channel restoration components, techniques such as toe wood-sod mats are being used to reduce effects. Restoration of the Pomme de Terre River and its floodplain is anticipated to offset possible adverse effects. Restoration activities will also occur on a 59-acre site which is an existing agricultural field.

10. 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.

Marsh Lake is part of the Minnesota River flowage. The pertinent geology and stratigraphy are related to the last glacier that retreated from the area approximately 14,000 years ago. As the glacier retreated north, the melting ice margin headed the ancestral Minnesota River. The glacier eventually retreated north of the topographic divide, near Browns Valley, and meltwater ponded behind the divide to form Glacial Lake Agassiz. When the meltwater raised the lake enough to overtop the drainage divide, a southern outlet stream, the River Warren, discharged from the lake. The River Warren carved the present oversized valley now occupied by the Minnesota River. Lake Agassiz ultimately drained to the northeast, allowing the Minnesota River to aggrade and adjust to the local conditions. The original Marsh Lake was formed by the damming effect of a delta at the mouth of the Pomme de Terre River. The present Marsh Lake is ponded behind a man-made embankment approximately two miles long that connects the lower river valley walls at about elevation 950.0 ft.

Bedrock - bedrock lies at an estimated depth greater than 200 feet beneath the glacial sediments in the region. The bedrock is likely composed of Paleozoic Era, Cretaceous Period sedimentary rock, or granitic intrusive rocks. The bedrock lies well below the influence of the proposed project.

Glacial Till - overlying the bedrock are the numerous till layers that were deposited predominately out of the Des Moines lobe, though some older units are encountered in the area. Dark gray, medium stiff to hard, sandy, gravelly till was encountered in Boring #09-15M at 930 feet and older borings taken in 1972 and 1986 show the average till elevation is about 927 feet except for the area just east of the concrete dam where the till surface dips to about 885 feet. A two-foot to three-foot thick zone of soft to medium stiff reworked or disturbed till tops the firm till beneath the west portion of the embankment. Till deposits vary in thickness from over 300 feet deep within the Big Stone Moraine, north of the Project area, to nonexistent at exposed bedrock along the Minnesota River farther downstream.

Stream sediment from Glacial River Warren - as the River Warren flowed through the underlying till, it both cut channels and deposited sediments. These deposits are found as stratified sand and gravel bars, and may be interbedded with finer sediments from stagnant periods, as encountered in Borehole #09-17M. This unit is found locally at elevation 935.0 feet, and extends below the end of the borehole at elevation 905.5.

Present day Alluvium - recent, upper level soils consist of stream sediments of the Pomme de Terre River, channel fill of organics and clays, and lake sediments from Marsh Lake. Varying clay categories are encountered in most boreholes, and these fine sediments vary in thickness depending on the depositional mechanism, and the channel topography from the stream cuts. The upper portion of the alluvium is commonly highly organic and very soft to medium stiff. The lower portion is sparsely organic and stiff. It contains shells, and ranges from black to greenish gray to gray.

Embankment fill - borings taken in 1972 and 1986, and Boring #09-16M show the embankment material averages 14 feet in thickness and is clay, variably silty and sandy with minor amounts of organics and roots.

In Minnesota there are few fault lines that could affect the Project area. The Morris fault extends diagonally from the town of Morris, Minnesota to the Brainerd area in west-central Minnesota. The

Morris fault, is confined to the Precambrian bedrock and is not considered tectonically active, although some seismic activity has been associated with the Morris fault. In 1975, an earthquake with a Modified Mercalli Intensity of VI occurred near the town of Morris. This earthquake occurred about ten miles west-northwest of Morris at a depth of three to five miles. It is one of the documented earthquakes in Minnesota history, and possibly the largest. Five other earthquakes have been linked to the Morris fault since 1860. The most recent earthquake in Minnesota occurred along the western edge of the Morris fault in 1993 near the town of Graceville. It had a magnitude of 4.1 on the Richter scale and a Mercalli Intensity of V. The Graceville earthquake occurred at an estimated depth of seven miles.

No other unique geological features have been identified within the project area.

[USACE Federal EA, July, 2011: Appendix H.]

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 11.b.ii.

The project area consists primarily of gently sloping lands, ranging from 0-6% in steepness. Soils are predominantly loamy, with landscapes having a complex mixture of well and poorly drained soils. Drainage of depressional areas is often poor, and tile drainage is common. Water erosion potential is moderate on much of the land within this geomorphic setting.

A National Pollutant Discharge Elimination System/State Disposal System (NPDES/SDS) Permit for Construction Stormwater would be obtained from the Minnesota Pollution Control Agency (MPCA) prior to any construction activity. The need for this permit and approval is noted in EAW Item No. 8. Areas with exposed soils would be mulched and seeded as necessary to prevent erosion. Other erosion measures such as silt curtains and/or straw waddles may also be implemented depending on the established permit and approval requirements.

Excavation would be limited to the specific project features described in this EAW. A detailed summary of the Project footprint and estimated fill areas is shown in the USACE's April, 2016 Federal Supplemental EA, Table 1.

[EAW Attachment A, Project Maps, Map 5.]
[USACE Federal EA, July, 2011: Appendix F.]
[USACE Federal Supplemental EA, April, 2016: Sections 4.0 and Section 5.0, Pages 8-18.]

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 11 must be consistent with the geology, soils and topography/land forms and potential effects described in EAW Item 10.

11. Water resources: Describe surface water and groundwater features on or near the site in a.i. and a.ii. below. Surface water - lakes, streams, wetlands, intermittent channels, and county/judicial ditches. Include any special designations such as public waters, trout stream/lake, wildlife lakes, migratory waterfowl feeding/resting lake, and outstanding resource value water. Include 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 Marsh Lake Ecosystem Restoration Project has been developed to improve fish and wildlife habitat conditions and water quality on Marsh Lake (DOW Basin Number #06000100). Marsh Lake is a public waters basin. Marsh Lake is mostly identified as a shallow wildlife lake of which a portion is posted and managed as a migratory waterfowl feeding and resting area. The 33,000 acre Lac qui Parle WMA encompasses the entire lake. The Project would also include restoring the Pomme de Terre River, a Public Waters Inventory Natural Watercourse, to its original channel as it enters the Minnesota River. Marsh Lake is impaired for aquatic consumption and the Pomme de Terre River is impaired for aquatic consumption, aquatic life, and aquatic recreation immediately above Marsh Lake.

Marsh Lake is a constructed impoundment along the Minnesota River. Marsh Lake has been affected since it was constructed. Upstream of Marsh Lake is the Big Stone National Wildlife Refuge and the Big Stone Lake-Whetstone River Flood Control Project. The USACE operates and maintains the Highway 75 Dam. Immediately downstream of Marsh Lake is Lac qui Parle Lake and the Chippewa Diversion which are also operated and controlled by the USACE (USACE Federal EA, July, 2011: Section 1.7.1.]

[USACE Federal EA, July, 2011: Section 2.6, Pages 46-48; Section 6.7.9, Page 174; Section 6.7.10, Pages 174-175, Section 6.7.13, Pages 176-177; and USACE Feasibility Report, Appendix D and Appendix J.]

The average annual water level on Marsh Lake is 938.3 ft. The crest elevation of the fixed crest spillway on the Marsh Lake Dam is 937.6 ft. Approximately 3,000 acres of Marsh Lake is less than three feet deep when the lake is at the level of the fixed crest spillway.

The Marsh Lake Dam cannot currently be operated to manage water levels on Marsh Lake (USACE Federal EA, July, 2011: Section 1.7.1, Pages 22-27; and Section 1.7.2, Page 28.)

Current conditions on Marsh Lake are characterized as shallow, turbid, and a hyper-eutrophic lake system with the absence of submersed aquatic plants. Emergent stands of vegetation have also been greatly reduced. Because the Marsh Lake Dam has a fixed crest, the natural flooding and drying cycles no longer occur. As a result, emergent aquatic plants that require exposed mudflat conditions to germinate from seed have declined in the lake. Reduced stands of aquatic plants have increased the effects of wind fetch in the lake. Wind-induced wave action and nonnative carp re-suspend sediments and nutrients, blocking sunlight and eliminating submersed aquatic plant growth. Over the years, increased wave action has severely eroded the shoreline, islands, and points of Marsh Lake. MNDNR aquatic plant survey data since 2002 shows distinct declines in aquatic plant occurrences.

Marsh Lake Aquatic Plant Occurrences during Shallow Lake Surveys

YEAR	No Vegetation	Sago Pondweed	Coontail
2002	26.4%	72.2%	3.6%
2004	77.6%	22.4%	0.6%
2007	86.1%	11.5%	1.2%
2010	96.8%	3.2%	0.6%
2015	98.2%	0.0%	1.2%

i. 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.

Depth to groundwater is variable around Marsh Lake, with a combination of surficial and buried artesian aquifers present. There are no active water supply wells within the specified Project location (i.e., Lac qui Parle WMA). The closest Minnesota Department of Health (MDH) wellhead protection area is the City of Appleton approximately four miles from Marsh Lake. The Project is not anticipated to affect groundwater resources or any MDH wellhead protection areas.

[USACE Federal EA, July, 2011: Feasibility Report, Appendix F5.]

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.

There will be no wastewater generated by this project.

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.
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 such a system.

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.

ii. Stormwater - Describe the quantity and quality of stormwater runoff at the site prior to and post construction. Include the routes and receiving water bodies for runoff from the site (major downstream water bodies as well as the immediate receiving waters). Discuss any environmental effects from stormwater discharges. Describe stormwater pollution prevention plans including temporary and permanent runoff controls and potential BMP site locations to manage or treat stormwater runoff. Identify specific erosion control, sedimentation control or stabilization measures to address soil limitations during and after project construction.

An MPCA NPDES/SDS Construction Stormwater Permit to be issued by the MPCA would be required for project construction. The Project construction area would be confined to publically-owned property. Runoff from the site enters either Marsh Lake, backwaters of Marsh Lake, Lac qui Parle Lake, or the Pomme de Terre River. Construction actions would include the use of Best Management Practices (BMPs) to limit and reduce short-term effects. The specific construction methods, including identification of specific BMPs, have not been finalized and will be included in the final USACE design plan and project specifications for all project features. Potential BMPs include construction during low-flow periods, use of silt curtains, dewatering of the construction area using coffer dams, limiting the time period for exposed soils, use of mulch, and control of stormwater flow from any upland areas disturbed during construction. Disturbed areas would be seeded using state-approved seed mixes such as a Native Prairie Mesic General (35-241) mix for restoration purposes and a Native Construction (32-241) mix for erosion control and soil stabilization. Seeding would occur as quickly as possible to establish vegetative cover and erosion control. Seeding would be broadcast or drilled depending on specific site conditions. The USACE's on-site project manager will insure contractors comply with permit requirements and conditions, and erosion control Best Management Practices.

[USACE Federal EA, July, 2011: Section 6.7.13, Page 176.]
[USACE Federal Supplemental EA, April, 2016: Section 5.3.7, Page 16; and Section 6.2, Page 19.]

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. Identify any measures to avoid, minimize, or mitigate environmental effects from the water appropriation.

The Marsh Lake Project does not involve surface or groundwater appropriation.

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. 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 Marsh Lake Project proposes to enhance environmental conditions on the 5,000-acre Marsh Lake. Up to 4.3 acres of wetland habitat could be affected by Project construction. Some of the wetland acreage effects will be mitigated on-site by creating wetlands within the borrow area and adjacent agricultural field. The amount of wetland acreage proposed to be created is estimated. An additional 16-acre backwater will also be restored as a result of Embankment A, which would also partially mitigate affected wetland areas or result in the possible conversion of other backwater areas (USACE Federal Supplemental EA, April, 2016: Appendix G).

Effects to aquatic habitat would be mixed. Beneficial effects would include improvements to riverine habitat in the Pomme de Terre River associated with the riffle structures and naturalized bank stabilization. In addition, the length of the river would be increased with flows directed into the Pomme de Terre River's historic channel. The river would also have increased lateral connectivity with its floodplain, thus increasing habitat diversity. Aquatic habitat in the Minnesota River would also be permanently improved with the enlarged fish passage structure. Positive habitat improvement and water quality benefits are expected on the 5,000-acre Marsh Lake.

Wetland Impacts	**Before**	**After**
Wetlands (Wetland Types 3, 6,7)	4.3 acres	Unknown
Deep water (Wetland Types 3, 4, 5)/Streams	3.1 acres	7.0 acres
Backwater (Wetland Types 3, 4, 6,)	13.0 acres	Unknown

- A minimum of 2.0 acres of wetland will be created depending on the need for borrow material.
- The 13.0-acre backwater is not anticipated to be significantly altered and an additional estimated 16.0 acres of backwater will be created.
- The 5,000-acre Marsh Lake will be enhanced as a direct result of this project.

[USACE Federal EA, July, 2011: Section 6.7.10, Pages 174-175; Section 6.7.13, Pages 176-177; and Feasibility Report, Appendix D and Appendix J.]
[USACE Federal Supplemental EA, April, 2016: Section 5.3.3, Page 14; Section 5.3.4, Page 15; and Appendix B.]

As noted in this EAW, an MNDNR Public Waters Work Permit will be required for construction

activities within the public waters of Marsh Lake up to the Ordinary High Water (OHW) level. The MNDNR has recently established 939.7 as the Marsh Lake OHW elevation (based on site evaluation and survey). Marsh Lake and most of the water resources in the Project area will be covered by this jurisdiction and be addressed by the MNDNR's permit. This includes primary backwater areas. It is also anticipated that some riparian areas along Marsh Lake above the OHW level may be temporarily or periodically influenced by changing the Marsh Lake weir from a fixed crest dam to a notched weir structure. Individual permits and approvals would also include mitigation measures and specific requirements to address public waters and wetland fill considerations.

The MNDNR has been working with resource staff from federal, state, and local government agencies on a "no loss" determination for wetland areas above the OHW elevation as provided for by the Wetland Conservation Act (WCA). A preliminary determination of "no loss" has been made and this determination will be addressed as part of the decision process on the MNDNR's Public Waters Work permit. Based on the "no-loss criteria" identified in the WCA (Minn. Rules, Part 8420.0415, Section C. and Minn. Rules, Part 8420.0415, Section D.), determinations of "no loss" for wetland areas above the OHW elevation can be based on and occur in coordination with a Technical Evaluation Panel (TEP):

> Where temporary or seasonal water level management activities done for the purpose of performing maintenance or as part of vegetation or habitat management activities, which will not result in the conversion of a wetland to a nonwetland or conversion of a nondegraded wetland to a different type. (Minn. Rules, Part 8420.0415, Section C.)
>
> Where an activity is conducted as part of an approved replacement or banking plan, conducted or authorized by public agencies for the purpose of wetland restoration or fish and wildlife habitat restoration or improvement according to the guidance referenced in part 8420.0112, items J and H, or repair and maintenance of earthen containment structures. (Minn. Rules, Part 8420.0415, Section D.)

[USACE Federal EA, July, 2011: Section 2.10.5, Page 93; and Section 2.10.6, Page 94.]
[USACE Federal Supplemental EA, April, 2016: Section 4.3.1, Page 9; Sections 5.3.2 and 5.3.3, Pages 14-15; Section 5.3.4, Page 15; Section 5.3.7, Page 16; and Appendix B.]

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. 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 Marsh Lake Ecosystem Restoration Project includes a water control structure that MNDNR staff would have the ability to alter and manage through an approved operation and management plan (refer to EAW Attachment C). An MNDNR Public Waters Work permit will be required for the temporary drawdown and appropriation of surface waters. Any use of the water control feature would require close coordination with the USACE and would be done within the provisions of and according to the USACE Standing Instructions for both the Marsh Lake dam and the Lac qui Parle dam downstream. These instructions have limits on discharge flows to protect downstream resources. The purpose of this feature is to allow resource managers additional tools to provide for shallow lake habitat and water quality conditions through temporary water level drawdown within Marsh Lake. Temporary water level drawdown simulates natural drought conditions and can be used as a management tool to improve and maintain waterfowl, wetland wildlife, and water quality conditions by increasing water clarity, stimulating the growth of diverse emergent and submerged native aquatic plant communities, and reduce populations of undesirable fish. This objective can be accomplished by using the drawdown structure for timely temporary drawdowns. This management practice aims to mimic a short-term drought and the natural wet-dry cycle wetlands require for effective biological production. This active water control structure would be used infrequently and only as needed according to existing water quality and habitat conditions, recommendations by the adaptive management team, and as downstream water levels and flooding conditions allow. Temporary dewatering of Marsh Lake will be managed so as not to create or exacerbate downstream flooding conditions. Water levels will be monitored and recorded during temporary draw downs in close coordination with the USACE, who also manage the downstream Lac qui Parle dam.

Infrequent managed drawdowns are anticipated to occur to maintain a healthy ecosystem state. Specific factors identified in the MNDNR's Draft Operation and Management Plan (EAW Attachment C) will need to be met prior to a managed drawdown. This will be an adaptive management plan. An adaptive management team with representatives from the MNDNR, the USACE, the USFWS, and the Upper Minnesota River Watershed District will guide these active management efforts. Plans for future drawdowns will consider potential environmental, wildlife, and fisheries effects and measure those effects in terms of anticipated benefits. An analysis of costs and benefits may be included. Incidental effects will be avoided or limited as much as possible. An example of limiting effect could include deciding to not drawdown water levels down on Marsh Lake below elevation 936.0 during American White Pelican nesting times. This could provide more open water isolation from predators.

[EAW Attachment C, Draft Operation and Management Plan.]
[USACE Federal Supplemental EA, April, 2016: Appendix F.]

12. 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.

No contaminated or hazardous materials are known to be present on-site.

[USACE Federal EA, July, 2011: Section 2.8.11, Page 73; and Appendix F.]
[USACE Federal Supplemental EA, April, 2016: Appendix C.]

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.

No generation or storage of solid waste is predicted as a result of this project.

[USACE Federal EA, July, 2011: Appendix F.]
[USACE Federal Supplemental EA, April, 2016: Appendix C.]

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 above or below ground tanks to store petroleum or other materials. 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.

For construction, diesel fuel will be on-site and stored within construction equipment including fuel tanks and potentially a portable fuel cube. If a fuel cube contains more than 143 gallons of diesel fuel the driver needs to have a Hazardous Materials (i.e., or Haz Mat) endorsement with their Commercial Driver's License. Contractors will be required to have spill kits on site. Any diesel spills will be immediately reported to the USACE's on-site project manager and a clean-up plan will be implemented as required by state and federal regulations. As part of preparation for construction, a spills and clean-up plan will be developed.

The USACE will oversee all construction activities including any potential handling or storage of hazardous materials related to the project. Any waste generated will be disposed of properly according to Federal and/or State standards and guidelines. All hazardous materials including fuel storage will be handled as necessary to meet state and federal guidelines.

[USACE Federal EA, July, 2011: Appendix F.]
[USACE Federal Supplemental EA, April, 2016: Appendix C.]

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.

No generation or storage of hazardous waste is anticipated as a result of this project.

[USACE Federal EA, July, 2011: Appendix F.]
[USACE Federal Supplemental EA, April, 2016: Appendix C.]

13. 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.

Marsh Lake is a shallow reservoir with natural shallow lake characteristics. Historically, Marsh Lake provided productive shallow water habitat critical to migrating and brood rearing waterfowl. Currently, Marsh Lake provides poor waterfowl habitat conditions and hunting opportunities. Marsh Lake used to provide a clear-water lake condition that supported the growth of sago pondweed and other submersed aquatic plants, but currently water clarity is poor and the lake supports essentially no rooted submersed aquatic plant growth. Aquatic plants are important to enhancing fish and wildlife habitat conditions on Marsh Lake and establishing/sustaining those submersed aquatic plant communities, which is part of the intent of the Project.

Marsh Lake is surrounded by the 33,000-acre Lac qui Parle WMA which is owned and operated by the MNDNR. This area is specifically managed for diverse wildlife habitat and public hunting and contains native prairie, wetlands, and restored native prairie and wetland areas.

The proposed Project has been developed to enhance the aquatic habitat on Marsh Lake and restore more natural functions that will provide benefits to all native fish and wildlife species. Restoring a more natural hydrograph to Marsh Lake may favor some species during some years, but the fluctuation in water levels also maintains the health and function of a shallow lake ecosystem. Low water conditions or drought in shallow lake systems is necessary to maintain health and vigor in these systems.

Construction effects would will be limited to the immediate construction area and designed to limit and reduce effects to the greatest extent possible. Minor wetland/upland habitat effects are anticipated but effects will be mitigated through site restoration and habitat benefits created through the implementation of project features. Wetland effects also will be evaluated for a “no loss” determination (through the WCA) as this is a public project with the primary purpose to restore and enhance fish and wildlife habitat.

[USACE Federal EA, July, 2011: Section 2.8.5, Pages 55-62; Section 2.8.6, Pages 62-65; Section 2.8.7, Page 65; Section 2.8.8, Pages 66-68; Section 2.8.9, Pages 69-73; Section 2.10.7, Pages 94-95; Section 2.10.8, Pages 95-96; Section 6.7.9, Page 174; Section 6.7.10, Page 174; Section 6.7.11, Page 175; Section 6.7.12, Page 175; and Feasibility Report, Appendices D and E.]

Describe rare features such as state-listed (endangered, threatened or special concern) species, native plant communities, Minnesota County Biological Survey Sites of Biodiversity Significance, and other sensitive ecological resources on or within close proximity to the site. Provide the license agreement number (LA-____) and/or correspondence number (ERDB 20160266) from

which the data were obtained and attach the Natural Heritage letter from the DNR. Indicate if any additional habitat or species survey work has been conducted within the site and describe the results.Describe fish and wildlife resources as well as habitats and vegetation on or in near the site.

The MNDNR's Natural Heritage Information System (NHIS) was queried to determine if any rare features are known to occur within an approximate one-mile radius of the proposed project site. Based on this information, there are several rare species and native plant communities in the vicinity of the project (refer to EAW Attachment B, the NHIS review and correspondence report, and index report of Rare Features).

b. Discuss how the identified fish, wildlife, plant communities, rare features and ecosystems may be affected by the project. 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.

There are several Minnesota County Biological Survey (MCBS) Sites of Biodiversity Significance near the proposed Project area. These sites contain Dry Hill Prairie and Mesic Prairie native plant communities. The rare plants and butterflies listed on the database reports are associated with these prairies and include the Dakota skipper (*Hesperia dacotae)* and the Poweshiek skipperling (*Oarisma Poaeshiek)*. The Dakota Skipper is a federally listed species and is also addressed in the USACE's April, 2016 Federal Supplemental EA (USACE Federal Supplemental EA, April, 2016: Section 4.3.2, Page 9). The upland sandpiper (*Bartramia longicauda*), marbled godwit (*Limosa fedoa*), and the greater prairie-chicken (*Tympanuchus cupido*) are also associated with native prairie. The MCBS Sites are outside of the proposed Project area and there are no identified native prairie remnants within the proposed Project area. Adverse effects to these rare features are not expected to occur. Native prairie areas will be avoided during construction of the Project features.

The NHIS identified one bald eagle (*Haliaeetus leucocephalus*) nest in close proximity to the proposed Pomme de Terre River restoration. This nest was active when last checked. Bald eagles are federally protected under the Migratory Bird Treaty Act and under the Bald and Golden Eagle Protection Act. Trees should and will be inspected for nests prior to being cut down. Any clearing, external construction, and landscaping activities within a 660-foot buffer zone around the affected nest would not occur during the nesting season. The nesting season is from approximately February 1 to July 15. This season varies slightly from the Midwest season due to the more northerly location of the project. The USFWS has concurred with this conservation measure for the identified bald eagle nest. This measure would not apply if the nest is determined non-active. If eagles are not initiating nesting by March 15, it is unlikely they will nest at that location in a particular year. {See EAW Attachment A, Project Maps, for a map showing known active bald eagle nests.)

Landscape buffers within the 660-foot buffer zone of the nest would be maintained such that the affected nest would remain protected to the level that it is currently is (i.e.; the nesting pair will only experience human presence and noise levels to which they have already experienced). The salvage of trees for the toe wood-sod mats and stream plugs would be limited within the 660-foot buffer and there would be no clear cutting of trees. This is to provide the nest protection against items such as wind. No activities would be allowed within a 150-foot buffer of the nest at any time. Contractors

would be required to have measures in place to protect the nest tree from falling trees, and would protect the critical root zone of the nest tree. No tree salvage would occur within 660 feet of the nest during the eagle breeding season. The nest site would be monitored closely to reduce and limit effects during and after Project construction. The USFWS would be contacted if there are any changes, if the nest is no longer present, or if a new nest is built with 660 feet of the Project site. {Refer to EAW Attachment A, Project Maps, for the location of known active bald eagle nests.)

To avoid adverse effects to the Northern long-eared bats (Myotis septentrionalis), tree removal activities would be restricted to periods when nesting and roosting periods do not occur (USACE Federal Supplemental EA, April, 2016: Section 4.3.2, Page 9).

Some habitats may be temporarily or permanently altered. The native mussel community will be affected impacted by the Pomme de Terre River restoration. The MNDNR conducted pre-project mussel surveys in 2007 and 2010 (EAW Attachment E). The black sandshell (*Ligumia recta*), a state-listed mussel of special concern, and the elktoe (*Alasmidonta marginata*), state-listed as threatened, were documented within the proposed Project area. It is likely that these species would be adversely affected by the Pomme de Terre River channel restoration and areas of the river channel that would be cutoff from flow. To mitigate and minimize this loss, the MNDNR will rescue mussels from the Pomme de Terre River channel and relocate or translocate the rescued mussels to the Mississippi River. The plans for mussel rescue and relocation are described in the Mussel Rescue and Translocation Plan (EAW Attachment F, MNDNR's Mussel Rescue and Translocation Plan) which also incorporates the MNDNR's April, 2013 Minnesota Freshwater Mussel Survey and Relocation Protocols (refer to EAW Attachment F). This Plan includes the identified schedule and timing for this activity. Post-project monitoring of mussel colonization may also occur depending on the results of the mussel relocation efforts. Minnesota's endangered species law and rules generally prohibit the taking of threatened or endangered species without a permit. Given the relocation effort, the MNDNR has determined that a permit for the taking of live mussels is not required. MNDNR staff river ecologists will coordinate and oversee the implementation of the mussel rescue and relocation plan. Efforts to relocate mussels will continue to be coordinated with MNDNR's staff including the Endangered Species Coordinator.

Availability for colonial waterbird nesting at Marsh Lake and on Marsh Lake islands would be part of the overall project. Colonial waterbird nesting, including American White Pelican nesting, on Marsh Lake is most successful during years with low water levels (EAW Attachment D, 2015 Journal of Wildlife Management Research Article on the Implications of Spring Water Levels on the Production of American White Pelicans Nesting at Marsh Lake). Mitigation for colonial waterbird nesting is further identified in the next subitem (i.e., Item 13.c.).

Contractors would be responsible for providing and using clean equipment which will be inspected prior to work beginning. Equipment and materials will be inspected routinely to help prevent the spread of invasive species including primarily seeds, plants, and other small organisms (i.e., zebra mussels).

The Marsh Lake Ecosystem Restoration Project does not include a fish barrier. Invasive Carp (bighead carp) were recently found in the Minnesota River near New Ulm. However, a fish barrier at Marsh Lake is not feasible due to the elevation and hydrology at this location.

[USACE Federal EA, July, 2011: Section 2.8.10, Page 73; Section 2.10.7, Pages 94-95; Section 2.10.8, Pages 95-96; Section 6.7.14, Pages 176-177; USFWS July 12, 2011 letter; and USACE Feasibility Report, Appendices D and Q.]
[USACE Federal Supplemental EA, April, 2016: Section 5.3.2, Page 13; Section, 5.3.8, Page 17; Section 6.1, Page 18; Section 6.5, Page 19; and Appendix C.]

c. Identify measures that will be taken to avoid, minimize, or mitigate adverse effects to fish, wildlife, plant communities, and sensitive ecological resources.

All possible and reasonable measures will be taken to avoid, minimize, and mitigate adverse effects of this Project. An adaptive management team with representatives from the USACE, the MNDNR, the USFWS, and the Upper Minnesota River Watershed District will guide future management actions related to the draw down structure and future project monitoring (EAW Attachment C, Draft Operation and Management Plan). The USACE will continue to be actively involved in the Marsh Lake Project during the length of project construction and further also as part of the adaptive management plan and adaptive management team.

To limit and address effects on the mussel population which will be affected by the Pomme de Terre channel restoration, the mussel rescue and relocation plan has been prepared (EAW Attachment F). The plan includes specific time schedules and periods when the mussel rescue and relocation or translocation can and cannot occur. These periods of rescue and relocation are so that mussels are best protected and sustained, to account for water temperatures, and to provide for safety for mussels and divers.

Water level management plans take into account colonial waterbird nesting on Marsh Lake islands and the need to maintain some isolation during the nesting season. During the operation of the Project, water levels would not be drawn down below elevation 936.0 during the nesting season (EAW Attachment C). A bald eagle nest in the vicinity will be avoided and protected as described in this EAW Item. Tree removal will also be restricted and not occur during the breeding and roosting season for Northern long-eared bats. Disturbance to native prairie will be avoided.

The Project would result in enhancing shallow lake habitat conditions and water quality within Marsh Lake, restoring the Pomme de Terre River to its original channel and floodplain, enhanced riverine and floodplain processes, and restored fish connectivity to the Minnesota River and the Pomme de Terre River. BMPs would be used during Project construction to limit short-term effects and reduce erosion. Construction sites and disturbed areas would be restored appropriately (i.e., seeded and mulched) as soon as possible after construction. Any permit and approval conditions and requirements will be followed. Applicable proposed permit and approval conditions will be identified in detailed specifications for the project.

[USACE Federal EA, July, 2011: Appendix Q.]
[USACE Federal Supplemental EA, April, 2016: Section 5.3.2, Page 13; Section 5.3.8, Page 17; Section 6.1, Page 18; Section 6.5, Page 19; and Appendix C.]

14. 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.

Modifications involving the water control structure could adversely affect the appearance of the Marsh Lake Dam. The dam has been determined individually eligible for the National Register of Historic Places (NRHP). Phase III mitigation documentation of the Marsh Lake Dam has been completed using Level II documentation as identified in the Minnesota Historic Property Record Guidelines.

Phase I and Phase II cultural resources surveys were completed at the preferred and alternate borrow areas. Investigations at the preferred borrow site determined that the pre-contact artifact scatter (21SW27) is not eligible for listing on the NRHP as the site lacks integrity. Two archaeological sites (21SW65 and 21SW66) were identified at the alternate borrow area and these areas will be avoided. The USACE has identified that the Project is not anticipated to have an adverse effect to historic properties.

A Memorandum of Agreement between the USACE and the Minnesota State Historic Preservation Office has been developed describing mitigation measures and cultural resource investigations for the Project (refer to Attachment G, SHPO 2010 correspondence and agreement).

[USACE Federal EA, July, 2011: Section 2.7, Pages 49-50.]
[USACE Federal Supplemental EA, April, 2016: Section 5.2, Page 12; and Section 6.7, Page 20.]

15. 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.

Construction would be pursued in two components beginning likely in the Fall, 2016 and extending through 2018. The first component would include building the drawdown structure, rock-ramp fishway, dam embankment road, parking areas, and using the borrow area. The second component would include restoring the Pomme de Terre River and restoring the borrow pit area and surrounding agricultural field. The timing and duration of these construction activities would depend on site conditions and the contractor's staffing. Construction activities would be primarily during daylight hours. Short-term visual effects during construction activities can be expected as a result of earth work and large construction equipment at the site. Contractors would be advised to maintain a clean worksite. Garbage, refuge, and waste should be disposed of properly, construction sites should be leveled, and mulched/seeded as soon as possible. Upon completion of Project construction, Marsh Lake and the Pomme de Terre River restoration would provide improved scenic and natural views. The use of natural bank stabilization materials rather than rip-rap would enhance the visual appearance along sections of the lower Pomme de Terre River.

[USACE Federal EA, July, 2011: Section 6.7.1, Page 172.]
[USACE Federal Supplemental EA, April, 2016: Section 5.1.2, Pages 10-11.]

16. 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, and any greenhouse gases. 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.

No stationary source air emissions are proposed with this project.

The proposed Project may result in temporary effects to local air quality as construction activities using heavy equipment powered by fossil fuels would be required.

[USACE Federal EA, July, 2011: Section 6.7.8, Page 174.]
[USACE Federal Supplemental EA, April, 2016: Section 5.3.1, Page 13.]

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.

A measurable increase in general traffic due to this Project is not anticipated. Heavy construction equipment would emit CO^2 while the Project is being constructed but the amount of emissions is expected to be short-term and minimal. Vehicles will need to meet U.S. Environmental Protection Agency (EPA) standards for emissions.

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 16a). 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.

The Marsh Lake construction area is remote, surrounded by an MNDNR Wildlife Management Area. Construction activities during dry periods and the equipment's burning of fossil fuel may result in a temporary increase in dust and odors but effects are expected to be minimal. Increased dust and odor as a result of Project construction will be short term from the start of construction through the end of construction in approximately 2018. There should be no effects on quality of life resulting from this Project. Once the project is constructed, there will be no additional dust or odor effects.

[USACE Federal EA, July, 2011: Section 6.7.8, Page 174.]
[USACE Federal Supplemental EA, April, 2016: Sections 5.3.1, Page 13.]

17. 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.

The Project would result in temporary increases in noise levels as construction activities with heavy equipment would be required. The Project site is remote and a temporary increase in noise levels during construction periods is anticipated to create little to no disturbance to any nearby receptors. There are no effects on quality of life anticipated as a result from this Project. Any disturbance that does result would be temporary and would typically occur during normal daytime operating hours during construction in 2017 and through the end of planned construction activities in 2018. As described in this EAW, there would be periods of time when construction would be limited or not be occurring. Once the Project is constructed, additional noise effects are not anticipated.

[USACE Federal Supplemental EA, April, 2016: Section 5.1.1, Page 10.]

18. 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.

An additional parking area would be constructed (West Parking Lot) to accommodate public day use. The seasonal parking area would be 180' x 84' ft. and allow access to the west side of the dam structure for recreational purposes during various but limited months of the year. A parking lot (i.e., Marsh Lake Day Use Facility) currently exists at the Marsh Lake Dam and is operated by the USACE on the east side. The proposed Project does not include improving or expanding the Day Use Facility parking lot to accommodate more vehicles but the parking lot would continue to be maintained. The existing Day Use facility has parking for approximately 44 vehicles. Additionally, a small East Parking area would be improved at the corner of 240th Avenue and 100th Street SW to provide access to Lac qui Parle WMA above the abandoned road site. Also, 255th Avenue SW would be realigned as part of the project but would still provide remote water access to Marsh Lake.

The MNDNR, Section of Wildlife maintains an additional six parking lots located around Marsh Lake. These lots have a grass or gravel surface and are almost exclusively used by hunters, primarily waterfowl hunters. Each parking lot can hold ten to 15 vehicles. The proposed Project does not include an expansion of these parking lots.

An increase in general traffic is not anticipated as a direct result of this project. No long-term transportation or traffic features are planned other than the parking areas described above. Construction activities, including by the use of heavy construction equipment accessing the area, may impede traffic at times from the start of construction through the end of construction in 2018.

Approximately 15 to 20 construction vehicles, including heavy equipment vehicles, could be on the Project site at any one time. This amount would vary depending on the contractors, site conditions, and the particular Project features being constructed at any one time. This could result in an inconvenience or disturbance for those using the Project area, but would not interfere with any emergency response or affect travel to any permanent residence. The new embankment road will be constructed before the Pomme de Terre River is restored and 100th Street SW is deconstructed to maintain access to the dam site. The Marsh Lake Dam site is remote and traffic generally is generated for only recreational purposes.

Contractors would be responsible to manage, sign, and post traffic during construction periods. This would occur with oversite from the USACE Project Manager.

[USACE Federal EA, July, 2011: Section 2.9.2, Pages 74-75.]
[USACE Federal Supplemental EA, April, 2016: Section 3.1.6, Page 6; Section 3.1.10, Page 7; and Sections 5.1.3 and 5.1.4, Page 12.]

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 Project is not expected to cause traffic congestion or result in any other needed road improvements. This Project is in a relatively remote area and does not receive a lot of traffic other than traffic specifically coming to the site. The dam location is not a through-road. Roads in this area are gravel township roads and WMA roads. WMA roads are lightly travelled except during the fall hunting season or during the days following the opening of fishing season. Improved ecosystem conditions could lead to increased participation in outdoor recreation on the wildlife area and Day Use parking facility. The traffic levels would likely be similar to the range previously recorded during the mid-1990s (i.e., Lac qui Parle WMA opening day car counts).

During the mid-1990s, the MNDNR recorded its highest vehicle counts for waterfowl and pheasant hunting which never exceeded 250 vehicles. Since that time vehicle counts have declined by more than 40% during peak use periods. The decline includes fall weather, lake levels, status of wildlife populations, and decline in hunter numbers. Wildlife viewing is predicted to have the largest percentage increase in participation, but traffic volumes are dispersed throughout the year compared to hunting and fishing openers.

[USACE Federal EA, July, 2011: Section 6.7.3, Page 173.]

c. Identify measures that will be taken to minimize or mitigate project related transportation effects.

Project related transportation effects are expected to be minimal due to the remote location of the Project site. Contractors would be responsible to manage, sign, and post traffic during construction periods. The USACE would have an on-site project manager assigned to the project and project construction. This Project Manager would be responsible for helping maintain necessary traffic.

19. 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.

Anticipated short-term adverse effects of construction in the project area are wetland impacts, impacts to live mussel local populations, effects to fish and wildlife habitat, noise, dust, traffic, and water quality during construction of the project, which will occur in stages between Fall, 2016 and Summer, 2018. The geographic scale of short-term effects to wetlands, mussel populations, water quality, and fish and wildlife habitat includes Marsh Lake, backwaters of Marsh Lake, Lac qui Parle Lake, or the Pomme de Terre River. For short-term effects including noise, dust, and traffic, generally effects would be limited to the immediate construction area.

Following construction, the project will have ongoing beneficial effects to aquatic habitat and water quality in the Marsh Lake and Minnesota River ecosystem. Long-term adverse effects to wetlands are anticipated to be limited and minor.

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.

The Upper Minnesota River Watershed District has acquired land and is planning the Whetstone Restoration Project upstream of Marsh Lake located between the USACE's Highway 75 dam (Big Stone National Wildlife Refuge) and Big Stone Lake. This project will result in 3.6 miles of restored Whetstone River stream channel and 150 acres of restored floodplain. The Upper Minnesota River Watershed District will be restoring floodplain areas to native vegetation in 2016 and 2017 and a new diversion structure will be built in 2018. The diversion structure will be built to direct flows back into the restored channel/floodplain and will have a natural rock riffle appearance above a driven sheetpile structure.

Management activities on Marsh Lake will be coordinated closely with the USACE and the USFWS who share management of the Highway 75 dam upstream of Marsh Lake. The Highway 75 dam creates the east pool on the Big Stone National Wildlife Refuge. Coordination is necessary to have optimal water level management actions and to achieve shared ecological and wildlife habitat objectives on both reservoirs.

The USACE will be repairing the Lac qui Parle Dam in August to September, 2016. Lac qui Parle Lake is located along the Minnesota River immediately downstream of Marsh Lake, and was created by the Lac qui Parle Dam which is owned and operated by the USACE. Repair and maintenance will require the

use of temporary coffer dams. Coffer dams will be used provide access to the gates. Temporary earthen coffer dams will be erected on the upstream and downstream sides of the dam. The top of the upstream coffer dam will be built to an elevation of 938.5 feet. Materials will be brought in from off-site and placed in the water with heavy machinery. It is estimated that the coffer dams will require about 13,450 cubic yards (cu. yds.) of granular fill, 1,720 cu. yds. of clay, 195 cu. yds. of riprap, and 185 cu. yds. of gravel. This material will be brought in from a local commercial source. In addition, about 25,525 square feet (sq. ft.) of polyethylene material will be used to cover the coffer dams. The areas inside of the coffer dams will be dewatered with pumps. Coffer dams will have short-term effects to some portions of lake and stream habitats upstream and downstream of the Lac qui Parle Dam. However, long-term effects to fish and wildlife habitat are expected to be minor due to the removal of the coffer dams following the repair and maintenance activities. These activities are estimated to be completed by October, 2016. This work is estimated to be completed prior to beginning of construction activities on Marsh Lake.

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.

Up to 4.3 acres of wetland habitat could be affected by Project construction. Some of the wetland acreage effects will be mitigated on-site by creating wetlands within the borrow area and adjacent agricultural field. Other projects identified within the geographic scale and timeframe of the Project are not anticipated to have additional wetland effects.

Effects on the mussel population from the Project are due to the restoration of the Pomme de Terre River and channel cutoffs components. These are proposed to be mitigated by the mussel rescue and relocation or translocation activities to occur during components of project construction. Other projects occurring in the geographic scale and timeline of the proposed Project are not expected to have additional effects to local mussel populations.

Effects to fish and wildlife habitat from the Project are expected to be short-term displacement during Project construction. Long-term effects are expected to be beneficial, as a result of Project components including the new passive water control structure and rock-ramp fishway. Additional effects to fish and wildlife habitat from other projects in the geographic area and timeframe are expected to be minor and limited to the construction phase of these projects, which will only have limited overlap with the proposed Project's timeframe. Long-term effects to fish and wildlife habitat are expected to be beneficial, including the restoration of 3.6 miles of the Whetstone River and 150 acres of its original floodplain, creating additional fish and wildlife habitat.

Construction of Project features between 2016 and 2018 may result in temporary and short term environmental effects to water quality, noise, dust, and traffic. Other projects located within the geographic scale and timeline of the Project are not anticipated to contribute to these environmental effects due to construction schedules of the projects overlapping minimally.

Long-term effects of the Project are expected to include improved ecosystem health, enhanced fish and wildlife habitat, and overall better water quality, as well as enhancement and restoration of upland

and wetland habitats in and around Marsh Lake and the Minnesota River. Other projects in the area are expected to result in supporting the restored natural functioning of the channel and floodplain above Marsh Lake, which would likely support the potential positive outcomes of the Marsh Lake project.

19. **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.

No other potential environmental effects are anticipated as a result of this project.

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 Charlotte W Cosh Date 3 July, 2016

Title Environmental Review EAW Project Manager