MVD DECISION DOCUMENT REVIEW PLAN

UPPER MISSISSIPPI RIVER RESTORATION PROGRAM
HABITAT REHABILITATION AND ENHANCEMENT PROJECT
February 2022

Project Name: Lower Pool 4 Big Lake Habitat Rehabilitation and Enhancement Project (HREP), Upper Mississippi River Restoration (UMRR) (Wabasha County, MN and Buffalo County, WI)

P2 Number: 495702

District: St Paul District (MVP)
District Contact: [redacted], Project Manager, 651-290-5250
[redacted], MVP UMRR Program Manager,
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Major Subordinate Command (MSC) and Review Management Organization (RMO):
Mississippi Valley Division (MVD) [redacted] Program Manager, CEMVD-PDM

MSC/RMO Contact: [redacted], 601-634-5310, [redacted]

Key Review Plan Dates

Date of MSC Approval of Review Plan: Pending
Date of Last Review Plan Revision:
Date of Review Plan Web Posting:

Milestone Schedule

	Scheduled	Actual	Complete
FCSA Execution:	N/A	N/A	N/A
TSP Milestone:	November 2022	N/A	No
Release Draft Report to Public:	February 2023	N/A	No
Final Report Transmittal:	October 2023	N/A	No

Programmatic Review Plan

Please reference the UMRR Programmatic Review Plan for additional information regarding the review of project studies in the program. For this Review Plan only project-specific review information is provided. The plan does not repeat standard information common to all UMRR reviews as noted in the programmatic review plan.

1. FACTORS AFFECTING THE LEVELS AND SCOPE OF REVIEWS

The project area is within Pool 4 of the Upper Mississippi River within the Upper Mississippi River National Wildlife and Fish Refuge between river miles 760 to 752. The goal of the project is to maintain, enhance, and create habitat suitable for native and desirable, aquatic and terrestrial plants and animals. Sedimentation of the backwaters is an ongoing issue in this study area. Big Lake has lost much of its island complex and forest to wind and wave erosion. Please reference the UMRR Programmatic Review Plan for additional information regarding the factors affecting the levels and scope of reviews for HREP Projects.

2. REVIEW EXECUTION PLAN

Table 1 provides the schedules and costs for reviews. The specific expertise required for the teams are identified in later subsections of this plan covering each review. These subsections also identify requirements, special reporting provisions, and sources of more information.

Table 1: Schedule and Costs of Review

Product(s) to undergo Review	Review Level	Start Date	End Date	Cost	Complete
Planning Model Review	*Model Review (see EC 1105-2-412)*	N/A	N/A	N/A	N/A
Draft Feasibility Report and EA	*District Quality Control*	January 2023	February 2023	$15,000	No
Draft Feasibility Report and EA	*Agency Technical Review*	February 2023	March 2023	$25,000	No
Draft Feasibility Report and EA	*MSC Policy and Legal Review*	February 2023	March 2023	n/a	No
Final Feasibility Report and EA	*Targeted District Quality Control*[1]	July 2023	August 2023	$10,000	No
Final Feasibility Report and EA	*Targeted Agency Technical Review*[1]	September 2023	October 2023	$15,000	No
Final Feasibility Report and EA	*MSC Policy and Legal Review*	October 2023	November 2023	n/a	No

[1] The Final Feasibility Report and EA will undergo a targeted DQC and ATR focusing on significant changes to the analysis or TSP based on the results of concurrent review. The scope of this reivew is scalable.

a. DISTRICT QUALITY CONTROL

Table 2 identifies the required expertise for the DQC team. The DQC Team members will not be involved in the production of any of the products reviewed.

Table 2: Required DQC Expertise

DQC Team Disciplines	Expertise Required
DQC Lead	*A senior professional with extensive experience preparing Civil Works decision documents and conducting DQC. The lead will also serve as a reviewer for a specific discipline (such as planning, economics, environmental resources, etc.).*
Plan Formulation	*A senior water resources planner with experience in riverine aquatic ecosystem restoration consistent with the features/measures evaluated in the UMRR HREP. Fully familiar with USACE ecosystem restoration policies and have demonstrated experience with Cost Effectiveness/Incremental Cost Analysis (CE/ICA) and the Institute for Water Resources (IWR) Planning Suite. If the reviewer does not have CE/ICA experience, a separate Economics reviewer will be assigned to the DQC Team.*
Environmental Resources	*A senior biologist with experience working on large river systems and with water resources and aquatic amd wetland ecology. Experience in calculating ecosystem benefits and be able to ascertain if the ecological output models were appropriately applied. Possess detailed knowledge of NEPA and other environmental statutes and regulations to confirm compliance with NEPA. This reviewer will also be responsible for evaluating any cultural resoruces work performed for the study if applicable. If the reviewer does not have cultural resources experience, a separate Cultural Resources reviewer will be assigned to the DQC team.*
Hydrology and Hydraulic Engineering	*The reviewer will be proficient in hydrology and hydrologic engineering with working experience evaluating large river systems. Experience in water resource studies, hydrodynamics, sediment transport and modeling, and GIS is necessary.*
Climate Preparedness and Resilience Community of Practice (CoP) Reviewer	*The reviewer will be proficient in preparing qualitative assessments of climate change impacts to inland hydrology in accordance with USACE climate change guidance.*
Civil Engineering	*The reviewer will have experience in civil design of ecosystem restoration features for large river systems. A certified Professional Engineer is suggested.*
Cost Engineering	*The reviewer will have experience in developing cost estimates for Civil Works ecosystem restoration projects, including development of a Total Project Cost Summary, cost and schedule risk analysis, and associated cost contingencies.*
Real Estate	*An expert with a thorough understanding of real estate transactions for ecosystem restoration projects, including experience with assessment of LERRD requirements for ecosystem restoration projects.*
Office of Counsel	*A reviewer able to provide comment on legal sufficiency.*
Geotechnical Engineering	*The reviewer will have experience in geotechnical engineering in large river systems to include island construction. This review may be performed by a dedicated team member or may be satisfied by a civil reviewer, depending on individual qualifications.*
Economics	*A senior economist familiar with ecosystem output analyses and concepts, including demonstrated experience with CE/ICA analysis and the IWR Planning Suite.*

b. AGENCY TECHNICAL REVIEW

Table 3 identifies the disciplines and required expertise for this ATR Team (also see Attachment 1 - the ATR Team roster. Each ATR reviewer should be certified by the appropriate CoP and demonstrate certification in Corps of Engineers Reviewer Certification and Access Program (CERCAP) for the requisite area of expertise. *Potential disciplines and expertise required are included from the UMRR Programmatic Review Plan and should be updated as necessary.*

Table 3: Required ATR Team Expertise

ATR Team Disciplines	Expertise Required
ATR Lead	*The ATR Lead must be assigned from outside the home MSC. A senior professional with extensive experience preparing Civil Works decision documents and conducting ATR. The lead will have the skills to manage a virtual team through an ATR. The lead will also serve as a reviewer for a specific discipline (such as planning).*
Plan Formulation	*A senior water resources planner with experience in riverine aquatic ecosystem restoration consistent with the features/measures evaluated in the UMRR HREPs. The reviewer will be fully familiar with USACE ecosystem restoration policies and demonstrated experience with CE/ICA and the IWR Planning Suite. If the Plan Formulation reviewer does not have CE/ICA experience, a separate Economics reviewer will be assigned to the ATR Team.*
Environmental Resources	*A senior biologist with experience working on large river systems and with water resources and wetland and aquatic ecology. The reviewer will have experience in calculating ecosystem benefits and be able to ascertain if the ecological output models were appropriately applied. Finally, the reviewer will have detailed knowledge of NEPA statutes and regulations to confirm compliance with NEPA.*
Hydrology and Hydraulic Engineering	*The reviewer will be proficient in hydrology and hydrologic engineering with working experience evaluating large river systems. Experience in water resource studies, hydrodynamics, sediment transport and modeling, and GIS is necessary.*
Civil Engineering	*The reviewer will have experience in civil design of ecosystem restoration features for large river systems. A certified Professional Engineer is suggested. This review may be performed by a geotechnical reviewer, depending on individual qualifications.*
Climate Preparedness and Resilience	*A certified ATR reviewer within the Climate Preparedness and Resiliency CoP with experience evaluating climate change impacts to inland hydrology will participate in the ATR.*
Cost Engineering	*For projects with a total project cost (TPC) of less than $10 million, a precertified cost engineer may conduct the Cost Engineering Review and certification instead of the Cost Engineering Directory of Expertise (DX). For projects with a TPC of $10 million of greater, the Cost Engineering DX will perform the review and provide the cost certification.*
Geotechnical Engineering	*The reviewer will have experience in geotechnical engineering in large river systems to include island construction. This review may be performed by a dedicated team member or may be satisfied by a civil reviewer, depending on individual qualifications.*
Economics	*A senior economist familiar with ecosystem output analyses and concepts, including demonstrated experience with Cost Effectiveness/Incremental Cost Analysis (CE/ICA) and the Institute for Water Resources (IWR) Planning Suite.*

c. MODEL CERTIFICATION OR APPROVAL

Table 4: Planning Models. The following models may be used to develop the decision document:

Model Name and Version	Brief Model Description and How It Will Be Used in the Study	Certification / Approval
IWR Planning Suite II (Version 2.0.9)	*IWR Planning Suite II was developed by Institute of Water Resources as accounting software to compare habitat benefits among alternatives.*	*Certified for National Use*
One or more approved for use/certified Habitat Suitability Index (HSI) models (e.g., USFWS HEP models) will be used depending on site-specific conditions	*Habitat Evaluation Procedure (HEP) is a species-habitat approach to impact assessment and habitat quality for selected evaluation species documented with an index, the Habitat Suitability Index (HSI). This value is derived from an evaluation of the ability of key habitat components to compare existing habitat conditions and optimum habitat conditions for the species of interest. There are currently 166 models for invertebrates, fish, amphibians, reptiles, birds, mammals, and communities. Typical HEP models used for HREP projects include white bass, smallmouth buffalo, fox squirrel, gray squirrel, black capped chickadee, bullfrog, mink, dabbling duck, diving ducks, and migrating shorebirds through the Northern Plains/Prarie Pothole Region.* *For this study, the models that will likely be used are the dabbling duck, diving duck, bluegill, and floodplain forest HEP models.*	*Approved or certified for Regional Use (within geographic limits defined for each model)*

Table 5: Engineering Models. These models may be used to develop the decision document:

Model Name and Version	Brief Model Description and How It Will Be Used in the Study	Approval Status
HEC-RAS 5.0.7 (River Analysis System)	*The Hydrologic Engineering Center's River Analysis System (HEC-RAS) program provides the capability to perform one-dimensional steady and one-dimensional or two-dimensional unsteady flow river hydraulics calculations. The program will be used for steady flow analysis to evaluate the future without- and with-project conditions at project sites. For a particular study the model could be used for unsteady flow analysis or both steady and unsteady flow analysis. Sediment transport simulations can be done if needed.*	*HH&C CoP Preferred Model*
Micro-Computer Aided Cost Engineering System (MCACES) MII Version 3.0	*MCASES is a cost estimation model. This model will be used to estimates costs for the HREP.*	*Certified.*

ATTACHMENT 1: TEAM ROSTERS [REDACTED]

ATTACHMENT 2: HREP FACT SHEET

Lower Pool 4, Big Lake, Robinson Lake, and Tank Pond

Habitat Rehabilitation and Enhancement Project
Minnesota and Wisconsin; St. Paul District
Upper Mississippi River Restoration Program

Fact Sheet

Location

The Lower Pool 4 study area encompasses approximately 9,382 acres of open backwater, meandered side channel, main channel border, and island formations from state Highway 25
(Nelson Dike) at Wabasha, Minnesota to Lock and Dam 4 near Alma, Wisconsin. The study area extends from approximate river mile 760.2 to 752.8 (7.4 miles), and includes the main stem of the Mississippi River (8,276 acres) and portions of the Buffalo River (1,106 acres). Land ownership within the study area is a patchwork of both U.S. Army Corps of Engineers (USACE) and U.S. Fish and Wildlife Service (USFWS) with all being managed as part of the Upper Mississippi River National Wildlife and Fish Refuge (Refuge) (Figure 1).

Existing Resources

Aquatic Vegetation

In general, aquatic vegetation is abundant and diverse throughout most of the lower Pool 4 backwaters. Submersed plants are mostly stable, rooted-floating species are declining, and emergent plant coverage is increasing, which is primarily attributed to the expansion of wild rice (*Zizania aquatica*) beds. Outside of the backwaters, aquatic vegetation in side channels and within the main channel borders is comprised mainly of spatially disjunct pockets of wild celery (*Vallisneria Americana*) and water stargrass (*Heteranthera dubia*), two species known to be associated with lotic habitat.

Water Quality

Water quality data from Long Term Resource Monitoring (LTRM) indicate that summer water clarity has improved substantially in lower Pool 4 backwaters, including Big Lake, over the past two decades due to a reduction in turbidity. Chlorophyll a concentrations, an indicator of algal biomass, has declined. These improvements in water quality are primarily due to the increase in submersed aquatic vegetation (SAV).

Fisheries

The fishery resource within the study area is quite diverse with 79 species being documented. In addition, various endangered, threatened, or species of concern status have also been sampled. Habitat quality and quantity during spring, summer, and fall appears adequate for most species as does spawning habitat for a multitude of species during spring and early summer. However, winter habitat, comprised of deeper water areas that are protected from flow, appears limiting.

Avian

Monitoring of the Big Lake Closed Area has shown waterfowl use on the increase. Peak numbers of waterfowl recorded during fall aerial surveys include 26,970 tundra swans, 14,830 puddle ducks, and 30,755 diving ducks. There are 25 documented bald eagle nests, of which 10–12 are active each year.

Forestry

Forest inventory has been completed across the study area, but in-depth analysis has been limited to specific locations where forest enhancement projects have occurred. Forests are typical of those found across the Upper Mississippi River (UMR), characterized by reduced natural diversity and productivity and less diverse species composition, especially evident is the decline of mast-producing species.

Many of the island formations, particularly in the lower portion of the pool, are deteriorating from wind and wave action and prolonged inundation. Particularly evident are the islands and subsequently the forests at the lower end of Big Lake, which are nearly eliminated.

Current Status of Habitat Needs Assessment-II (HNA-II) Indicators

Pool 4 has the following rating for HNA-II indicators: orange (existing conditions deviates from desired, and may merit action to improve), yellow (existing condition is near defined desired condition but may merit actions to maintain or improve conditions), and gray (existing condition is near desired condition, but may merit action to maintain).

Orange: Longitudinal Aquatic Connectivity (LAC); Aquatic Functional Class 2 (AFC2); Aquatic Vegetation Diversity (AVD); Floodplain Functional Class Diversity (FFCD); Pool Flux Difference (PFD).

Yellow: Longitudinal Floodplain Connectivity (LFC); Aquatic Functional Class 1 (AFC1); Floodplain Vegetation Diversity (FVD); Total Suspended Solids (TSS).

Gray: Lateral River-Floodplain Connectivity (LRC); Tailwater Flux Difference (TFD).

Per the HNA-II, the future desired habitat condition includes: maintain and enhance existing open water area for waterfowl habitat; improve quality, depth, and distribution of lentic habitat for fish; reduce sedimentation; improve lotic habitat; maintain and enhance floodplain vegetation; restore floodplain vegetation diversity in conjunction with diversifying floodplain inundation periods; improve navigation dam gate management for native fish passage; deter invasive fish species; and adjust operation to allow for more gradual rate of change, when feasible.

Problem Identification

As with the majority of the UMR, sedimentation of the backwaters is an ongoing issue. This study area is greatly influenced by the input of sand from the Chippewa River that enters Pool 4 at about river mile 763.5. Other potential sources of sand are the historic channel maintenance dredging side-cast islands and the four active temporary placement sites within the study area. Increased flows over extended periods have transported more material into side channels, which can be seen as exposed sand bars in times of “normal” river conditions.

Big Lake has lost much of its island complex and forest to wind and wave erosion. The barrier islands between the lake and Catfish Slough have been degraded and/or eliminated over the past several years.

Tank Pond near the mouth of the Buffalo River has relatively poor water quality due to a lack of water circulation and lower abundance and diversity of SAV coupled with nutrient concentrations sufficient for algal growth, high turbidity, and chlorophyll a concentrations.

Overwintering Centrarchidae habitat in and below Big Lake is limited, in part, by high current velocities. The existing desirable overwintering areas appear to be filling with sediment and are exposed to flows that are more frequent.

Without the implementation of forest restoration measures, continued decline will result due to the following factors: dominance of reed canarygrass; loss of native plant species diversity; loss of forest structural and age class diversity and cover including fragmentation; cumulative adverse

impacts on forest-dependent wildlife species, ecosystem services (e.g., improvements to water quality), and local aesthetic and cultural resources; as well as decreases in forest habitat connectivity and forest interior habitat will be witnessed.

Project Objectives

The overall goal is to maintain/enhance/create quality habitat for native and desirable plant, animal, and fish species. The project objectives are:

- Protect/stabilize/enhance existing and constructed/reconstructed islands as well as historic and current dredge material placement sites. (LAC, LRC, AFC1, AFC2, AVD, FVD, TSS)
- Protect existing, develop additional, and promote regeneration of floodplain forest. (FVD)
- Reduce sedimentation inputs to backwater lakes. (AFC1, AFC2, AVD, TSS)
- Enhance the quality of migratory bird habitat with an emphasis on waterfowl and neotropical migrants. (LAC, LRC, AFC1, AFC2, AVD, FVD
- Reduce wind fetch in upper Big Lake. (LAC, LRC, AFC1, AFC2, AVD, FVD, TSS)
- Improve water quality in Tank Pond. (LAC, LFC, LRC, AFC1, AFC2, AVD, FVD, TSS)
- Enhance bathymetric diversity in the study area. (LAC, LFC, LRC, AFC1, AFC2, AVD, FVD)
- Maintain or increase quantity and diversity of submerged vegetation. (AFC1, AFC2, AVD, TSS)
- Maintain or increase quantity and diversity of emergent vegetation. (AFC1, AFC2, AVD, TSS)
- Enhance habitat for aquatic species. (LAC, LFC, AFC1, AFC2, AVD, TSS)

Proposed Project Features and Implementation

The project could be developed as three phases (Big Lake, Robinson Lake, and Tank Pond/Buffalo River). Big Lake and Robinson Lake phases include traditional Habitat Rehabilitation and Enhancement Project (HREP) techniques of island construction/protection with a forestry component and dredging to increase bathymetric diversity while providing fine material for the island surface. Tank Pond/Buffalo River phase is focused on connectivity and bathymetric diversity, which may not contain an element of island construction. There are also large island features (for example Island 26 in Figure 2) that could provide for opportunistic use of main channel dredge material placement along the navigation channel.

- **Island construction/enhancement and reed canarygrass reversion** could provide wave and wind fetch protection in the upper portion of Big Lake and provide for enhanced patch size of floodplain forest.
- **Mudflats and/or terraces** could increase emergent vegetation and provide bathymetric diversity to support aquatic species.
- **Dredging backwater areas and secondary channels** to obtain island construction material would create bathymetric diversity and benefit aquatic species.
- **Increasing wild celery beds and perennial emergent vegetation** could increase habitat for

migratory waterfowl.

Financial Data & Sponsorship

The proposed Lower Pool 4 study area features are located within the Refuge boundary and on lands owned in fee title by the USFWS and USACE; therefore, the project cost would be 100 percent federal. In accordance with Section 107(b) of the Water Resources Development Act
(WRDA) of 1992, all costs for operation, maintenance, and rehabilitation of project features would be the responsibility of the USFWS. Operation and maintenance (O&M) is estimated at $10,000/year provided by the USFWS. During the study, if any project features are proposed that are located outside the Refuge boundaries, the states of Minnesota or Wisconsin would be the non-federal sponsor required to provide the cost share implementation and maintenance of those features in accordance with Section 107(b) of the WRDA of 1992. The estimated cost of the Lower Pool 4 project area is $28 million to $45 million as estimated by sub-area:

- Big Lake/Indian Slough: $12 million to $18 million
- Robinson Lake: $6 million to $12 million
- Tank Pond/Buffalo River: $10 million to $15 million

Point of Contact

[redacted] Program Manager, St. Paul District, U.S. Army Corps of Engineers, 651-290-5293, [redacted]

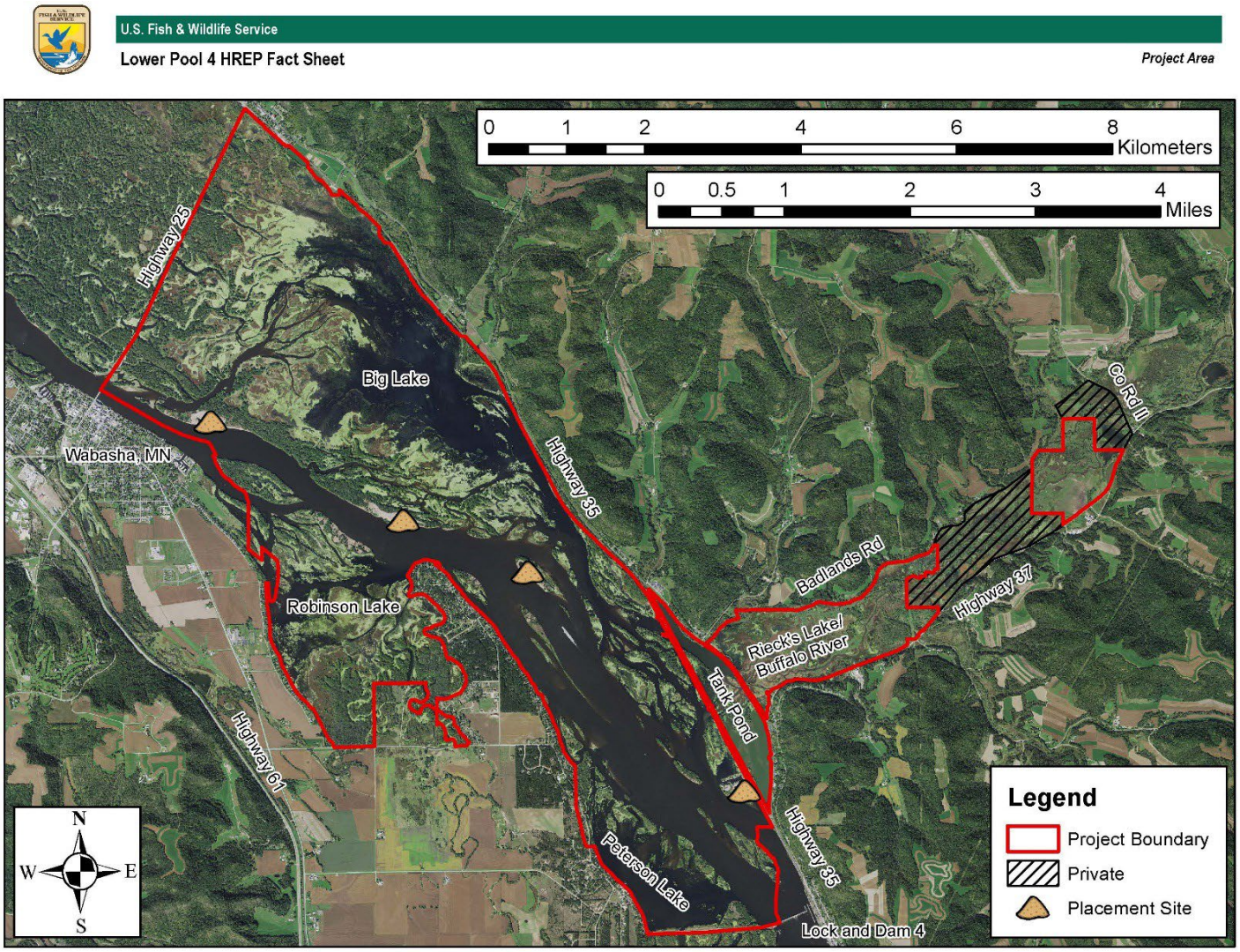
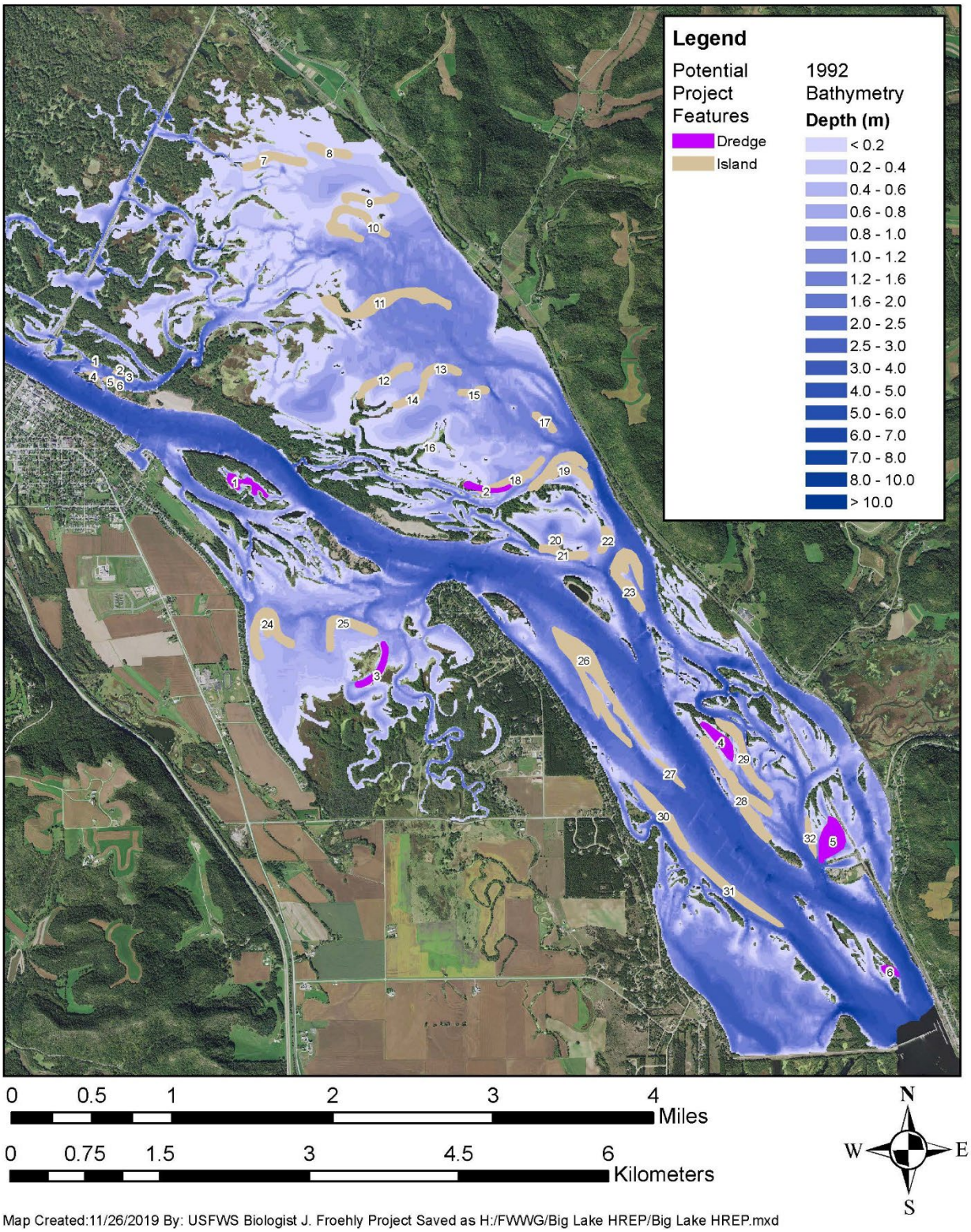


Figure 1. Lower Pool 4 study area.



Map Created:11/26/2019 By: USFWS Biologist J. Froehly Project Saved as H:/FWWG/Big Lake HREP/Big Lake HREP.mxd

Figure 2. Potential constructed/enhanced island locations and configurations.