MVD DECISION DOCUMENT REVIEW PLAN

UPPER MISSISSIPPI RIVER RESTORATION PROGRAM HABITAT REHABILITATION AND ENHANCEMENT PROJECT

April 2025

Project Name: Bank Stabilization, Minnesota River Habitat Rehabilitation and Enhancement Project (HREP), Upper Mississippi River Restoration (UMRR) (Savage, MN)

P2 Number: 506167

District: St Paul District (MVP)
District Contact: Ben Nelson, Project Manager
Kacie Grupa, Technical Lead

Major Subordinate Command (MSC) and Review Management Organization (RMO): Mississippi Valley Division (MVD) Samantha Thompson

MSC/RMO Contact: Samantha Thompson

Key Review Plan Dates

Date of MSC Approval of Review Plan: 2 June 2025
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 2025	N/A	No
Release Draft Report to Public:	January 2026	N/A	No
Final Report Transmittal:	June 2026	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 Minnesota Valley National Wildlife Refuge between river miles 15 and 16 on the Minnesota River. Land ownership within the study area is USFWS with all being managed as part of the Minnesota Valley National Wildlife Refuge (Refuge) near Savage, Minnesota. The Project will consist of approximately 1,200 feet of bank stabilization/protection at Refuge along the Minnesota River.

Independent External Peer Review (IEPR). In February 2012, USACE Headquarters granted a programmatic IEPR Exclusion for UMRR HREP projects. All UMRR HREP projects are excluded from the Type I IEPR except those that meet the mandatory triggers for an IEPR. As such, further discussion of IEPR is limited to the information presented in Section 2(d).

2. REVIEW EXECUTION PLAN

This section describes each level of review to be conducted for UMRR HREP projects. Based upon the factors discussed in Section 1, this study will undergo the following types of reviews:

District Quality Control. All decision documents (including data, analyses, environmental compliance documents, etc.) undergo DQC. This internal review process covers basic science and engineering work products. It fulfils the project quality requirements of the Project Management Plan.

Agency Technical Review. ATR is performed by a qualified team from outside the home district that is not involved in the day-to-day production of the project/product. These teams are comprised of certified USACE personnel. The ATR team lead will be from outside the home MSC.

Cost Engineering Review. All decision documents shall be coordinated with the Cost Engineering Mandatory Center of Expertise (MCX). The MCX will assist in determining the expertise needed on the ATR team. The MCX will provide the Cost Engineering certification. The RMO is responsible for coordinating with the MCX for the reviews. These reviews typically occur as part of ATR.

MSC Policy and Legal Review. All decision documents will be reviewed for compliance with law and policy. ER 1105-2-100, Appendix H, and Director's Policy Memorandum 2019-01, both provide guidance on policy and legal compliance reviews. These reviews culminate in determinations that report recommendations and the supporting analyses and coordination comply with law and policy, and warrant approval by the home MSC Commander. These reviews are managed by the MSC and are not further detailed in this Review Plan.

Public Review. The district will post the Review Plan and approval memo on the district internet site. Public comment on the adequacy of the Review Plans will be accepted and considered.

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, Office of Counsel, and Agency Partner Review	October 2025	December 2025	$14,000	No
Draft Feasibility Report and EA	Agency Technical Review (ATR)	January 2026	March 2026	$18,000	No
Draft Feasibility Report and EA	MSC Policy Review[1]	January 2026	March 2026	n/a	No
Final Feasibility Report and EA	Targeted District Quality Control and Office of Counsel[2]	March 2026	March 2026	$8,000	No
Final Feasibility Report and EA	Targeted Agency Technical Review[1]	April 2026	April 2026	$9,000	No
Final Feasibility Report and EA	MSC Policy Review	May 2026	June 2026	n/a	No

3. REVIEW PROTOCOLS FOR HREP FEASIBILITY REPORTS

The Feasibility Report will undergo the following concurrent review process:

i. ***Feasibility Kick-off.*** The Home District will conduct a scoping meeting to develop the following information: existing conditions, problems, opportunities, constraints, goals, objectives, and potential measures.

ii. ***Document DQC of Draft Feasibility Report.*** The Home District will conduct a documented DQC review when the Draft Feasibility Report is at least 75 percent complete. This review will be performed in accordance with the Home District's Quality Management Plan (QMP). DQC is planned to start duringthe TSP Milestone. DQC must be complete prior to release of the Draft Report for concurrent review.

iii. ***Tentatively Selected Plan (TSP) Milestone.*** The TSP Milestone will take place after the alternative plans have been formulated and prior to release of the draft decision document for public review. The TSP Milestone is intended to ensure that plans have been propertly formulated, legal and policy issues have been identified, a consensus on resolution has been reached, and the MSC concurs with the TSP that will likely proceed into the design and

[1] Public draft review will be concurrent to MSC Policy and ATR

[2] 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 review is scalable.

implementation phase. The PDT will submit the following as read-aheads two weeks before the TSP Milestone meeting: 1) Presentation Slide Deck and 2) Report Summary.

iv. ***Release Draft Report for Concurrent Review.*** Upon MVD's approval of the TSP, and after DQC is complete, the report will be released for 30-day concurrent Public, ATR, and MVD review. The MVD submittal will include the following: 1) Draft Report and NEPA Document, 2) Fact Sheet, 3) UMRR Study Issue Checklist, 4) DQC Summary Report, and 5) Legal Sufficiency.

v. ***Targeted DQC and Targeted ATR on Final Feasibility Report.*** 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. Targeted review of the feasibility-level design documentation, responses to public comments and agency input, or environmental compliance documentation is also appropriate.

vi. ***Submit Final Report to MSC for Approval.*** The District will submit the final report to MVD for a 30-day review prior to MSC approval. The MVD submittal will include the following: 1) Transmittal Memo, 2) Final ATR Report/Certification, 3) Cost DX Certification, 4) DQC Summary Report/Certification, 5) Legal Certification, and 6) Final Detailed Project Report (including unsigned Finding of No Significant Impact, Recommendation, 404(b)(1)).

4. DISTRICT QUALITY CONTROL

The home district shall manage DQC and will appoint a DQC Lead to manage the local review (see ER 1165-2-217, Chapter 4).

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.
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 resources impacts for the study if applicable. If the reviewer does not have cultural resources experience, a separate Cultural Resources reviewer may 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.
Infrastructure and Installation Resilience Reviewer	A member of the Infrastructure and Installation Resilience (IIR) Community of Practice knowledgeable in methods and tools related to infrastructure resilience (prepare, absorb, recover, and adapt) for water resources projects.
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	The reviewer will have experience in real estate transactions for ecosystem restoration projects.

DQC Team Disciplines	Expertise Required
Geotechnical Engineering	The reviewer will have experience in geotechnical engineering in large river systems to include bank stabilization projects.
Construction	The reviewer will have experience in construction of ecosystem restoration projects including bank stabilization.

Documentation of DQC. Quality Control will be performed continuously. A specific certification of DQC completion will be prepared at the draft and final report stages. Documentation of DQC will follow the District Quality Manual and the MSC Quality Management Plan. Dr. Checks will be used for documentation of DQC comments. An example DQC Certification statement is provided in ER 1165-2-217, Appendix D.

Documentation of completed DQC will be provided to the MSC/RMO and the ATR Team leader. Documentation available at the time of ATR will be made available to the ATR Team. The team will examine DQC records and comment in the ATR report on the adequacy of the DQC effort.

5. AGENCY TECHNICAL REVIEW

The ATR will assess whether the analyses are technically correct and comply with guidance, and that documents explain the analyses and results in a clear manner. MVD will be the review management organization for ATR. The Home District will propose the ATR team and lead to MVD for its approval. The ATR lead will be from outside MVD, and the team of SMEs will be from outside the Home District.

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 engineering and construction disciplines should demonstrate certification in Corps of Engineers Reviewer Certification and Access Program (CERCAP) for the requisite area of expertise.

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.
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

ATR Team Disciplines	Expertise Required
	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.
Infrastructure and Installation Resilience Reviewer	A member of the Infrastructure and Installation Resilience Community of Practice knowledgeable in methods and tools related to infrastructure resilience (prepare, absorb, recover, and adapt) for water resources projects. Subject matter expert recognized by the IIR Leadership and certified to perform technical review in CERCAP.
Cost Engineering	The reviewer will have experience in cost estimating riverine ecosystem restoration features. 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 bank stabilization projects. This review may be performed by a dedicated team member or may be satisfied by a civil reviewer, depending on individual qualifications.

Documentation of ATR. DrChecks will be used to document all ATR comments, responses and resolutions. Comments will be limited to those needed to ensure product adequacy. All members of the ATR team will use the four part comment structure (see ER 1165-2-217). If a concern cannot be resolved by the ATR team and PDT, it will be elevated to the vertical team to resolve using the issue resolution process in ER 1165-2-217. Concerns will be closed in DrChecks by noting the concern has been elevated. The ATR Lead will prepare a Statement of Technical Review for the draft and final reports, certifying that review issues have been resolved or elevated. ATR will be certified when all concerns are resolved or referred to the vertical team and the ATR documentation is complete.

6. INDEPENDENT EXTERNAL PEER REVIEW

(i) Assessment of IEPR Conditions and Factors.

This Review Plan assesses the factors affecting the levels and scopes of reviews including IEPR. These factors include three mandatory conditions (cost of a project, request by the Governor of an affected state, or a determination by the Chief of Engineers) that independently require performance of IEPR. Additional discretionary factors or scenarios may also lead to the performance of IEPR. A risk-informed decision regarding the performance of IEPR is made through assessment of both the mandatory conditions and discretionary factors.

Decision on IEPR. *In February 2012, USACE Headquarters granted a programmatic IEPR Exclusion for UMRR HREP projects. All UMRR HREP projects are excluded from the Type I IEPR except those that meet the mandatory triggers for an IEPR. UMRR HREP projects do not have estimated total project costs greater than $200*

million. In addition, the Governor of an affected state has never requested peer review by independent experts. Finally, the Chief of Engineers has not determined that UMRR HREP projects are controversial due to significant public dispute over the size, nature, or effects of the project or the economic or environmental costs or benefits of the project. It is expected that nearly all UMRR HREP will fall below the IEPR mandatory triggers and therefore Type I IEPR is unlikely. In the rare event that a project may warrant a Type I IEPR, coordination with MVD and the vertical team will be initiated.

(ii) Safety Assurance Review.

Safety Assurance Reviews are managed outside of the USACE and are conducted on design and construction products for hurricane, storm and flood risk management projects, or other projects where existing and potential hazards pose a significant threat to human life. In some cases, significant life safety considerations may be relevant to planning decisions. These cases may warrant the development of relevant charge questions for consideration during reviews such as ATR or IEPR. In addition, if the characteristics of the recommended plan warrant a Safety Assurance Review, a panel will be convened to review the design and construction activities before construction begins, and until construction activities are completed, on a regular schedule.

Decision on Safety Assurance Review. *The district chief of E&C will make a decision concerning the need for SAR during the implementation phase and that decision will be documented in in the Implementation phase review plan*

7. MODEL CERTIFICATION OR APPROVAL

EC 1105-2-412 mandates the use of certified or approved models for all planning activities to ensure the models are technically and theoretically sound, compliant with USACE policy, computationally accurate, and based on reasonable assumptions. Planning models are any models and analytical tools used to define water resources management problems and opportunities, to formulate potential alternatives to address the problems and take advantage of the opportunities, to evaluate potential effects of alternatives and to support decision making. The use of a certified/approved planning model does not constitute technical review of a planning product. The selection and application of the model and the input and output data is the responsibility of the users and is subject to DQC, ATR, and IEPR.

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

EC 1105-2-412 does not cover engineering models used in planning. The responsible use of well-known and proven USACE developed and commercial engineering software will continue. The professional practice of documenting the application of the software and modeling results will be followed. The USACE Scientific and Engineering Technology Initiative has identified many engineering models as preferred or acceptable for use in studies. These models should be used when

appropriate. The selection and application of the model and the input and output data is still the responsibility of the users and is subject to DQC, ATR, and IEPR.

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 (River Analysis System) (current version)	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	MCACES is a cost estimation model. This model will be used to estimates costs for the HREP.	Certified.

8. POLICY AND LEGAL REVIEW

Policy and legal compliance reviews for draft and final planning decision documents are delegated to the MSC (see Director's Policy Memorandum 2019-01).

(i) Policy Review.

The policy review team is identified through the collaboration of the MSC Chief of Planning and Policy and the MSC DST Planner. The makeup of the Policy Review team will be drawn primarily from the MSC but may include reviewers from Headquarters (HQUSACE) the Planning Centers of Expertise, and other review resources as needed.

- The Policy Review Team will be invited to participate in key meetings during the development of decision documents as well as the TSP Milestone meeting. These engagements may include In-Progress Reviews, Issue Resolution Conferences or other vertical team meetings plus the milestone events.

- The input from the Policy Review team will be documented in a Memorandum for the Record (MFR) produced for each engagement with the team. The MFR will be distributed to all meeting participants.

- In addition, teams may choose to capture some of the policy review input in a risk register if appropriate. These items will be highlighted at future meetings until the issues

are resolved. Any key decisions on how to address risk or other considerations will be documented in an MFR.

(ii) Legal Review.

Representatives from the Office of Counsel will be assigned to participate in reviews. Members may participate from the District or MSC. The MSC Chief of Planning and Policy will coordinate membership and participation with the office chiefs.

- In some cases legal review input may be captured in the MFR for the particular meeting or milestone. In other cases, a separate legal memorandum may be used to document the input from the Office of Counsel.

- Each participating Office of Counsel will determine how to document legal review input.

ATTACHMENT 1: TEAM ROSTERS

REDACTED

ATTACHMENT 2: HREP FACT SHEET

Bank Stabilization and Natural Levee
Habitat Rehabilitation and Enhancement Project
Upper Mississippi River Pools 4 to 11 and the Lower Minnesota River
Minnesota, Wisconsin, and Iowa; St. Paul District
Upper Mississippi River Restoration Program

Fact Sheet

Location

Potential project locations include various islands and natural levees throughout Pools 4 to 11 (river miles 613.5 –763.4) of the Upper Mississippi River (UMR) and the Lower Minnesota River (LMR, river miles 0.0 – 25.6), bordering the states of Minnesota, Wisconsin, and Iowa within the St Paul District of the U.S. Army Corps of Engineers (USACE). Specific habitat protection locations will be determined during the feasibility study following field reconnaissance as well as a reassessment of previously identified habitat protection needs. Locations proposed for restoration are on lands managed by the U.S. Fish and Wildlife Service's (USFWS), including the Upper Mississippi River National Wildlife and Fish Refuge, the Minnesota Valley National Wildlife Refuge, and the Trempealeau National Wildlife Refuge.

Existing Resources

The islands and shorelines throughout Pools 4–11 of the UMR and the LMR are comprised of bottomland and upland forest communities, unique lotic and lentic aquatic areas, transitional aquatic zones, protected wetlands, side channels and other habitat types. However, following lock and dam construction, water levels throughout the UMR are generally higher over the entire year, flood pulses are higher, and in the lower portion of pools, periods of lower surface water elevations have been eliminated. Altered water surface elevations, combined with channel and flow velocities, have led to the erosion and loss of islands and the dissection of natural levees, increasing connectivity throughout UMR pools. Island loss results in increased wind fetch, further eroding and exposing previously protected habitats, such as mussel beds, overwintering areas for fish, and floodplain forest acreage. These stressors are likely to continue system wide, as will the decline of the quality of aquatic, wetland, and floodplain habitats. Though degraded, the habitats within the proposed study area are important for migratory and breeding waterfowl and other waterbirds, migratory and breeding songbirds and other landbirds, bald eagles, tree-roosting bats, and fish and mussels adapted to both lotic and lentic conditions. Some of the fish and wildlife species in the study area are listed as threatened, endangered, or in need of conservation by state and federal agencies. This project provides an opportunity to protect and prevent further degradation and loss of critical habitats throughout the system.

Problem Identification

The Habitat Needs Assessment-II (HNA-II) identified bankline erosion and island dissection as major factors contributing to the decline in habitat quality throughout the UMR floodplain (McCain et al. 2018). Wind and boat generated waves in large open water habitats created by the dams contribute to island erosion and sediment resuspension, with banklines within the Upper Mississippi River observed to be eroding at rates ranging from 0.3 to 3.7 feet per year. Higher annual flows resulting from a changing climate are further exacerbating island erosion and dissection. Collectively, these factors reduce the number and acreage of islands throughout many UMR pools.

Bankline erosion and island or natural levee dissection allow flow to enter isolated habitats, such as wetlands, and areas of the backwaters that were formally free of current. These new channels and increased connectivity carry sediment into the backwater lakes reducing their depth and quality due to

sedimentation. This introduction of current and sediment can wipe out aquatic vegetation beds and diminish the value of a backwater lake as an overwintering site for a variety of fish species. Further, as banklines erode, trees roots are exposed and destabilized. When these trees fall, they further disturb the bankline as the roots pull free. Prolonged periods of inundation leads to a conversion of historically diverse floodplain forest to a low-diversity forest characterized by a limited number of flood tolerant tree species, and regeneration of trees is hindered by highly flood tolerant herbaceous species such as reed canarygrass. The loss of floodplain forest acreage and diversity also results in the loss of valuable habitat for breeding and migratory landbirds and tree-roosting bats, among other species. These stressors are likely to continue system wide, as will the decline of the quality of aquatic, wetland, and floodplain habitat. This project provides an opportunity to protect further degradation and loss of critical habitats throughout the system.

Project Goals

The intention of this project is to identify multiple locations where relatively small, similar efforts can be strung together in a cost-effective and flexible manner to accomplish habitat protection and maintenance goals at a larger scale than typically addressed by other project-specific fact sheets. The desired outcome of this project is to protect, maintain, and enhance existing habitat quality at various locations throughout the UMR floodplain within the St Paul District. Goals for this project were derived from multiple planning efforts and align with several document guidelines including the HNA-II, the Upper Mississippi River National Wildlife and Fish Refuge's Habitat Management Plan, and the Environmental Pool Plans. Specifically, project work will focus on protecting, maintaining, and restoring historic island acreage and floodplain habitat diversity and areas of quality habitat within the Upper Mississippi River. Targeted habitats include contiguous and isolated backwater complexes, lotic and lentic habitat diversity, secondary and tertiary channels, aquatic vegetation beds, floodplain forests, and wetlands.

Seven HNA-II indicators are expected to be directly influenced as a result of this project. In support of the desired future conditions of the indicators, as described by the Fish and Wildlife Working Group (FWWG), this project would help to:

- **Lateral Connectivity (Open Water):**
    - Improve open water connective conditions, including island restoration.
    - Reduce the effects of bankline erosion due to wind and wave action and restore island habitat by armoring banklines, restoring historic island acreage, and diversifying flow velocities across the floodplain to protect terrestrial species and backwater fish communities and aid in the production of aquatic vegetation.
- **Floodplain Functional Class:**
    - Restore floodplain topographic diversity and diversify inundation periods.
    - Protect and enhance existing island acreage to maintain and increase floodplain vegetation acreage, and utilize dredged material to promote topographic diversity within the project site.
- **Floodplain Vegetation Diversity:**
    - Restore, maintain, and enhance floodplain vegetation diversity, including hard-mast trees.
    - Protect and enhance existing island acreage to maintain and increase floodplain vegetation acreage and establish a diverse mix of mast producing trees to provide habitat for a variety of birds and mammals, including tree-roosting bats, and migrant passerines.

- **Aquatic Vegetation Diversity:**
    - Maintain and enhance aquatic vegetation diversity.
    - Protect existing islands, and utilize dredged material to restore historic island areas to preserve and promote aquatic vegetation growth and diversity within "shadow effect" zones.
- **Total Suspended Solids Concentrations (TSS):**
    - Reduce sedimentation and total suspended solids concentrations.
    - Reduce island erosion and restore a more natural sediment transport pattern throughout the study area by decreasing the amount of total suspended solids entering and being deposited within backwater lakes and side channels.
- **Aquatic Functional Classes (AFC) 1:**
    - Improve and restore function and diversity of aquatic habitat types by improving quality, depth, and distribution of lotic and lentic habitats.
    - Decrease loss of channel border habitat and enhance/maintain velocities, depths, sediment types, and sediment transport within targeted channels of the upper and middle portions of pools.
- **Aquatic Functional Classes (AFC) 2:**
    - Improve and restore function and diversity of aquatic habitat types by improving quality, depth, and distribution of lotic and lentic habitats.
    - Decrease island and natural levee dissection in the upper and middle portions of the pools to preserve and improve ideal flow conditions to backwater lentic and shallow lotic areas, and protect floodplain terrestrial wet meadow, isolated wetlands, and smaller, less-connected lentic habitat areas.

All of these HNA-II indicators were identified as indicators of highest importance amongst the upper, middle, and lower impounded clusters, with the exception of total suspended solids. The proposed project is not expected to result in a negative influence to any HNA-II indicators.

Proposed Project Features

Specific habitat protection locations would be determined following field reconnaissance as well as a reassessment of previously identified habitat protection needs within these pools. A list of island protection sites within these pools was previously prepared under the Navigation and Ecosystem Sustainability Program (NESP) in 2005. Figures 1 and 2 show examples of habitat project locations and features being considered. A wide range of small-scale projects could be accomplished under this project.

Proposed project features to address the habitat goals for the project include the following:

- Shoreline stabilization features such as rock wedges, offshore rock mounds, rock-log breakwaters, vanes, groins, biological bank stabilizations, and bank reshaping to protect and enhance existing quality habitat.
- Closure structures constructed of rock and/or earth would be considered in areas where connectivity should be reduced.

- Historic island acreage restoration, including partnering with the St Paul District operations and maintenance (O&M) program to utilize areas behind rock protection as dredged material placement sites.
- Forest creation, diversification, and enhancement activities, including increased topographic diversification through use of dredged material and tree plantings to enhance or restore natural levies.

Collectively, these features will provide protection to existing quality habitats, including bottomland and upland forest communities, unique lotic and lentic aquatic areas, transitional zone aquatic areas, protected wetlands, side channels, and other habitat types. This project provides the opportunity to protect, enhance, and restore habitats for all native and desirable plant, wildlife, and fish species. Target resources include many of the Refuge priority resources of concern (ROC) as identified by the respective Refuge Habitat Management Plans and state fish and wildlife plans. Priority wildlife ROCs potentially benefiting from the proposed actions include cerulean warbler, prothonotary warbler, red-shouldered hawk, transient neotropical migrant passerines, tree-roosting bats, limnophilic native fish, migratory fluvial-dependent native fish, and limnophilic and fluvial-dependent freshwater mussel species.

Implementation Considerations

Opportunities: There exist many discrete locations within the UMR where a relatively modest expenditure of effort to protect and maintain existing habitat would be ecologically beneficial and very cost-effective. Additional economies of scale can be realized when a number of similar habitat protection and maintenance projects, that require similar equipment and construction techniques, can be coordinated and sequenced over large geographical reaches and multiple pools. Additionally, there are chronic dredging needs throughout the UMR pools, providing for a regular supply of sand dredged material that may be utilized for habitat protection, where feasible and appropriate. Further, this project has the potential to complement and help maintain existing Habitat Rehabilitation and Enhancement Project (HREP) effects and will provide a large ecological footprint throughout the St Paul District. A design opportunity is to implement stabilization techniques that continue to allow wildlife access to aquatic/floodplain terrestrial habitat.

Constraints: Work in off-channel areas may present access constraints, and there is the potential for seasonal work constraints, in accordance with Refuge Closed areas and state permits. Additionally, resources that are currently found near the project sites, including freshwater mussels, may constrain implementation of some features throughout the project.

Sequencing Requirements: The intent of this project is to identify multiple locations where relatively small, similar efforts can be strung together in a cost-effective manner to accomplish habitat protection and maintenance goals that are not addressed by other programmatic or project-specific fact sheets. Since there are several project locations throughout the proposed study area, it may be beneficial to plan construction in multiple phases. For example, dividing the project into phases based on location (Minnesota, Wisconsin, and Iowa) or by pool may facilitate moving the project through the respective flood impact compliance processes.

Financial Data

Project lands federally owned and managed by the USFWS would be 100 percent federal with operation and maintenance on these lands the responsibility of the USFWS. Project features implemented on non-refuge lands will require a cost share partner that will contribute 35 percent of the project costs and all maintenance costs. The estimated cost for the general planning, design, and construction of the items

discussed under the Proposed Project Features section, depending on sequencing and the number of sites and features selected, could range from $5 million to $20 million. The estimated annual O&M is $5,000.

Sponsorship

In many instances, the USFWS would be the project sponsor. In other instances, the project sponsor might be a state agency, tribe, local municipality, or a non-governmental organization.

Point of Contact

Program Manager, St. Paul District, U.S. Army Corps of Engineers

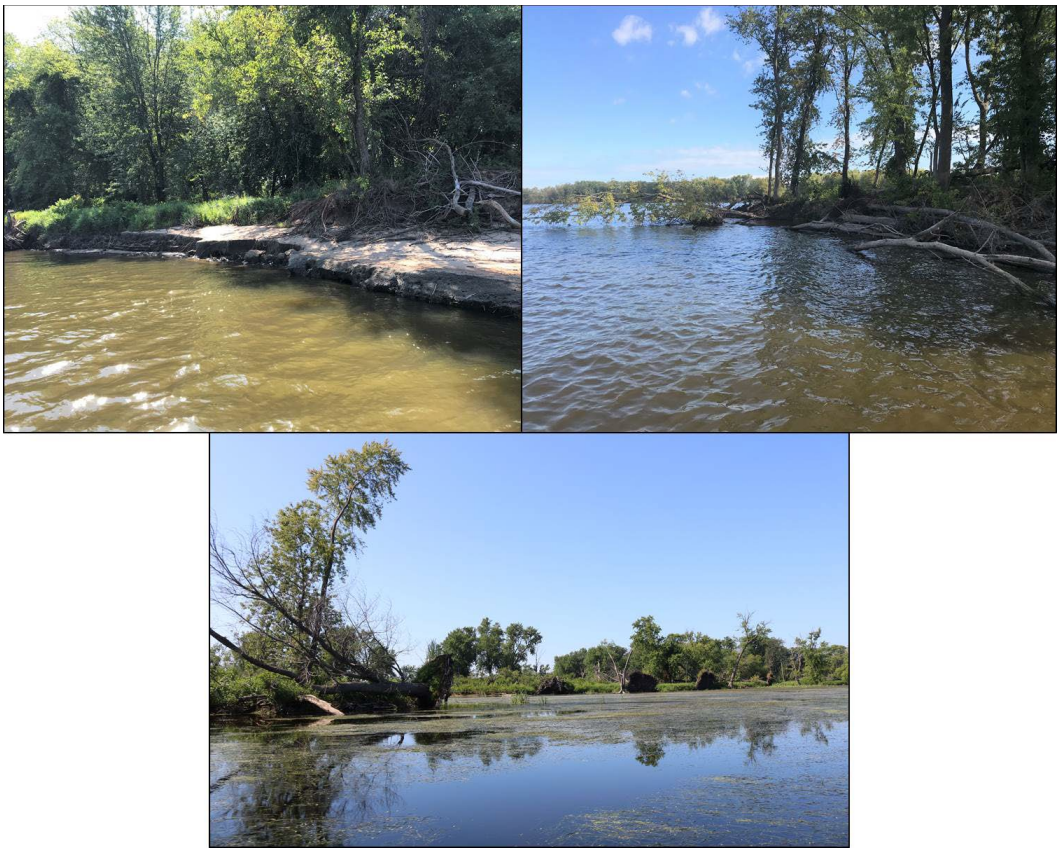

Figure 1. Examples of eroding banklines that could benefit from bankline protection.

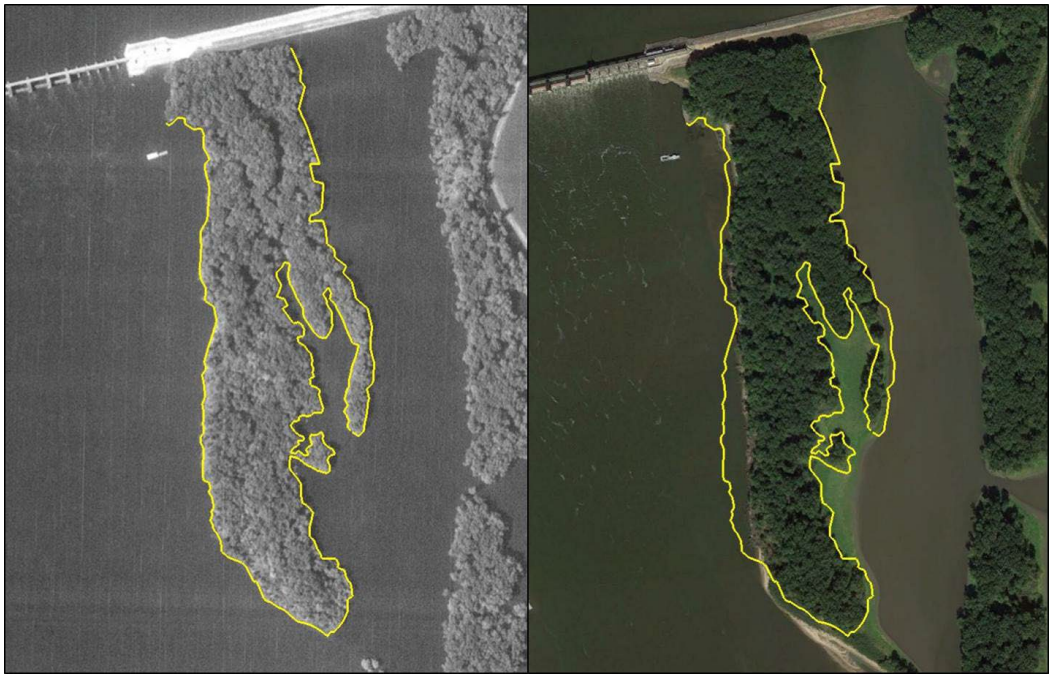

Figure 2. Example of bankline erosion and forested island loss between the main channel and Swift Slough in upper Pool 11, 1994–2013. Yellow line depicts extent of tree canopy in 1994.