



# Pre-Application Document

**Melvin Price Locks and Dam Hydroelectric Project  
Federal Energy Regulatory Commission Project No. P-15257  
Madison County, Illinois and St. Charles County, Missouri**

Lock+™ Hydro Friends Fund X, LLC

March 27, 2026

➔ **The Power of Commitment**



# Contents

<b>1.</b>	<b>Introduction</b>	<b>1</b>
1.1	Project Overview	1
1.2	FERC Licensing Process Overview	1
1.3	Additional State and Federal Regulatory Processes	2
1.4	Geographic References	2
1.5	Pre-Application Document Overview	3
1.6	Description of Consultation Process Undertaken by the Applicant Prior to the Submittal of the PAD	3
<b>2.</b>	<b>Process Plan and Schedule</b>	<b>4</b>
2.1	Process Plan	4
2.2	Schedule	4
<b>3.</b>	<b>Project Location, Facilities, and Operations</b>	<b>5</b>
3.1	Applicant	5
3.2	Existing Project Facilities	5
3.2.1	Location	5
3.2.2	General	5
3.2.3	Dam	5
3.2.4	Main Lock	6
3.2.5	Upstream Guidewall – Main Lock	6
3.2.6	Downstream Guidewall – Main Lock	6
3.2.7	Auxiliary Lock	7
3.2.8	Upstream Guidewall – Auxiliary Lock	7
3.2.9	Downstream Guidewall – Auxiliary Lock	7
3.2.10	Overflow Dike	7
3.3	Proposed Project Facilities	8
3.3.1	Project Overview	8
3.3.2	Proposed Project Features and Facilities	8
3.3.3	Intake, Powerhouse, and Tailrace	9
3.3.4	Transformer	10
3.3.5	Transmission Line	10
3.3.6	Project Operation	10
<b>4.</b>	<b>Description of Existing Environment and Resource Impacts</b>	<b>14</b>
4.1	Geology and Soils	16
4.1.1	Regional Geology	16
4.1.1.1	General Regional Geology	16
4.1.1.2	Physiography and Topography	17
4.1.1.3	Geologic History	17
4.1.1.4	Structural Geology	17
4.1.1.5	Regional Stratigraphy	18
4.1.2	Site Geology	19
4.1.2.1	Site Location and Description	19
4.1.2.2	Stratigraphy and Lithology	19

4.1.3	Groundwater Geology/Hydrogeology	21
4.1.3.1	General	21
4.1.3.2	Missouri Side Aquifer Characteristics	21
4.1.3.3	Illinois Side Aquifer Characteristics	22
4.1.3.4	Groundwater Quality	22
4.1.4	Soils	23
4.1.4.1	General	23
4.1.4.2	Fertile Soils and Availability of On-Site Soils for Recreational Activity	24
4.1.4.3	Potential Erosion, Mass Soil Movement, Scour and Associated Instability	30
4.2	Water Resources	31
4.2.1	Existing Environmental and Physical Characteristics	31
4.2.2	Hydrology	32
4.2.3	Water Quality	33
4.2.3.1	Federal Water Quality Standards	33
4.2.3.2	Beneficial Uses	34
4.2.3.3	Dissolved Oxygen	34
4.2.3.4	Sedimentation, Erosion, Turbidity	35
4.2.4	Nearby Sensitive Waters	37
4.3	Fish and Aquatic Resources	37
4.3.1	Existing Aquatic Community	37
4.3.2	Essential Fish Habitat	38
4.3.3	Temporal and Spatial Distribution of Fish and Aquatic Communities	38
4.3.3.1	Species and Life Stage Composition	38
4.3.3.2	Standing Crop	39
4.3.3.3	Age and Growth Data	39
4.3.3.4	Spawning Run Timing	39
4.3.3.5	Extent and Location of Spawning, Rearing, Feeding, and Wintering Habitat	39
4.3.4	Special Aquatic Considerations	40
4.3.5	Fish Community Monitoring, Entrainment, and Aquatic Risk Considerations	41
4.3.5.1	Fish Passage	41
4.3.5.2	Fish Impingement and Entrainment/Survival Assessment	42
4.3.5.3	Construction Windowing	42
4.4	Wildlife and Botanical Resources	43
4.4.1	Existing Environment	43
4.4.1.1	Wildlife Habitat	43
4.4.1.2	Wildlife Resources	44
4.4.1.3	Botanical Resources	46
4.5	Wetlands, Riparian, and Littoral Habitat	46
4.5.1	Existing Conditions	46
4.6	Rare, Threatened, and Endangered Species	48
4.6.1	Existing Environment	48
4.6.1.1	Federal and State Listed Species	48
4.6.2	Critical Habitat and Spatial Distribution	52
4.7	Recreation and Land Use	52
4.7.1	Existing Recreational and Land Uses	52
4.7.2	Current and Future Recreational Needs	54
4.8	Aesthetic Resources	55
4.9	Cultural Resources	56
4.10	Socio-Economic Resources	57
4.10.1	Illinois	57

4.10.2	Missouri	57
4.11	Tribal Resources	58
4.12	River Basin Description	58
4.12.1	Upper Mississippi River Basin and Subregions	58
4.12.2	Land Uses and Water Uses	59
4.12.3	Dams and Diversion Structures in the River Basin	60
4.12.4	Tributary Rivers and Streams	61
<b>5.</b>	<b>Preliminary Issues and Studies List</b>	<b>62</b>
5.1	Targeted Avian Use Surveys	63
5.1.1	Primary Issues	63
5.1.2	Recommended Study Steps/Information Needs	63
5.2	Targeted Mussel Surveys	63
5.2.1	Primary Issues	63
5.2.2	Recommended Study Steps/Information Needs	63
5.3	Lake Sturgeon and Pallid Sturgeon Surveys: Tailwater and Main-Channel Use	64
5.3.1	Primary Issues	64
5.3.2	Recommended Study Steps/Information Needs	64
5.4	Aquatic Resource Delineation (ARD) Surveys	65
5.4.1	Primary Issues	65
5.4.2	Recommended Study Steps/Information Needs	65
5.5	Flora Surveys – Decurrent False Aster	65
5.5.1	Primary Issues	65
5.5.2	Recommended Study Steps/Information Needs	65
5.6	Interconnection Routing and Excavation Spoils Planning Studies	66
5.6.1	Primary Issues	66
5.6.2	Recommended Study Steps/Information Needs	66
<b>6.</b>	<b>Summary of Contacts</b>	<b>66</b>
<b>7.</b>	<b>References</b>	<b>67</b>

## Table Index

Table 2-1	Schedule	4
Table 3-1	Melvin Price Hydroelectric Project Data	10
Table 4-1	Project Area Soil Characteristics	29
Table 4-2	Monthly Climate Normals for the Melvin Price L&D Area	32
Table 4-3	Monthly summary of air temperature and dissolved oxygen for the Melvin Price L&D (USGS 2026b)	35
Table 4-4	Special Status Wildlife Species Potential to Occur within the Project Area	49
Table 4-5	Recreational Sites List	53
Table 4-6	Water Resource Subregions Upstream of the Project	58
Table 4-7	List of Pools and Locks	60
Table 4-8	The 10 Largest Recorded Floods on the Mississippi River at St. Louis, Missouri	61

## Figure Index

Figure 3-1	Site Plan	12
Figure 3-2	Powerhouse Plan	13
Figure 3-3	Powerhouse Section A	14
Figure 3-4	Powerhouse Sections B & C	15
Figure 4-1	Melvin Price L&D Construction Photograph	14
Figure 4-2	Melvin Price L&D Construction Photograph	15
Figure 4-3	Google Earth aerial imagery dated April 6, 1988	16
Figure 4-4	NRCS Web Soil Survey Map	25
Figure 4-5	Melvin Price L&D Project Boundary with Aerial Spatial Context	45
Figure 4-6	USFWS NWI Mapping around Melvin Price L&D	47
Figure 4-7	Recreational Sites Map	52
Figure 4-8	Flow Duration Curve for the Melvin Price L&D Project (1986 to 2023)	62

## Appendices

Appendix A	Stakeholder Contact and Distribution List
Appendix B	Applicant's Outreach
Appendix C	USFWS Information for Planning and Consultation
Appendix D	IESPB 2025 Illinois Endangered & Threatened Checklist

# List of Abbreviations and Acronyms

°	degrees
#	Number
%	Percent
+/-	Plus or Minus
AL	Alabama
APE	Area of Potential Effect
APLIC	Avian Power Line Interaction Committee
ARD	Aquatic Resource Delineation
CAD	Computer-Aided Design
CEO	Chief Executive Officer
CFR	Code of Federal Regulations
cfs	cubic feet per second
Cl	Chloride
cm	centimeter
cm/sec	centimeters per second
CSR	Missouri Code of State Regulations
CWA	Clean Water Act
DNR	Department of Natural Resources
DO	dissolved oxygen
DOC	Department of Conservation
E	State Listed Endangered
EA	Environmental Assessment
EFH	Essential Fish Habitat
EPA	Environmental Protection Agency
EPM	Environmental Pool Management
EPRI	Electric Power Research Institute
FERC	Federal Energy Regulatory Commission
F	Fahrenheit
F	Fluorine
FLA	Final License Application
GIS	Geographic Information System
GPS	Global Positioning System
GWh	Gigawatt hour
HUC	Hydrologic Unit Code
IA	State of Iowa
IAC	Illinois Administrative Code
IDNR	Illinois Department of Natural Resources
IEPA	Illinois Environmental Protection Agency
IESPB	Illinois Endangered Species Protection Board
IL	State of Illinois

ILP	Integrated Licensing Process
INHS	Illinois Natural History Survey
IPaC	Information for Planning and Consultation
JAM	Joint Agency Meeting
km	kilometer
kV	kilovolt
LE	Federally Listed Endangered
LLC	Limited Liability Company
LT	Federally Listed Threatened
LTRM	Long Term Resource Monitoring
LTRMP	Long Term Resource Monitoring Program
MBTA	Migratory Bird Treaty Act
MCT	Madison County Transit
MDC	Missouri Department of Conservation
MDNR	Missouri Department of Natural Resources
Melvin Price L&D	Melvin Price Locks and Dam
mi	mile
MICRA	Mississippi Interstate Cooperative Resource Association
MISO	Midcontinent Independent System Operator
MN	State of Minnesota
MO	State of Missouri
MONHP	Missouri Natural Heritage Program
MW	Megawatts
NCEI	National Centers for Environmental Information
NEPA	National Environmental Policy Act
NESP	Navigation and Ecosystem Sustainability Program
NGVD29	National Geodetic Vertical Datum of 1929
NL	Not Listed
NMFS	National Marine Fisheries Service
No.	Number
NO <sub>3</sub>	Nitrate
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPS	National Park Service
NWI	National Wetlands Inventory
OHWM	Ordinary High-Water Mark
PAD	Pre-Application Document
PE	Federally Proposed Endangered
pg	Page Number
pH	A value expressing the acidity or alkalinity of a solution on a logarithmic scale
PM&E	Protection, Mitigation, and Enhancement
POI	Point of Interconnection

PPM	Parts Per Million
PT	Federally Proposed Threatened
PURPA	Public Utility Regulatory Policies Act of 1978
ROR	Run-of-river
sec	second
SHPO	State Historic Preservation Office
SO <sub>4</sub>	Sulfate
SOCC	Species and Communities of Conservation Concern
sq. mi.	square mile
St. or Ste.	Saint
T	State Listed Threatened
THPO	Tribal Historic Preservation Office
UMRR	Upper Mississippi River Restoration
UMRS	Upper Mississippi River System
U.S. or US	United States
U.S. Army	United States Army
USACE	United States Army Corps of Engineers
USC	United States Code
USCB	United States Census Bureau
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WQS	Water Quality Standards

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# 1. Introduction

The Melvin Price Locks and Dam are located on the Mississippi River approximately 17 miles upstream from St. Louis, Missouri. Hydroelectric power installation at the Melvin Price Locks and Dam has been studied several times in the past. In 1982 the U.S. Army Corps of Engineers (USACE) St. Louis District issued a report “Lock and Dam No. 26 (Replacement) Hydroelectric Power Study, General Reevaluation Report”. The study included 6 turbines having a 23.67-foot runner diameter (or similar) located West of the gated dam in the overflow spillway area. The proposed installed capacity was 114 MW. The study contained conclusions that the hydroelectric project would have no impact on navigation and no significant impact on the environment. The recommendation was to include hydropower as part of the project authorization. In 1983, the USACE Omaha District reviewed the St. Louis District report and issued a Preliminary Design Report in which the turbine runner diameter was changed to 22.14 feet and the installed capacity to 100.9 MW. Congress did not fund the hydropower component.

In 1987 FERC issued a license to develop a hydroelectric project to the Missouri Joint Municipal Electric Utility Commission for Project No. 3246. As licensed, the proposed project would contain six turbines rated at 13 MW each for an installed capacity of 78 MW. The Environmental Assessment (EA) issued for this project contained the conclusion that the project would have no significant impact on the environment.

In 2005 FERC issued a license to develop a hydroelectric project to the Price Dam Partnership, Ltd, as Project No. 12187. A total of 192 turbine units in six modules were proposed to be installed in spillway gate slots. Installed capacity was approximately 92 MW. An EA issued by FERC staff for this project contained the finding that the issuance of the license is not a major federal action significantly affecting the quality of the human environment. In 2007 the Price Dam Partnership was acquired by Brookfield Power US (now Brookfield Renewable). Brookfield filed a non-capacity license amendment to replace the 192 turbines with three 25 MW bulb turbines to be located in a powerhouse west of the gated dam in the area of the overflow spillway. Total installed capacity was 75 MW. It was agreed by the stakeholders to conduct field studies after the license issuance but before any construction would start. Brookfield did not develop the project and decided to surrender the license.

In summary, extensive studies have been conducted for developing hydropower at the Melvin Price Locks and Dam. These studies documented environmental investigations that concluded development of hydropower would not have a significant environmental impact.

## 1.1 Project Overview

Lock+™ Hydro Friends Fund X, LLC, is seeking to obtain a license from the Federal Energy Regulatory Commission (FERC) to develop a hydroelectric project at the Melvin Price Locks and Dam (Melvin Price L&D) located at Mississippi River Mile 200.78. The Project will span the Mississippi River from Madison County, Illinois to St. Charles County, Missouri. The Applicant for the Melvin Price L&D Hydroelectric Project (Project) is Lock+™ Hydro Friends Fund X, LLC, which is a domestic limited liability company (LLC) and is referenced in this Pre-Application Document (PAD) as the “Applicant.” The Project will utilize the existing Melvin Price L&D that is owned by the federal government and operated by the USACE. The Project will operate in a run-of-river (ROR) mode and, as such, will not alter nor adversely affect current or future USACE operations. By utilizing the existing locks and dam structures, the Applicant will develop a new renewable energy resource for the region that will have minimal environmental effects.

## 1.2 FERC Licensing Process Overview

The Applicant has been granted a Preliminary Permit for this Project from the FERC. The Preliminary Permit does not authorize Project construction but rather authorizes the Applicant to explore Project development options and undertake the pre-filing portion of the FERC licensing process, including consultation with state and federal resource agencies and interested parties (Stakeholders). The Preliminary Permit is effective for a 4-year period, in order to

allow adequate time for completing the pre-filing portion of the FERC licensing process. The FERC licensing process is officially initiated by the filing of this PAD, and a Notice of Intent (NOI) to seek a 50-year license for the development of the hydroelectric Project. There are three licensing process options allowed by the FERC's regulations. The Integrated Licensing Process (ILP) is the default process required of all Applicants unless FERC approves an alternate process, The Applicant will follow the ILP process. After filing the PAD and NOI with FERC and distributing the PAD to agencies and stakeholders, a public and Joint Agency Meeting (JAM) will be held to discuss the PAD and resource studies that may need to be undertaken in order to assess resource effects. Study plans including their timing, will then be developed and distributed for agency and stakeholder review and comment. Once comments on the study plans are received, the study plans will be finalized. Significant environmental studies have already been completed for the proposed hydropower development at this Project. It is proposed that only desktop studies be conducted prior to filing the license application, and that field studies be conducted after license issuance but before construction. Additional justification for this approach is given in **Section 5** of this document. Results of the desktop studies will be incorporated into the license application. The FERC will then review the application and undertake environmental review.

### 1.3 Additional State and Federal Regulatory Processes

There are additional permits or licenses that the Applicant will be required to obtain prior to proceeding with the development of this Project:

- USACE
  - Rivers and Harbors Act Section 10 and Clean Water Act (CWA) Section 404 permit for work in navigable waters and wetlands (33 USC § 1344)
  - Section 408 approval to construct at a USACE facility (Section 14 of the River and Harbors Act [33 USC § 408])
- States of Illinois and Missouri, as applicable
  - Section 401 Water Quality Certification (Section 401 of the CWA)
  - Other state permits as required for construction in waterways and wetlands

These additional regulatory processes will require the Applicant to address many of the same resource effects that must be addressed during the FERC licensing process. To the extent feasible, it is the Applicant's goal that the resource effects that need to be considered in all of these regulatory processes will be identified and addressed through the FERC licensing consultation process. This will allow the Applicant to prepare a FERC License application, and subsequent applications for all other required approvals, that consistently and thoroughly address all resource effects. The Applicant understands that not all of these processes require the same type of information, and each may necessitate slightly different schedules than the FERC process. The Applicant will consult and work with regulatory agencies to establish a plan and schedule that appropriately coordinates all processes and meets both the Applicant's and each regulatory agencies' needs.

### 1.4 Geographic References

Throughout this PAD there are several different geographic area references used:

- "Project Boundary" is used to refer to only those lands within the proposed FERC Project boundary. The Project boundary includes all Project features and lands necessary to operate the Project.
- "Area of Potential Effect" (APE) includes an aquatic component and a terrestrial component. The aquatic APE is the reservoir upstream and tailrace downstream of the existing dam that the new hydropower Project will potentially affect. The terrestrial APE includes lands that may be affected by Project construction, including transmission line corridors.
- "Project Area" is a very general reference to the land and waters in the immediate vicinity of the proposed Project. It is not equivalent to the Project Boundary or APE and can vary with usage.

- “Project Region” is used to encompass a larger geographic area in the Mississippi River Basin. Its geographic scope varies according to subject matter and source document usage.

Additionally, it should be noted that the border between Illinois and Missouri is on the Missouri side of the Mississippi River. Most of the Project, including the powerhouse, is located in Illinois with the exception of a section of the transmission line.

## 1.5 Pre-Application Document Overview

To begin the initial stage of the FERC licensing process, the Applicant has filed this PAD in accordance with the requirements of 18 C.F.R. § 5.6, together with Applicant’s NOI to seek a license following ILP. The purpose of the PAD is to provide resource agencies and interested parties (stakeholders) existing, relevant, and reasonably available information relative to Applicant’s proposed Project. The information presented was obtained by the Applicant through its exercise of due diligence in the preparation of the PAD, and the outreach process described below. This information is intended to help stakeholders identify concerns and related information needs, develop study requests and study plans, and prepare documents analyzing the Applicant’s license application that will follow. The information contained in the PAD consists of such current and historical information that is relevant to describing the existing environment and potential effects of the Applicant’s proposed Project. This information includes that which is available in the public realm, as well as information which the Applicant has obtained from the appropriate resource agencies and interested parties, which the Applicant has contacted. The Applicant was not obligated to conduct studies in order to generate information for inclusion in this PAD. The Applicant has generated as much information about the proposed Project and its environmental effects as is reasonably practicable at the present time as required by FERC regulations, and has incorporated such information into the PAD.

## 1.6 Description of Consultation Process Undertaken by the Applicant Prior to the Submittal of the PAD

The Applicant will continue consultation with the following resource agencies that FERC identifies as interested parties with respect to the PAD:

- Any state agency with responsibility for fish, wildlife, and botanical resources, water quality, coastal zone management plan consistency certification, shoreline management, and water resources;
- USACE;
- U.S. Fish and Wildlife Service (USFWS);
- Environmental Protection Agency (EPA);
- State Historic Preservation Offices (SHPOs);
- Tribal Historic Preservation Offices (THPOs);
- National Park Service (NPS);
- Local, state, and regional recreation agencies and planning commissions; including but not limited to the Illinois Department of Natural Resources (IDNR), the Illinois EPA (IEPA), the Missouri Department of Natural Resources (MDNR), and the Missouri Department of Conservation (MDC).
- Local and state zoning agencies; and,
- Any other state or Federal agency or Indian tribe with managerial authority over any part of Project lands and waters.

The Applicant has begun a preliminary stakeholder consultation and participation process in advance of filing the PAD. The purpose of this outreach was to request information relevant to preparation of a PAD, determine the relationships between stakeholders’ issues and Project operations, and identify likely study needs in advance of the start of the formal licensing process. Documentation of consultation completed to-date is included in **Appendix A** as a list of stakeholder contacts and distribution list made by the Applicant.

## 2. Process Plan and Schedule

### 2.1 Process Plan

In accordance with FERC's regulations governing the ILP in 18 CFR § 5.5, the Applicant is using the ILP for the licensing process. The Applicant will comply with the requirements of 18 CFR § 5.5.

### 2.2 Schedule

The FERC licensing process is officially initiated by the filing of the PAD, and an NOI to seek a 50-year license for the development of the Project with FERC.

Public and joint agency meetings will be held to discuss the PAD and resource studies that may need to be undertaken and their timing in order to assess resource effects. Desktop study plans will then be developed and distributed for agency and stakeholder review and comment. It is proposed that field studies be conducted after license issuance but before construction begins. Once the desktop study plans are finalized, studies will be undertaken, and the results of studies will be compiled in draft study reports, which will be distributed for agency and stakeholder review. Upon completion of consultation on the desktop study reports, the Applicant will prepare and file a Final License Application with the FERC. The FERC will then review the application and undertake environmental review prior to rendering a licensing decision. The Applicant's anticipated schedule for the licensing process before issuance of the license is shown in **Table 2-1**.

*Table 2-1 Schedule*

<b>Stage</b>	<b>Estimated Schedule</b>
Conduct Public and Joint Agency Meeting	Second Quarter 2026
Develop and Consult on Study Plans	Third and Fourth Quarters 2026
Finalize Study Plans	First Quarter 2027
Conduct Desktop Studies and Issue Draft Study Report	First Quarter 2027 through Fourth Quarter 2027
Prepare and File Final License Application	Second Quarter 2027 through First Quarter 2028
Water Quality Certification Applications	Second Quarter 2028

# 3. Project Location, Facilities, and Operations

## 3.1 Applicant

The Applicant for this Project, Lock+™ Hydro Friends Fund X, LLC, is a domestic limited liability company.

The mailing address for the Applicant is as follows:

Lock+™ Hydro Friends Fund X, LLC  
2901 4<sup>th</sup> Avenue South, #B 253  
Birmingham, Alabama 35233

The exact name and business address of the person authorized to act as an agent for the Applicant is:

Wayne F. Krouse, CEO  
Lock+™ Hydro Friends Fund X, LLC  
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Birmingham, Alabama 35233  
Phone (877) 556-6566  
Email [wayne@hgenergy.com](mailto:wayne@hgenergy.com)

## 3.2 Existing Project Facilities

### 3.2.1 Location

The Melvin Price L&D Project spans the Mississippi River at River Mile 200.78 upstream from the confluence of the Mississippi and Ohio Rivers and is located approximately 2 miles downstream of the City of Alton, Illinois. Road access to the Project is provided by U.S. Highway 67 on the west side (Missouri) and Illinois State Highway 143 (Great River Road) on the east.

### 3.2.2 General

The Project consists of a gated dam with nine tainter gates, one 1,200-foot main lock, one 600-foot auxiliary lock, upstream and downstream guidewalls for both locks, and an overflow dike located between the Illinois abutment (pier 11) and the spur dike/Missouri access road. The Project is bounded in Illinois by the Wood River Levee and in Missouri by the Spur Dike/Missouri access road (a.k.a. Riverlands Way).

### 3.2.3 Dam

The non-navigable dam section consists of 11 piers, with two gatebays located between the locks and seven gatebays located on the Missouri side of the main lock. The pier stems support the service bridge (deck elevation 494 feet, National Geodetic Vertical Datum of 1929 [NGVD29]) and an emergency bulkhead crane. Nine 110-foot wide by 42-foot high tainter gates serve to regulate the pool level. All gate hoisting equipment is housed in the tops of the piers just below the service bridge level. The piers are founded on vertical and battered H-piles driven to bedrock or refusal. Foundation elevation for the piers is 359 feet, NGVD29 upstream to 349 feet, NGVD29 downstream. Gate sills (Ogee Crest) are at elevations 379 feet, NGVD29. A reinforced concrete stilling basin, approximately 105 feet in length with two rows of 8-foot wide by 8-foot high baffle blocks located at approximately 110 and 125 feet, respectively, downstream dissipate velocity and energy from water releases.

Transition to the river floor is accomplished with 50 feet of 42-inch-thick reinforced concrete paving which rises from the stilling basin floor elevation of 365 feet, NGVD29 on a 1V on 5H slope to elevation 370 feet, NGVD29 downstream. Both the stilling basin and paving blocks are placed on a 30-inch-thick graded filter. From the end of the paving blocks to approximately 1,470 feet downstream, scour protection consists of 6 feet of 3,500-pound top size riprap placed on

15 inches of 150-pound riprap, which was placed on 6 inches of bedding on filter cloth. This transitions to 42 inches of 1,000-pound top size riprap placed on 9 inches of bedding placed over filter cloth. The original upstream stone protection consisted of 20 inches of 400-pound riprap on 6 inches of bedding material that extended 64 feet upstream of the face of the dam. After scour holes were found upstream of several dam piers in 2007, the holes were filled with various-sized stone, including 5,000-pound top size riprap. Three rows of continuous sheet piling driven to elevation 335 feet, NGVD29 and located 12 feet upstream, 162 feet downstream, and 212 feet downstream of the dam centerline provide positive underseepage cutoff.

### 3.2.4 Main Lock

The 1,200-foot long by 110-foot wide reinforced concrete U-frame structure with base elevation 358 feet, NGVD29 for gate monoliths L-3 and L-17 and elevation 362 feet, NGVD29 for the rest of the lock structure is founded on vertical and battered H-piles driven to bedrock or refusal, except for monoliths L-17 and L-18. For these two monoliths, shorter piles that did not go to rock were used. Floor elevation of the lock is 374 feet, NGVD29. The lock walls rise to elevation 434.5 feet, NGVD29, 2 feet above cessation of navigation. The filling and emptying system contained within each lock wall consists of an interior, ported intake manifold upstream of the lift gate (monolith L-2); a 16-foot wide by 18-foot high culvert with 26 filling and emptying ports in each wall of the chamber; and an exterior, ported discharge manifold in both walls of monolith L-16. Filling and emptying of the lock chamber is controlled by upstream and downstream culvert tainter valves. Initially, control of the main lock was from the interim control house, which was located below the service bridge on monolith L-3, Missouri side. Upon completion of the auxiliary lock, control of the locks and dam was transferred to the central control house. Inspection galleries with floor elevation 422.5 feet, NGVD29 run the length of both lock walls from monolith L-3 to L-17. Monolith L-3 contains the upstream lift gate, the emergency bulkhead sill, and the maintenance (stop log) sills with controlling sill elevation 386 feet, NGVD29. Monolith L-17 contains the downstream miter gates, the emergency bulkhead sill, and the maintenance (stop log) sills with controlling sill elevation of 377 feet, NGVD29. Maximum lift is designed to be 24 feet. Positive seepage cutoff is provided with a continuous sheet pile cutoff driven to elevation 335 feet, NGVD29 that completely encloses the lock area. Additional cutoff lines were placed across the width of the lock at 68 feet, 429 feet, and 1,231 feet downstream of the dam centerline.

### 3.2.5 Upstream Guidewall – Main Lock

The upstream guidewall extends from a point 142 feet upstream, the end of the intake monolith on the Missouri side lock wall, to a point 1,641 feet upstream. The wall is founded on 6-foot diameter concrete-filled caissons driven to elevation 319 feet, NGVD29. Caissons are placed on 21-foot centers Missouri to Illinois and 26-foot 8-inch centers upstream to downstream. Stone protection, graded “C” stone, has been placed from natural ground to approximate elevation 370 feet, NGVD29. The upstream most monolith, UG-20, with base elevation of 364 feet, NGVD29, is founded on HP14X117 H-Piles. Other monoliths founded on the caissons have a base width of 32 feet from founding elevation 410 to 417 feet, NGVD29, backsloped to 9-foot width at elevation 425 feet, NGVD29, and remains at 9-foot width to top of wall elevation 434.5 feet, NGVD29. The opening between the caissons is reduced to elevation 404 feet, NGVD29 with a precast concrete diaphragm, 2-foot by 6-foot cross-section, placed between caissons in the upstream-downstream direction. Rubbing surfaces between elevation 410 feet, NGVD29 and the top of the wall are protected with wall armor.

### 3.2.6 Downstream Guidewall – Main Lock

The downstream guidewall, consisting of fifteen 35-foot diameter and one (DG-16) 57-foot diameter concrete filled sheet pile cells, extends 900 feet downstream from the end of the Illinois side lock wall. The rubbing surface is composed of six 7-foot by 8-foot cross-section precast reinforced concrete beams extending from elevation 393 feet, NGVD29 to top of wall elevation 434.5 feet, NGVD29. A PZ-27 sheet pile diaphragm wall, driven to elevation 350 feet, NGVD29, attaches to the backside of the bottom precast beam to form a cutoff between the sheet pile cells. Sheet pile cells were driven to elevation 338 feet, NGVD29, cleaned out to elevation 355 feet, NGVD29, and the cell filled with concrete. The guidewall cells are founded on H-piles (HP14X117) to provide guidewall stability.

### 3.2.7 Auxiliary Lock

The 600-foot long by 110-foot wide reinforced concrete U-frame structure, with base elevation 358 feet, NGVD29 for gate monoliths AL-3 and AL-10, elevation 362 feet, NGVD29 for monoliths AL-2, AL-4, and AL-9, and elevation 364 feet, NGVD29 for the rest of the lock structure, is founded on vertical and battered H-piles driven to bedrock or refusal. Floor elevation of the lock is 374 feet, NGVD29. The lock walls rise to elevation 434.5 feet, NGVD29, 2 feet above cessation of navigation. The filling and emptying system contained within each lock wall consists of an interior, ported intake manifold upstream of the upper miter gates (monolith AL-2); a 12-foot wide by 12-foot high culvert with 14 filling and emptying ports in each wall of the chamber; and an exterior, ported discharge manifold in both walls of monolith AL-10. Filling and emptying of the lock chamber are controlled by upstream and downstream culvert tainter valves. Lock operation is controlled from the two control shelters on the Illinois wall. Inspection galleries with floor elevation 422.5 feet, NGVD29 run the length of both lock walls from monoliths AL-2 to AL-10. Monolith AL-3 contains the upstream miter gate and the two maintenance (stop log) sills with controlling sill elevation 377 feet, NGVD29. The emergency bulkhead sill is located in monolith AL-2. Monoliths AL-9 and AL-10 contain the downstream miter gate and the two maintenance (stop log) sills with controlling sill elevation of 377 feet, NGVD29. Maximum lift is designed to be 24 feet. Positive seepage cutoff is provided with a continuous sheet pile cutoff driven to elevation 335 feet, NGVD29 that completely encloses the lock area. Additional cutoff lines were placed across the width of the lock at 68 feet, 224 feet, and 616 feet downstream of the dam centerline.

### 3.2.8 Upstream Guidewall – Auxiliary Lock

The upstream guidewall is made up of twenty 35-foot diameter and one (AUG-1) 57-foot diameter concrete filled sheet pile cells which extend 1,188 feet upstream from the end of the Missouri side lock wall. The rubbing surface is composed of four 7-foot by 8-foot cross-section precast reinforced concrete beams extending from elevation 407 feet, NGVD29 to top of wall elevation 434.5 feet, NGVD29. Sheet pile cells were driven to elevation 338 feet, NGVD29, cleaned out to elevation 355 feet, NGVD29, H-piles driven to elevation 287 feet, NGVD29 or refusal, and the cells filled with concrete. Each cell, AUG-2 through AUG-21, is founded on forty 73-foot-long H-piles (HP14X117), top elevation 360 feet, NGVD29, to provide guidewall stability. AUG-1, the 57-foot diameter cell, is founded on eighty nine 73-foot H-piles. Stone protection, graded “B” stone, has been placed from approximate elevation 369 to 375 feet, NGVD29.

### 3.2.9 Downstream Guidewall – Auxiliary Lock

The downstream guidewall consists of twenty 35-foot diameter and one (ADG-21) 57-foot diameter concrete filled sheet pile cells that extend 1,188 feet downstream from the end of the Missouri side lock wall. The rubbing surface is composed of six 7-foot by 8-foot cross-section precast reinforced concrete beams extending from elevation 393 feet, NGVD29 to top of wall elevation 434.5 feet, NGVD29. Sheet pile cells were driven to elevation 338 feet, NGVD29, cleaned out to elevation 355 feet, NGVD29, H-piles driven to elevations between 280 and 290 feet, NGVD29 or refusal, and the cells filled with concrete. Each cell, ADG-1 through ADG-20, is founded on 36 H-piles (HP14X117), top elevation 360 feet, NGVD29, to provide guidewall stability. ADG-21, the 57-foot diameter cell, is founded on 89 H-piles. Stone protection, graded “B” stone, has been placed from approximate elevation 364 to 370 feet, NGVD29.

### 3.2.10 Overflow Dike

An overflow dike, approximately 2,000 feet in length with a crest elevation of 422 feet, NGVD29, is designed to span the low area between the abutment cells at pier 11 and the spur dike/access road. The centerline of the overflow dike is offset 14 feet downstream of the centerline of the dam. The overflow dike consists of a compacted clay embankment with a 29-foot crest width and 1V on 3H side slopes. Slope protection on the upstream side is provided by 19 inches of 650-pound riprap on 6 inches of bedding. Thirty inches of soil cement placed on 18 inches of pervious fill make up the downstream slope protection. An 18-foot-wide access roadway, consisting of 9 inches of reinforced concrete placed on 6 inches of compacted base material, extends along the crest of the dike. A 5-foot length sheet pile cutoff wall is embedded in the upstream footing of the roadway. Since the overflow dike was designed to provide

normal access to the dam from the Missouri side during construction, a vehicular turnaround was constructed on the upstream side of the dike near the abutment cells. To control underseepage, the overflow dike was constructed with a trapezoidal shaped cutoff trench 10 feet wide at base with 1V on 2H side slopes. The cutoff trench was backfilled with compacted impervious material from base elevation 405 feet, NGVD29 to natural ground or to a minimum depth of 5 feet. A downstream seepage berm, 140 feet in width, was constructed between the spur dike/access road and station 11+00Ax on the overflow dike. The seepage berm consists of 18 inches of 500-pound top size riprap on 6 inches of bedding placed over plastic filter cloth which was placed on 24 inches of sand. The riprap transitions into 15 inches of 150-pound top size at approximately 40 feet downstream. A 10-foot-wide toe apron, consisting of 18 inches of 500-pound top size riprap on 6 inches of bedding placed over plastic filter cloth on 24 inches of sand, protects the toe of the overflow dike between station 11+00Ax and the abutment closure cells at Pier 11.

## 3.3 Proposed Project Facilities

### 3.3.1 Project Overview

Lock+™ Hydro Friends Fund X, LLC, is seeking to obtain a license from the FERC to develop a hydroelectric project at the Melvin Price L&D located at Mississippi River Mile 200.78. The Project will span the Mississippi River from Madison County, Illinois to St. Charles County, Missouri. The Applicant for the Project is Lock+™ Hydro Friends Fund X, LLC, which is a domestic LLC referenced in this PAD as the “Applicant”.

The Project will utilize the existing Melvin Price L&D that is owned by the federal government and operated and administered by the USACE. The Project will operate in an ROR mode and will not alter nor adversely affect current or future USACE operations. By utilizing this existing structure, the Applicant will develop a new renewable energy resource for the region that will have minimal environmental effects.

The proposed Project described in this PAD is located in the States of Illinois and Missouri. The powerhouse is located in Illinois and the transmission point of interconnection (POI) is located in Illinois. **Figure 3-1** shows the Project location in relation to state and county boundaries as well as major geographical features. The Illinois state line is on the Missouri side of the Mississippi River. The approximate latitude and longitude of the existing dam are:

Latitude 38.8691° North

Longitude 90.15381° West

The Project boundary, **Figure 3-1**, includes all primary Project features and areas required for operation and maintenance. It is anticipated that these boundaries may be adjusted after further outreach meetings have been conducted. Major Project features including the headrace, powerhouse, tailrace, substation, transmission line, and access road are shown on **Figure 3-2**.

### 3.3.2 Proposed Project Features and Facilities

The Applicant’s proposed hydroelectric Project will be built using low-profile structures and aesthetics that preserve the qualities of the site. Modern, high efficiency generating equipment will be installed to maximize energy production.

The Project will include the construction of a new head race, a four-unit submersible powerhouse, and a tailrace located in Illinois even though it is on the Missouri side of the river. The Project will be located in Illinois and Missouri. The excavated trapezoidal head race will be approximately 400 feet in length by 315 feet in width at the invert. The head race will convey flow from the river upstream from the dam to the powerhouse located at the existing overflow weir spillway. The powerhouse will be constructed of precast concrete modules founded on 78-inch-diameter drilled piers. The powerhouse including the draft tubes will be approximately 325 feet long and 315 feet wide. The four identical turbines in the powerhouse will be 7.7+/- meter-diameter bulb-type turbines having a total maximum installed capacity of 100 megawatts (MW). The net design head is 18 feet. The minimum net head is 8.2 feet, and the maximum net head is 21.3 feet. The rated unit turbine flow is 17,834 cubic feet per second (cfs). Average annual

generation is estimated to be 407.33 gigawatt hour (GWh). Flow will exit the powerhouse into an excavated trapezoidal tailrace approximately 500 feet long by 315 feet wide at the invert. Flow will discharge from the tailrace into the Mississippi River.

The Applicant proposes an aerial transmission line that will transfer power from the powerhouse across the river upstream from the dam to an existing substation located on the Illinois side of the river. All transmission line towers will be terrestrially located. Power at 6.9 kilovolt (kV) will be transferred from the generators through switchgear and protective relays to a 138-kV step up transformer above the powerhouse roof. From the powerhouse, power will be transferred by an aerial line to an existing Midcontinent Independent System Operator (MISO) substation interconnection point located approximately 0.5 miles north of the dam in Illinois.

Powerhouse access will be provided by using the existing USACE access road.

### 3.3.3 Intake, Powerhouse, and Tailrace

The powerhouse will be constructed of precast concrete units that will be installed on H piles and a reinforced concrete mat foundation. The powerhouse will have four turbine units all contained within a low-profile powerhouse made of prefabricated concrete modules. The powerhouse will be comprised of an intake section, a turbine section, and a draft tube section. **Figure 3-2** shows a typical plan of the horizontal bulb turbine units. **Figures 3-3** and **3-4** show longitudinal and transverse cross sections of the powerhouse, respectively.

The powerhouse intake section will be comprised of four bays, each containing one turbine. Operable headgates will be installed on the upstream side allowing operators to dewater the bays for emergency shutdown, inspection, and maintenance. Inclined trash racks will span the entire width of the intake structure. The trash racks will have an estimated maximum approach velocity of 2.0 feet per second with bar spacing of 4-3/4-inch clear. An operator's deck will be constructed above the trash racks. The deck will have a traveling mechanical rake to remove debris from the racks. A trapezoidal excavated head race channel will be constructed from the river to a transition at the intake structure. The entrance to the head race at the river will be protected with riprap or other hard armoring to prevent scour. The excavated headrace will be protected with articulated concrete block armoring.

The turbine section of the powerhouse supports each horizontal bulb turbine unit. A mechanical room containing mechanical and ancillary systems will be located above this section. Each turbine bay will be approximately 54 feet and 6 inches wide. The roof of the powerhouse will have large hatches to facilitate the removal and re-installation of turbine elements. The transformer and electrical switchgear and mechanical equipment will be located in a structure adjacent to the powerhouse above the probable maximum flood elevation.

The draft tube portion of the powerhouse is a transition structure downstream from the turbine section. Each draft tube will have stoplog slots to accommodate the installation of bulkheads to provide emergency shutdown and to provide unit dewatering for inspection and maintenance. The bulkheads will be placed using a mobile crane. A trash sluiceway will be provided along the side of the powerhouse for passing organic debris and to provide aeration into the tail race when not being used for passing trash. An excavated tailrace channel will be constructed from the end of the draft tube section to the river. The channel will be protected with articulated concrete block armoring. The tailrace outlet at the river will be protected with riprap or other hard armoring to prevent scour and erosion.

A pipeline or tailrace low flow channel are proposed to provide flow to the sturgeon spawning area downstream from the dam.

Construction of the intake, powerhouse, and tailrace will be a large-scale construction project involving secant pile walls for cofferdams, dewatering, and mass excavation. The duration of construction will be approximately 2 years and will likely include two low water seasons.

The foundation design will be based on existing drawings from the USACE, new borings and laboratory testing of those new borings, geological surveys, and conditions encountered during construction. For locations that have rock foundations, rock surfaces will be cleaned and prepared for new structures. For locations that have soil foundations, either spread footings or piles will be used to support the structures as appropriate. It is anticipated that the

powerhouse will be supported by H pile extending to rock and a reinforced concrete mat foundation. The USACE dam and spillway piers are pile-supported with vertical and battered piles.

### 3.3.4 Transformer

A 6.9-kV to 138-kV step up transformer will be located in a transformer room above the powerhouse above the probable maximum flood level as defined by the USACE.

### 3.3.5 Transmission Line

Power will be transmitted from the powerhouse to a MISO substation in Illinois by means of an aerial 138 kV transmission line that crosses the upper pool.

### 3.3.6 Project Operation

The Project will operate in an ROR mode to minimize its impact on fluctuations of water surface levels within the upper pool. Project operation will meet the USACE's requirement of maintaining a relatively constant water surface elevation of between 412.5 feet, NGVD29 and 419.0 feet, NGVD29 in Pool 26. The only flow used for power generation will be flow that normally passes through the dam by the USACE. Project operations will be coordinated with USACE operations in order to avoid any adverse effect on lockage, flood control, upstream flooding, or minimum flow passed into the pool below the dam.

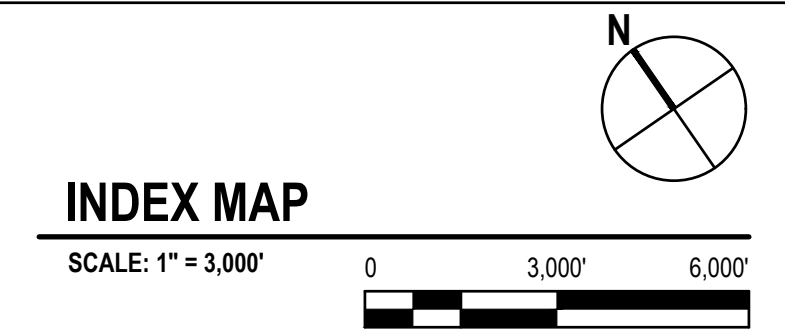
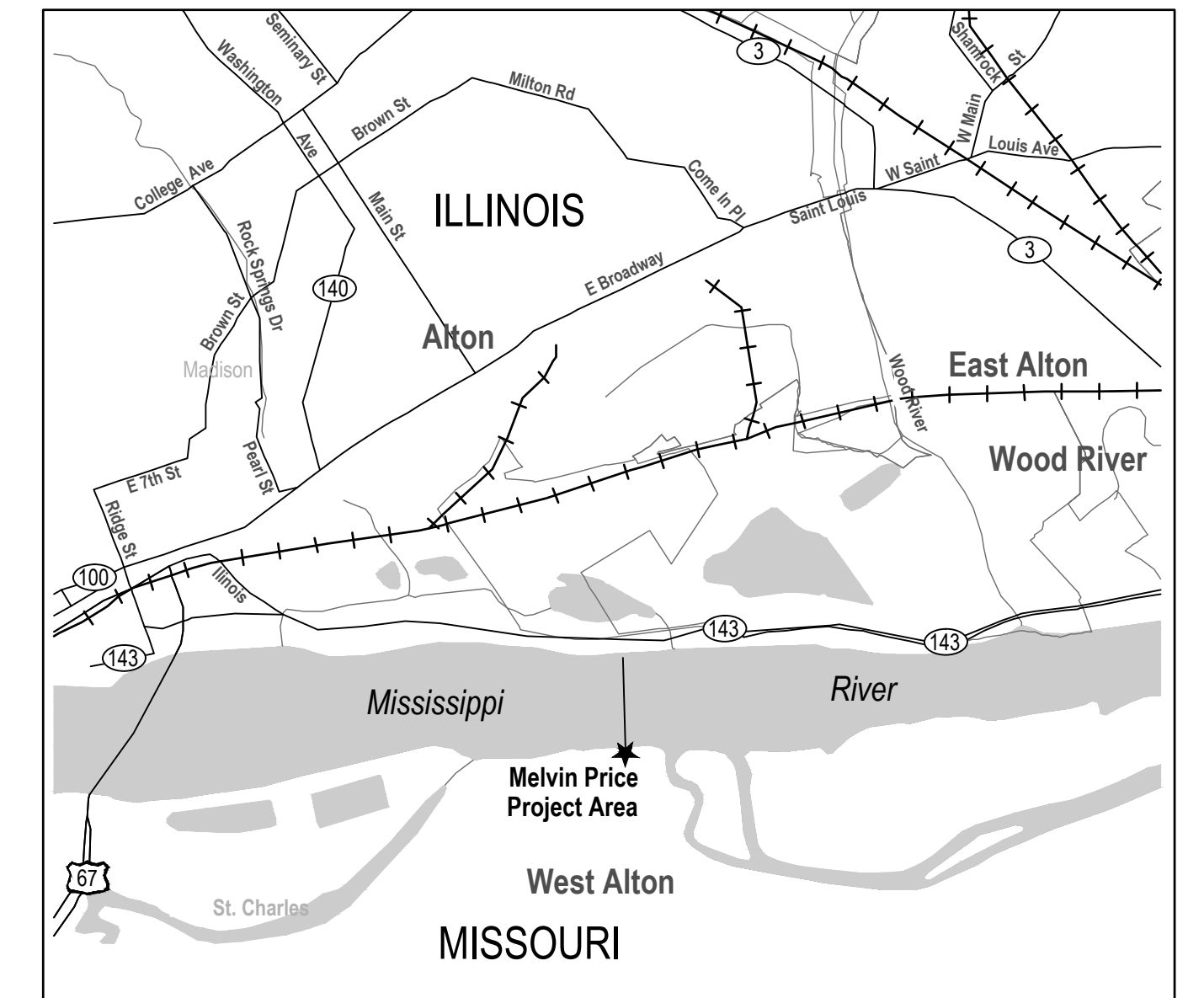
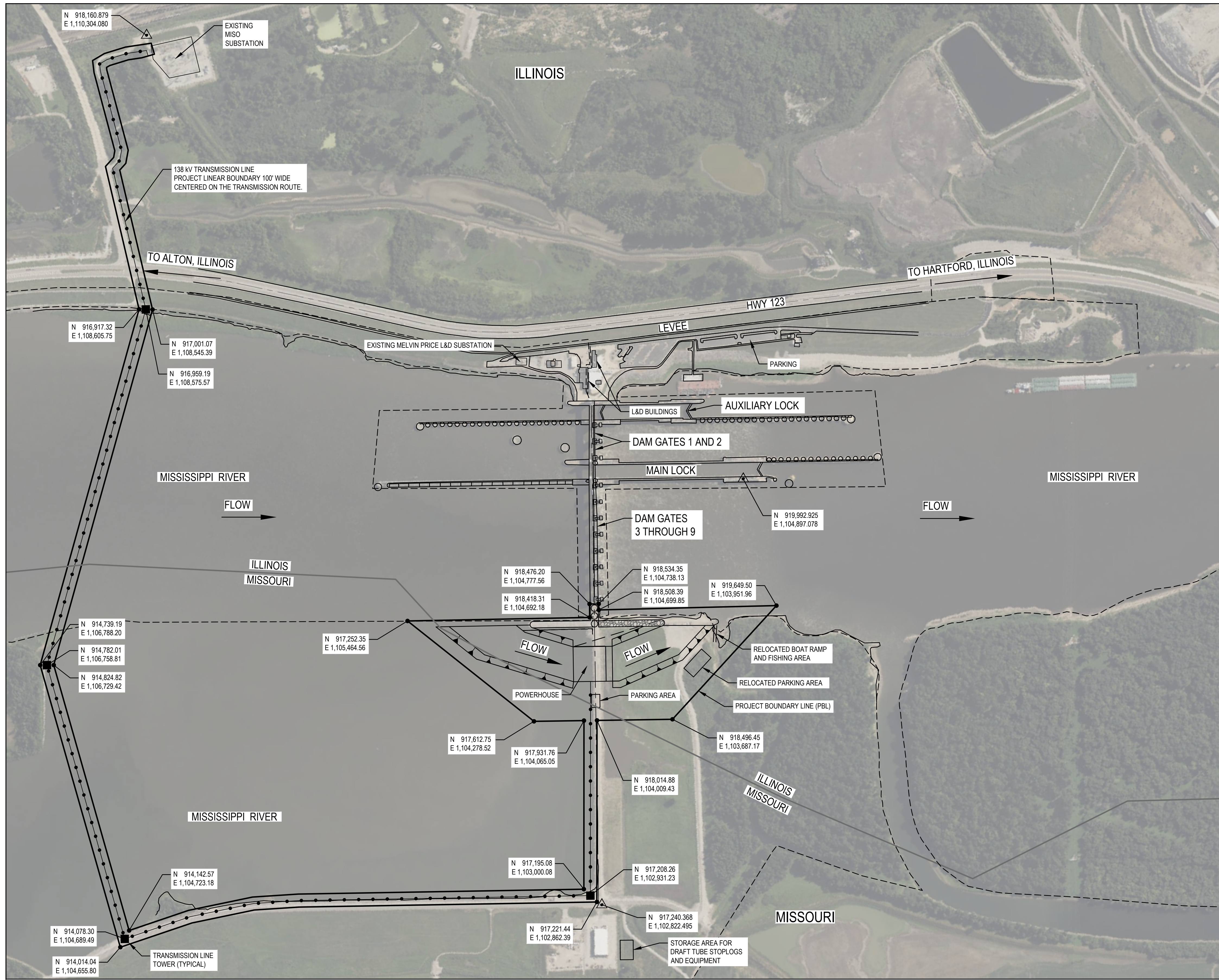
The average monthly flow at the Project ranges from approximately 89,000 cfs in December to 220,230 cfs in May. Minimum recorded average monthly flow at the Project occurred in September 1976 and was 21,340 cfs. Turbine flow for each unit ranges from approximately 3,560 cfs to 20,000 cfs. The operating plan for the Project requires a minimum downstream release of 1,000 cfs. On a continual flow basis, approximately 500 cfs is required to operate the locks. During the Sturgeon spawning season from approximately February 15 through April 1, a tainter gate opening for Gates 8 and 9 equal to 25 percent of the opening of Gates 3 through 6 is required to provide a flow velocity of 0.5 feet per second at the spawning area. This flow is variable depending on river flow and the opening of Gates 3 through 6. The Project includes the provision of providing flow at trial the sturgeon spawning area near the tailrace discharge. Even during the sturgeon spawning season, it is anticipated that there will always be sufficient water for the operation of at least one turbine unit. However, if flow and head are below the turbine operating range, the plant would go offline. During periods when river flow and head conditions are within the operating range of the proposed power plant, flow provided by the USACE would be diverted through the powerhouse. If river flow is greater than that required for the turbines, excess water would be discharged by the USACE through the tainter gates.

In addition to a pipeline that will provide flow to the sturgeon spawning area, the conceptual design includes a trash sluiceway adjacent to the powerhouse. The sluiceway will include a pneumatically operated gate or inflatable dam that can be lowered to provide aeration flow to the tailrace.

Table 3-1 Melvin Price Hydroelectric Project Data

Item	Value
<b>Reservoir</b>	
Normal Maximum Elevation	419.0 feet, NGVD29
Surface Area	25,900 acres Mississippi River 6,100 acres Illinois River
Storage Capacity	112,634 acre-feet (between Elevation 414 and 419 feet, NGVD29)
<b>Turbine Data</b>	
Number of Units	4

<b>Item</b>	<b>Value</b>
Type	Bulb, 7.7+/- meter runner diameter
Minimum Hydraulic Capacity	Approximately 3,560 cfs each unit
Maximum Hydraulic Capacity	Approximately 20,000 cfs each unit
Installed Capacity	100 MW (25 MW each unit)
<b>Transmission Line</b>	
Number	1
Length	2.8 miles
Voltage	138 kV
Interconnection	Existing MISO substation
<b>Energy Output</b>	
Plant Factor	46.5 %
Dependable Capacity	17.7 MW
Average Annual Energy Production	407.33 GWh
Average Monthly Energy Production:	
January	22.81
February	25.21
March	39.57
April	51.36
May	55.96
June	50.75
July	41.30
August	25.86
September	22.85
October	24.86
November	24.18
December	22.62
<b>Proposed Operation</b>	
Mode of Operation	Run-of-River
Lockage Flows	Intermittent Short-Term Flows for Lockage
Reservoir Operation	USACE Navigation
Flood Control Operation	Not Applicable



**SHEET GENERAL NOTES**

1. SEE SHEET 2 FOR POWERHOUSE PLAN.
2. SEE SHEETS 3 AND 4 FOR POWERHOUSE SECTIONS A, B, AND C.
3. HORIZONTAL DATUM BASED ON THE MISSOURI STATE PLANE COORDINATE SYSTEM: NAD 1983 MISSOURI EAST (FT).
4. ALL REFERENCED SURVEY DISTANCES ARE IN FEET (').

**LEGEND**

- REFERENCE POINT
- ROAD
- TRANSMISSION LINE - ABOVE GROUND
- TRANSMISSION LINE TOWER
- PROJECT BOUNDARY LINE (PBL)
- STATE BOUNDARY LINE
- USACE RIVERS PROJECT BOUNDARY LINE

**SITE PLAN**



**PRELIMINARY**

No.	Issue	Checked	Approved	Date	
Author	O. MALKO	Drafting Check	K. MOHOS	Project Manager	S. BALACHANDRAM
Designer	A. BLYSTRA	Design Check	A. BLYSTRA	Project Director	J. KULIKOWSKI

Bar is one inch on original size sheet  
0 1"



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Client **LOCK+™ HYDRO FRIENDS FUND X, LLC**  
Project **MELVIN PRICE HYDROELECTRIC PROJECT P-15257**

Title **SITE PLAN**

Project No. **12686191** Date **MARCH 2026** Scale **AS SHOWN**

Size **ANSI D**

Figure No. **3-1** Sheet **1 of 4**



## 4. Description of Existing Environment and Resource Impacts

The Melvin Price Locks and Dam Project was constructed during the 1979 through 1994 time period. The Project replaced the original Lock and Dam 26 that was located about two miles upstream. During construction, the area within the project boundary was significantly disturbed, including the area of the proposed hydroelectric project, as shown in **Figures 4-1 to 4-3**.



*Figure 4-1 Melvin Price L&D Construction Photograph*



*Figure 4-2 Melvin Price L&D Construction Photograph*



Figure 4-3 Google Earth aerial imagery dated April 6, 1988

## 4.1 Geology and Soils

There are several existing documents available with information regarding geology and soils for this Project. Most of the information presented in this section was taken from the report, Final Environmental Statement Report, Locks and Dam Number (No.) 26 (Replacement), dated June 1974.

### 4.1.1 Regional Geology

#### 4.1.1.1 General Regional Geology

The Project Area is located in the Mississippi River - Missouri River common alluvial valley near Alton, Illinois. In this alluvial valley area, the unconsolidated valley deposits consist of over 100 feet of alluvial and glacial deposits. Mississippian limestones directly underlie most of the Project site and form the abrupt bluffs bordering the broad valley. The Mississippian rocks dip gently to the east into the broad, shallow, Illinois Basin which extends all the way across the State of Illinois into Indiana and Kentucky.

Much of the area north of the Missouri River in Missouri and over most of the State of Illinois is blanketed by a veneer of glacial deposits derived from glaciation of Nebraskan, Kansan, Illinoian, and Wisconsin ages.

Northwest of the Project area lies the Forest City Basin, which occupies northwestern Missouri and adjacent portions of Nebraska, Kansas, and Iowa. Here beds of Pennsylvanian and Permian age dip towards the center of the basin at Forest City, Missouri. The basin was probably formed by a gentle down warping of the Mississippian surface and functioned as a depositional basin throughout the Pennsylvanian.

The major geologic feature in Missouri is the Ozark dome, which is centered in the St. Francois mountains, Iron County, Missouri. This dome is part of a broad, regional uplift which influences the geology of several states including the southern half of Missouri. Sediments dip away from the dome structure to the north towards St. Louis and to the east towards the Illinois basin and southeast towards the Mississippi River embayment. The major structural movement forming the Ozark uplift occurred in the Precambrian. Structural movement continued through the Paleozoic and possibly to the present time.

South of the Ozark uplift and the contiguous Illinois Basin, the Mississippi River embayment or structural trough extends as a spoon-shaped depression into southern Missouri and Illinois. Mesozoic and Cenozoic sediments, which form the Gulf Coastal Plain extend into this trough. New Madrid in southern Missouri is the site of the major earthquake events of 1811 and 1812 with earthquakes with magnitudes between 7 and 7.5. The earthquakes were most likely caused by deep seated pre-Cretaceous faulting beneath the Mississippi River embayment sediments.

Smaller geologic features near the Project site are the Dupou anticline, the Lincoln anticline, the Cap au Gras fault, and the St. Louis fault. Refer to **Section 4.1.1.4 - Structural Geology** for a discussion of these features.

## **4.1.1.2 Physiography and Topography**

### **4.1.1.2.1 Physiography**

The proposed Project straddles the boundary between the Till Plains section and the Dissected Till Plains section near the southern limits of the Central Lowland physiographic province. The northeastern limits of the Springfield-Salem plateaus section of the Ozark Plateaus province lies just a few miles south of the Project.

### **4.1.1.2.2 Topography**

The regional topography is comprised of the thoroughly dissected Ozark plateaus, the flat alluvial plains of the Mississippi and Missouri Rivers, and the glacial topography of the till plains.

## **4.1.1.3 Geologic History**

The Precambrian geologic history of the region, which includes the Project area, is generally obscure, except for the formation of the Ozark uplift about 1,350 million years ago. The Precambrian crystalline rocks are over 3,000 feet deep at the Lock and Dam No. 27 site. During the early and middle Cambrian, the area was generally stable and exposed to erosion. Beginning in late Cambrian, about 300 million years ago, and continuing into Pennsylvanian time, there were several periods of subsidence and uplift resulting in alternating periods of carbonate and clastic deposition and erosion. Since Pennsylvanian times, about 270 million years ago, uplift and erosion have apparently persisted. This has resulted in the deposition of alluvial materials in flood plain areas, weathering of rock units and formation of residual soils, and development of various solution features in the soluble carbonate rocks. The Pleistocene glaciers affected Missouri north of the Missouri River, and most of Illinois, leaving a blanket of glacial deposits, altering courses of rivers and topography, and producing characteristic glacial landforms. South of the glaciated regions, Pleistocene deposits consist of windblown loess (rock flour) associated with glacial action. This loess, or silt, deposits occur near the Mississippi River as far south as Mississippi but are not continuous. After the glaciation, which covered much of Illinois and Missouri, the Project area was affected by large quantities of melt water and deposition of outwash from the glaciers of Wisconsinan age. During recent times, the region has been exposed to erosion and weathering of upland areas, and deposition of alluvial materials in the flood plain areas.

## **4.1.1.4 Structural Geology**

Geologic investigations at the Lock and Dam No. 27 site revealed the absence of any geologic structure. The bedrock formations are in an essentially monoclinical attitude with gentle dips northeastward into the northern part of the Illinois

Basin. No apparent faults or off-sets have been discovered at the site. The structural position of the Project area is best described as near the western limit of the Illinois Basin on a general shelf between the Illinois Basin and the Ozark uplift. Locally, the gentle dips of the monocline are interrupted by small folds and faults, and in a few places by narrow zones of more intense deformation. The proposed Project area is located near the northeastern flank of the Dupo-Waterloo-Florissant anticlinal trend. The Cap au Gres fault - Lincoln anticline trend begins near the Alton, Illinois area and extends northwestward for about 165 miles. A smaller feature, the St. Louis fault has been traced from the bluffs, south of the Lock and Dam No. 27 site, in a southerly direction for about 45 miles.

1. The Dupo-Waterloo-Florissant anticline trend strikes north 10° west, and extends from Monroe County, Illinois, through Dupo, Illinois, and St. Louis, Missouri, to the Florissant dome in northern St. Louis County, and terminates at the Cap au Gres fault in Jersey County, Illinois. The anticline has a steep west flank with a series of closed structures lying along the apex.
2. The Cap au Gris fault is a narrow band of steeply dipping rocks and discontinuous faults extending from west-central Illinois to east-central Missouri in a general east-west direction. South of the fault zone, rocks of lower Paleozoic age are steeply upturned, and north of the zone the beds dip gently downward into the fault. The upthrown side is to the north, and the throw is approximately 1,100 feet. Prior studies indicate that the fault is a strike-slip fault with a horizontal displacement of about 30 miles, offsetting the Lincoln Fold and the Dupo-Waterloo-Florissant anticline.
3. The St. Louis fault strikes north 5° east with a width of several hundred feet. Two vertical fault planes with a net throw of 10 feet are visible in an abandoned quarry at 4528 South Broadway, St. Louis, Missouri. The upthrown side is to the east. The fault has been traced by geophysical methods for 15 miles north and 30 miles south of the outcrop area.
4. The so-called Lincoln Fold or anticline is effectively a series of faults or flexures trending northwesterly for about 165 miles. The southwest flank of the trend is marked by steep dips and faults while the northeast flank has more gentle dips with no faulting. The Cap au Gres fault is associated with the trend. It is thought that the Lincoln Fold and associated faulting resulted from regional uplift related to the Ozark uplift.

#### **4.1.1.5 Regional Stratigraphy**

##### **4.1.1.5.1 Bedrock**

The stratigraphic succession ranges in age from the Precambrian igneous and metamorphic rocks to the Pennsylvanian sediments of the Paleozoic era. The Precambrian rocks are exposed as the mountain peaks of the St. Francois Mountains located about 100 miles southwest of St. Louis. Near St. Louis the highly eroded Precambrian surface is buried by many hundreds of feet of limestone, dolomite, sandstone, and shale deposited by the Paleozoic seas. Representative formations from the Cambrian through the Pennsylvanian systems have been penetrated by deep wells in the St. Louis area. In general, the limestones make up the younger formations and dolomite the older with subordinate amounts of sandstone and shale occurring at irregular intervals throughout the section. Except where interrupted by minor folds and faults, the bedrock dips gently northeastward into the Illinois Basin.

Bedrock exposed in the Project area consists of formation of Mississippian and Pennsylvanian age. Mississippian limestones underlie the unconsolidated valley fill deposits and form the bluffs on both sides of the Mississippi River. Pennsylvanian sediments consisting of limestone, sandstone, clay, shale, and coal occur as outliners and filled sinks in Missouri. In Illinois, outcrops of the Pennsylvanian system occur as a series of relatively narrow bands of rock which represent successively younger beds dipping into the Illinois Basin.

##### **4.1.1.5.2 Unconsolidated Materials**

The unconsolidated deposits overlying bedrock in northern Missouri and much of Illinois are composed of gravel deposits of Tertiary Age, and Pleistocene glacial, alluvial, and eolian deposits. In the unglaciated Ozark region of southern Missouri, the unconsolidated deposits are chiefly residual in origin.

## 4.1.2 Site Geology

### 4.1.2.1 Site Location and Description

The site of the proposed Project is on the right bank area of Mississippi River, 200.78 miles upstream from its confluence with the Ohio River. The Missouri River joins the Mississippi River about 5.5 miles downstream of the site, and the Illinois River enters the Mississippi River approximately 17 miles upstream.

The valley near the site is shared by the Mississippi and Missouri Rivers, is approximately 6 miles wide, and is bounded by steep limestone bluffs which rise 100 feet or more above the flood plain. The lowland area between the two rivers, known locally as Portage de Sioux, is a broad, flat, nearly featureless surface used primarily for agriculture. The flood plain on the Illinois side of the Mississippi River is narrower near the Project site and is the northern extension of the American Bottoms, a much larger flood plain extending downstream for about 30 miles and attaining a maximum width of 11 miles.

### 4.1.2.2 Stratigraphy and Lithology

#### 4.1.2.2.1 Valley Fill

The valley fill material is composed of unconsolidated alluvial and glacial sediments which reach thicknesses up to 125 feet. The bulk of the material is made up of sand size particles; however, all sizes from clay to boulders are represented.

Special studies were conducted for the Lock and Dam No. 26 Project to determine the depositional environment and engineering significance of the various glacial and alluvial deposits of the valley fill materials. Samples of nearly 200 boring samples were examined to determine the origin, distribution, and manner of deposition of the sediments. Correlation and extrapolation of engineering characteristics are based largely on the geologic history of the deposits. Emphasis is placed on types of material, grain size, sorting, percentage of fines, and carbonate content. Results of these studies were compared with penetration studies, electric logs, geophysical studies, and mineralogical studies. Six depositional or stratigraphic units had been established from previous investigations and studies. These units are described below in descending order, from the youngest to the oldest.

##### 4.1.2.2.1.1 *Recent Flood Plain Deposits*

These deposits consist of clay, silts, and fine sand. They are noncalcareous to slightly calcareous.

##### 4.1.2.2.1.2 *Recent Alluvium*

This is primarily a sequence of well sorted sands with some fine gravel and occasionally isolated cobbles and boulders. These deposits are non-calcareous to slightly calcareous. Penetration rate by standard split spoon is usually from 15 to 40 blows per foot.

##### 4.1.2.2.1.3 *Wisconsinan Outwash*

This unit is the outwash sands and gravels believed to be of Wisconsinan age. They are usually fairly clean, well sorted, slightly to moderately calcareous, with scattered cobbles and boulders. Standard penetration rates are usually from 20 to 60 blows per foot. A recent seismic reflection survey suggests that this unit may be composed of two subunits separated by a thin gravel and cobble zone.

##### 4.1.2.2.1.4 *Illinoian Near Ice Deposits*

These are grey to grey-brown, poorly sorted, calcareous, silty sands and gravels with large cobbles and boulders. Gravel and cobbles are composed primarily of limestone, dolomite, and chert with lesser amounts of igneous and metamorphic rocks. Penetration rates by standard split spoon are highly variable, dependent on size and amount of the larger materials, but generally ranging 40 to 100+ blows per foot. This unit can often be detected on the electric log by a noticeable base line shift of the natural gamma curve to the right and a shift to the left of the resistivity curve.

#### **4.1.2.2.1.5      *Glacial Till***

This ice contact deposit is Illinoian in age, and is composed of grey, hard, compact, calcareous, clayey silt and silty clay with various amounts of sand, gravel, cobbles, and boulders. Larger gravel and cobbles are generally angular to subangular. The average clay/mineral composition of the till, as determined by the Illinois Geological Survey utilizing x-ray diffraction methods, is as follows: 44% illite, 34% expansive clay minerals, and 22% kaolinite plus chlorite. Percentages of gravel, sand, silt, and clay were also determined by the Illinois Geological Survey, and are summarized as follows: gravel, 3.5 to 7%; sand, 20 to 30%; silt, 35 to 55%; clay, 17 to 35%. Penetration of this unit by split spoon is very difficult. Blow counts range from about 80 to 100+ blows per foot to complete refusal.

#### **4.1.2.2.1.6      *Older Alluvial Deposits***

Older alluvium, sand, or gravel outwash. They are extremely varied in nature, and these are discontinuous patches of glacial lacustrine deposits, local in occurrence.

#### **4.1.2.2.2      *Bedrock***

Available seismic and boring information indicates that the top of rock at the proposed Project site is an undulating surface, which varies in elevation from about 275 to 305 feet. The highest elevations occur in the downstream area. The valley floor bedrock is about 85 to 90% limestone. A few small, thin patches of interbedded shale and sandstone overlie the limestone in the vicinity of the dam axis. At the downstream area of the Project, approximately 20 feet of shale and sandstone were encountered in overwater borings and over 70 feet were encountered in land boring a few hundred feet farther downstream. Four relatively deep core borings were taken to determine formation identification and stratigraphic and structural relationships. Members of the Illinois Geological Survey made a detailed analysis of the core. Their findings identify the shale and sandstone as the lower Chester Series and the limestone as the Ste. Genevieve formation, both Mississippian in age.

#### **4.1.2.2.2.1      *Chester***

The Chester Series is represented by alternating beds of shale and sandstone. The shale is moderately soft to moderately hard, calcareous, and arenaceous with thin beds of sandstone and limestone. It varies in color from greenish-grey to dark grey, and reddish-brown to brown. The sandstone is hard, tight, dirty grey, very fine grained to fine grained, and often contains thin light greenish-grey, sandy shale seams.

#### **4.1.2.2.2.2      *Ste. Genevieve***

The Ste. Genevieve limestone is light grey, hard, dense, sub-lithographic to medium crystalline, stylonitic, and thin to massively bedded. Sandy texture and oolitic zones are common. The base of the formation is marked by a light greenish-grey shaly zone containing small limestone inclusions. Laboratory strength tests and visual inspection of the core indicate a hard, competent limestone with no evidence of deep weathering or solution activity. Several high angle fractures have been noted in the core, but they are generally tight. The open fractures are usually fresh and un-weathered and appear to have been opened by drilling action. Total thickness of the formation is about 35 to 40 feet.

#### **4.1.2.2.2.3      *St. Louis***

The St. Louis formation underlies the Ste. Genevieve and has been penetrated by some of the deeper borings. It is a grey, hard, lithographic to medium crystalline, medium to massively bedded limestone. The formation contains a few zones of hard, blue-grey chert nodules and bands interbedded with fine crystalline limestone. Approximately 40 feet from the top of the formation, there are two zones of dolomite and dolomitic limestone. These zones are dark grey, hard, fine crystalline, pitted, and vary in thickness from about three to eight feet. The total thickness of the formation has not been penetrated at the damsite.

## 4.1.3 Groundwater Geology/Hydrogeology

### 4.1.3.1 General

The proposed site for the proposed Project lies in the alluvial valley of the Mississippi River about its confluence with the Missouri River. The valley fill at the site consists of approximately 0 to 20 feet of clays and silts (referred to as the "blanket" materials or "top stratum") underlain by approximately 70 to 100 feet of pervious soils (sand, sandy gravels, gravel, etc.). The pervious soils extended to bedrock or, if present, glacial till. The thick layer of pervious soils beneath the top stratum readily conducts groundwater through its interconnected voids and is referred to as the "aquifer." To study the movement of groundwater, several small diameter observation wells, or piezometers, had been installed in the lock and dam area. The elevation to which the groundwater will rise in a piezometer may be considered as a point on the aquifer's piezometric surface. Where the piezometric surface is within the aquifer, it may also be referred to as the "water table", and the aquifer is said to be an unconfined or water table aquifer. Where the piezometric surface is above the aquifer, in the impervious top stratum or above ground, the aquifer is termed confined or artesian. An intermediate case, in which the top stratum is impervious in comparison to the permeability of the aquifer yet sufficiently permeable to permit significant recharge of the aquifer, is termed "leaky artesian." The aquifer at the Project site contains all three types of areas, and particular areas may vary confined to unconfined conditions, depending upon river stage.

### 4.1.3.2 Missouri Side Aquifer Characteristics

On the Missouri side of the river, the Missouri and Mississippi Rivers share a common flood plain, as they run parallel courses only a few miles apart for a distance of about 10 miles upstream of their confluence. The aquifer extends continuously between the two rivers and permits groundwater to flow to or from both rivers. In the natural state (without considering the effects of the existing Locks and Dam No. 26) and at periods of steady river stages, groundwater enters the aquifer by percolation from the surface and flows toward the nearer of the two rivers, forming a rise in the piezometric surface between the two rivers. The groundwater between this rise and a straight line between the two river levels is termed the accretion component and is fed from rainfall; the groundwater beneath this is referred to as the boundary component. The location of the line dividing the components is dependent on the stage of the two rivers. In addition to the groundwater movement toward the rivers, there is movement in a downstream direction at a gradient generally proportional to the gradient of the two rivers. During periods of rising river, as the river stage becomes higher than the adjoining piezometric surface, flow reverses and the rivers recharge the aquifer. Upon periods of sustained high water, such as in the spring, the aquifer may be recharged to the river level, rainfall may superimpose a new accretion component, and the piezometric surface may assume a shape similar to its original configuration at a higher elevation. This phenomenon accounts for seasonal variations in the piezometric surface. In a similar manner, years that are wetter or dryer than average will produce long-term variations in the piezometric surface. After construction of the original locks and dam in the late 1930s, the pool area was changed from an uncontrolled river to a controlled pool at a relatively constant elevation of 419 feet, NGVD29 in 1974. As a result, the groundwater regime was changed to its present-day situation. At and beyond about 2 miles upstream of the existing dam, groundwater flow from the pool generally balances the accretion. Groundwater flow is from the accretion rise (and usually the pool) to the Missouri River along a path generally perpendicular to the two rivers. Beyond about 2 miles below the existing dam, groundwater flow is essentially unaffected by the dam and occurs in the natural condition discussed above. Within a 2- or 3-mile radius of the dam, groundwater movement is a complex situation as water flows from the pool toward both the Missouri River and the tailwater. The tailwater, being closer to the pool and generally at a lower elevation, exerts a greater influence, and groundwater flows from the pool to the tailwater follows a counterclockwise path centered around the south end of the dam. During above normal Missouri River stages and as the pool is drawn down, the groundwater flow situation temporarily reverses, and flow is from the Missouri River to the pool. As river stages continue to rise and the dam gates are drawn out of the river ("open river" conditions), the dam's influence on the groundwater regime ceases. During a major flood, as overbank flooding takes place, the aquifer becomes totally saturated and the piezometric surface beneath a flooded area becomes coincident with the surface of the floodwaters. To determine the characteristics of the Missouri aquifer, a total of 40 permanent piezometers and a test well have been installed in the aquifer. A comprehensive pumping test was performed on the

Missouri test well in September 1971. The test well was located on the centerline of the proposed dam axis about 1,500 feet from the river. To determine the horizontal permeability of the aquifer, a fully penetrating pump test was performed with flow measurements taken at 5-foot increments to the full depth of the well. Computed coefficients of permeability for various elevations in the aquifer varied from a minimum of  $1,130 \times 10^{-4}$  centimeters per second (cm/sec) to a maximum of  $6,030 \times 10^{-4}$  cm/sec with an average value for the aquifer of  $2,150 \times 10^{-4}$  cm/sec. An independent check on the coefficients of permeability was made using an empirical relationship between grain size distribution and permeability developed by the U. S. Army Waterways Experiment Station, and the results were in good agreement with the observed values.

#### **4.1.3.3 Illinois Side Aquifer Characteristics**

The vertical configuration of the Illinois side aquifer is similar to the Missouri side; that is, a thick layer of sands and gravels overlaying bedrock and in turn overlain by a thin impervious top stratum of clays and silts. However, the areal extent of the aquifer is considerably less than on the Missouri side due to the proximity of the bluffs, which form the boundary of the aquifer. Just above the existing locks and dam, the bluffs border the river, and the divergence of the bluffs and river near the existing locks and dam marks the beginning of the vast flood plain known locally as the American Bottoms. Because of this location, the existing pool has little or no influence on groundwater levels in the aquifer, which is in sharp contrast to conditions on the Missouri side. To study the characteristics of the groundwater regime on the Illinois side, nine permanent piezometers and a test well have been installed; in addition, there were a number of existing piezometers adjacent to the Wood River Levee. Under natural conditions, groundwater would be expected to move from the base of the bluffs to the riverbank, with a reversal of this movement as the aquifer is recharged during periods of high water. However, heavy industrial use of groundwater in the Alton riverfront area has created a broad area of groundwater depression such that groundwater movements, even at low river stages, are from the river to the pumping centers. Such movement due to heavy pumping is termed induced infiltration. Because the Wood River Levee provides flood protection up to a river stage of about elevation 445 feet, NGVD29, or about 20 to 25 feet above much of the surrounding ground, piezometric levels landward of the levee during flood periods may rise above the ground surface. Such excess piezometric pressures may cause unstable conditions at the toe of a levee in the form of sand boils and uncontrolled seepage, which, if unchecked, may undermine a levee by subsurface erosion. To prevent such problems, the Wood River Levee is protected by a series of pressure relief wells in locations where soil conditions warrant. The purposes of such relief wells are to lower the piezometric surface in the immediate vicinity by discharging water. They will not and are not intended to control groundwater levels in the entire flood plain. The wells have no pumps and discharge only when the piezometric surface is above the well outlet. At other times, the wells have no effect on the groundwater regime. A single fully penetrating pumping test was performed on the Illinois test well in October 1971. Coefficients of horizontal permeability varied from  $220 \times 10^{-4}$  cm/sec to  $8,870 \times 10^{-4}$  cm/sec with a weighted average of about  $2,600 \times 10^{-4}$  cm/sec. As was the case for Missouri well, the computed permeability coefficients were in reasonably good agreement with estimated coefficients determined from grain size distribution.

#### **4.1.3.4 Groundwater Quality**

The groundwater taken from the Mississippi River alluvium both upstream and downstream from Locks and Dam No. 26 had been chemically characterized. The data represents a series of tests run on private and public wells throughout the area under consideration. For the Locks and Dam No. 26 Project, the tests were run over a period of years, the first being April 1, 1942, and the last being January 25, 1973. The chemical constituents are given in ionic form in parts per million.

Groundwater quality in the Mississippi River aquifer from River Mile 197 to 228 varies considerably from well to well. The quality of water may also vary with well depth (Schisht, 1965) as well as with the rate of pumping. The quality is also influenced by the source of the water; for example, wells located near the bluff line will receive groundwater from the uplands, whereas wells located in the flood plain will receive recharge from the river or upstream from the aquifer.

Test results show a high variability of chemical constituents.

Iron content ranges from 0.06 parts per million (PPM) to 19.8 PPM. Given a U. S. Public Health Association Standard (American Public Health Association, 1971) of 0.3 PPM, only five of the 43 tests listed are acceptable for drinking

water. Manganese levels are also highly variable, ranging from an acceptable level of 0.02 PPM to an unacceptable level of 2.33 PPM (0.05 PPM is the highest acceptable level for potable water). Nitrate (NO<sub>3</sub>) levels vary widely, from 0.0 PPM to 36.9 PPM, although none of these exceed the U. S. Public Health Standard of 45 PPM. Sulfate (SO<sub>4</sub>) levels range from 0.2 PPM to 264.7 PPM, which exceeds the Public Health Standard of 250 PPM. None of the wells sampled exceeds the chloride (Cl) limits of 250 PPM, but values do range from 0.0 to 200 PPM. Fluorine (F) contents are generally low (0.1 to 0.41 PPM) and do not exceed Public Health Standards for potable water. Dissolved residue on evaporation reflects the amount of dissolved solids present on the water. Approximately one-third of the wells tested exceed the Public Health Standard of 500 PPM for dissolved solids.

Water from this aquifer, while considered safe for drinking, does require treatment for use in home and city water supplies. Although untreated water would not endanger health, excessive hardness causes difficulty in washing clothes and decreases wear life. Hardness causes clogs in pipelines, home washers, and water heaters. Treatment methods vary in the Project area from no treatment in farm wells to a sophisticated Split-Treatment method for the City of St. Charles, Missouri (Payette, 1973). Basically, this system aerates the water to remove gases, adds lime to remove calcium, magnesium, iron and adjust the pH, and adds chlorine to purify and stabilize the water. The water is also filtered several times during the treatment process. Water hardness is reduced from approximately 356 PPM to about 80 PPM of calcium carbonate to enhance its usability for cleaning in water systems. Turbidity values for several wells exceed the recommended limits; however, this seems to be a local problem of adequate well design and operation, rather than a regional problem. Water from this aquifer is not unusual or hazardous in its quality. Iron and magnesium contents are high, but this represents a problem of hardness and usability, rather than a danger of water quality. Several locations which suggest possible sources of groundwater contamination are:

1. The fly ash disposal pond for the Sioux Passage fossil fuel generating plant.
2. River bottom accumulation from liquid wastes discharge from Illinois near River Mile 201 (temporarily blocked).
3. Effluents from sewage treatment plants, which do not meet state standards.
4. Periodic waste accumulation in recreational boat harbors.
5. Sanitary landfills that are unacceptable by 1974 standards either in original construction or method of operation. None of these singly or in concert with others is considered to be a real cause for present or future general concern.

## 4.1.4 Soils

### 4.1.4.1 General

Surficial soils within the Project area are entirely of recent alluvial origin, geologically classified as flood plain deposits. As typified by soils of similar genesis, these surface soils are of a highly heterogeneous nature in both vertical and lateral extents. Properties such as soil texture, color, plasticity and other physical characteristics may be expected to vary widely over relatively short distances. Textural classifications range from sands to highly plastic clays and some organic deposits, depending on the detailed depositional history at the particular location. Soils having a preponderance of sand sizes are found at depth and, in general, gradations become coarser with depth.

Flood plain deposits within the Project area may be of four landform or morphological types: 1) point-bar (meander-bar) deposits, 2) abandoned channel fillings, 3) natural levee deposits, or 4) backswamp deposits (U. S. Army Engineer District, St. Louis, 1972). Each type deposit has its own characteristic topographic expression and associated soil type.

Point-bar (meander bar) deposits (Thornbury, 1969) mark former or presents courses of the principal channel. Well-defined point-bar deposits exhibit a low ridge and swale topography, and soil types vary from sand to silt. Poorly defined point-bars exhibit similar depositional heterogeneity but have no discernible topographic expression.

Channel fillings (Thornbury, 1969) are deposits made in abandoned stream channels. Cut-off channels are formed when the stream abandons a portion of its circuitous channel for a more direct route. Abandoned channels may generally be recognized as topographic lows with definite directional characteristics. Soils found in an abandoned

channel are typically clays of moderate to high plasticity; organic content may also be high. The thickness of the clay depends on the size of the abandoned channel and the degree to which that channel has been filled in. Thicknesses of up to 20 feet may be expected to occur in this area of the Mississippi and Missouri Rivers.

Natural levee deposits (Thornbury, 1969) are formed during times of flood when water spills out over the banks, losing velocity and depositing silt and sand. Natural levees are low ridges that parallel a river course, either present or former. They are highest near the river course and slope gradually away from it.

Backswamp deposits (Thornbury, 1969) are those that were laid down in the flood plain landward of natural levees. They consist of interlayered deposits of silt and clay. Areas of backswamp deposits are usually marked by very flat relief and by drainage networks that reflect the position of older drainage lines.

**Figure 4-4** presents the NRCS Web Soil Survey Map with data dated September 2, 2025, which depicts the specific soils that occur in the Project area and vicinity. At the proposed powerhouse and tailrace, the soil is identified as 66037, which is a Chequest silt loam having 0 to 2% slopes.

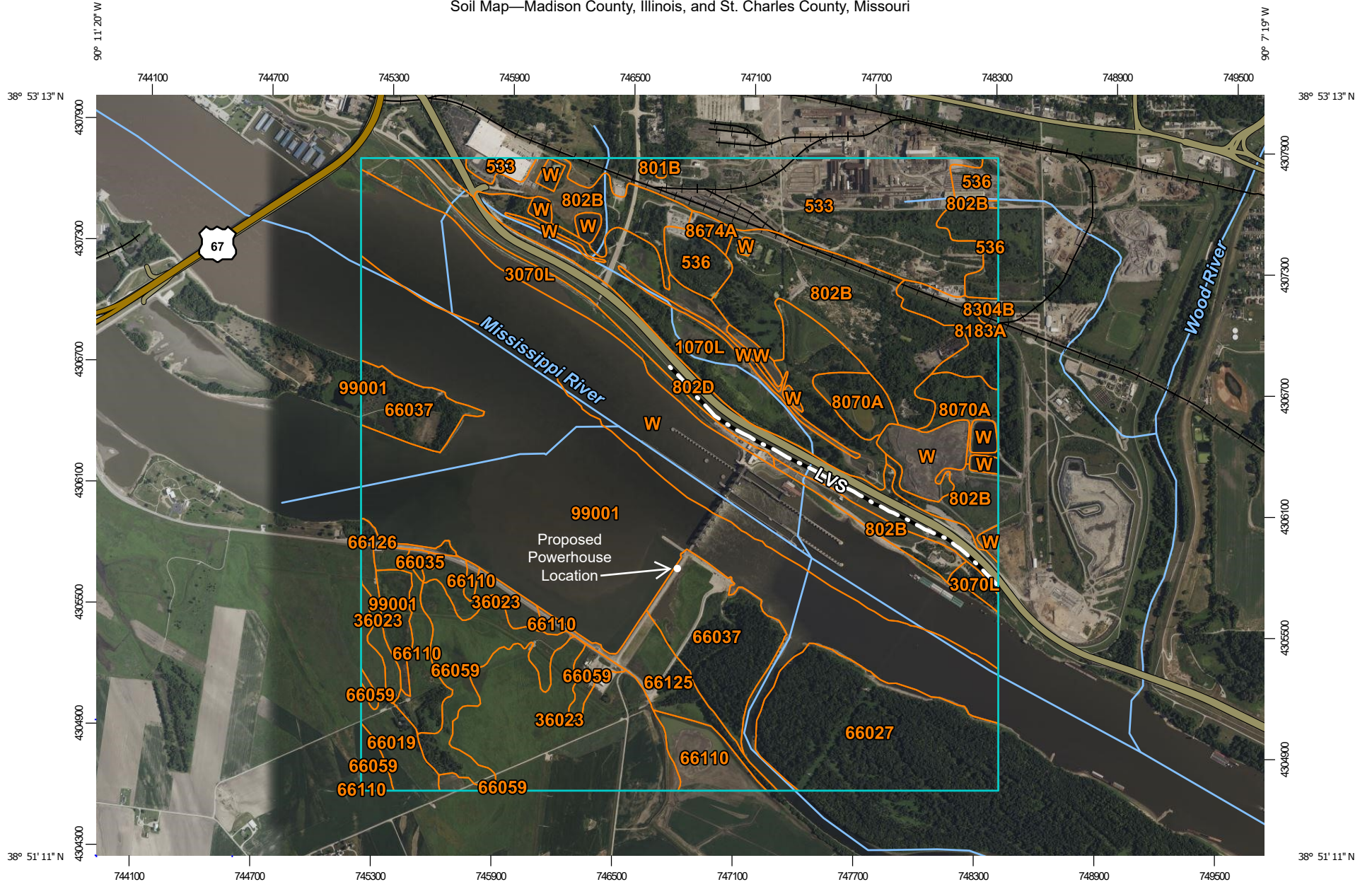
#### **4.1.4.2 Fertile Soils and Availability of On-Site Soils for Recreational Activity**

The fertile soils derived from the alluvial deposits are primarily composed of fine textured clays intermingled with fine sandy loams. Major difficulties with these soils are weed control, maintaining fertility, and drainage. Relatively fertile, dark, grayish-brown soils with silt loam surfaces have developed from loess overlying glacial tills on the gently sloping to rolling areas of the Illinois plains. Light-colored soils with silt loam surfaces have developed on the loess deposits and the moderately to steeply sloping areas on the Missouri side. These soils are less fertile than those found in the floodplains and the Illinois plains.

Bottomland soils suitable for recreational development are limited due to flooding, poor drainage, and seasonal water tables. Recreational sites and improvements must be planned and designed with a firm understanding of the flood hazards and precautions to minimize damage and maintenance costs.

Summary of Project site area soil characteristics are listed in **Table 4-1** (USACE, St. Louis District, The Master Plan, Rivers Project, Design Memorandum No.3, dated 2025c).

**Figure 4-4 NRCS Web Soil Survey Map**  
 Soil Map—Madison County, Illinois, and St. Charles County, Missouri



Map Scale: 1:26,600 if printed on A landscape (11" x 8.5") sheet.

0 350 700 1400 2100 Meters


0 1000 2000 4000 6000 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N WGS84




## MAP LEGEND

### Area of Interest (AOI)

 Area of Interest (AOI)

### Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

### Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

### Water Features



Streams and Canals

### Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

### Background



Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at scales ranging from 1:12,000 to 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Madison County, Illinois

Survey Area Data: Version 20, Aug 31, 2025

Soil Survey Area: St. Charles County, Missouri

Survey Area Data: Version 27, Sep 2, 2025

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 22, 2022—Aug 25, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
533	Urban land	186.9	7.6%
536	Dumps	49.4	2.0%
801B	Orthents, silty, undulating	1.4	0.1%
802B	Orthents, loamy, undulating	229.8	9.3%
802D	Orthents, loamy, hilly	95.5	3.9%
1070L	Beaucoup silty clay loam, undrained, 0 to 2 percent slopes, occasionally flooded	148.4	6.0%
3070L	Beaucoup silty clay loam, 0 to 2 percent slopes, frequently flooded, long duration	52.4	2.1%
8070A	Beaucoup silty clay loam, 0 to 2 percent slopes, occasionally flooded	43.1	1.8%
8183A	Shaffton clay loam, 0 to 2 percent slopes, occasionally flooded	30.7	1.2%
8304B	Landes very fine sandy loam, 2 to 5 percent slopes, occasionally flooded	1.5	0.1%
8674A	Dozaville silt loam, 0 to 2 percent slopes, occasionally flooded	6.3	0.3%
W	Water	384.6	15.6%
<b>Subtotals for Soil Survey Area</b>		<b>1,229.9</b>	<b>49.9%</b>
<b>Totals for Area of Interest</b>		<b>2,463.9</b>	<b>100.0%</b>

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
36023	Landes fine sandy loam, 0 to 2 percent slopes, occasionally flooded	181.5	7.4%
66019	Lowmo silt loam, 0 to 2 percent slopes, occasionally flooded	33.2	1.3%
66027	Carlow silty clay loam, 0 to 2 percent slopes, frequently flooded	155.9	6.3%
66035	Hodge loamy fine sand, 0 to 2 percent slopes, occasionally flooded	3.0	0.1%
66037	Chequest silt loam, 0 to 2 percent slopes, frequently flooded	118.0	4.8%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
66059	Peers silty clay loam, 0 to 2 percent slopes, occasionally flooded	82.8	3.4%
66110	SansDessein silty clay, 0 to 2 percent slopes, occasionally flooded	63.5	2.6%
66125	SansDessein silty clay, 0 to 2 percent slopes, frequently flooded	36.8	1.5%
66126	Haynie-Treloar-Blake complex, 0 to 2 percent slopes, frequently flooded	5.1	0.2%
99001	Water	554.1	22.5%
<b>Subtotals for Soil Survey Area</b>		<b>1,233.9</b>	<b>50.1%</b>
<b>Totals for Area of Interest</b>		<b>2,463.9</b>	<b>100.0%</b>

Table 4-1 Project Area Soil Characteristics

Soil Unit	Landscape Position	Surface Text	Rate of Surface Runoff	Depth to Water Table	Internal Drainage	Flood Hazard	Open-Land	Wood-Land	Suitability for Wildlife	Suitability For Recreation Uses	Slope Range (%)
I (Hapludalfa)	Uplands and terraces	Silt loam and fine, sandy loam	Slow to medium	As shallow as 3 to 4 feet in spring	Well-drained to moderately well-drained	No	Yes	Yes	Wetland	*	0 to 18
II (Ochraqualfa)	Uplands, terraces, and outwash plains	Silt loam and loam spring	Slow to medium poorly spring	As shallow as 1 to 3 feet in spring	Somewhat poorly to poorly drained	No	Yes	Yes	No	Moderate to Severe	<3
III (Albaqualfs)	Uplands and terraces	Silt loam ponded	Slow to 2 feet in spring	Less than poorly drained	Poorly to very poorly drained	No	Yes	Yes	Yes	Severe	<2
IV (Udifluvents)	Bottom lands	Silt loam	Slow	1 to 3 feet in spring	Well-drained and somewhat poorly drained	Yes	Yes	Yes	Yes	Moderate to Severe	0 to 2
V (Fluvaquents)	Bottom lands	Silt loam	Slow	0 to 3 feet in spring	Poorly to somewhat poorly drained	Yes	Yes	Yes	**	Moderate to Severe	<2
VI (Hapludolls)	Bottom lands	Silt loam	Slow	Fluctuates with adjacent streams	Moderately well-drained	Yes	Yes	Yes	Yes	Moderate to Severe	<2
VII (Haplaquolls)	Bottom lands	Silty clay	Slow to ponded	0 to 2 feet in spring	Poorly to very poorly drained	Yes	Yes	Yes	No	Severe	0 to 2
VIII (Argiudolls)	Uplands and terraces	Silty loam and Silty clay loam	Slow to ponded	Less than 3 feet in spring	Poorly and somewhat poorly drained	No	Yes	Yes	Yes	Moderate to Severe	0 to 3

**Notes:**  
 Moderate - limitations need to be recognized; but can be overcome with proper planning.  
 Severe - limitations are difficult to overcome and require careful planning.  
 \* - Slight on gentle slopes to severe on steep slopes.  
 \*\* - Depends on drainage.

#### **4.1.4.3 Potential Erosion, Mass Soil Movement, Scour and Associated Instability**

At the Melvin Price Locks and Dam (formerly Lock and Dam No. 26) on the Upper Mississippi River, erosion, mass soil movement, slumping, and related forms of geotechnical instability are important considerations due to the scale of the structure, the hydraulic forces involved, and the long history of navigation and flood-control operations at the site.

##### **4.1.4.3.1 Existing and Potential Erosion Conditions**

The Project is located in a high-energy river environment where fluctuating water levels, strong currents, and vessel traffic contribute to ongoing erosion processes. Bank erosion has been observed along portions of the riverbanks upstream and downstream of the dam, particularly where natural banks interface with engineered features such as guide walls, training dikes, and revetments. During high-flow events, increased velocities and turbulence can accelerate the removal of fine-grained soils, leading to localized scour and bank retreat.

##### **4.1.4.3.2 Mass Soil Movement and Slumping**

Slumping and slope instability are potential concerns along embankments, riverbanks, and areas adjacent to Project facilities. These conditions can be exacerbated by rapid drawdown of water levels, prolonged saturation of soils, or seepage pressures behind retaining structures and embankments. In areas where cohesive soils overlie weaker or more erodible layers, rotational slumps or shallow slides may occur, especially following flood events or seasonal freeze–thaw cycles.

##### **4.1.4.3.3 Scour and Foundation-Related Instability**

Scour is a key issue near the dam structure itself, particularly downstream in the stilling basin and tailwater areas where high-velocity flows dissipate energy. If not properly managed, scour can undermine concrete structures, lock walls, or adjacent riprap protection, potentially leading to settlement or cracking. Similarly, localized scour around piers, abutments, and guide walls can contribute to differential movement or loss of support.

##### **4.1.4.3.4 Project Facilities and Operations Contributing to These Conditions**

Several Project facilities and operational factors may influence erosion and instability:

- Dam and Lock Operations: Changes in gate settings and discharge rates can cause rapid fluctuations in water levels and flow velocities, increasing erosion potential and contributing to slope instability through drawdown effects.
- Navigation Traffic: Towboats and barges generate propeller wash and drawdown that can erode banks and slopes near lock approaches and mooring areas.
- Training Structures and Revetments: While designed to stabilize channels and banks, aging or damaged revetments and dikes may allow erosion to initiate behind or beneath them, leading to slumping or failure if not maintained.
- Drainage and Seepage Paths: Inadequate drainage behind walls or embankments can increase pore water pressures, reducing soil strength and increasing the likelihood of mass movement.

##### **4.1.4.3.5 Ongoing Monitoring and Management**

To address these issues, the Project typically relies on regular inspections, bathymetric surveys, and geotechnical monitoring to identify early signs of erosion, scour, or instability. Maintenance measures may include riprap placement, slope regrading, repair of revetments and drainage systems, and operational adjustments during extreme flow conditions. These efforts are critical to maintaining the structural integrity, navigational reliability, and long-term safety of the Melvin Price Locks and Dam complex.

## 4.2 Water Resources

This subsection summarizes the sources used to provide the basis for the Project's geographic setting, navigation and pool context, climatological (temperature) characterization, stream gaging and drainage area, CWA implementation and state water quality standards, and the identification of nearby sensitive waters immediately downstream of Melvin Price L&D:

- United States Geological Survey (USGS) existing environmental and physical characteristics of the Melvin Price L&D (USGS, 2026a);
- National Oceanic and Atmospheric Administration (NOAA) National Centers for Environmental Information (NCEI) U.S. climatological norms (NOAA NCEI, 2021);
- NOAA tailwater, traces, and thresholds from Melvin Price L&D and St. Louis gages (NOAA, 2026b);
- USGS Water Data for Stations 05587450 and 05587500 (USGS, 2026a); and
- United States EPA Water Quality Standards Regulations for the states of Illinois and Missouri (EPA, 2026a).

### 4.2.1 Existing Environmental and Physical Characteristics

The Mississippi River is the primary river system of the central United States and one of the largest drainage networks in North America. Originating at Lake Itasca in northern Minnesota, the Mississippi River flows generally south for approximately 2,300 miles before discharging into the Gulf of Mexico. Along its course, the river integrates major tributary systems, including the Illinois, Missouri, and Ohio Rivers, and serves as a critical navigation corridor, water supply, and ecological resource.

The Melvin Price L&D Project Area is located on the Upper Mississippi River at approximately River Mile 200.78, near Alton, Illinois, and immediately upstream of the confluence with the Missouri River. The Project reach lies within Pool 26, which extends upstream to Lock and Dam 25 near Winfield, Missouri. The Mississippi River drainage area at the Project Area is approximately 171,300 square miles (sq. mi.), reflecting contributions from the Upper Mississippi River basin as well as major tributaries entering upstream, including the Illinois River. All major tributaries influencing hydrology at the Project Area enter the Mississippi River upstream of Melvin Price L&D, and no significant tributaries enter the river between the Project Area and the downstream confluence with the Missouri River.

The downstream reach potentially influenced by Project hydraulics is a low-gradient, regulated river segment extending from the Melvin Price L&D tailwater gage (ALNI2) to the St. Louis gage (EADM7). Using concurrent stage readings, the most recent representative water-surface gradient for this reach was approximately 0.31 feet per mile, based on (a) Melvin Price L&D tailwater stage of 3.64 feet (ALNI2) and (b) St. Louis stage of 12.7 feet (EADM7), converted to water-surface elevations using the published gage zero datums. Because stage differences between ALNI2 and EADM7 vary with discharge, backwater effects, and gate operations, the gradient should be reported as a range across representative low-, median-, and high-flow conditions using paired time-matched gage records for ALNI2 and EADM7 (NOAA, 2026b).

The Upper Mississippi River is fully navigable in the Project Area and is operated by the USACE as part of the federally authorized 9-foot navigation channel. Melvin Price L&D is one of 29 lock-and-dam facilities on the Upper Mississippi River and is operated to maintain navigation depths and pool elevations. Upstream of the Melvin Price L&D, USACE operates Lock and Dam 25, while downstream navigation conditions are influenced by Lock and Dam 27 near Chain of Rocks, Missouri. The proposed Project would operate within this existing navigation framework and would not alter upstream or downstream pool elevations controlled by USACE.

Regional climate conditions for the Project Area are characterized using long-term climatological data from the Alton, Illinois area, including records from the Alton Melvin Price climate station. The climate is classified as humid continental, with warm summers and cold winters, with water pH averaging 8.3. Climatological data show that precipitation averages 45.36 inches per year, with most rain falling in the spring. Temperatures range from an average monthly maximum of 87.3°F in July to a minimum of 21.7°F in January, reflecting strong seasonal variability typical of the central Mississippi River Valley. These temperature patterns influence seasonal river conditions, including ice

formation during winter months and elevated water temperatures during summer low-flow periods (NOAA NCEI, 2021).

A summary of monthly average air temperatures applicable to the Project Area is provided in **Table 4-2**, which presents long-term normal temperature conditions for the Alton, Illinois vicinity.

**Table 4-2** Monthly Climate Normals for the Melvin Price L&D Area

Month	Temperatures (°F)			Precipitation (inches)
	Monthly Maximum	Monthly Minimum	Monthly Mean	Monthly Mean
January	39.0	21.7	30.3	2.53
February	43.7	25.2	34.5	2.52
March	53.5	34.7	44.1	3.46
April	66.1	45.2	55.6	4.92
May	75.0	56.1	65.6	5.46
June	83.7	65.6	74.6	3.40
July	87.3	69.3	78.3	3.95
August	86.0	67.3	76.6	3.30
September	80.1	59.8	70.0	3.38
October	67.9	48.0	57.9	2.93
November	54.3	36.5	45.4	3.43
December	43.5	27.1	35.3	2.59
Year	65.0	46.4	53.4	Total Average Year Precipitation: 45.36

Source: NOAA NCEI, 2021

The Project is not expected to measurably affect Mississippi River water temperatures at the Melvin Price L&D, nor in the downstream reach. The Project would not alter USACE pool elevations or the seasonal hydrograph and would use only the flow already passed through the dam by USACE. Under ROR conditions, the Project functions as a pass-through diversion of routing a portion of existing dam releases through turbines and returning it to the river, rather than as a storage/peaking facility that could change residence time, thermal stratification, or seasonal temperature regimes. The proposed headrace and tailrace would convey water from the upstream pool to the powerhouse and back to the river over relatively short distances. In a large river with continuous throughflow, routing water through a turbine passage does not inherently heat or cool the water at a scale detectable beyond localized mixing zones, provided the Project does not create prolonged impoundment or deep withdrawal layers that differ thermally from surface layers.

## 4.2.2 Hydrology

The USGS maintains multiple stream gages in the vicinity of the Melvin Price L&D that are used to characterize hydrologic conditions in the Project Area. The nearest upstream USGS gage that records streamflow (discharge) on the Mississippi River is USGS Gage 05587450, Mississippi River at Grafton, Illinois, which is located upstream of the Project Area and downstream of the confluence with the Illinois River. According to the USGS, the drainage area at this gage is approximately 171,300 sq. mi., and it provides a long-term, continuous record of daily, monthly, and annual streamflow for the Upper Mississippi River in the vicinity of Pool 26. Based on available flow data from the USGS gage, flows were prorated based on the drainage area for the year of 2024<sup>1</sup>. The minimum, mean, and maximum discharge during 2024 was 34,900 cfs, 131,472 cfs, and 312,000 cfs, respectively (USGS, 2026a).

<sup>1</sup> 2025 data was incomplete, and therefore, not referenced.

## 4.2.3 Water Quality

The Federal CWA is implemented in the Upper Mississippi River through a cooperative framework involving the EPA, the USACE, the USGS, the USFWS, and state regulatory agencies. In the vicinity of the Melvin Price L&D, CWA provisions are administered primarily through state-adopted and federally approved water quality standards for Illinois and Missouri, which are implemented consistent with Section 303 of the CWA. These standards are designed to restore and maintain the chemical, physical, and biological integrity of the nation's waters, including the Mississippi River.

### 4.2.3.1 Federal Water Quality Standards

Water quality standards applicable to the Project Area are implemented under the CWA through a cooperative federal–state framework. Under CWA Section 303(c) and EPA's implementing regulations (40 CFR Part 131), states adopt water quality standards (WQS), including designated uses, water quality criteria (numeric and narrative), and antidegradation policies, which are then reviewed and approved by the EPA or are otherwise in effect for CWA purposes. In the Project Area, the federally applicable standards are therefore the Illinois and Missouri WQS that EPA has approved or that are in effect for CWA purposes, and these standards serve as the regulatory basis for permit limits, compliance determinations, and water quality management decisions.

Because the Project is considered to be located in Illinois, specifically due to the powerhouse and tailrace located on the Illinois side of the Mississippi River, Clean Water Act (CWA) Section 401 water quality certification authority would be exercised by Illinois as the certifying authority for the federal license/permit, consistent with EPA's Section 401 framework requiring certification from the state in which the discharge originates. However, because the Project occurs on an interstate waterway and project-related discharges or water quality effects could extend across the state line, Missouri may still have a role through EPA's Section 401(a)(2) "neighboring jurisdiction" process if a discharge from the federally licensed activity may affect the water quality of another state. In implementing CWA requirements, the federally effective water quality standards used to evaluate project-related conditions and compliance include the EPA-posted state water quality standards "in effect for CWA purposes" for both Illinois and Missouri. EPA's compilation includes Illinois standards (35 IAC Parts 302 and 303) and Missouri standards (10 CSR 20-7.031), which establish designated uses, numeric and narrative criteria, and antidegradation provisions applicable to the Mississippi River and relevant to Project evaluation (EPA, 2026a).

In addition to state WQS, EPA develops national recommended water quality criteria pursuant to CWA Section 304(a). These criteria are scientific recommendations for protecting aquatic life and human health in surface waters, and they provide guidance that states and tribes may use when adopting or revising WQS. The EPA maintains a consolidated set of national recommended criteria tables that include aquatic life and human health criteria for approximately 150 pollutants, which can be relevant when evaluating potential effects of activities that may result in pollutant discharges or sediment disturbance (EPA, 2025b). Section 304(a) criteria serve as supporting federal guidance that informs state criteria development and may be referenced in permit evaluations, particularly where site-specific criteria development, translator methods, or narrative-to-numeric approaches are required (EPA, 2026b).

For activities requiring a federal permit or license that may result in a discharge to waters of the United States (e.g., USACE authorizations for dredge/fill or work in navigable waters), CWA Section 401 requires that the applicant obtain a state water quality certification (or waiver), confirming the activity will comply with applicable provisions of the CWA and state water quality requirements (EPA, 2025a). In Illinois, the IEPA's Section 401 program describes how certifications may include conditions and monitoring necessary to assure compliance with state WQS, and such conditions become enforceable conditions of the corresponding federal permit (IEPA, 2026). Because the Project will be licensed by FERC and may involve in-water work and discharges associated with construction, the Project will be evaluated for consistency with federally effective Illinois and Missouri WQS through the Section 401 certification process.

#### **4.2.3.2 Beneficial Uses**

The Mississippi River within the Project Area supports a range of existing beneficial uses that are regionally and nationally significant, including commercial navigation, municipal and industrial water supply, limited agricultural irrigation, recreation, and aquatic habitat support. The Melvin Price L&D is a critical element of the federally authorized 9-foot navigation channel, and maintenance of navigable depths and stable pool elevations is the primary operational constraint governing water management in Pool 26 (USACE, 2025b).

Municipal and industrial water supply withdrawals occur at multiple locations upstream and downstream of the Project Area and rely on consistent river levels, flow continuity, and water quality rather than project-specific flow regulation. Because the Project would not modify pool elevations or discharge patterns, it would not affect the availability, reliability, or operational constraints of water supply intakes. Agricultural irrigation use in the immediate Project Area is limited relative to overall river discharge and is similarly dependent on basin-scale hydrology and USACE operations; these uses would not be affected by Project construction or operation (USACE, 2025a).

State water resource planning frameworks for Illinois and Missouri generally attribute multiple beneficial uses to this segment of the Mississippi River, including navigation, water supply, aquatic life support, and recreation. The proposed Project is consistent with these planning assumptions, as it would not modify the hydrologic conditions upon which such beneficial uses are based.

Instream flow uses within the Project Area include fish spawning and migration, aquatic habitat maintenance, water quality support, recreation, and aesthetic values associated with the Upper Mississippi River corridor. These uses are sustained by the existing flow regime managed by USACE, including minimum downstream flows, stable pool elevations, and seasonal flow variability driven by basin hydrology. Sensitive instream uses include tailwater habitats that support fisheries (including documented sturgeon spawning), backwater habitats important for warm-water fish recruitment, and instream processes that maintain dissolved oxygen and temperature conditions suitable for aquatic life (USFWS, 2015).

Water rights in the Project Area are governed by a combination of federal navigation authority and state water law. The Mississippi River is a federally regulated navigable waterway, and USACE operations take precedence for navigation and flood control purposes. The proposed Project would be non-consumptive, would not require new water rights, and would not modify or impair existing water rights or pending water rights applications upstream or downstream. Project operation would occur entirely within the existing federal and state water management framework.

Because the Project would operate in an ROR mode and would not alter discharge magnitude, timing, duration, or spatial distribution, instream flow uses would remain unchanged. The Project would not store water, shift seasonal flow patterns, or reduce downstream releases below existing minimum flow requirements. Accordingly, no adverse effects on instream habitat availability, migration timing, or water quality-related instream functions are anticipated.

#### **4.2.3.3 Dissolved Oxygen**

Water quality criteria applicable to the Project Area are established under Illinois Administrative Code (35 IAC 302.206) which is approved by EPA for CWA purposes. For the protection of general use and warm-water aquatic life habitat in the Mississippi River, these standards include dissolved oxygen (DO) requirements intended to support fish, macroinvertebrates, and other aquatic organisms throughout all life stages, including spawning periods.

Applicable DO criteria for the Mississippi River in the Project Area include the following:

- Minimum dissolved oxygen concentrations sufficient to protect warm-water aquatic life must be maintained at all times. Under Illinois' general use standards for the main body of streams, DO must not be less than 5.0 mg/L at any time during March through July and 3.5 mg/L at any time during August through February.
- Average daily DO concentrations must meet or exceed levels protective of aquatic life uses. In Illinois, these include a 7-day average of daily mean DO of 6.0 mg/L during March through July, and during August through February a 7-day average of daily minimum DO of 4.0 mg/L and a 30-day average of daily mean DO of 5.5 mg/L.

- Seasonal protections apply during sensitive biological periods (e.g., spring spawning), during which higher DO concentrations are required to support successful reproduction and early life-stage development, as reflected in the more stringent March–July criteria relative to August–February criteria (IPCB 2023).

State-approved water quality criteria applicable to the Project Area are presented in **Table 4-3**, which summarizes DO calculations for the Mississippi River under Illinois and Missouri water quality standards.

**Table 4-3** Monthly summary of air temperature and dissolved oxygen for the Melvin Price L&D (USGS 2026b)

Month	Temperatures (°F)			Dissolved Oxygen, Water, Unfiltered, milligrams per liter
	Daily Maximum	Daily Minimum	Monthly Mean	Monthly Mean
January 2025	ND	ND	ND	ND
February 2025	ND	ND	ND	ND
March 2025	ND	ND	ND	ND
April 2025	ND	ND	ND	ND
May 2025	72.0	65.5	68.8	7.30
June 2025	69.1	85.6	77.4	7.44
July 2025	86.0	81.7	83.9	6.46
August 2025	85.1	77.0	81.1	7.33
September 2025	77.9*	75.0*	76.5	8.87
October 2025	77.0	57.7	67.4	7.68
November 2025	57.7	43.3	50.5	9.13
December 2025	43.2	33.4	38.3	13.4
January 2026	37.9	32.9	35.4	15.0

Notes:

\* - Represents incomplete data.

ND - No Data

Source: USGS 2026b.

Dissolved oxygen concentrations in large river systems are primarily controlled by flow velocity, turbulence, temperature, and residence time. The Project would operate entirely within the existing USACE-managed flow regime, utilizing only water already released through the dam. Pool 26 water surface elevations would remain within the established navigation operating range, approximately 412.5 to 419.0 feet, NGVD29, and the Project would not increase water residence time in the pool or tailwater. Because DO depletion is most commonly associated with increased residence time, increased temperatures, reduced velocities, or stratified storage conditions, the proposed ROR operation would not create conditions conducive to oxygen depletion. Additionally, the Project conceptual design includes an aeration channel that will be used to release water from the upper pool to the tailrace and increase DO concentrations.

#### 4.2.3.4 Sedimentation, Erosion, Turbidity

Sediment dynamics in the Project Area are strongly influenced by the Upper Mississippi River’s engineered navigation system and by the naturally high sand supply and transport capacity of the mainstem. The St. Louis District’s navigation maintenance program indicates that channel maintenance dredging in this reach is typically conducted using hydraulic pipeline dredges and that the excavated material is “almost always sand” within the District’s dredging operations footprint. Pool-scale investigations specific to Pool 26 also document that sedimentation processes and bed-material distributions vary by habitat type and hydraulic setting, with channelized areas dominated by coarse material while lower-energy off-channel areas trap finer sediments. The Illinois State Geological Survey’s Pool 26

sedimentology and bathymetry work provides a technical basis for understanding how bed material, depositional zones, and bathymetry interact across the pool (Goodwin et al., 1983).

Historical and long-term monitoring further indicate that sedimentation is a persistent management and ecological issue in Pool 26 backwaters and chutes. For example, USACE documentation for Pool 26 habitat rehabilitation identifies sediment deposition as a principal driver of backwater and slough infilling and consequent loss of off-channel habitat quality and connectivity (USACE, 1989). More recent USGS–USACE synthesis work for the Upper Mississippi River System (UMRS) emphasizes that hydrogeomorphic processes, including sediment transport and deposition, are key drivers of habitat condition and restoration prioritization at multiple spatial scales (Fitzpatrick et al., 2024).

Project construction would involve large-scale activities that have the potential to cause temporary, short-term, localized increases in turbidity and suspended sediments in the immediate work area. Turbidity increases during construction are most likely to occur during (1) mass excavation and channel shaping, (2) dewatering discharge and rewatering activities, and (3) armoring installation or bed/bank disturbance near the active channel margin. These effects are expected to be temporary and spatially constrained to the near-field area adjacent to work zones because the Mississippi River at the Melvin Price L&D has substantial discharge and mixing capacity, and because the Project would be implemented under a comprehensive erosion and sediment control framework consistent with CWA implementation. To manage these short-term risks, the Project should implement a detailed Soil Erosion and Sediment Control Plan and associated turbidity controls, including: staged excavation, stabilized construction entrances and haul routes, bank protection/armoring sequencing, silt control measures where practicable in low-velocity margins, controlled dewatering (with appropriate filtration/settling where needed), and rapid stabilization/revegetation of disturbed areas. The Illinois Section 401 Water Quality Certification program framework confirms that projects involving dredge/fill or alterations to beds/banks may require certification conditions and monitoring necessary to assure compliance with state water quality standards, with conditions becoming enforceable components of the federal permit (IEPA, 2026).

Operationally, the Project is expected to have minimal effects on basin-scale sediment transport and turbidity because it would operate in a run-of-river configuration using only flows already passed by USACE and would not modify the seasonal hydrograph or pool elevation management that drive long-term sediment transport patterns. Under ROR operation, system-wide sediment supply and transport remain governed by river discharge, navigation structure operations, and regional geomorphic drivers rather than by project-specific storage or flow regulation (Fitzpatrick et al., 2024). However, localized operational effects may occur at the immediate Project facilities due to hydraulics at the intake/tailrace interface. Specifically, headrace/tailrace bottoms and banks can be subject to localized scour and erosion during high-flow conditions, and localized sediment deposition may occur in lower-velocity zones created by channel geometry or structural transitions. Such localized effects are consistent with navigation-pool settings where bedforms and channel margins adjust to hydraulic gradients and structures. Continued maintenance may be required to preserve design capacity and limit secondary turbidity during maintenance events. The St. Louis District's dredge and channel maintenance program provides context that dredging and sediment management are ongoing operational realities in this navigation system, and that dredged material handling is routinely integrated with environmental coordination (USACE, 2026b).

In addition to standard erosion and turbidity controls, the Applicant has initiated early coordination with USACE regarding excavation spoils management and potential beneficial reuse opportunities. In a January 28, 2026, coordination memorandum, USACE and the Applicant discussed the potential to use an anticipated ~500,000 cubic yards of excavation spoils to support island building or enhancement efforts, which could provide additional shorebird habitat where consistent with USACE planning and environmental requirements. This approach is consistent with the St. Louis District's broader navigation maintenance practices, which note that dredged/excavated sand is routinely managed outside the navigation channel and that USACE coordinates dredging activities to be conducted in an environmentally sensitive manner, including exploring opportunities such as island creation and habitat enhancement where practicable (Hydro Green Energy, 2026a).

## 4.2.4 Nearby Sensitive Waters

In the vicinity of the Melvin Price L&D, the Riverlands Migratory Bird Sanctuary located upstream of the dam on the Alton Slough and the associated Maple Island complex located downstream of the dam, support extensive wetland and floodplain habitats that provide high-value resources for migratory birds and other wildlife. The Sanctuary encompasses approximately 3,700 acres and includes a 1,200-acre wetland/prairie restoration area adjacent to Melvin Price L&D that is managed with controlled water levels and supported by active stewardship and public access management. These wetland and riparian features function as a major concentration area for seasonal waterfowl, shorebirds, and raptors, including wintering bald eagles (USACE, 2026b).

Project design and implementation should explicitly account for the sensitivity of these downstream habitats. In particular, tailrace hydraulics and associated riverbed/scour conditions should be designed and operated to minimize adverse effects to downstream wetland function, island margins, and biologically important nearshore zones, if any. Additionally, USACE and partner monitoring has documented Lake Sturgeon spawning activity in the vicinity of the man made embankment adjacent to pier 11 on the downstream side of Melvin Price L&D, and recent cooperative flow management actions during spawning season from late February to April have been used to support spawning conditions at this location (USACE, 2024). Accordingly, the Applicant has initiated discussions with the USACE about empirically observed Lake Sturgeon preferences in flow conditions during the sturgeon spawning period. The Applicant has included in the initial design an aeration sluiceway that will support adequate dissolved oxygen levels in the tail race during the spawning period. This is detailed further in **Section 4.3**.

## 4.3 Fish and Aquatic Resources

This subsection summarizes existing sources used to characterize the aquatic community, evaluate Essential Fish Habitat (EFH) applicability, describe temporal and spatial patterns of fish and aquatic resource use, identify special aquatic considerations, including invasive carp species, and develop the monitoring and risk-assessment framework for the Project Area. These sources collectively reflect federal and state agency datasets, peer-reviewed studies, and long-term river monitoring programs applicable to the Upper Mississippi River near the Melvin Price L&D:

- USACE Upper Mississippi River navigation system and pool operations (USACE, 2025b);
- MDC/Upper Mississippi Conservation Area (MDC, 2026a);
- USACE and partner agencies concerning Lake Sturgeon spawning documentation at the Melvin Price L&D (USACE, 2024);
- USFWS species profiles and regional studies on Pallid Sturgeon and Spectaclecase Mussel (USFWS, 2026d; USFWS, 2026e);
- NOAA Fisheries EFH Mapper (NOAA, 2026a);
- USGS Long Term Resource Monitoring (LTRM) Program (LTRMP) along the Upper Mississippi River (USGS, 2026b); and
- USGS ecology studies concerning impacts of invasive carp species (USGS, 2003).

### 4.3.1 Existing Aquatic Community

The aquatic habitat of the Upper Mississippi River near the Melvin Price L&D is characterized primarily by a deep, channelized mainstem navigation corridor created and regulated by the USACE and its lock-and-dam system. Similar to other impounded reaches of the Mississippi River, water levels within Pool 26 are maintained at stable elevations to support navigation, resulting in broad expanses of slow-moving, lacustrine-like habitat in the impounded pool and higher-velocity flows in the tailwaters immediately downstream of the dam. Historical changes to the hydrologic regime have reduced natural seasonal water-level variability and altered ecological processes throughout the river corridor. As a result, much of the pool exhibits relatively uniform water depths and warm-water fish assemblages typical of large, impounded rivers, while diverse habitat conditions remain most pronounced in the tailwater zone below the dam where turbulence, scour, and variable velocities create more complex hydraulic conditions.

Tailwater areas below the Melvin Price L&D provide the most heterogeneous and productive aquatic habitat within this portion of the river. In these reaches, increased flow velocities, turbulent eddies, and localized scour create coarse-substrate patches and plunge pools that support a variety of game and non-game fish species. Similar to other large-river systems, these physical conditions provide microhabitats preferred by species that rely on cooler, faster-moving waters during seasonal low-flow periods. Within Pool 26 itself, USACE's Environmental Pool Management (EPM) efforts have demonstrated that modest reductions in summer water levels can regenerate emergent vegetation on exposed mudflats and shallow margins. These vegetated edges contribute to improved fish and wildlife habitat quality by increasing structural complexity along the river's littoral zone (USACE, 2026c).

The aquatic habitat base in the Project vicinity also benefits from the extensive backwaters, sloughs, and floodplain features associated with the Upper Mississippi Conservation Area, which spans 87 federally managed tracts between Alton, Illinois, and LaGrange, Missouri. These tracts include riverine wetlands, shallow off-channel areas, and backwater chutes that diversify the habitat mosaic beyond the relatively homogeneous main navigation channel. Such features provide important spawning, nursery, and foraging habitat for a range of fish species and mussels. Although the mainstem channel within Pool 26 is highly engineered and exhibits reduced habitat variability, the surrounding floodplain resources help offset this structural simplicity by supporting broader aquatic biodiversity (USFWS, 2026c).

Within the Project Area, several state-listed and federally listed fish and mollusk species are known or expected to occur in the Upper Mississippi River system. The Lake Sturgeon (*Acipenser fulvescens*), listed as state-endangered in both Illinois and Missouri, has documented spawning activity downstream of the Melvin Price L&D, demonstrating active use of tailwater habitat. In addition, the Pallid Sturgeon (*Scaphirhynchus albus*), a federally endangered species, occupies the Mississippi River in this region and is associated with the deep, swift main-channel habitats characteristic of the Project vicinity. Among mollusks, the Spectaclecase Mussel (*Cumberlandia monodonta*), federally listed as endangered, occurs within the Mississippi River Basin but is sparsely distributed due to its highly specific microhabitat needs and the fragmenting effects of dams, which restrict upstream movement and isolate small populations. No anadromous or catadromous fish species are known to occur in this portion of the Upper Mississippi River, and the system is dominated by resident warm-water species and potadromous fishes that move between pools, side channels, and tributaries for spawning and foraging. Movement of these species occurs through locks, gate releases, or crest overtopping during high-flow events.

## 4.3.2 Essential Fish Habitat

Under the Magnuson–Stevens Fishery Conservation and Management Act, EFH is designated exclusively for marine and coastal species managed by regional Fishery Management Councils. Because the Upper Mississippi River is a freshwater inland system, no EFH designated by the National Marine Fisheries Service (NMFS) occurs within or near the Project Area. Consequently, no federally designated EFH is present in Pool 26 or the surrounding reaches of the Mississippi River near the Melvin Price L&D. This determination is consistent with existing species distribution data and the absence of any anadromous or marine-managed species in this portion of the Mississippi River. The fish community in Pool 26 consists entirely of freshwater resident and potadromous species, with no anadromous or diadromous migrants known from this reach (NOAA, 2026a). Thus, EFH would not be affected by the Project.

## 4.3.3 Temporal and Spatial Distribution of Fish and Aquatic Communities

### 4.3.3.1 Species and Life Stage Composition

The aquatic community within Pool 26 is shaped by the regulated hydrology and habitat mosaic of the Upper Mississippi River, including tailwaters, main channel, side channels, and backwaters. Tailwater areas below the Melvin Price L&D support the highest species diversity, with coarse substrates, higher velocities, and increased oxygenation providing habitat for large-river specialists such as Lake Sturgeon, which has documented spawning activity at the Project site, and the Pallid Sturgeon (USACE, 2023). Off-channel habitats maintained within the Upper Mississippi

Conservation Area support early life stages of warm-water species, benefiting small-bodied fishes including minnows, sunfishes, and shiners through seasonal inundation and vegetation regrowth (Chick et al., 2005).

#### **4.3.3.2 Standing Crop**

Although no single comprehensive standing-crop estimate is available for Pool 26, habitat conditions indicate that fish biomass is highest in backwaters and tailwaters, where structural complexity increases prey and forage availability. Regenerated emergent vegetation and mudflat habitat produced by EPM have increased habitat productivity in portions of the Melvin Price Pool by improving conditions for aquatic vegetation and associated fauna. The dominant species contributing to the standing crop are expected to include freshwater drum, gizzard shad, sunfishes, and catfish, with large-river sturgeon contributing less to biomass but representing ecologically significant components of the assemblage.

#### **4.3.3.3 Age and Growth Data**

Age and growth information for target species in the Project vicinity is best documented for sturgeon populations. Lake Sturgeon in the Mississippi River exhibits slow maturation, long life spans, and periodic spawning cycles. The presence of multi-year successful spawning at the Melvin Price L&D indicates that suitable growth and recruitment conditions exist locally. Pallid Sturgeon, similarly long-lived and slow-growing, utilize deep main-channel habitats, and their population structure within the Mississippi River reflects recruitment constraints tied to habitat fragmentation. Mussel species such as the Spectaclecase also demonstrate exceptionally long lifespans and slow population turnover, with individuals documented to reach up to 70 years in age (DeLong et al., 2019).

#### **4.3.3.4 Spawning Run Timing**

Spawning activity near the Melvin Price L&D is strongly influenced by spring hydrology and temperature cues, with the most sensitive reproductive period occurring in late March through May for large-river sturgeons. For Lake Sturgeon, documented spawning below the Melvin Price L&D occurs during spring when tailwater conditions align with water temperatures approximately 50 to 55°F, relatively high near-bank velocities ranging from 0.5 to 4.0 feet per second, and clean rock/cobble substrate that supports egg adhesion and incubation. These conditions have been intentionally supported through tainter-gate manipulations at the Melvin Price L&D during the spawning season, and multiple years of spawning have been observed when gate operations produced the targeted near-bank hydraulic environment (USACE, 2023). The Applicant has discussed with the USACE the potential of creating an additional shallow spawning shelf towards the end of the tailrace. This shelf would be shallow enough to allow more rigorous scientific investigation of conducive conditions for spawning including substrate types and sizes.

For Pallid Sturgeon, spawning migrations and reproductive activity are generally associated with spring increases in discharge that cue upstream movements and aggregation in deep, swift main-channel habitats (USGS, 2016); however, Pool 26-specific timing and spawning confirmations are limited in the available record for this particular reach. Across the species' range, the prevailing management and science basis identifies spring flow pulses as an important driver for conditioning spawning substrates and cueing spawning movements, with adult pallid sturgeon capable of migrating long distances to reproduce during this period (USFWS, 2026d). Warm-water resident fishes (e.g., cyprinids and centrarchids) generally spawn during spring through early summer when rising temperatures and seasonal floodplain connectivity increase habitat availability in backwaters and shallow vegetated margins, supporting egg deposition and early rearing in low-velocity environments; these patterns are consistent with long-term Upper Mississippi River monitoring that emphasizes the ecological importance of connected backwaters for recruitment.

#### **4.3.3.5 Extent and Location of Spawning, Rearing, Feeding, and Wintering Habitat**

Within the Project vicinity, the most critical spawning habitat is concentrated in the tailwater immediately downstream of the Melvin Price L&D, where coarse substrates and hydraulically energetic near-bank flow fields occur. Recent coordination with USACE fisheries staff confirms that spawning has been observed and confirmed at the current tailwater site, including on limestone riprap and near the dam face, and that adults may use structured areas (e.g., behind large boulders) as lower-velocity refuge before moving into higher-velocity zones to deposit eggs. Habitat

attributes emphasized as most influential include consistent velocity, adequate oxygenation, and protection from sedimentation during incubation; in this setting, rock size may be less determinative than sustaining suitable velocities and oxygen supply over the incubation period. USACE fisheries staff also noted that Lake Sturgeon spawning is temperature-triggered (not solely flow-triggered), occurs over an extended duration, and typically occurs on sloped surfaces rather than flat substrates, with fish oriented upstream during spawning (Hydro Green Energy, 2026b). Consistent with these observations, suitable tailwater spawning conditions can be produced through operational gate settings and tailrace hydraulics that maintain a sustained period of appropriate nearshore velocities over rocky, sloped substrates (NOAA, 2026a). The Applicant has discussed with the USACE the potential of creating an additional shallow spawning shelf towards the end of the tailrace. This shelf would be shallow enough to allow more rigorous scientific investigation of conducive conditions for spawning including substrate types and sizes.

To reflect these site-specific insights in a design and effects context, the following Lake Sturgeon spawning habitat factors are most relevant to the Project Area:

- Substrate and refuge: Limestone riprap and boulder-scale structure are used; adults may stage in low-velocity refuge behind large boulders and then move to higher-velocity zones for egg deposition.
- Slope preference: Spawning has been associated with sloped areas more than flat surfaces, supporting the relevance of sloped rock shelf concepts where feasible.
- Flow duration: Sustained flow duration is necessary; short-term releases are insufficient for supporting spawning and incubation.
- Oxygenation and sediment protection: Eggs adhere to substrate and require oxygenation during incubation; limiting sedimentation and maintaining oxygenated flow through the substrate are critical.
- Hydraulic targets (planning-level): A preliminary design velocity range of approximately 0.5 to 4 feet per second was identified as a relevant planning envelope for habitat design and evaluation, to be refined through coordination (Hydro Green Energy, 2026b).

Rearing and feeding functions are distributed across habitat types: littoral zones and emergent vegetation belts provide nursery habitat and prey production for juvenile fishes, while tailwater turbulence and eddies enhance foraging opportunities for benthic and drift-feeding taxa. Long-term monitoring and habitat studies in the UMRS consistently show that structural complexity (vegetation, shoreline configuration, and habitat connectivity) increases prey availability and supports higher abundance and diversity, particularly in backwater shoreline habitats relative to main-channel borders. During winter, deep main-channel habitats provide thermal stability and refuge for large-bodied river fishes (including sturgeons), while protected backwaters may function as overwintering habitat for smaller warm-water species depending on ice conditions and dissolved oxygen dynamics (USFWS, 2026d). For federally listed mussels such as Spectaclecase, occupancy is typically limited to specialized microhabitats in large rivers (often among boulders/rock slabs or other sheltered substrates) and populations can be isolated by dam fragmentation; thus, habitat protection emphasis is generally focused on minimizing sedimentation, preserving stable substrates, and avoiding hydraulic alterations that could degrade these limited refugia (USFWS, 2026e).

Based on the proposed run-of-river operational design, reliance on USACE-controlled flows, and maintenance of existing pool elevations and downstream discharges, Project operation would not affect spawning run timing, spawning cues, or reproductive habitat availability for fish species in the Project Area. Spawning behavior and migration timing would remain governed by natural hydrologic conditions and USACE dam operations, and no Project-related changes to these drivers are anticipated.

#### 4.3.4 Special Aquatic Considerations

Invasive carp represents a significant aquatic resource concern within the Upper Mississippi River Basin, including the Project vicinity near the Project Area. The invasive carp complex in this reach is composed primarily of Bighead Carp (*Hypophthalmichthys nobilis*), Silver Carp (*Hypophthalmichthys molitrix*), Grass Carp (*Ctenopharyngodon idella*), and, to a lesser extent, Black Carp (*Mylopharyngodon piceus*), all of which are non-native species established within the Mississippi River system. Long-term monitoring conducted by USFWS, USGS, and Illinois Natural History Survey

(INHS) confirms that Silver and Bighead Carp are the dominant invasive carp species within Pool 26 and adjacent reaches, with individuals documented throughout the pool and in connected backwaters and side channels (Mississippi Interstate Cooperative Resource Association [MICRA], 2022).

The Upper Mississippi River is managed under a basin-wide invasive carp framework that identifies three management zones based on relative abundance and reproductive potential. Invasive carp in this system occur across a broad longitudinal extent, with bighead carp documented from the lower Mississippi River (including Louisiana near the river's outlet region) northward through the Mississippi River corridor and throughout the Illinois River Basin to its northern terminus in the Chicago Area Waterway System, which represents the primary aquatic connection toward Lake Michigan (USGS 2026d). The Project Area lies within the northern extent of the transitional management zone, where adult Silver and Bighead Carp are present and capable of seasonal movement and localized reproduction, particularly during high-flow conditions that promote connectivity between the main channel and floodplain habitats. Telemetry and hydroacoustic studies indicate that invasive carp in this reach exhibit strong seasonal movement patterns, with increased use of backwaters and low-velocity habitats during spring and early summer in advance of spawning, and occupation of deeper main-channel habitats during winter months (MICRA, 2019).

Ecologically, invasive carp pose a substantial risk to native fish and mollusk communities due to their highly efficient filter-feeding behavior, which removes large quantities of phytoplankton and zooplankton from the water column. This feeding strategy directly competes with native planktivorous fishes and reduces food availability for early life stages of many native species, including state- and federally listed fishes. In portions of the Mississippi River Basin, invasive carp have been documented to comprise a majority of total fish biomass, fundamentally altering aquatic food webs and energy pathways. In addition, invasive carp have been associated with degraded water clarity and reduced primary productivity, conditions that can indirectly affect sensitive native mussel species by altering habitat quality and host-fish availability (USGS, 2003).

The proposed Project is expected to be overall neutral to mildly adverse with respect to invasive carp. This determination is based on the Project's ROR operation within existing USACE flow and pool-elevation constraints, which is not expected to increase habitat suitability or reproduction potential for invasive carp at the pool scale.

## 4.3.5 Fish Community Monitoring, Entrainment, and Aquatic Risk Considerations

### 4.3.5.1 Fish Passage

Fish passage conditions in the Project Area are characteristic of a large, regulated river system and are influenced primarily by operations of the existing Melvin Price L&D. No anadromous fish species occur in the vicinity of the Project Area, and movement patterns of endemic Mississippi River fish species have historically been attributed largely to localized foraging behavior rather than a consistent upstream or downstream migratory pattern (Brookfield Amendment pg 39). While some endemic species exhibit variable movement upstream and downstream of the dam, such movements are generally opportunistic and not indicative of obligate passage requirements.

Mississippi River flows are typically passed through existing dam gates for a substantial portion of the year. Project operations may require the closure of certain gates at times to direct flows toward the generating units; however, based on existing hydrologic data, it is anticipated that flows would continue to be passed through the gates at least 68% of the time. Seasonal flow variability governs dam operations, with higher flows most commonly occurring during the spring and fall months, coinciding with periods when limited seasonal fish movements are most likely to occur. During these periods, the Applicant anticipates that river flows will be sufficient to support both Project generation and continued spillage through the gates (Brookfield Amendment pg 39).

Existing upstream and downstream passage opportunities are already present at the Melvin Price L&D. Fish may move through both the main and auxiliary lock chambers on a year-round basis during normal lock operations. Lockage frequency at the Melvin Price L&D is relatively high, with approximately 7,400 lockages per year, providing repeated opportunities for incidental fish passage.

#### **4.3.5.2 Fish Impingement and Entrainment/Survival Assessment**

Potential effects of the Project on fish resources from impingement and entrainment have been evaluated in prior studies and environmental reviews for hydropower development at the Melvin Price L&D. These evaluations concluded that impacts to the fishery would be minimal due to a combination of Project design features, hydraulic conditions, and the biological characteristics of the Upper Mississippi River fish community (Brookfield Amendment pg 32).

As part of an early assessment of hydropower development at the Melvin Price L&D, USACE conducted a fishery impact evaluation that examined potential entrainment and turbine-related mortality. The USACE determined that impacts would be minimal due to several factors, including: (1) the use of bulb-type turbines, which have been shown to provide relatively high fish survival compared to other turbine types; (2) high water velocities through the tailrace and dam gates, which reduce fish residence time near intake structures; (3) the predominance of fish movement associated with high-flow periods, when fish are more likely to pass downstream via spillways rather than turbine intakes; and (4) the dominance of highly fecund warm-water species in Pool 26, which produce large numbers of eggs and larvae and are resilient to limited incidental losses. The USACE further concluded that the installation of trash racks at turbine intakes would reduce the likelihood of entrainment of larger fish. Based on these considerations, the USACE concluded that turbine operation would result in only minimal impacts to the fishery (Brookfield Amendment pg 35).

These conclusions were subsequently reaffirmed by the FERC in its EA for a previous project. In its 1987 EA, the Commission concurred with the USACE analysis and concluded that turbine-related mortality would not be expected to have a significant effect on fishery resources in the vicinity of the Melvin Price L&D (FERC, 1987). Although the Commission acknowledged that some endemic fish species exhibit variable upstream and downstream movement near the dam, it determined that most movement was attributable to localized foraging behavior rather than directed migratory passage, reducing the biological significance of turbine-related losses.

Modern hydropower research supports these earlier findings. Studies conducted by the U.S. Department of Energy and Electric Power Research Institute (EPRI) indicate that bulb-type and Kaplan-style turbines generally exhibit higher fish passage survival than conventional Francis turbines due to reduced blade strike probability, smoother pressure transitions, and fewer gaps between moving components. Field and laboratory studies of advanced and conventional turbine designs routinely demonstrate survival rates exceeding 95 percent for turbines of the type being considered for many warm-water species under appropriate operating conditions, particularly in large rivers with high through-flow (EPRI, 2004; U.S. Army, 2023).

With respect to impingement, intake trash racks are a primary design feature used to reduce fish contact with turbine structures. Prior USACE analyses for the Melvin Price L&D evaluated a range of trash-rack configurations and recommended 4-inch bar spacing, which allows smaller fish to pass downstream while enabling larger, stronger-swimming fish to avoid impingement by maintaining swimming speeds greater than approximately 2.0 feet per second. Contemporary guidance from federal agencies similarly recognizes that appropriate bar spacing and intake velocities are effective measures for minimizing impingement risk at hydropower intakes (FIThydro Consortium, 2021).

#### **4.3.5.3 Construction Windowing**

In-water construction activities will be seasonally windowed to avoid sensitive biological periods, with particular attention to Lake Sturgeon spawning in the tailwaters below the Project Area. USACE and partner monitoring have documented repeat spawning events at this location under specific temperature, flow, and substrate conditions; accordingly, work windows will be coordinated to minimize disturbance during the sturgeon spawning period and early incubation.

## 4.4 Wildlife and Botanical Resources

This subsection summarizes the sources used to describe the existing wildlife habitat and resources and to support the impact pathways and mitigation concepts for wildlife and botanical resources in the vicinity of the Melvin Price L&D. These sources provide the best-available basis for describing the Upper Mississippi River floodplain habitat mosaic, the Rivers Project/Riverlands context, and the seasonal ecological sensitivities (e.g., eagle use and sturgeon spawning) that inform construction/operation planning:

- MDC of the Upper Mississippi Conservation Area (MDC, 2026a);
- USACE Sustainable Rivers Program for EPM and for aquatic vegetation response to pool operations (USACE, 2025a);
- USACE Rivers Project Office Bird Watching and Maple Island eagle roosting (USACE, 2026a); and
- USACE Sustainable Rivers Program report – system operations for Lake Sturgeon spawning (USACE, 2024).

### 4.4.1 Existing Environment

#### 4.4.1.1 Wildlife Habitat

The Melvin Price L&D is situated within the broad floodplain of the Upper Mississippi River, a landscape defined by extensive riverine, wetland, and bottomland forest habitats. This reach of the Mississippi River is part of the Upper Mississippi Conservation Area, a region noted for its high wildlife and habitat diversity. The Conservation Area encompasses 87 tracts of federal land totaling more than 11,000 acres, extending from the Melvin Price L&D in Alton, Illinois, north to LaGrange, Missouri. These tracts include a mosaic of riparian forests, backwater lakes, sloughs, emergent wetlands, and river islands, which together support a wide range of aquatic and terrestrial wildlife species (MDC, 2026a).

Historically, the construction of navigation dams on the Upper Mississippi altered natural hydrologic patterns, creating more stable water levels within the navigation pools. While these conditions increased navigability, they reduced seasonal variability that once supported diverse aquatic vegetation communities. However, targeted EPM actions implemented in the 1990s restored portions of this ecological function by lowering water levels during the summer growing season. These measures have regenerated extensive mudflats and river-edge vegetation within the Melvin Price Pool, resulting in the reestablishment of native emergent plant communities such as arrowhead (*Sagittaria* spp.). These recovering habitats now provide improved foraging and nesting resources for migratory waterfowl, wading birds, and aquatic fauna (USACE, 2025a).

The immediate vicinity of the Project Area contains well-developed riparian corridors, backwater wetlands, and floodplain forests, which serve as critical wildlife habitat along this portion of the Mississippi River. Riparian wetlands and backwater areas near Alton and West Alton function as important foraging and resting sites for migratory birds, particularly during winter. The region is part of the federally managed Rivers Project Area, which includes more than 110,000 acres of public land and water across Mississippi River Pools 24 through 27. These habitats support large seasonal concentrations of American Bald Eagles, which roost in the floodplain forests surrounding the river and feed on abundant fish resources immediately downstream of locks and dams. Maple Island, just west of the Project Area, is a major roost site for wintering eagles (USACE, 2026a).

The broader floodplain landscape also includes forested tracts, old fields, emergent marshes, and river islands within the Upper Mississippi Conservation Area, including nearby areas such as Dresser Island and the West Alton tract. These habitats collectively support diverse wildlife communities typical of the Upper Mississippi River valley, including white-tailed deer, raccoons, beavers, waterfowl, shorebirds, raptors, and amphibians. The combination of wetlands, backwaters, and riparian forest provides essential ecological functions, nutrient processing, sediment retention, and habitat connectivity, that sustain species richness throughout this reach of the river (MDC, 2026a).

Additionally, the region near the National Great Rivers Research and Education Center, located immediately adjacent to the Project Area, includes restored swamp and prairie demonstration habitats, which illustrate the native plant communities historically present along this corridor. These reconstructed habitats, along with the surrounding natural areas, support a variety of avian species, with observations frequently including migratory geese, raptors, and nesting eagles within nearby wetland pockets along the Confluence Trail.

Overall, the wildlife habitats surrounding the Melvin Price L&D constitute a dynamic and ecologically significant portion of the Upper Mississippi River floodplain. The combination of large-river hydrology, restored aquatic vegetation, diverse riparian and wetland habitats, and extensive public conservation lands supports high biodiversity and provides critical habitat for resident and migratory wildlife.

#### **4.4.1.2 Wildlife Resources**

Wildlife within the Upper Mississippi River corridor near the Melvin Price L&D is managed cooperatively by the USFWS and USACE through programs that oversee federal trust species, migratory birds, and diverse nongame wildlife communities. This region supports substantial migratory bird use due to the concentration of floodplain, riparian, and backwater habitats, which attract large numbers of raptors, waterfowl, and other avian species during winter and migratory periods. In particular, the Riverlands Migratory Bird Sanctuary and adjacent Maple Island provide significant foraging and roosting habitat for Bald Eagles and other migratory birds, as documented by USACE's seasonal guidance on eagle viewing and roost protection. These habitats function as major seasonal congregation points within the Mississippi River valley, reflecting strong migratory bird use driven by the river's broad floodplain and open-water conditions during colder months (USACE, 2026a).

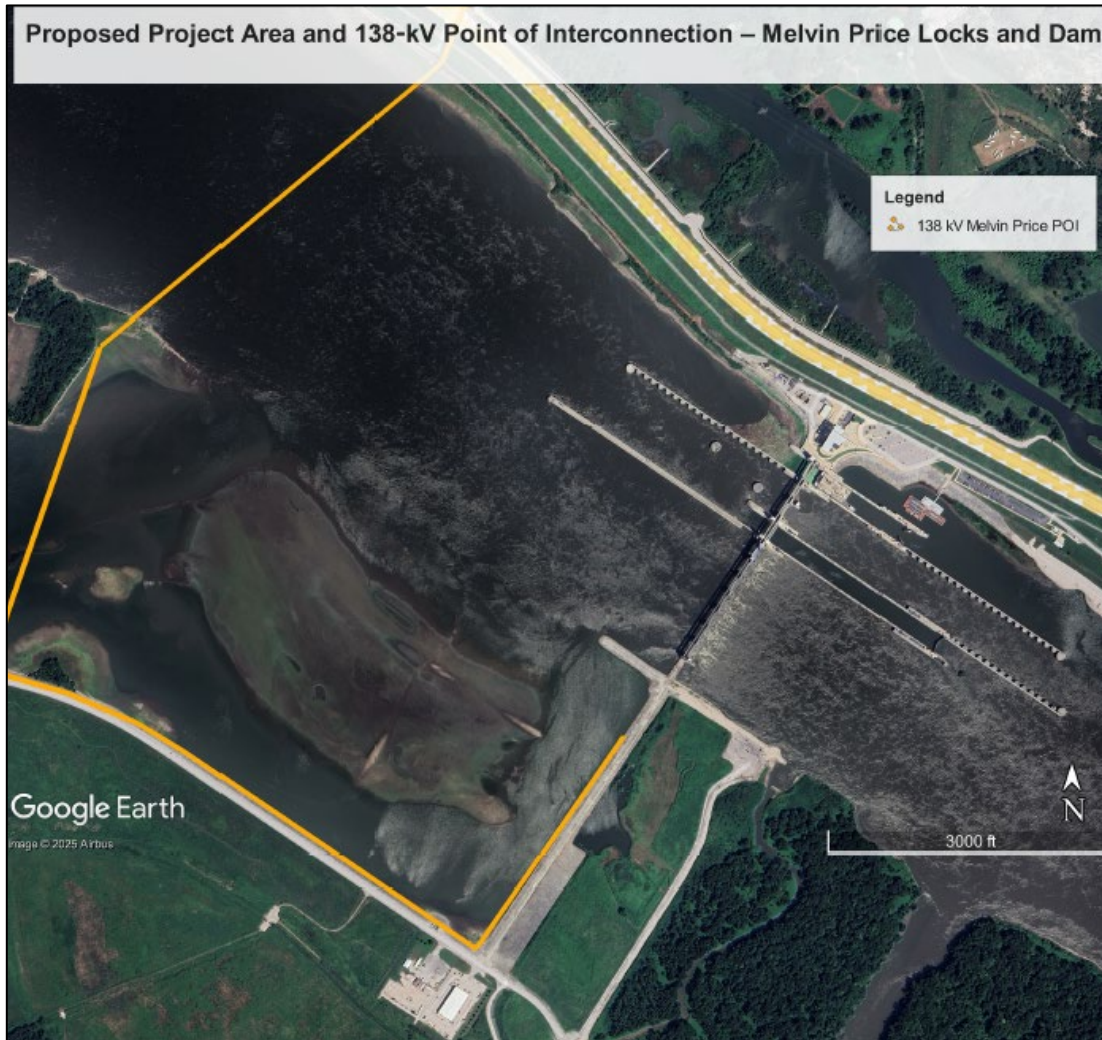
Complementing these resources, the Upper Mississippi Conservation Area, which extends northward from the Project site, encompasses a mosaic of wetlands, river islands, forested floodplain, and emergent marsh habitats that support a wide array of nongame wildlife groups, including fish, birds, mammals, amphibians, reptiles, and invertebrates. Although extensive species inventories exist for the Upper Mississippi River basin as a whole, no complete scientific list is available for the specific reach surrounding the Project Area, and such lists are not included here to avoid misrepresenting the presence or absence of federal or state-listed species. Species for which documented county- or regional-level concern exists are addressed separately in **Section 4.6 – Rare, Threatened and Endangered Species**.

The proposed Project has the potential to affect wildlife and vegetation in several ways. Increased human presence, construction equipment, and elevated noise levels have the potential to disturb wildlife species that utilize the Mississippi River floodplain, backwater wetlands, and riparian forests adjacent to the Project site. Seasonal concentrations of migratory birds are particularly sensitive in this region due to the Mississippi Flyway convergence and the high migratory use of adjacent habitats such as the Riverlands Migratory Bird Sanctuary and Maple Island, where large wintering eagle populations occur.

Construction-related wildlife disturbance in the Project Area would be driven primarily by the final footprint of ground disturbance and any associated vegetation removal. As shown on **Figures 4-1 and 4-3**, the proposed powerhouse and tailrace area is largely situated within a previously disturbed/managed setting characterized by minimal vegetative cover immediately adjacent to the dam infrastructure and maintained access areas. In the vicinity of the powerhouse footprint, vegetative cover appears limited and predominantly consists of short herbaceous/grass cover or sparsely vegetated ground, suggesting that direct vegetation removal at the powerhouse location is likely to be minimal relative to the surrounding landscape. In contrast, **Figures 3-1 and 4-5** show adjacent riparian/floodplain vegetation and wooded cover beyond the immediate construction footprint that would presumably remain undisturbed, provided that staging, access, and construction limits are maintained within the defined disturbance areas.

Potential impacts associated with the transmission line are less certain at this stage because the precise locations of transmission towers and final alignment have not yet been established. Depending on final siting, tower installation and conductor corridor clearing could require localized vegetation disturbance, including removal of shrubs or trees if towers are placed near riparian edges or in vegetated portions of the floodplain; conversely, if towers are sited within existing upland/disturbed areas, vegetation disturbance may be negligible. Accordingly, final design development should confirm tower locations and quantify any associated vegetation clearing needs prior to construction.

For birds specifically, construction activity (noise, lighting, equipment, and human presence) could cause temporary displacement or avoidance behavior in areas near active work zones, particularly during sensitive periods. To comply with the Migratory Bird Treaty Act and other applicable federal and state requirements, seasonally appropriate pre-construction nesting bird surveys should be conducted prior to any vegetation removal during the nesting/breeding season, unless vegetation removal is scheduled and completed outside applicable nesting periods.



**Figure 4-5** Melvin Price L&D Project Boundary with Aerial Spatial Context

The installation or modification of transmission lines associated with the Project may pose electrocution and collision risks for birds. Transmission structures placed in areas with high raptor use, including open river corridors where birds forage and perch, may increase the likelihood of electrocution if conductor spacing is insufficient. Lines located over water, within natural flyways, or between roosting and feeding habitats also increase collision risk, particularly for less maneuverable species. Consistent with Avian Power Line Interaction Committee (APLIC) guidance, all transmission structures should be designed to provide adequate conductor separation or incorporate perch deterrents where necessary to reduce electrocution risk, and incorporate visibility enhancements (e.g., line markers) to reduce collision potential in high-risk spans.

The Applicant's objectives include: (1) minimize disturbance to wildlife and habitats, and (2) minimize disturbance to sensitive species in the Project Area. Construction timing and methods will be planned in accordance with these goals; for example, if vegetation removal is proposed during the avian nesting and breeding season, targeted avian use surveys will be conducted near construction zones to identify active nests and implement appropriate avoidance measures.

### 4.4.1.3 Botanical Resources

Modification and construction activities associated with the Melvin Price L&D hydropower project are expected to result in localized and limited impacts to vegetation communities within the Project footprint. As shown in **Figure 4-5**, the immediate powerhouse area and adjacent disturbed ground are characterized by herbaceous cover that fluctuates seasonally in response to periods of drought and vegetative growth, indicating that vegetation removal in this portion of the Project Area would most likely be minimal and limited to short herbaceous vegetation. Based on current planning-level estimates, approximately 25 acres of existing downstream, previously disturbed, herbaceous area near the proposed powerhouse location would be permanently converted to the proposed tailrace channel and a relocated parking lot. In addition, approximately 1 acre would be affected by the transmission line corridor; however, the specific vegetative cover type within that corridor has not yet been confirmed and will require field verification. Collectively, these impacts represent a relatively small disturbance footprint compared to the extensive surrounding conservation lands, but they would constitute permanent conversion of previously disturbed earth where grading and infrastructure placement occur.

Disturbed soils associated with the tailrace excavation, parking relocation, staging areas, and equipment access routes may also create conditions favorable for invasive plant colonization, including species such as reed canarygrass (*Phalaris arundinacea*), which is known to expand rapidly in disturbed floodplain environments and outcompete native flora if not controlled. Accordingly, minimizing disturbance outside the defined footprint and implementing early detection and response measures would reduce the likelihood of invasive establishment.

Although the overall scale of botanical disturbance is expected to be limited compared to the extensive surrounding conservation lands, any amount of soil disturbance in a floodplain setting may encourage the spread of noxious weeds. The Applicant will coordinate closely with USACE and the IDNR and MDNR relevant state natural resource agencies to develop and implement an invasive species and noxious weed control plan to guide long-term site maintenance (IDNR, 2000; MDNR, 2019).

## 4.5 Wetlands, Riparian, and Littoral Habitat

This subsection summarizes the sources used to characterize wetland, littoral, and riparian existing conditions for the Melvin Price L&D vicinity. These sources collectively provide the best-available foundation for identifying and classifying mapped wetlands, describing habitat functions created or influenced by the lock-and-dam system, and supporting jurisdictional verification and permitting/mitigation commitments consistent with federal and state regulatory expectations. The following data sources were reviewed:

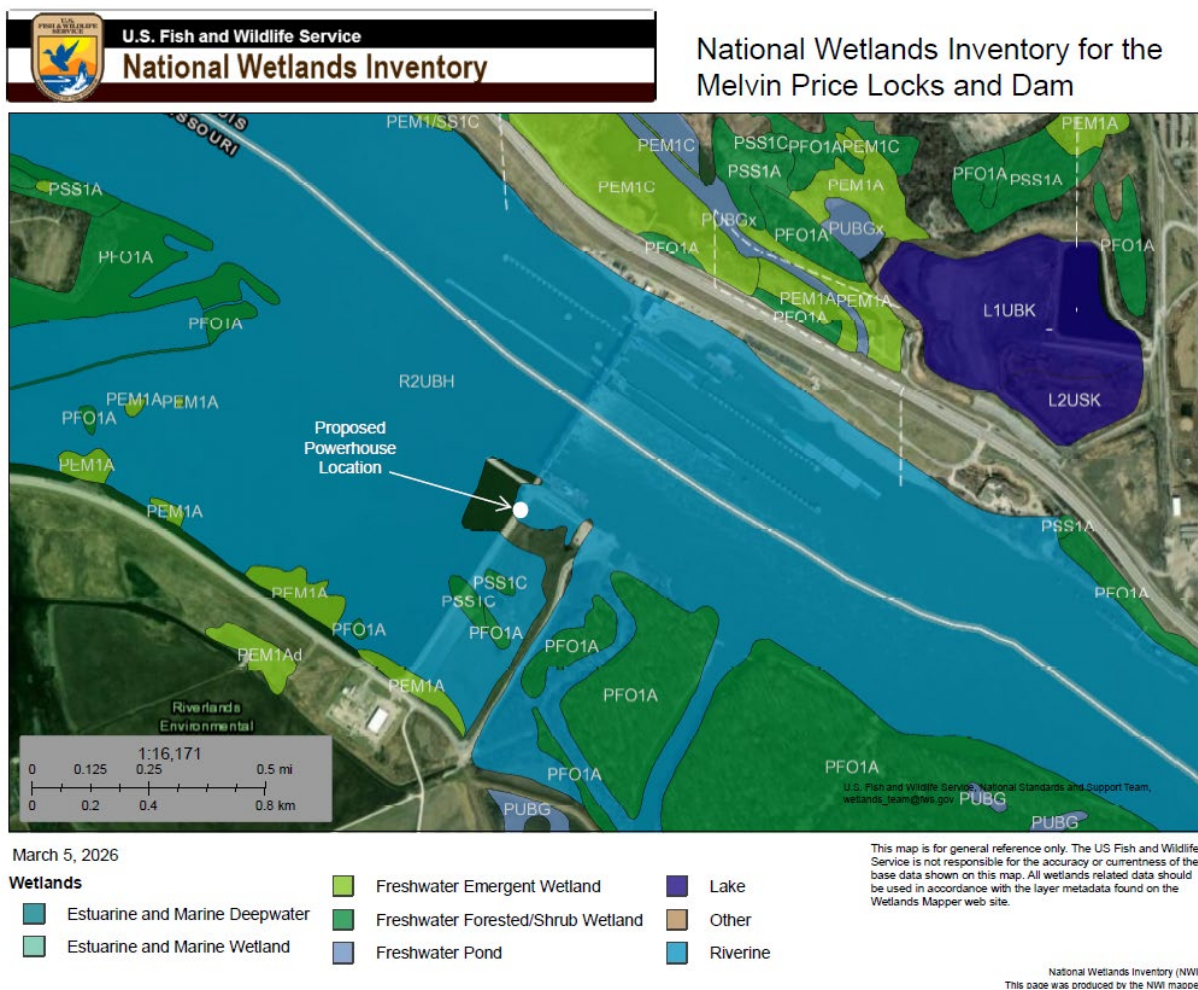
- National Wetlands Inventory (NWI) maps from USFWS (2026c);
- USACE Sustainable Rivers Program – Mississippi River site (USACE, 2025a);
- USGS Pool 26 Field Station (USGS, 2026b);

### 4.5.1 Existing Conditions

According to the NWI, wetlands are present along the Upper Mississippi River in the vicinity of the proposed Project Area (**Figure 4-6**). As shown in **Figure 4-6**, wetlands mapped near the Project Area are primarily classified as riverine and lacustrine systems with additional mapped freshwater wetland classes occurring along backwater margins and shoreline environments adjacent to the dam and associated side channels. Riverine wetlands in the vicinity of the Project Area are associated with the mainstem Mississippi River and adjacent backwaters and are characterized by permanently flooded conditions, a lower perennial subsystem, and unconsolidated bottom substrates. Riverine wetlands are hydraulically complex features that occur within floodplains and riparian corridors in direct association with stream and river channels, and they typically extend laterally from the active channel to the margins of the river's floodplain. Lacustrine wetlands within the Project vicinity are generally associated with backwater lakes, side channels, and embayments formed by the lock-and-dam system, and they provide shallow-water habitat that supports aquatic vegetation, fish spawning and rearing, and waterfowl use. Collectively, the mapped wetland features shown in **Figure 4-6** contribute to ecological diversity by providing transitional habitats between open riverine waters and

adjacent upland environments. A current aquatic resources delineation has not yet been completed for the Project; therefore, the NWI mapping shown in **Figure 4-6** is used for planning-level characterization only and does not represent jurisdictional boundaries.

The modification of the Melvin Price L&D to accommodate the proposed hydroelectric Project has the temporary potential to alter localized wetland, riparian, or littoral habitats during construction activities. Limited terrestrial habitat would be permanently displaced in areas immediately adjacent to the existing lock and dam to accommodate Project components such as the intake, outlet, and powerhouse. However, these facilities would be sited largely on previously disturbed or filled areas from construction of the Melvin Price Locks and Dam, and construction would rely on existing access roads and infrastructure to the maximum extent practicable. Other Project modifications would be confined to the existing dam structure itself. Specific measures would be implemented to provide that construction activities do not mobilize sediments or result in indirect degradation of adjacent wetlands, including the development and implementation of a Project-specific Stormwater Pollution Prevention Plan (SWPPP), which is required under Illinois regulations due to construction disturbance anticipated to exceed one acre. This would be coordinated with applicable regulatory requirements and resource agency guidance. Although the precise relationship between current operations at the Melvin Price L&D and the hydrologic support of nearby wetlands and riparian habitats is not fully defined, the proposed Project would not alter upstream or downstream pool elevations, which are controlled by USACE operations. Accordingly, no long-term, operation-related impacts to local wetlands or riparian habitats are anticipated as a result of the proposed hydroelectric Project. An aquatic resources delineation is needed to determine construction-phase impacts to jurisdictional aquatic resources that may result from placement of riprap and other material during construction of the trail races and other Project features.



**Figure 4-6** USFWS NWI Mapping around Melvin Price L&D

## 4.6 Rare, Threatened, and Endangered Species

This subsection summarizes the existing sources used to develop the federal- and state-listed (endangered, threatened, candidate, or proposed) species, species protected by the Migratory Bird Treaty Act (MBTA), critical habitat context, invasive species screening, and impact-avoidance framework for the Melvin Price L&D Project vicinity in Madison County, Illinois, and St. Charles County, Missouri. Collectively, these sources provide the best-available, agency-recognized foundation for identifying species with potential to occur, understanding habitat relationships in the Upper Mississippi River corridor, and supporting consultation under FERC and related federal and state review processes. The following data sources were reviewed:

- USFWS Information for Planning and Consultation (IPaC) digital project planning tool (USFWS, 2026a, see **Appendix C**);
- Illinois Endangered Species Protection Board (IESPB) 2025 Illinois Endangered & Threatened Checklist (IESPB, 2025, see **Appendix D**);
- MDC Missouri Natural Heritage Program (MONHP) (MDC, 2026a);
- Missouri Species and Communities of Conservation Concern (SOCC) Checklist (MDC, 2026b);
- Missouri floodplain habitat documentation for Decurrent False Aster (*Boltonia decurrens*) (USFWS, 2026b);
- USACE UMRR and regional habitat program documentation (Pool 26 and lower Illinois River) (USACE, 2026c);
- USACE Rivers Project Office: Riverlands Migratory Bird Sanctuary and access and seasonal management context (USACE, 2026b); and
- USACE and MDC lake sturgeon spawning documentation for the Melvin Price L&D and Maple Island vicinity (USACE, 2024).

### 4.6.1 Existing Environment

This section provides a description of the rare, threatened, and endangered species with the potential to occur in Madison County, Illinois, and St. Charles County, Missouri. Although certain federally or state-listed species may inhabit or migrate through portions of the broader Upper Mississippi River corridor, including riparian forests, emergent wetlands, and riverine habitats managed by the IDNR and the MDNR, their presence within the immediate Project Area should not be assumed without further verification. This list serves as an initial reference point to support ongoing coordination with federal and state natural resource agencies. Additional consultation with USFWS, IDNR, and MDNR is anticipated to refine species-specific considerations and management needs.

This section also identifies species with the potential to occur in counties that are considered to be noxious or invasive and may therefore need to be eradicated or controlled. Again, the list is a starting point and further agency consultation is anticipated in order to discuss specific species, species concerns/threats and agency recommendations.

#### 4.6.1.1 Federal and State Listed Species

The USFWS IPaC resources list, the Illinois Endangered & Threatened Species Checklist, and the Missouri MONHP & SOCC Checklist were reviewed for the Project Area. Seven species with federal listing status, and two with proposed federal listing status were included on the USFWS IPaC resources list for the review area (USFWS, 2026a). In addition, the IESPB and MONHP list two additional species with federal listing status, and four species with state listing status as potentially occurring in Madison County, Illinois and St. Charles County, Missouri near Pool 26 (IESPB, 2025; MDC, 2026a). **Table 4-4** contains a list of these species along with their listing status, preferred habitat, whether appropriate habitat for the species was found within the review area, and a determination of whether the Project would impact each species.

Table 4-4 Special Status Wildlife Species Potential to Occur within the Project Area

Species	Federal Status	State Status	Habitat Description	Habitat Present in Review Area?	Species Effect/Impact
<b>Birds</b>					
Least Tern ( <i>Stemula antillarum</i> )	NL	E(IL)	Inhabit open, sparsely vegetated coastal beaches, sandbars, and inland riverine islands, preferring areas with sand, shell, or gravel substrate for nesting. Require flat, unobstructed, sandy areas near shallow water for foraging and often nest in colonies near estuaries, bays, or reservoirs.	Yes	Moderate impact. Sensitive to disturbance during nesting; potential seasonal restrictions needed.
<b>Fish</b>					
Greater Redhorse ( <i>Moxostoma valenciennesi</i> )	NL	E(IL)	Inhabits clear, unpolluted, large rivers and sometimes lakes, specifically preferring areas with moderate-to-fast currents, gravel or rocky substrates, and clean, oxygen-rich water. Often found in deep runs and pools during non-spawning periods, migrating to shallow riffles with gravel for spring spawning.	Yes	Low impact. May experience disturbance in areas of substrate modification.
Ironcolor Shiner ( <i>Notropis chalybaeus</i> )	NL	T(IL)	Inhabits clear, slow-moving, and often acidic blackwater streams, creeks, and rivers with abundant submerged vegetation and sandy bottoms. They are frequently found in low-gradient, vegetated pools and, occasionally, in quiet, soft-bottomed swamps, preferring areas with low turbidity and clean, sandy substrates for spawning.	Yes	Moderate impact. Sensitive to turbidity and sedimentation from in-water work.
Lake Sturgeon ( <i>Acipenser fulvescens</i> )	NL	E(IL)	Inhabits large, clean freshwater lakes and rivers, particularly within the Great Lakes and Hudson Bay basins. Prefer deep (4–9 meters), soft-bottomed, and rocky habitats for feeding. They require specific, swift-flowing, shallow rocky rivers for spawning in spring.	Yes	High impact. Project actions could affect spawning flows and substrate. Known spawning occurrences near Project Area.
Pallid Sturgeon ( <i>Scaphirhynchus albus</i> )	LE	E(IL/MO)	Native to large, silty, and turbid river systems like the Missouri and Mississippi, specifically favoring fast-flowing channels with sandy or gravelly substrates. Thrive in environments with depths ranging from 3 to 25 feet, characterized by sandbars, braided channels, and strong currents.	Yes	May Affect, not likely to adversely affect. Sensitive to flow alteration, turbidity, and substrate changes; Project activities may affect movement and feeding habitat.
<b>Insects</b>					
Monarch Butterfly ( <i>Danaus plexippus</i> )	PT	NL	Thrive in open, sunny areas with abundant milkweed for breeding (larval host plant) and diverse nectar sources for energy. Key habitats include native tallgrass prairies, agricultural field margins, roadsides, pastures, and suburban gardens, providing essential breeding grounds.	No	No Effect to this species or its habitat.
<b>Mammals</b>					
Gray Bat ( <i>Myotis grisescens</i> )	LE	E(IL)	Cave-dependent species found in the limestone karst regions of Missouri and southern Illinois, occupying caves or cave-like structures year-round. Require specific, deep vertical caves for winter hibernation and warmer caves, often near water, for summer maternity colonies. Foraging occurs along river and stream corridors surrounded by forests.	No	No Effect to this species or its habitat.

Species	Federal Status	State Status	Habitat Description	Habitat Present in Review Area?	Species Effect/Impact
Indiana Bat ( <i>Myotis sodalis</i> )	LE	E(IL)	Require specialized limestone caves for winter hibernation and mature, forested riparian areas for summer roosting and foraging. They require large snags with exfoliating bark for maternity colonies, primarily within floodplain forests or upland hardwood forests.	No	No Effect to this species or its habitat.
Northern Long-eared Bat ( <i>Myotis septentrionalis</i> )	LE	E(IL)	Inhabit mature, hardwood forests and woodland edges across Missouri and Illinois. In summer, they roost in tree cavities, crevices, or under bark, particularly favoring snags. Winters are spent hibernating in caves and abandoned mines with high humidity and stable, cool temperatures.	No	No Effect to this species or its habitat.
Tricolored Bat ( <i>Perimyotis subflavus</i> )	PE	NL	During the winter, tricolored bats are often found in caves and abandoned mines, although in the southern U.S., where caves are sparse, tricolored bats are often found roosting in road-associated culverts where they exhibit shorter torpor bouts and forage during warm nights. During the spring, summer, and fall, tricolored bats are found in forested habitats where they roost in trees, primarily among leaves of live or recently dead deciduous hardwood trees, but may also be found in Spanish moss, pine trees, and occasionally human structures. Associated with forested landscapes, where they forage near trees (including forest perimeters) and along waterways. In many areas, most foraging occurs in riparian areas.	No	No Effect to this species or its habitat.
<b>Mollusks</b>					
Spectaclecase ( <i>Cumberlandia monodonta</i> )	LE	E(IL/MO)	Found in large rivers where they live in areas sheltered from the main force of the river current. This species often clusters in firm mud and in sheltered areas, like beneath rock slabs, between boulders and even under tree roots.	Yes	May Effect, not likely to adversely affect. Likely sparse near Project; impacts limited unless substrate is disturbed.
<b>Plants</b>					
Decurrent False Aster ( <i>Boltonia decurrens</i> )	LT	T(IL/MO)	Found in moist, sandy floodplains, prairie wetlands, and mudflats along the Mississippi River in Missouri and Illinois. Requires open, sunny areas, often colonizing disturbed habitats created by periodic flood-induced scouring.	Yes	May Affect, not likely to adversely affect. Sensitive to hydrologic disturbance.
Eastern Prairie Fringed Orchid ( <i>Platanthera leucophaea</i> )	LT	E(IL)	Thrives in moist-to-wet, open-sunlight habitats like tallgrass prairies, fens, and sedge meadows, often on calcareous silt loam, sand, or muck soils. In Found in wet, undisturbed grassland, occasionally inhabiting roadside ditches, and requires open conditions with minimal woody encroachment.	No	No Effect to this species or its habitat.
Mead's Milkweed ( <i>Asclepias meadii</i> )	LT	E(IL) T(MO)	Primarily inhabits undisturbed, high-quality native tallgrass prairies and rocky, open areas such as glades or barrens. Thrives in well-drained, mesic to dry-mesic, deep silt loam soils and requires full sun, often persisting in prairies that are regularly burned.	No	No Effect to this species or its habitat.

Species	Federal Status	State Status	Habitat Description	Habitat Present in Review Area?	Species Effect/Impact
<b>Reptiles</b>					
Eastern Massasauga (=rattlesnake) ( <i>Sistrurus catenatus</i> )	LT	T(IL/MO)	Inhabit a mix of wetlands and adjacent uplands. Preferred habitats include wet prairies, marshes, sedge meadows, floodplains, and shrubby old fields. Require high water tables for hibernation and open, sunny areas for basking, often using crayfish burrows for winter survival.	No	No Effect to this species or its habitat.
<p>Notes:</p> <p>LE = Federally Listed Endangered            LT = Federally Listed Threatened            PE = Federally Proposed Endangered            PT = Federally Proposed Threatened            E = State Listed Endangered            T = State Listed Threatened            NL = Not Listed</p> <p>Source: UFSWS, 2026a, IESPB, 2025, MDC, 2026a</p>					

## 4.6.2 Critical Habitat and Spatial Distribution

While no final federally designated critical habitat has been established for certain species such as the Spectaclecase Mussel and Eastern Prairie Fringed Orchid, formal status documents identify the Mississippi River and associated floodplain features as important habitat areas for several listed species. The Spectaclecase Mussel occupies large rivers within the Mississippi Basin, where dams have fragmented habitat and restricted dispersal, leaving only isolated habitat patches between major impoundments (USFWS, 2026e). The Decurrent False Aster is strongly tied to the Mississippi River floodplain, particularly in St. Charles County, Missouri, where it persists in moist, disturbed floodplain soils maintained by periodic flooding (USFWS, 2026b). The Lake Sturgeon is documented to spawn directly at the Melvin Price L&D, confirming that critical riverine substrate and hydrologic conditions in the Project Area provide essential reproductive habitat (MDC, 2026a). Although formal federal critical habitat has not been designated for these species at this location, their known ecological requirements demonstrate that portions of the Mississippi River and its floodplain adjacent to the Project Area serve as occupied or potentially suitable habitat (IDNR, 2000).

The proposed Project has the potential to alter localized, limited portions of the local riverine, riparian, or adjacent terrestrial habitat during construction. Consistent with federal and state guidance, the Project will prioritize minimizing impacts to all species, protected or otherwise, through early coordination, design refinements, and application of best management practices. To verify that potential effects are thoroughly evaluated, the Project will continue consultation with federal and state resource agencies, including USFWS, the IDNR, and the MDC, to identify sensitive biological resources and minimize impacts to the extent feasible.

The Project will also consider measures that promote long-term habitat enhancement and ecological function within the Project vicinity. These proactive measures will be evaluated in coordination with resource agencies to identify feasible opportunities to strengthen species conservation.

## 4.7 Recreation and Land Use

### 4.7.1 Existing Recreational and Land Uses

Existing recreational facilities at or near the Melvin Price L&D are shown on **Figure 4-7** and the type of recreational activities at each facility are described in **Table 4-5**.

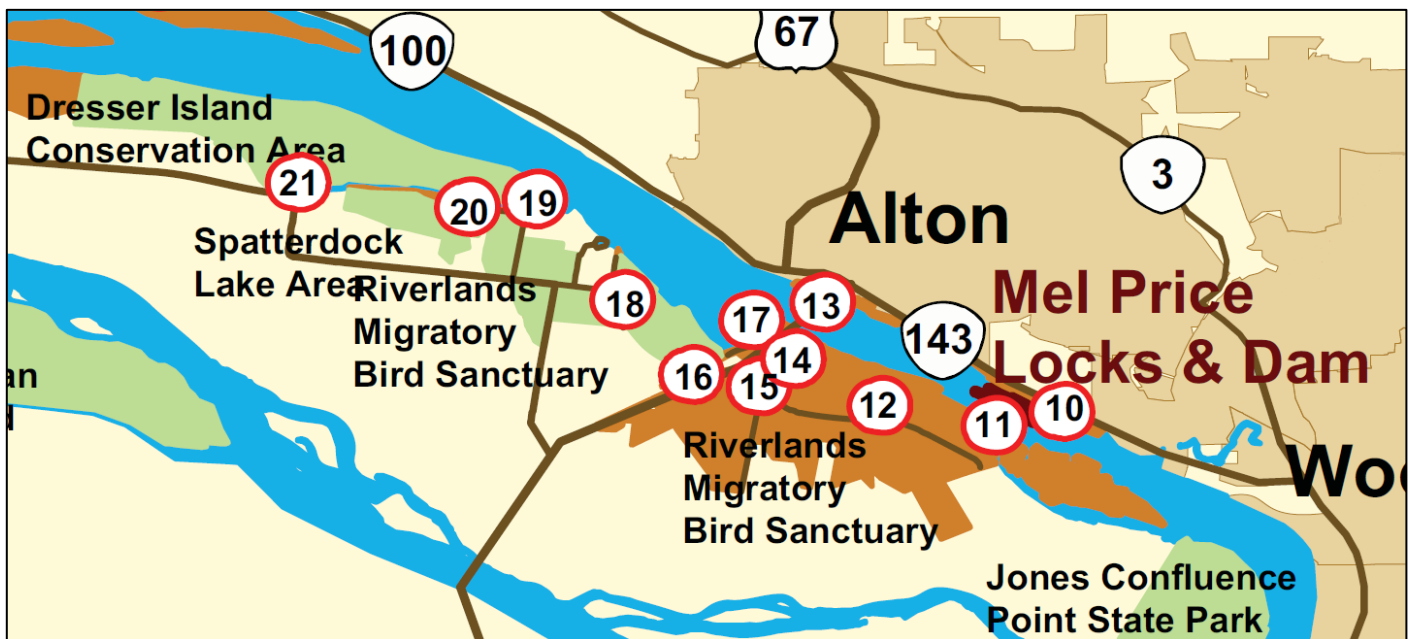


Figure 4-7 Recreational Sites Map

Table 4-5 Recreational Sites List

Site No.	Site Name	Public Parking	Boat Ramp	Shoreline Fishing	Primitive Camping	Picnicking	Restrooms	Visitor Center	Watchable Wildlife	Bike Trails	Managed By
10	Melvin Price / NGRM / Illinois Esplanade	X				X	X	X	X	X	USACE
11	Maple Island Access	X	L	X					X	X	USACE
12	Ellis Bay (Riverlands Way)	X		X			X		X	X	USACE
13	Alton River Park	X	X	X		X	X			X	City of Alton
14	Ellis Island Access	X		X					X	X	USACE
15	Teal Pond	X	L	X					X	X	USACE
16	Ellis Lake Access	X							X		USACE
17	Lincoln Shields Recreation Area	X	L	X		X	X			X	USACE
18	Alton Lake Access	X	L	X					X		USACE
19	Alta Villa Access	X	L	X							USACE
20	Spatterdock Access	X	L	X							USACE
21	Dresser Island	X	L	X					X		MDC

Note: L = Limited due to type, slope, elevation, and condition of ramp.  
 Source: The Master Plan, Rivers Project, Design Memorandum No. 3 (USACE, Saint Louis District, 2025).

A brief description of the existing recreational and land uses, and the opportunities within and adjacent to the Project boundary are the following:

- The Melvin Price L&D are an excellent area for watching American Bald Eagles. The National Great Rivers Museum on the Illinois side of the river has an observation deck. The museum is managed by the USACE and the Meeting of the Rivers Foundation.
- The Madison County Transit (MCT) Trail is a 20.5-mile paved trail that extends past the museum and connects Alton, IL with Granite City, IL. The trail is popular for biking, walking, and running.
- Personal watercraft such as kayaks, motorboats, and sailboats can use the auxiliary lock to travel between the lower and upper pools.
- The site is a key location on the Mississippi River Water Trail. Paddlers lock through the dam in annual events such as the Great Rivers Rendezvous.
- The waters near the dam are known for Blue Catfish fishing. Tournaments are regularly held.
- There are nearby public boat ramps such as the one at Lincoln Shields Pavilion in West Alton, MO.
- Maple Island is located downstream from the dam near West Alton, MO. It is part of the Riverlands Migratory Bird Sanctuary and provides opportunities for bird watching. It is also part of an Audubon Important Birding Area.
- The spillway has a public boat ramp and parking lot. A 4-mile-long back channel exists that provides paddling opportunities for kayakers and canoeists.
- Shoreline fishing is permitted at the spillway Access Point. Boat fishing also is popular upstream and downstream from the dam.

- Alton Slough is a backwater located on the Missouri side of the river immediately upstream from the dam. It is managed by the USACE as part of the Riverlands Migratory Bird Sanctuary. The slough provides opportunities for paddling and small boating. Small boats, canoes, and kayaks can be launched from Ellis Bay Access.
- The slough is an Audubon Important Bird Area that is a component of the Riverlands Migratory Bird Sanctuary. There are designated viewing areas and photography blinds where photographers can view migratory birds without disturbing them.
- There are accessible locations for bank fishing along the Ellis Bay shoreline.
- The shoreline of Alton Slough includes several hiking trails, including the Teal Pond Trail and the Ellis Island Trail.

Existing Mississippi River Trail Sites are the following:

- Alta Villa Access: The Alta Villa has a boat ramp and bank fishing. This is Mississippi River Trail site 25-19.
- Alton Lake Access: The Alton Lake access has a crushed stone boat ramp. This is Mississippi River Trail site 25-20.
- Ellis Island Recreation Area: Provides bank fishing, bird watching, and hiking. This is Mississippi River Trail site 25-25.
- Lincoln Shields Recreation Area: Provides picnicking, fishing, sightseeing, boating, and hunting access. Two concrete boat ramps. This is Mississippi River Trail site 25-21.
- Piasa Creek Recreation Area: Concrete boat ramp and River access.
- Piasa Harbor Area: Popular for boating, fishing, sightseeing, and access to waterfowl hunting. This is Mississippi River Trail site 25-15.
- Spatdock Access: Popular for bank fishing and bird watching. This is Mississippi River Trail site 25-18.
- Teal Pond Aquatic Area: Offers educational and research opportunities for deep water lake habitat studies, bank fishing, walking path, and bird viewing. This is Mississippi River Trail site 25-23.

Existing shoreline buffer zones include the following:

- No-Access Buffers: There is a 500-foot safety and security buffer upstream and downstream from the Melvin Price L&D. No boats or individuals are allowed within this zone. The banks adjacent to the structures are classified as Prohibited Access Areas.
- Environmental and Conservation Buffers:
  - Access is limited to foot traffic on mowed paths along the shoreline areas of Ellis Island.
  - The Ellis Island – Least Tern Island Sanctuary has a 300-foot buffer during the April 16 through August 15 nesting seasons.

The USACE has a Shoreline Management Plan that classifies the shoreline into four categories:

1. Protected shoreline areas that are designated to maintain aesthetics, fish and wildlife habitat, and cultural values.
2. Prohibited access described above.
3. Limited development for specific areas that allow private use such as stairs and erosion control.
4. Public recreation open to the general public but subject to federal protection of vegetation and natural formations.

## 4.7.2 Current and Future Recreational Needs

Both Illinois and Missouri, along with the USACE, have identified several recreation and infrastructure needs for the Melvin Price L&D area. They are the following:

- Byway Discovery Center is scheduled to open in 2026. This center will provide new visitor orientation and will include a gift shop and kayak launch.

- Sturgeon Habitat and Spawning Improvement Program: The USACE plans to continue its program.
- Mississippi River Water Trail Expansion: This program is an ongoing effort by the USACE and the Mississippi River Water Trail Association to transform the “Working River” into a world-class paddling and ecotourism destination. The program includes a primitive camping network that currently has 17 designated primitive campsites between Saverton, MO and St. Louis. Recent expansion efforts have prioritized “island hopping” sites such as Duck Island and the backchannels of Maple Island.
- USACE Rivers Project Master Plan:
  - Trail gaps: A major priority of the Master Plan is closing the gaps in the regional trail system.
  - Inclusive design: The Master Plan includes upgrades at the Melvin Price observation decks and the Riverlands sanctuary such that bird-blind structures and river viewing platforms meet ADA accessible standards.
- Fisheries Management: Illinois established a Mississippi River Basin Fishery Commission for invasive species control and updated fishing regulations.
- Spillway Boat Ramp Improvements: They are scheduled for 2026 – 2027.

The Project is not located within or adjacent to a river segment that is designated as part of, or under study for inclusion in, the National Wild and Scenic River System or a state-protected river segment.

No Project lands are under study for inclusion in the National Trails System or designated as, or under study for inclusion as, a Wilderness Area.

Nationally important recreation areas in the Project vicinity include:

- Alton Slough is a backwater located on the Missouri side of the river immediately upstream from the dam. It is managed by the USACE as part of the Riverlands Migratory Bird Sanctuary.
- Maple Island is located downstream from the dam near West Alton, MO. It is part of the Riverlands Migratory Bird Sanctuary and provides opportunities for bird watching. It is also part of an Audubon Important Birding Area. The sanctuary is managed by the USACE.

There are some areas with non-recreational land use and management within the Project boundary.

Recreational land use and management adjacent to the Project boundary is described above. Non-recreational land use is primarily agricultural in Missouri and residential, industrial, and commercial in Illinois.

## 4.8 Aesthetic Resources

The Melvin Price L&D is one of 29 locks and dams on the Upper Mississippi River as part of the Mississippi River Navigation System. Recreation areas in this corridor provide boating, fishing, wildlife viewing, hiking, and picnicking opportunities. The Project vicinity on the Missouri side of the river is characterized by wetlands, sloughs, islands, and agricultural land. The shoreline is fairly undeveloped. The primary developed area is immediately opposite the Project Area on the Illinois side of the river and consists mainly of the USACE locks and the communities of East Alton and Alton, Illinois.

Fishing and boating on the Melvin Price L&D Pools are popular pastimes, but these occur primarily upstream and downstream of the Project Area. Alton Slough is located upstream, and Maple Island is located downstream of the proposed Project, which are popular areas for wildlife viewing, boating, and fishing. The existing aesthetic resources of the region are considered to be a primary reason for the area’s popularity even with the existing locks and dam. Though scenic, the Mississippi has a long history as a working river, and one tied to energy production.

The USACE non-navigable dam section has 11 piers, with nine 110-foot-wide by 42-foot-high tainter gates that serve to regulate the pool level. The pier stems support the service bridge (deck elevation 494 feet, NGVD29) and an emergency bulkhead crane. All gate hoisting equipment is housed in the tops of the piers just below the service bridge level.

The intake, low-profile powerhouse, tailrace and transmission, will be designed to balance aesthetic resources with energy production. The powerhouse roof is proposed to have an elevation of 422 feet, NGVD29 compared to the dam deck elevation 494 feet, NGVD29. The existing spillway overflow weir crest is elevation 422 feet, NGVD29 at the powerhouse location. The low powerhouse profile will avoid adverse effects to aesthetic resources, while maintaining consistency with the river-focused and energy-focused heritage and landscape.

To minimize the impact the Project will have on the aesthetic resources of the Melvin Price L&D and any cumulative effects on the visual character of the local area will be dependent on how well this facility blends with the existing facilities at the dam.

The Project design will consider ways to help the proposed facilities blend in with current visual elements in the area. The amount of impact on visual resources is dependent upon the profile of the proposed Project elements as well as the interaction of the Project features with existing features within the viewshed. The Project will be designed to blend with the existing aesthetic character of the existing locks and dam as well as the general area. The Applicant will work to keep the Project in line with these objectives.

## 4.9 Cultural Resources

Existing historical and archaeological resources in the Project's vicinity have been investigated for several previous FERC license applications as well as issued Licenses. Based on a review of the FERC 2005 EA and license order, this information has not changed substantially. The area of the proposed headrace, powerhouse, and tailrace was significantly disturbed during the construction of the Melvin Price L&D.

The following is an assessment of the Project's potential impacts on historical and archaeological resources in the vicinity of the Locks and Dam. The impacts of constructing and operating a conventional hydroelectric project at the Locks and Dam, including dredging and cofferdam placement, were previously assessed by the USACE and the FERC.

Available information indicates that previous studies have been conducted within the Project's APE, and that no historic or archaeological resources will be impacted by Project construction or operation. The identified effects of Project construction and operation were analyzed in relation to the data regarding existing historical and archaeological resources to provide an assessment of the Project's potential impacts on these resources. Professor Danny (Danny, 1974) concluded that: "*Archaeological resources in the Alton Lock and Dam No. 26 Project Area appear to be non-existent. ...No further archaeological investigations appear to be warranted.*"

Documentation and maps provided in the 1983 license application demonstrate that much of the area that would be impacted by the construction of the proposed Project has been previously disturbed by construction of the existing Locks and Dam. Prior to the USACE's construction activity, a cultural survey was conducted by Southern Illinois University. Letters from the Illinois and Missouri SHPOs dated October 28, 1985, and December 9, 1985, respectively, concluded that there are no historic resources within the Project's APE listed in or eligible for inclusion in the National Register of Historic Places (National Register). The previous applicant for a FERC license requested the concurrence from the Illinois SHPO that an adequate cultural resource survey of the Project's APE (including the proposed transmission line route) had previously been conducted and that no historic properties would be affected. The transmission line corridor was studied by Haven and Hart (2002) and they concluded that: "*No cultural resources were identified. No further work appears to be necessary; project clearance is recommended.*"

On May 24, 2004, the Illinois SHPO concurred with the previous applicant's assessment and determined that no further cultural resource studies were required. In a letter dated March 19, 2002, the Missouri SHPO concluded that an adequate cultural resource survey of the Project had previously been conducted, and that the Project would have no effect on historic properties listed in or eligible for inclusion in the National Register. The SHPO's findings are consistent with the Commission's 2005 EA for the Hydromatrix facility.

In its analysis, the FERC concluded that the Project should have no effect on historic properties downstream of the dam, should any such resources exist (FERC 2005a). Based on previous studies and the limited footprint of the

Project, as amended, the Applicant has tentatively concluded that the previous investigations are sufficient to protect and manage historic properties within the Project's APE, should any such resources exist.

The Applicant will consult with the MO SHPO, the IL SHPO, the federally recognized Indian tribes, the public, and the National Park Service pursuant to the requirements of 18 CFR § 4.38 and Section 106 of the National Historic Preservation Act, as amended. The Applicant will reflect the results of these consultations activities and include additional studies or Protection, Mitigation, and Enhancement (PM&E) measures that may be necessary. During previous licensing studies, cultural resource agencies raised concerns over the possibility of encountering previously unidentified sites that could be eligible for inclusion in the National Register during construction. If the Applicant discovers any previously unknown archaeological or historic properties during the course of preparing the license application, the Applicant will consult the Illinois and Missouri SHPOs.

## 4.10 Socio-Economic Resources

General socio-economic conditions in the vicinity of the Project are described below for each state.

### 4.10.1 Illinois

The land use pattern in the Alton and East Alton, Illinois area is atypical example of a river town industrial corridor that is transitioning into a mixed-use and service-oriented landscape. The low-lying bottom land along the Mississippi River is dominated by industry and commerce while residential neighborhoods generally are located in the nearby bluffs. Residential land use is the most dominant category where it includes approximately 25% of the Alton area. The area has affordable housing in the St. Louis area. The median home prices range between \$100,000 and \$135,000 ([www.redfin.com](http://www.redfin.com)).

Madison County is the eighth most populous county in Illinois having an estimated 2026 population of 262,167. The county has experienced a slow, consistent downward trend in population. The 2020 census was 265,859, and the 2010 census was 269,283. The estimated 2026 Alton population is 24,713. The city has also experienced a steady decline in population. The 2020 census was 25,676, and the 2010 census was 27,865. The population trend in East Alton has been similar. The estimated 2026 population is 5,621. The 2020 census was 5,786, and the 2010 census was 6,301. The January 2026 unemployment rates were 4.9 percent for Alton and 4.6 percent for East Alton. The overall poverty rate for the area is approximately 21 percent.

Health care providers have the most employees in Alton followed by employees in education, industry and manufacturing, and service and retail organizations. The majority of employees in East Alton are employed by manufacturing industries.

### 4.10.2 Missouri

St. Charles County, Missouri, is the third largest county in Missouri having an estimated 2026 population of 435,262 and is one of the fastest growing areas in the state. The county is adjacent to St. Louis, but the county population numbers do not include St. Louis. The 2020 census for the county was 405,262, and the 2010 census was 360,485. The largest cities in the county are St. Charles, O'Fallon, and St. Peters. Major employers in the county include Amazon (6,000 employees) and General Motors (4,000 employees) in St. Peters, and the Global Technology Headquarters of Mastercard (3,500 employees) and Citigroup (2,000 employees) in O'Fallon. Other major employers in the county include education, healthcare, logistics, and manufacturing entities.

The majority of the land in West Alton area is agricultural. The soil is composed of rich river silt and is exceptionally fertile and is primarily used for growing row crops. A significant portion of the land in the West Alton area is dedicated to environmental protection and public recreation. The Upper Mississippi Conservation Area includes approximately 2,300 acres of forests, wetlands, and fields managed by the Missouri Department of Conservation. The Riverland Migratory Bird Sanctuary is located in close proximity to the Melvin Price L&D. The sanctuary is federal land that is managed by the USACE Rivers Project Office, St. Louis District.

In contrast to the population trend in St. Charles County, the population of West Alton has been steadily declining. The projected 2026 population of West Alton is 353. The 2020 census was 359, and 2010 census was 522. West Alton is primarily a residential and agricultural area. A major employer in the area is the coal-fired Sioux Power Station of Ameren. The USACE has staff for the Riverlands Migratory Bird Sanctuary and MDNR has employees at the Confluence Point State Park. There also is an electrical and plumbing supply company in the West Alton area.

## 4.11 Tribal Resources

The Choctaw Nation of Oklahoma responded to the Preliminary Permit Application and stated that St. Charles County, Missouri lies outside its area of historic interest and deferred to other tribes. The only tribe listed in the FERC Initial Consultation List is the Eastern Shawnee Tribe of Oklahoma. The Tribal Historic Preservation Office is located in Seneca, Missouri. The Applicant has contacted the Eastern Shawnee Tribe of Oklahoma as documented in **Appendix A**. The tribe has generally been non-responsive; however, the Applicant will continue efforts to engage the tribe.

## 4.12 River Basin Description

This section presents descriptions of various features of the drainage basin located upstream of the Melvin Price L&D Project.

### 4.12.1 Upper Mississippi River Basin and Subregions

The Melvin Price L&D Project is situated between the States of Illinois and Missouri on the Mississippi River. It is located at River Mile 200.78 upstream from the confluence of the Mississippi River with the Ohio River (USACE, 2026b).

**Table 4-6** presents the water resource subregions, listed from North to South, that are located upstream of the Project.

*Table 4-6 Water Resource Subregions Upstream of the Project*

Subregion Name	Location (State) and Watershed Area	Hydrologic Unit Code (HUC)
Mississippi Headwaters	Minnesota 20,200 sq. mi.	HUC0701
Minnesota	Iowa, Minnesota, South Dakota 16,800 sq. mi.	HUC0702
St. Croix	Minnesota and Wisconsin 7,750 sq. mi.	HUC0703
Upper Mississippi-Black-Root	Iowa, Minnesota, Wisconsin 10,700 sq. mi.	HUC0704
Chippewa	Michigan, Wisconsin 9,570 sq. mi.	HUC0705
Upper Mississippi-Maquoketa-Plum	Illinois, Iowa, Minnesota, Wisconsin 8,610 sq. mi.	HUC0706
Wisconsin	Michigan, Wisconsin 11,900 sq. mi.	HUC0707
Upper Mississippi-Iowa-Skunk-Wapsipinicon	Illinois, Iowa, Michigan 22,800 sq. mi.	HUC0708

Subregion Name	Location (State) and Watershed Area	Hydrologic Unit Code (HUC)
Rock	Illinois and Wisconsin 10,900 sq. mi.	HUC0709
Des Moines	Iowa, Minnesota, Missouri 14,400 sq. mi.	HUC0710
Upper Mississippi-Salt	Illinois, Iowa, Missouri 9,970 sq. mi.	HUC0711
Upper Illinois	Illinois, Indiana, Michigan, Wisconsin 10,900 sq. mi.	HUC0712
Lower Illinois	Illinois 17,700 sq. mi.	HUC0713

Upstream of St. Anthony Falls in Minnesota, the land slopes gently to river's edge. The river passes through a gorge with high limestone bluffs as it flows from St. Anthony Falls to St. Paul, Minnesota. Downstream of St. Paul, the river then enters the wide Mississippi River valley.

## 4.12.2 Land Uses and Water Uses

The dominant category of land use near the Project is residential, which comprises approximately 25% of the land use in the area. Other land use types in the vicinity of the Project include agricultural, recreational, open space, commercial, and industrial.

The majority of the watershed area above the Project is located within the central lowland province. This lowland area includes the Illinois River valley and much of the Mississippi River valley, from St. Paul, Minnesota to St. Louis, Missouri.

There are several multipurpose USACE reservoirs located within the Mississippi River Basin upstream of the Melvin Price L&D Project. The Congressionally authorized purpose of these reservoirs is for flood control, and therefore the reservoir operations do have some effect on the flow rate in the Mississippi River. Below is a list of USACE reservoirs that are located upstream of the Melvin Price project. The location of each reservoir is identified inside parentheses.

- Lake Winnibigoshish (Mississippi River; Bena, Minnesota)
- Leech Lake (Leech River; Federal Dam, Minnesota)
- Lake Pokegama (Mississippi River; Grand Rapids, Minnesota)
- Big Sandy Lake (Sandy River; McGregor, Minnesota)
- Pine River Lake (Pine River; Cross Lake, Minnesota)
- Gull Lake (Gull River; Brainerd, Minnesota)
- Lac Qui Parle Lake (Minnesota River; Watson, Minnesota)
- Eau Galle Lake (Eau Galle River; Spring Valley, Wisconsin)
- Coralville Lake (Iowa River; Iowa City, Iowa)
- Saylorville Lake (Des Moines River; Johnston, Iowa)
- Lake Redrock (Des Moines River; Knoxville, Iowa)
- Mark Twain Lake (Salt River; Monroe City, Missouri)

Beneficial water uses of the Mississippi River Basin include commercial navigation, municipal and industrial water supply, agricultural irrigation, recreation, and aquatic habitat. The Melvin Price L&D is a critical element of the federally authorized 9-foot navigation channel, and the maintenance of navigable water depths and of stable pool elevations is the primary operational constraint that governs the use and management of water in Pool 26 (USACE, 2025b). The

Melvin Price L&D Project is not expected to have any measurable impact on the depth of the navigable channel nor on the water level elevation in the pool on the upstream side of the dam.

### 4.12.3 Dams and Diversion Structures in the River Basin

There are many Locks and Dam projects located upstream of the Melvin Price Project, stretching as far north along the Upper Mississippi River as St. Anthony Falls in Minnesota (MN). At each of the Locks and Dam along the Upper Mississippi River, pools of water have been created on the upstream side of the dam. **Table 4-7** lists the sequence of pools and locks located along the river, from north to south, starting from Pool 1 in Minneapolis and ending at Pool 26 at the Melvin Price L&D Project. The length of each river reach (in miles) is presented in the column labeled “Distance (mi).”

*Table 4-7 List of Pools and Locks*

Pool No.	Locality	Lock No.	Mile Marker	Mile Marker (kilometers)	Distance (mi)	Distance (kilometers)
Pool 1	Minneapolis, MN	Lock 1	848	1,365	5	8
Pool 2	Hastings, MN	Lock 2	815	1,312	33	53
Pool 3	Welch, MN	Lock 3	797	1,283	18	29
Pool 4	Alma, WI	Lock 4	753	1,212	44	71
Pool 5	Minnesota City, MN	Lock 5	738	1,188	15	24
Pool 5A	Fountain City, WI	Lock 5A	728	1,172	10	16
Pool 6	Trempealeau, WI	Lock 6	714	1,150	14	23
Pool 7	La Crescent, MN	Lock 7	703	1,132	11	18
Pool 8	Genoa, WI	Lock 8	679	1,093	24	39
Pool 9	Eastman, WI	Lock 9	648	1,043	31	50
Pool 10	Guttenberg, IA	Lock 10	615	990	33	53
Pool 11	Dubuque, IA	Lock 11	583	939	32	52
Pool 12	Bellevue, IA	Lock 12	557	897	26	42
Pool 13	Clinton, IA	Lock 13	522	840	35	56
Pool 14	LeClaire, IA	Lock 14	493	794	29	47
Pool 15	Rock Island, IL	Lock 15	483	778	10	16
Pool 16	Illinois City, IL	Lock 16	457	736	26	42
Pool 17	New Boston, IL	Lock 17	437	704	20	32
Pool 18	Gladstone, IL	Lock 18	410	660	27	43
Pool 19	Keokuk, IA	Lock 19	364	586	46	74
Pool 20	Canton, MO	Lock 20	343	552	21	34

Pool No.	Locality	Lock No.	Mile Marker	Mile Marker (kilometers)	Distance (mi)	Distance (kilometers)
Pool 21	Quincy, IL	Lock 21	325	523	18	29
Pool 22	New London, MO	Lock 22	301	485	24	39
Pool 24	Clarksville, MO	Lock 24	273	440	28	45
Pool 25	Winfield, MO	Lock 25	241	388	32	52
Pool 26	East Alton, IL (Melvin Price L&D)	Lock 26	201	324	40	64

Source: USACE, St. Louis District. <https://www.mvs.usace.army.mil/> (accessed March 4, 2026)

The nearest project located downstream of the Melvin Price L&D is the Locks and Dam No. 27 at Granite City, Illinois.

#### 4.12.4 Tributary Rivers and Streams

Major tributaries to the Upper Mississippi include the Illinois River, Des Moines River, Iowa River, Wisconsin River, and the Minnesota River. The Illinois River has its confluence with the Mississippi River approximately 17 miles upstream of the Melvin Price L&D Project.

Upstream of St. Anthony Falls (Minneapolis, Minnesota), the land slopes gently to river's edge. From St. Anthony Falls downstream to St. Paul, Minnesota, there is a gorge with high limestone bluffs. Downstream of St. Paul, the river enters a wide valley. The States of Minnesota, Wisconsin and Iowa, along with the federal government, have preserved certain areas of the land along this reach of the river.

There are many streams and rivers that contribute runoff from subbasins located in the Upper Mississippi River Basin. Unlike the Lower Mississippi, much of the upper river is a series of pools created by a system of 29 locks and dams. The structures were authorized by Congress in the 1930s, and most were completed by 1940.

**Table 4-8** lists the 10 largest recorded floods on the Mississippi River at St. Louis, Missouri, which is located a few miles downstream of the Melvin Price L&D Project.

*Table 4-8 The 10 Largest Recorded Floods on the Mississippi River at St. Louis, Missouri*

Flood Rank	River Stage (feet)	Date of Flood
1	49.58	8/1/1993
2	43.31	4/28/1973
3	41.90	5/22/1995
4	41.32	6/27/1844
5	40.28	7/21/1951
6	40.26	7/1/1947
7	39.27	5/4/1983
8	39.14	4/30/1944
9	38.94	10/9/1986
10	38.94	5/24/1943

**Figure 4-8** presents a flow duration curve for the Melvin Price L&D Project. The discharge data were collected by the USGS at Gaging Station No. 05587450 (Mississippi River at Grafton, Illinois) over a 38-year period from January 1986 through December 2023. The graph plots the mean annual discharge against the Probability of Exceedance. The largest value of the mean annual discharge for the Mississippi River during those 38 years was 254,691 cfs.

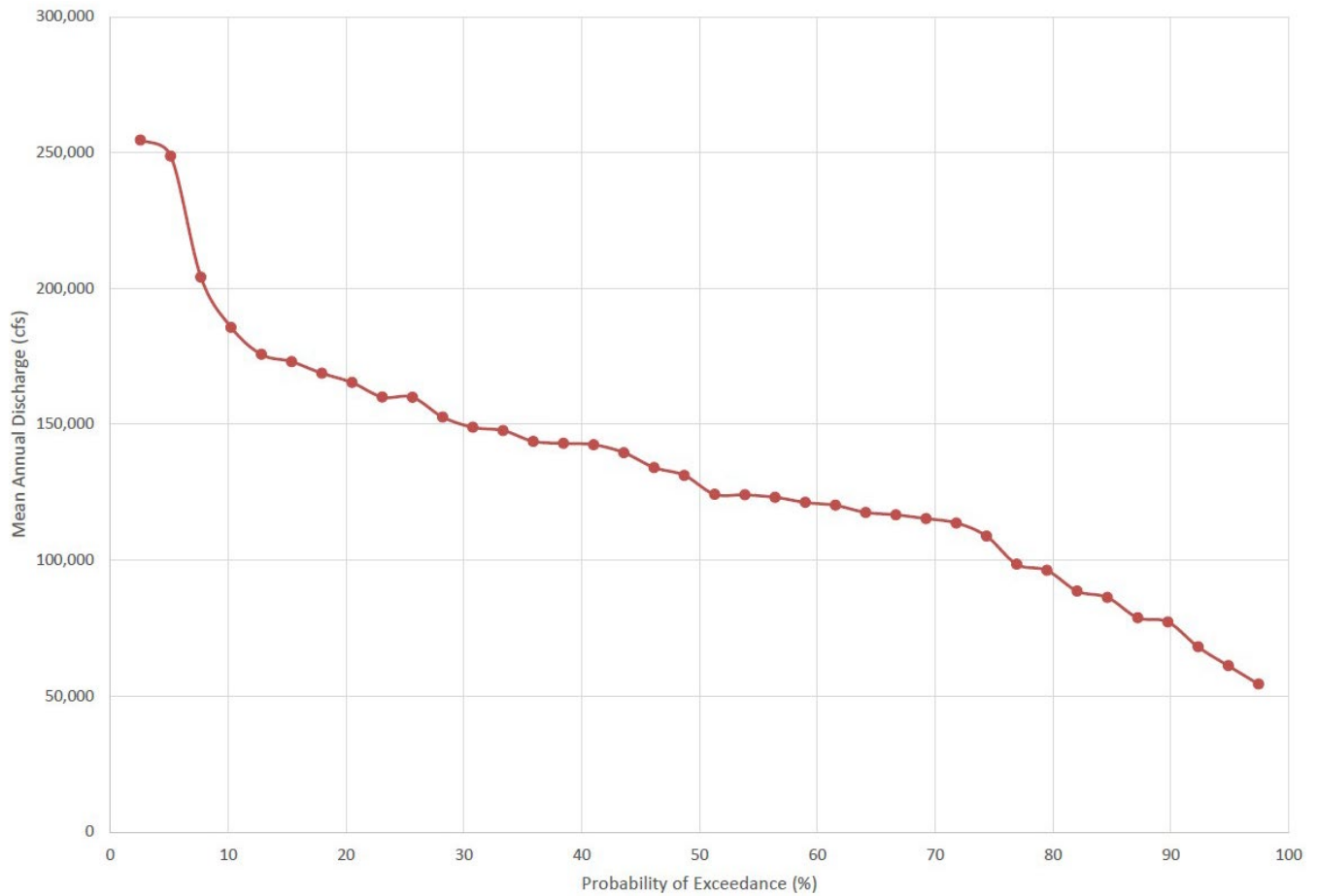


Figure 4-8 Flow Duration Curve for the Melvin Price L&D Project (1986 to 2023)

## 5. Preliminary Issues and Studies List

Preliminary issues have been identified for key biological and aquatic resources in the vicinity of Melvin Price L&D from past FERC EA's and issued Licenses. The Applicant proposes that these studies are to be conducted during the engineering phase of the project after the FERC license issues. In the most recent FERC License, the agencies agreed to conduct all studies after the FERC license issued but prior to start of construction. After the issuance of the FERC license for the project, the studies and information gathering steps that are needed to adequately characterize baseline conditions, evaluate potential Project effects, and support agency coordination under FERC and applicable federal and state requirements. The studies below are intended to be implemented and coordinated with the USACE management framework for the Project.

## 5.1 Targeted Avian Use Surveys

### 5.1.1 Primary Issues

The Melvin Price L&D tailwater and adjacent Riverlands/Maple Island complex supports high seasonal bird use, including wintering raptors and migratory waterbirds. Temporary construction activity, temporary lighting in the evenings, and temporary noise may occur in the project area.

### 5.1.2 Recommended Study Steps/Information Needs

#### Desktop seasonal sensitivity screening

- Compile existing seasonal use information from USACE Rivers Project Office resources (eagle viewing/roosting areas; sanctuary management) and identify sensitive areas.

#### Targeted avian use surveys (field)

- Conduct seasonal point-count and vantage point surveys focused on:
  - Winter roosting/foraging (eagles and other raptors),
  - Spring/fall migration (waterfowl/shorebirds), and
  - Breeding season activity near floodplain forest edges and wetland pockets.
- Record flight paths and activity concentrations near proposed work areas.

#### Nest/roost reconnaissance & buffers

- Perform focused surveys for active raptor nests and communal roost sites in riparian forests at the south edge of the project area on the spillway and on the spillway. Survey the Project footprint; map and apply avoidance buffers consistent with site management practices used in the Project Area.

#### Interconnection corridor avian risk screening (coordination-driven)

- Incorporate planning-level coordination findings indicating that a portion of the proposed interconnection routing may intersect a migratory bird movement corridor, and screen routing alternatives along the proposed interconnection route accordingly to identify segments with elevated avian use or flight activity.
- Evaluate seasonal flight patterns and height/use characteristics to inform routing refinement and the need for avian collision minimization measures necessary to align with APLIC guidance.
- Integrate avian screening results with interconnection design development to minimize disturbance and collision risk while maintaining routing on federal property (Hydro Green Energy, 2026a).

## 5.2 Targeted Mussel Surveys

### 5.2.1 Primary Issues

Unionid mussels are sensitive to substrate disturbance, turbidity, sedimentation, and hydraulic changes. Rare species, such as Spectaclecase, have specialized habitat requirements and are vulnerable to fragmentation in regulated rivers.

### 5.2.2 Recommended Study Steps/Information Needs

#### Tiered mussel survey approach (scaled to substrate and access)

- Phase 1: Reconnaissance survey using wading/shoreline visual searches where feasible and targeted boat-based checks in shallow margins.

- Phase 2: If Phase 1 indicates suitable habitat or mussel presence, use systematic timed searches or quadrat/transect methods; document species, density, size class distribution, and substrate.

#### **Special-status mussel considerations (Spectaclecase)**

- Where suitable microhabitat is present or if agencies indicate specific occurrence, implement targeted search methods appropriate for concealed microhabitats described by USFWS.

#### **Construction monitoring triggers**

- Establish turbidity monitoring triggers and stop-work criteria if work occurs adjacent to mapped/confirmed mussel habitat (to limit indirect burial and filter-feeding impairment).

## **5.3 Lake Sturgeon and Pallid Sturgeon Surveys: Tailwater and Main-Channel Use**

### **5.3.1 Primary Issues**

Lake Sturgeon spawning is documented below Melvin Price L&D, and sturgeon habitat use is strongly linked to flow, temperature, and substrate conditions. Disturbance during the spawning season is a key risk. Large-river sturgeon movements can be influenced by dam operations, high-flow connectivity, and tailwater hydraulics, requiring timing and location-specific evaluation.

### **5.3.2 Recommended Study Steps/Information Needs**

#### **Pre-season coordination and trigger definition**

- Coordinate with USACE and MDC partners to define annual spawning triggers (temperature, discharge/velocity, gate operations) and establish no-work windows in the tailrace during construction once it is open to the main channel during the spawning period.

#### **Spawning habitat verification (tailwater)**

- Map and characterize the confirmed lake sturgeon spawning bed and adjacent tailwater shoreline revetment (including substrate type/structure such as riprap/cobble/boulder features) and quantify near-bank velocity fields along the right descending bank where spawning has been documented at Melvin Price L&D; integrate site-specific hydraulic modeling and field measurements to verify that shoreline velocities meet or exceed the USACE/MDC operational target of  $\geq 0.5$  feet per second) during the spawning period.
- Document spawning-use conditions and timing by incorporating USACE monitoring approaches used in 2023 (e.g., shoreline visual observations of spawning behavior and egg adhesion on shoreline rocks, acoustic telemetry detections of tagged lake sturgeon on the spawning bed, and multibeam/imaging sonar confirmation of sturgeon use of subsurface shoreline revetment).
- Perform a spatial overlap analysis between the mapped spawning bed/velocity zone (including the area influenced by gate settings used to maintain target velocities) and proposed in-water work areas (e.g., tailrace excavation/armoring, bank protection, cofferdam footprints) to identify potential conflicts and refine avoidance buffers and construction sequencing (USACE 2024).

#### **Tailwater hydraulic persistence and slope assessment (coordination-driven)**

- Recent USACE fisheries investigations over the last several years indicates that Lake Sturgeon spawning occurs on sloped rocky substrates, with adults staging in lower-velocity refuge areas before moving into higher-velocity zones to spawn; verify whether proposed tailrace work areas intersect these sloped features.

- Use 2D or 3D hydraulic modeling (as appropriate) to assess whether near-bank velocity ranges consistent with documented spawning use (planning-level approximately 0.5 to 4 feet per second) can be maintained during the spawning period under USACE-controlled operations (Green Hydro Energy, 2026b).

#### **Entrainment/Impingement potential screening**

- Evaluate the potential for entrainment and impingement of fish at the intake and fish screens, across all life stages, through coordination with jurisdictional resource agencies to determine whether additional analysis or measures are warranted.

#### **Turbine passage risk evaluation**

- Evaluate turbine-passage stressors using established injury mechanisms (blade strike, shear/turbulence, mechanical interactions, and pressure changes) to estimate relative risk under representative operating conditions for large bulb-type turbines.

## **5.4 Aquatic Resource Delineation (ARD) Surveys**

### **5.4.1 Primary Issues**

The Melvin Price L&D floodplain includes complex riverine and backwater wetlands; small elevation changes and hydrologic alterations can affect wetland indicators. National datasets are not jurisdictional determinations; formal delineations are needed to support permitting and avoidance/minimization planning.

### **5.4.2 Recommended Study Steps/Information Needs**

#### **Field wetland delineation and waterbody identification**

- Conduct the delineations consistent with the 1987 Corps of Engineers Wetlands Delineation Manual and the Midwest Regional Supplement (Version 2.0), documenting vegetation, soils, and hydrology indicators.

#### **Aquatic Resource Delineation (ARD) mapping and survey**

- Prepare Geographic Information System (GIS) deliverables suitable for USACE verification and permitting.

#### **Agency verification pathway**

- Coordinate with the St. Louis District of the USACE for jurisdictional determination/verification and document any required avoidance/minimization.

## **5.5 Flora Surveys – Decurrent False Aster**

### **5.5.1 Primary Issues**

Decurrent False Aster is closely tied to the Mississippi River floodplain and persists in moist, disturbed alluvial habitats maintained by periodic flooding; it is documented in St. Charles County and is disturbance-dependent, making it vulnerable to construction-related grading, herbicide exposure, and altered floodplain processes.

### **5.5.2 Recommended Study Steps/Information Needs**

#### **Desktop occurrence and habitat screening**

- Identify potential habitat polygons (disturbed moist soils, old fields within the project boundary) within and near the construction footprint; coordinate early with MDC/USACE land managers where federal tracts are involved.

### **Focused field surveys inside of the project boundary during the flowering window**

- Conduct presence/absence surveys inside of the project boundary during the recommended blooming period (Best Management Practice (BMP) guidance indicates August–October survey window for detectability).

### **Population mapping and impact avoidance design**

- If present within project boundary, map occurrences with sub-meter Global Positioning System (GPS) and design avoidance buffers; establish construction exclusion areas and implement targeted monitoring during ground disturbance.

### **Weed control and herbicide management coordination**

- Implement invasive species controls within the project boundaries using methods consistent with BMP guidance and avoid non-selective herbicide application where the species or its suitable habitat occurs.

## **5.6 Interconnection Routing and Excavation Spoils Planning Studies**

### **5.6.1 Primary Issues**

Preliminary coordination with USACE identified planning-level concerns related to interconnection routing, including potential intersection with migratory bird movement corridors and the importance of maintaining routing on federal property. Coordination also identified the potential generation of a substantial volume of excavation spoils, with early discussion of beneficial reuse opportunities (e.g., island building or shorebird location enhancement) that could provide ancillary habitat value, subject to further agency planning and feasibility review (Hydro Green Energy, 2026a).

### **5.6.2 Recommended Study Steps/Information Needs**

#### **Interconnection routing refinement**

- Obtain and incorporate USACE-provided Computer-Aided Design (CAD) files and federal property shapefiles to refine routing to minimize disturbance.
- Evaluate alternative span distances and routing along the interconnection path to reduce aerial crossings where practicable and minimize avian risk consistent with findings from existing targeted avian use surveys.

#### **Excavation spoils characterization and management feasibility**

- Develop a planning-level estimate of excavation volumes and material characteristics to support spoils management decision-making.
- Coordinate with USACE to evaluate upland disposal versus beneficial reuse options, including compatibility with any existing or planned island-building or habitat enhancement efforts in the District.

## **6. Summary of Contacts**

The Applicant will not seek benefits under Section 210 of the Public Utility Regulatory Policies Act of 1978 (PURPA). The proposed installed capacity of 100 MW exceeds the 30 MW limit in PURPA Section 210.

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# Appendices

# **Appendix A**

## **Stakeholder Contact and Distribution List**



## STAKEHOLDER CONTACTS AND DISTRIBUTION LIST

Table 1 State of Illinois Contact List

Illinois Contacts
Regional Administrator <b>Federal Emergency Management Agency (FEMA)</b> 536 South Clark Street, 6 <sup>th</sup> Floor Chicago, IL 60605
Regional Engineer <b>Federal Energy Regulatory Commission (FERC)</b> Division of Dam Safety and Inspections 230 South Dearborn Street, Room 3130 Chicago, IL 60604
Director <b>Illinois Department of Agriculture (USDA)</b> Administrative Headquarters P.O. Box 19281 State Fairgrounds Springfield, IL 62794-9281
Chief - Bill Milner <b>Illinois Department of Natural Resources (IDNR)</b> Office of Water Resources One Natural Resources Way Springfield, IL 62702-1271 bil.milner@illinois.gov
Director <b>Illinois Department of Natural Resources (IDNR)</b> Office of Water Resources One Natural Resources Way Springfield, IL 62702-1271
State Historic Preservation Office (SHPO) <b>Illinois Department of Natural Resources (IDNR)</b> One Old State Capitol Plaza Springfield, IL 62701
Bureau Chief <b>Illinois Environmental Protection Agency (IEPA)</b> Bureau of Water 1021 North Grand Avenue P.O. Box 19276 Springfield, IL 62702

## STAKEHOLDER CONTACTS AND DISTRIBUTION LIST

<b>Illinois Contacts</b>
Darren Gove, CWA 401/Mines Sub-unit Supervisor <b>Illinois Environmental Protection Agency (IEPA)</b> Bureau of Water 2520 W Iles Avenue P.O. Box 19276 Springfield, IL 62794-9276 darren.gove@illinois.gov
Director <b>Illinois Environmental Protection Agency (IEPA)</b> Headquarters 1021 North Grand Avenue P.O. Box 19276 Springfield, IL 62702
Madison County, IL <b>Madison County Administration Building</b> 157 North Main Street Edwardsville, IL 62025
Attorney General <b>Office of the Attorney General</b> James R. Thompson Center 100 West Randolph Street Chicago, IL 60601
Governor <b>Office of the Governor</b> State Capitol 207 Statehouse Springfield, IL 62706
Mayor David Goins <b>City of Alton</b> 101 East Third Street Alton, IL 62002
Village President Darren Carlton <b>Village of East Alton</b> 118 West Main Street East Alton, IL 62024
Representative Nikki Budzinski <b>U.S. House of Representatives</b> 1717 Longworth House Office Building Washington, DC 20515 Yusuf.nekzad@mail.house.gov
Senator Dick Durbin <b>U.S. Senate</b> 711 Hart Senate Office Building Washington, DC 20510 Owen_Doherty@durbin.senate.gov

## STAKEHOLDER CONTACTS AND DISTRIBUTION LIST

<b>Illinois Contacts</b>
Senator Tammy Duckworth <b>U.S. Senate</b> 524 Hart Senate Office Building Washington, DC 20510
District Engineer <b>U.S. Army Corps of Engineers (USACE)</b> 111 North Canal Street, Suite 600 Chicago, IL 60606-7206
District Engineer <b>U.S. Army Corps of Engineers (USACE)</b> P.O. Box 2004 Rock Island, IL 81204-2004
Uses and Hydropower Program Lead <b>U.S. Bureau of Land Management (BLM)</b> Lands, Realty, and Cadastral Survey 4701 N. Torrey Pines Drive North Las Vegas, NV 89130
<b>U.S. Coast Guard (USCG)</b> Heartland District Western Rivers Division & Waterways Management 500 Poydras Street, Suite 1324, Room 1230 New Orleans, LA 70130
Supervisor – NEPA Implementation <b>U.S. Environmental Protection Agency (EPA)</b> Region 5 Office of Enforcement and Compliance Assurance 77 West Jackson Boulevard, Mailcode E-197 Chicago, IL 60604-3507 R5NEPA@epa.gov
Matthew Mangan, Field Supervisor <b>U.S. Fish and Wildlife Service (USFWS)</b> Rock Island Field Office 1511 47th Avenue Moline, IL 61265 matthew_mangan@fws.gov

*Table 2 State of Missouri Contact List*

<b>Missouri Contacts</b>
Kristy Laughlin and Laura Nuckolls <b>Tribal Historic Preservation Office</b> <b>Eastern Shawnee Tribe of Oklahoma</b> P.O. Box 350 Seneca, MO 64865 klaughlin@estoo.net lnuckolls@estoo.net

## STAKEHOLDER CONTACTS AND DISTRIBUTION LIST

<b>Missouri Contacts</b>
Regional Administrator <b>Federal Emergency Management Agency (FEMA)</b> 9221 Ward Parkway, Suite 300 Kansas City, MO 64114-3372
Matt Vitello, P.E., Policy Coordinator <b>Missouri Department of Conservation (MDC)</b> 2901 West Truman Blvd P.O. Box 180 Jefferson City, MO 65102-0180 matt.vitello@mdc.mo.gov
Jason Sumners, Director <b>Missouri Department of Conservation (MDC)</b> P.O. Box 180 Jefferson City, MO 65102-0180
Kurt U. Schaefer, Director <b>Missouri Department of Natural Resources (MDNR)</b> P.O. Box 176 Jefferson City, MO 65102-0176
State Historic Preservation Office (SHPO) <b>Missouri Department of Natural Resources (MDNR)</b> P.O. Box 176 Jefferson City, MO 65102
Attorney General <b>Office of the Attorney General</b> Supreme Court Building 207 West High Street Jefferson City, MO 65101
Governor <b>Office of the Governor</b> Missouri Capitol Building, Room 216 Jefferson City, MO 65101
Mayor William Richter <b>City of West Alton</b> P.O. Box 42 West Alton, MO 63386
St. Charles County, MO <b>St. Charles County Administration Building</b> 201 North Second Street St. Charles, MO 63301
Representative Ann Wagner <b>U.S. House of Representatives</b> 2350 Rayburn House Office Building Washington, DC 20515-2502 ann.wagnermo02@mail.house.gov

## STAKEHOLDER CONTACTS AND DISTRIBUTION LIST

<b>Missouri Contacts</b>
<p>Representative Bob Onder  <b>U.S. House of Representatives</b>                      1113 Longworth House Office Building                      Washington, DC 20515</p>
<p>Senator Josh Hawley  <b>U.S. Senate</b>                      381 Russell Senate Office Building                      Washington, DC 20510</p>
<p>Senator Eric Schmitt  <b>U.S. Senate</b>                      404 Russell Senate Office Building                      Washington, DC 20510</p>
<p>District Engineer  <b>U.S. Army Corps of Engineers (USACE)</b>                      700 Federal Building                      Kansas City, MO 64102-2896</p>
<p>District Engineer  <b>U.S. Army Corps of Engineers (USACE)</b>                      1222 Spruce Street                      St. Louis, MO 63103-2833                      abigail.c.hoyt@usace.army.mil</p>
<p>Uses and Hydropower Program Lead  <b>U.S. Bureau of Land Management (BLM)</b>                      Lands, Realty, and Cadastral Survey                      4701 N. Torrey Pines Drive                      North Las Vegas, NV 89130</p>
<p><b>U.S. Coast Guard (USCG)</b>                      Heartland District                      Western Rivers Division &amp; Waterways Management                      500 Poydras Street, Suite 1324, Room 1230                      New Orleans, LA 70130</p>
<p>Environmental Review Office  <b>U.S. Environmental Protection Agency (EPA)</b>                      Region 7                      11201 Renner Blvd                      Lenexa, KS 66219                      R7_NEPA@epa.gov</p>
<p>John S. Weber, Field Supervisor  <b>U.S. Fish and Wildlife Service (USFWS)</b>                      Columbia Field Service                      101 Park Deville, Suite A                      Columbia, MO 65203-0057                      john_s_weber@fws.gov</p>

# **Appendix B**

## **Applicant's Outreach**



## APPLICANT'S OUTREACH

Table 1 Applicant's Outreach List

Agency/Stakeholder	Name	Email Address	Date	Meeting Subject
U.S. Army Corps of Engineers (USACE) St. Louis District	Abigail Hoyt Ryan Swearingin Sarah Miller Matthew Hartman		January 28, 2026	Interconnection Routing and Excavation Spoils Meeting
U.S. Army Corps of Engineers (USACE) St. Louis District	Abigail Hoyt Ryan Swearingin		February 19, 2026	Lake Surgeon Meeting
U.S. Fish and Wildlife Services (USFWS)	Matt Mangan	Matthew_mangan@fws.gov	May 6, 2025	
Illinois Department of Natural Resources (IDNR)	Bill Milner	bill.milner@illinois.gov	May 12, 2025	
Illinois Environmental Protection Agency (IEPA)	Darren Gove	darren.gove@illinois.gov	May 12, 2025	
Eastern Shawnee Tribe of Oklahoma	Kristy Laughlin	klaughlin@estoo.net	May 12, 2025 June 10, 2025	
Eastern Shawnee Tribe of Oklahoma	Laura Nuckolls	lnuckolls@estoo.net	May 12, 2025 June 10, 2025	
U.S. Fish and Wildlife Services (USFWS)	John Weber	John_s_weber@fws.gov	May 15, 2025	

The following items are documentation of the Applicant's outreach.



# Hydro Green Energy®

Hydro Green Energy, LLC • 2901 4<sup>th</sup> Avenue South, # B253 • Birmingham, AL 35233

www.hgenenergy.com

## MEMORANDUM

To: FERC Project Docket, P-15257

From: Hydro Green Energy – Project Development

Date: January 28, 2026

Subject: Interconnection Routing and Excavation Spoils Meeting

**Attendees –**

- Abigail Hoyt, USACE**
- Ryan Swearingin, USACE**
- Sarah Miller, USACE**
- Matthew Hartman, USACE**
- Wayne Krouse, Hydro Green Energy**

### **Interconnection Routing and Excavation Spoils Meeting Summary**

#### **Abigail Hoyt – CAD file request**

- District working on CAD files
- May be a few weeks before able to provide

#### **Sarah Miller – Proposed Interconnection Routing & Location**

- Aerial routing crosses through migratory bird way
- Concerned about aesthetics
- Explore other routes if possible

#### **Ryan Swearingin – Interconnection Routing in District**

- Have Google Earth shape file of all federal property in District
- Will send shape file via email

#### **Ryan Swearingin – Island Building & Enhancement in District**

- USACE has used dredged materials as well as dikes for island building in District
- Showed location of some islands in district that might be able to add enhancements
- Need to find out more information about USACE future plans

#### **Wayne Krouse – Proposed Interconnection Location**

- Anticipate line will be 138 kV line
- Routing on right bank stays 100% on federal property from powerhouse to Riverway Dr.
- Will either be buried or aerial across spillway
- Requires aerial crossing of Alton Slough from Riverway Dr. and Mississippi River
- Comes down on river side of levee on left bank
- Aerial crossing over levee road to county property
- Short crossing on private property to substation
- Have already started working on obtaining ROW/Easements on private property

#### **Wayne Krouse – Excavation Spoils Disposition**

- Aware of island building efforts in District
- Anticipate ~500,000 cubic yards of excavation

- Discussed options to use spoils for supporting island building efforts in District
- May help shore bird habitat

**Key Discussion Themes**

- Habitat Enhancement Opportunity – Excavation spoils could increase shore bird habitat
- Critical Design Factors of Interconnection – Importance to HGE to stay on federal property as much as possible.

**Action Items**

<b>Action</b>	<b>Responsible</b>	<b>Notes</b>
Provide CAD Files	USACE	Within a couple of weeks
Obtain island building plans	USACE	For planning

Sincerely,



Wayne Krouse  
Managing Member,  
Lock+™ Hydro Friends Fund X, LLC  
Chairman & CEO  
Hydro Green Energy, LLC



## Hydro Green Energy®

Hydro Green Energy, LLC • 2901 4<sup>th</sup> Avenue South, # B253 • Birmingham, AL 35233

www.hgenergy.com

### MEMORANDUM

To: FERC Project Docket, P-15257

From: Hydro Green Energy – Project Development

Date: February 19, 2026

Subject: Lake Sturgeon Coordination & Tailrace Design Considerations (Gate 9 Project)

**Attendees –** Abigail Hoyt, USACE  
Ryan Swearingin, USACE  
Wayne Krouse, Hydro Green Energy  
Andrew Blystra, GHD  
Joe Kulowiski, GHD

#### Lake Sturgeon Meeting Summary

##### Ryan Swearingin – Fisheries / Sturgeon Biology Insights

###### Substrate & Habitat

- Riprap (limestone) is being used by spawning sturgeon.
- Adults hide behind large boulders (lower velocity zones) and move into higher velocity areas to deposit eggs.
- Eggs require oxygenation and protection from sedimentation.
- Rock size may be less important than consistent velocity and adequate oxygenation.

###### Spawning Behavior

- Occurs over extended duration (not minutes).
- Triggered by water temperature, not just flow.
- Fish face upstream during spawning.
- Typically occurs on sloped areas rather than flat surfaces.

###### Flow Considerations

- Sustained duration of flow is required.
- Short-term releases are insufficient.
- Eggs adhere to substrate; larvae drift downstream.
- Oxygenation during incubation is critical.

###### Spawning Observations

- Confirmed spawning at current site (first confirmed event).
- Observed spawning on riprap and near dam face.
- Habitat includes rocky slope and structured areas near gates.

###### Stocking & Hatchery Program

- Stocking ongoing since 1984 via federal and Missouri agencies (MDC).
- Fish move extensively throughout the river system.
- Wisconsin rootstock agreement ended (reason unknown).

- MDC collecting broodstock and rearing fish.
- Continued commitment to stocking.

#### **Workshops & Collaboration**

- First sturgeon workshop recently held.
- Included USACE and external partners.
- Open to collaboration and future involvement.

#### **Wayne Krouse – Project Support & Clarifications**

- Confirmed slope preference for spawning areas.
- Feasibility of primarily sloped habitat design.
- Emphasized importance of sustained flow duration.
- Discussed modeling and funding considerations.
- Fish access tied more to temperature than gate operation alone.

#### **Andrew Blystra – Design Suggestion**

- Referenced Indiana project experience.
- Suggested multiple spawning shelves with varying depths and slopes.
- Proposed testing habitat configurations to evaluate fish attraction.

#### **Abigail Hoyt – Modeling Input**

- 2D and 3D modeling available.
- 3D provides more detailed hydraulic information.
- 2D acceptable depending on scope.
- HEC-RAS currently standard within the Corps.

#### **Key Discussion Themes**

- Habitat Enhancement Opportunity – Incorporate sloped rock shelves, mixed substrate, and controlled velocity zones.
- Critical Design Factors – Velocity range (~0.5–4 fps), sustained flow, oxygenation, slope preference, structured refuge.
- Operational Flexibility – Maintain flow during non-generation and coordinate with spawning season.

#### **Action Items**

<b>Action</b>	<b>Responsible</b>	<b>Notes</b>
Refine tailrace cross-section design	Hydropower Team	Early March target
Obtain gate opening / regression data	Hydropower Team	For modeling
Evaluate 2D vs 3D modeling	Modeling Team	Consider biological detail
Consider sloped spawning shelves	Design Team	Based on fisheries input
Monitor future workshops	Hydropower Team	Potential collaboration

### **Open Questions**

1. Why did the Wisconsin rootstock agreement end?
2. Are there hatchery capacity constraints?
3. What are exact velocity targets for optimal egg survival?
4. How far downstream do larvae typically drift?

### **Overall Conclusion**

The meeting was collaborative and exploratory. The hydropower team demonstrated willingness to integrate biological considerations into tailrace design. Fisheries representatives emphasized slope preference, sustained velocity, oxygenation, temperature-triggered spawning, and consistent flow duration. There is clear opportunity to enhance sturgeon habitat while operating the hydropower facility through proper hydraulic and habitat design.

Sincerely,

A handwritten signature in black ink, appearing to read "Wayne Krouse", followed by a long horizontal line extending to the right.

Wayne Krouse  
Managing Member,  
Lock+™ Hydro Friends Fund X, LLC  
Chairman & CEO  
Hydro Green Energy, LLC

**From:** Gove, Darren <Darren.Gove@Illinois.gov>  
**Sent:** Monday, May 12, 2025 3:17 PM  
**To:** Davis, Christine L. <Christine.Davis@Illinois.gov>; Wayne Krouse <wayne@hgenergy.com>  
**Cc:** LeCrone, Darin <Darin.LeCrone@Illinois.gov>  
**Subject:** RE: FERC hydropower agency consultation contact

Wayne, IL DNR's contact for downstate regulatory is Bill Milner, [bill.milner@illinois.gov](mailto:bill.milner@illinois.gov).

I am the Illinois EPA contact for CWA §401 certifications and the joint application process with USACE. Let me know if you would like to schedule a call or meeting.

Thanks,

Darren R. Gove  
CWA 401/Mines Sub-unit Supervisor  
Permit Section, Division of Water Pollution Control  
Bureau of Water, Illinois EPA

Email address: <mailto:darren.gove@illinois.gov>

**From:** Wayne Krouse <wayne@hgenergy.com>  
**Sent:** Tuesday, May 6, 2025 1:24 PM  
**To:** Mangan, Matthew <Matthew\_Mangan@fws.gov>  
**Cc:** Larson, Lauren D <lauren\_larson@fws.gov>; McPeek, Kraig <kraig\_mcpeek@fws.gov>  
**Subject:** Re: [EXTERNAL] Melvin Price Locks and Dam hydropower project

**Matthew,**

**Thanks for providing. I'll be in touch.**

**Best regards,**

**Wayne Krouse**  
**President & CEO**  
**Hydro Green Energy**  
**877-556-6566 x709**  
[www.hgenergy.com](http://www.hgenergy.com)  
**wayne@hgenergy.com**

---

**From:** Mangan, Matthew <Matthew\_Mangan@fws.gov>  
**Sent:** Tuesday, May 6, 2025 1:16 PM  
**To:** Wayne Krouse <wayne@hgenergy.com>  
**Cc:** Larson, Lauren D <lauren\_larson@fws.gov>; McPeek, Kraig <kraig\_mcpeek@fws.gov>  
**Subject:** Re: [EXTERNAL] Melvin Price Locks and Dam hydropower project

**Wayne,**

**My information is provided below if you need to get ahold of me.**

**Matt Mangan**  
**Fish and Wildlife Biologist**  
**US Fish and Wildlife Service**  
**6987 Headquarters Road**  
**Marion, IL 62959**

**618-998-5945**

**618-364-5389 Cell**

[matthew\\_mangan@fws.gov](mailto:matthew_mangan@fws.gov)

---

**From:** McPeek, Kraig <kraig\_mcpeek@fws.gov>

**Sent:** Tuesday, May 6, 2025 12:38 PM

**To:** Wayne Krouse <wayne@hgenergy.com>

**Cc:** Larson, Lauren D <lauren\_larson@fws.gov>; Mangan, Matthew  
<Matthew\_Mangan@fws.gov>

**Subject:** Re: [EXTERNAL] Melvin Price Locks and Dam hydropower project

Hi Wayne,

**Message received. Matt Mangan will be your point of contact. He is copied to the email. Thanks**

**Kraig McPeek**

**Field Office Supervisor**

**US Fish and Wildlife Service**

**Illinois & Iowa ES Field Office**

**1511 47th Avenue**

**Moline, IL 61265**

**office - 309-757-5800 x202**

**TEAMS # (please use) - 309-315-9143**

**cell - 309-429-0362**

**From:** Wayne Krouse <wayne@hgenergy.com>  
**Sent:** Tuesday, June 10, 2025 1:31 PM  
**To:** klaughlin@estoo.net <klaughlin@estoo.net>  
**Cc:** lnuckolls@estoo.net <lnuckolls@estoo.net>  
**Subject:** Re: Melvin Price Locks and Dam hydropower project

**Dear Kristy and Laura,**

**It has been about a month since I sent you the last email and I did not receive a confirmation from you that you received my email. I checked my junk mail and trash folders to see if the email had bounced back and it had not. Unless you tell me otherwise, I will assume you are the point of contact for the tribe, since when I called the receptionist transferred me to you.**

**That being said, in the last four weeks, I have been able to obtain copies of all of the previous License applications with FERC and the study by the US Army Corps of Engineers for hydropower project at Melvin Price which have been conducted over a period of almost 45 years. Each License Application and the study by the Army conclude that there are no cultural resources in the project area. Our project area closely matches those of two of the FERC License applications and the study by the Army.**

**Could you please confirm that you are in agreement with the previous conclusions by the other past applicants and the Army. If you are in disagreement with their conclusions, could you please send me a copy of your documentation to review. As I mentioned on our call on May 12, 2025, we are collecting information that will be used in the licensing process and potentially our License application.**

**I look forward to hearing from you.**

**Best regards,**

**Wayne Krouse  
President & CEO  
Hydro Green Energy  
877-556-6566 x709  
[www.hgenergy.com](http://www.hgenergy.com)  
wayne@hgenergy.com**

---

**From:** Wayne Krouse  
**Sent:** Monday, May 12, 2025 11:28 AM  
**To:** klaughlin@estoo.net <klaughlin@estoo.net>  
**Cc:** lnuckolls@estoo.net <lnuckolls@estoo.net>  
**Subject:** Melvin Price Locks and Dam hydropower project

**Dear Kristy,**

**Thank you for your time on the phone this morning. As I mentioned, my company has a FERC Permit for the Melvin Price Locks and Dam hydropower project (P-15257). Currently, I am reaching out to stakeholders and agencies to establish a point of contact as we begin the licensing process. The Tribe's Historic Preservation Officer was listed on the FERC consultation contact list and you mentioned Laura would be that person.**

**I've included the original application for the FERC Preliminary Permit. When you look at the images in the exhibits, I do not believe the powerhouse will be as large as indicated on those drawings. The size of the powerhouse should end up being similar to the Meldahl hydropower project on the Ohio River (see image attached).**

**As you may be aware hydropower at Melvin Price has been licensed three times in the past by FERC and has undergone four EA's.**

**Please let me know if you have any questions. Lastly, could you please confirm receipt of this email. Thank you.**

**Best regards,**

**Wayne Krouse  
President & CEO  
Hydro Green Energy**

**877-556-6566 x709**

[www.hgenergy.com](http://www.hgenergy.com)

[wayne@hgenergy.com](mailto:wayne@hgenergy.com)

**From:** Weber, John S <John\_S\_Weber@fws.gov>  
**Sent:** Thursday, May 15, 2025 3:31 PM  
**To:** Wayne Krouse <wayne@hgenergy.com>  
**Subject:** Re: [EXTERNAL] contact for Melvin Price Locks and Dam hydropower project

**Great—and good luck to you.**

***John Weber***  
***Field Supervisor***  
***U.S. Fish & Wildlife Service***  
***Missouri Ecological Services Field Office***  
***Cell: 573-825-6048***

---

**From:** Wayne Krouse <wayne@hgenergy.com>  
**Sent:** Thursday, May 15, 2025 3:20 PM  
**To:** Weber, John S <John\_S\_Weber@fws.gov>  
**Subject:** Re: [EXTERNAL] contact for Melvin Price Locks and Dam hydropower project

**Dear Mr. Weber,**

**Thank you for that information and your quick response. I am in touch with Mr. McPeck and his designee.**

**Have a good weekend.**

**Best regards,**

**Wayne Krouse**  
**President & CEO**  
**Hydro Green Energy**  
**877-556-6566 x709**  
[www.hgenergy.com](http://www.hgenergy.com)  
**wayne@hgenergy.com**

**From:** Weber, John S <John\_S\_Weber@fws.gov>

**Sent:** Thursday, May 15, 2025 8:23 AM

**To:** Wayne Krouse <wayne@hgenergy.com>

**Subject:** Re: [EXTERNAL] contact for Melvin Price Locks and Dam hydropower project

**Hello Sir,**

**Thank you so much for the call. Our office works with the IL/IA Field Office to cover MS River Consultations. In this case, the consultation would go to Mr. Kraig McPeek or his designee.**

**Kraig can be reached at: [kraig\\_mcpeek@fws.gov](mailto:kraig_mcpeek@fws.gov)**

**Thank you kindly,**

# **Appendix C**

**USFWS Information for Planning and  
Consultation**

# IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

## Location

Illinois and Missouri



## Local offices

Missouri Ecological Services Field Office

☎ (573) 234-2132

📠 (573) 234-2181

MAILING ADDRESS

101 Park Deville Drive

Suite A

Columbia, MO 65203-0057

PHYSICAL ADDRESS

101 Park Deville Drive

Suite A}

Columbia, MO 65203-0057

Southern Illinois Sub-Office

☎ (618) 998-5945

✉ [Marion@fws.gov](mailto:Marion@fws.gov)

MAILING ADDRESS

Southern Illinois Sub-office

8588 Route 148

Marion, IL 62959-5822

PHYSICAL ADDRESS

6987 Headquarters Road

Marion, IL 62959

<https://www.fws.gov/office/illinois-iowa-ecological-services>

# Endangered species

**This resource list is for informational purposes only and does not constitute an analysis of project level impacts.**

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species<sup>1</sup> and their critical habitats are managed by the [Ecological Services Program](#) of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries<sup>2</sup>).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact [NOAA Fisheries](#) for [species under their jurisdiction](#).

1. Species listed under the [Endangered Species Act](#) are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the [listing status page](#) for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

## Mammals

NAME	STATUS
Gray Bat <i>Myotis grisescens</i> Wherever found No critical habitat has been designated for this species. <a href="https://ecos.fws.gov/ecp/species/6329">https://ecos.fws.gov/ecp/species/6329</a>	Endangered
Indiana Bat <i>Myotis sodalis</i> Wherever found There is <b>final</b> critical habitat for this species. Your location does not overlap the critical habitat. <a href="https://ecos.fws.gov/ecp/species/5949">https://ecos.fws.gov/ecp/species/5949</a>	Endangered
Northern Long-eared Bat <i>Myotis septentrionalis</i> Wherever found No critical habitat has been designated for this species. <a href="https://ecos.fws.gov/ecp/species/9045">https://ecos.fws.gov/ecp/species/9045</a>	Endangered
Tricolored Bat <i>Perimyotis subflavus</i> Wherever found No critical habitat has been designated for this species. <a href="https://ecos.fws.gov/ecp/species/10515">https://ecos.fws.gov/ecp/species/10515</a>	Proposed Endangered

## Reptiles

NAME	STATUS
Eastern Massasauga (=rattlesnake) <i>Sistrurus catenatus</i> Wherever found No critical habitat has been designated for this species. <a href="https://ecos.fws.gov/ecp/species/2202">https://ecos.fws.gov/ecp/species/2202</a>	Threatened

## Fishes

NAME	STATUS
Pallid Sturgeon <i>Scaphirhynchus albus</i> Wherever found No critical habitat has been designated for this species. <a href="https://ecos.fws.gov/ecp/species/7162">https://ecos.fws.gov/ecp/species/7162</a>	Endangered

## Clams

NAME	STATUS
Spectaclecase (mussel) <i>Cumberlandia monodonta</i> Wherever found There is <b>proposed</b> critical habitat for this species. Your location does not overlap the critical habitat. <a href="https://ecos.fws.gov/ecp/species/7867">https://ecos.fws.gov/ecp/species/7867</a>	Endangered

## Insects

NAME	STATUS
Monarch Butterfly <i>Danaus plexippus</i> Wherever found There is <b>proposed</b> critical habitat for this species. Your location does not overlap the critical habitat. <a href="https://ecos.fws.gov/ecp/species/9743">https://ecos.fws.gov/ecp/species/9743</a>	Proposed Threatened

## Flowering Plants

NAME	STATUS
Decurrent False Aster <i>Boltonia decurrens</i> Wherever found No critical habitat has been designated for this species. <a href="https://ecos.fws.gov/ecp/species/7705">https://ecos.fws.gov/ecp/species/7705</a>	Threatened

## Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

You are still required to determine if your project(s) may have effects on all above listed species.

## Bald & Golden Eagles

Bald and Golden Eagles are protected under the Bald and Golden Eagle Protection Act <sup>2</sup> and the Migratory Bird Treaty Act (MBTA) <sup>1</sup>. Any person or organization who plans or conducts activities that may result in impacts to Bald or Golden Eagles, or their nests, should follow appropriate regulations and implement required avoidance and minimization measures, as described in the various links on this page.

The [data](#) in this location indicates that no eagles have been observed in this area. This does not mean eagles are not present in your project area, especially if the area is difficult to survey. Please review the 'Steps to Take When No Results Are Returned' section of the [Supplemental Information on Migratory Birds and Eagles document](#) to determine if your project is in a poorly surveyed area. If it is, you may need to rely on other resources to determine if eagles may be present (e.g. your local FWS field office, state surveys, your own surveys).

Additional information can be found using the following links:

- Eagle Management <https://www.fws.gov/program/eagle-management>
- Measures for avoiding and minimizing impacts to birds <https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds>
- Nationwide avoidance and minimization measures for birds <https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf>
- Supplemental Information for Migratory Birds and Eagles in IPaC <https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action>

Bald and Golden Eagle information is not available at this time

## Bald & Golden Eagles FAQs

### What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are an eagle ([Bald and Golden Eagle Protection Act](#) requirements may apply).

### Proper interpretation and use of your eagle report

On the graphs provided, please look carefully at the survey effort (indicated by the black vertical line) and for the existence of the "no data" indicator (a red horizontal line). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort line or no data line (red horizontal) means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list and associated information help you know what to look for to confirm presence and helps guide you in knowing when to implement avoidance and minimization measures to eliminate or reduce potential impacts from your project activities or get the appropriate permits should presence be confirmed.

### How do I know if eagles are breeding, wintering, or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating, or resident), you may query your location using the [RAIL Tool](#) and view the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If an eagle on your IPaC migratory bird species list has a breeding season associated with it (indicated by yellow vertical bars on the phenology graph in your "IPaC PROBABILITY OF PRESENCE SUMMARY" at the top of your results list), there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

### Interpreting the Probability of Presence Graphs

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. A taller bar indicates a higher probability of species presence. The survey effort can be used to establish a level of confidence in the presence score.

#### **How is the probability of presence score calculated? The calculation is done in three steps:**

The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is  $0.25/0.25 = 1$ ; at week 20 it is  $0.05/0.25 = 0.2$ .

The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

#### **Breeding Season ( )**

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

#### **Survey Effort ( )**

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

#### **No Data ( )**

A week is marked as having no data if there were no survey events for that week.

#### **Survey Timeframe**

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

# Migratory birds

The Migratory Bird Treaty Act (MBTA) <sup>1</sup> prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior [authorization](#) by the Department of Interior U.S. Fish and Wildlife Service (FWS).

1. The [Migratory Birds Treaty Act](#) of 1918.
2. The [Bald and Golden Eagle Protection Act](#) of 1940.

Additional information can be found using the following links:

- Eagle Management <https://www.fws.gov/program/eagle-management>
- Measures for avoiding and minimizing impacts to birds <https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds>
- Nationwide avoidance and minimization measures for birds
- Supplemental Information for Migratory Birds and Eagles in IPaC <https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action>

Migratory bird information is not available at this time

## Migratory Bird FAQs

**Tell me more about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds.**

[Nationwide Avoidance & Minimization Measures for Birds](#) describes measures that can help avoid and minimize impacts to all birds at any location year-round. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is one of the most effective ways to minimize impacts. To see when birds are most likely to occur and breed in your project area, view the Probability of Presence Summary. [Additional measures](#) or [permits](#) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

**What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?**

The Migratory Bird Resource List is comprised of [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location, such as those listed under the Endangered Species Act or the [Bald and Golden Eagle Protection Act](#) and those species marked as "Vulnerable". See the FAQ "What are the levels of concern for migratory birds?" for more information on the levels of concern covered in the IPaC migratory bird species list.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) with which your project intersects. These species have been identified as warranting special attention because they are BCC species in that area, an eagle ([Bald and Golden Eagle Protection Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, and to verify survey effort when no results present, please visit the [Rapid Avian Information Locator \(RAIL\) Tool](#).

**Why are subspecies showing up on my list?**

Subspecies profiles are included on the list of species present in your project area because observations in the AKN for **the species** are being detected. If the species are present, that means that the subspecies may also be present. If a subspecies shows up on your list, you may need to rely on other resources to determine if that subspecies may be present (e.g. your local FWS field office, state surveys, your own surveys).

**What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?**

The probability of presence graphs associated with your migratory bird list are based on data provided by the [Avian Knowledge Network \(AKN\)](#). This data is derived from a growing collection of [survey, banding, and citizen science datasets](#).

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go to the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

**How do I know if a bird is breeding, wintering, or migrating in my area?**

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating, or resident), you may query your location using the [RAIL Tool](#) and view the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your IPaC migratory bird species list has a breeding season associated with it (indicated by yellow vertical bars on the phenology graph in your "IPaC PROBABILITY OF PRESENCE SUMMARY" at the top of your results list), there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

**What are the levels of concern for migratory birds?**

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are [Birds of Conservation Concern](#) (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the [Bald and Golden Eagle Protection Act](#) requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially BCC species. For more information on avoidance and minimization measures you can implement to help avoid and minimize migratory bird impacts, please see the FAQ "Tell me more about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds".

#### Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the [NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#) project webpage.

#### Proper interpretation and use of your migratory bird report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please look carefully at the survey effort (indicated by the black vertical line) and for the existence of the "no data" indicator (a red horizontal line). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list does not represent all birds present in your project area. It is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list and associated information help you know what to look for to confirm presence and helps guide implementation of avoidance and minimization measures to eliminate or reduce potential impacts from your project activities, should presence be confirmed. To learn more about avoidance and minimization measures, visit the FAQ "Tell me about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds".

#### Interpreting the Probability of Presence Graphs

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. A taller bar indicates a higher probability of species presence. The survey effort can be used to establish a level of confidence in the presence score.

#### *How is the probability of presence score calculated? The calculation is done in three steps:*

The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is  $0.25/0.25 = 1$ ; at week 20 it is  $0.05/0.25 = 0.2$ .

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#### Breeding Season ( )

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

#### Survey Effort ( )

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

#### No Data ( )

A week is marked as having no data if there were no survey events for that week.

#### Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

## Facilities

### National Wildlife Refuge lands

Any activity proposed on lands managed by the [National Wildlife Refuge](#) system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

## Fish hatcheries

There are no fish hatcheries at this location.

## Wetlands in the National Wetlands Inventory (NWI)

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

### Wetland information is not available at this time

This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the [NWI map](#) to view wetlands at this location.

### Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

### Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tubercid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

### Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

# **Appendix D**

**IESPB 2025 Illinois Endangered &  
Threatened Checklist**

# ***CHECKLIST OF ILLINOIS ENDANGERED AND THREATENED ANIMALS AND PLANTS***

## **Illinois Endangered Species Protection Board**

Effective October 31, 2025

The Illinois Endangered Species Protection Board (Board) reviews and revises the Illinois List of Endangered and Threatened Species (Illinois List) as warranted but no less often than every five years. The most recent review was completed in 2025, and the following checklist includes all species designated as endangered or threatened from that review. Species are listed by taxonomic group and alphabetically by scientific name.

Listing, delisting, or change of listing status of species for the Illinois List are actions performed in consultation with and formal approval by the Illinois Department of Natural Resources. The Illinois List is officially promulgated via two Illinois Administrative Rules: the Illinois List of Endangered and Threatened Fauna (Title 17 ILL. ADM. CODE, CH. I, SEC 1010) and the Illinois List of Endangered and Threatened Flora (Title 17 ILL. ADM. CODE, CH. I, SEC 1050). For links to these and other administrative rules, the Illinois Endangered Species Protection Act, and information about the Illinois List review and revision process, please visit the Board's website at <https://dnr.illinois.gov/esp.html>.

**NOTE REGARDING FEDERALLY DESIGNATED ENDANGERED OR THREATENED SPECIES:** All federally designated endangered or threatened species and subspecies have been automatically listed as endangered or threatened under the Illinois Endangered Species Protection Act and placed on the Illinois List by the Board and are protected under the Act even though their names do not appear in this checklist. Only those federally designated endangered or threatened species and subspecies known to occur in Illinois are designated as Illinois-endangered or Illinois-threatened by the Board and their names appear in this checklist (\*\* = federally endangered; \* = federally threatened). Users should refer to the US Fish and Wildlife Service website at [www.fws.gov/program/endangered-species](http://www.fws.gov/program/endangered-species) for a complete listing of all federally endangered and threatened species.

**CRITERIA FOR STATE LISTING:** 1) Species or subspecies designated as federally endangered or threatened, 2) Species proposed for Federal Endangered or Threatened status that occur in Illinois, 3) Species that formerly were widespread in Illinois but have been nearly extirpated from the State due to habitat destruction, collecting, or other pressures resulting from the development of Illinois, 4) Species that exhibit very restricted geographic ranges of which Illinois is a part, 5) Species that exhibit restricted habitats or low populations in Illinois, or 6) Species that are significant disjuncts in Illinois, i.e., the Illinois population is far removed from the rest of the species' range.

### **DEFINITIONS:**

"Endangered Species" means any species of plant or animal classified as endangered under the Federal Endangered Species Act of 1973, P.L. 93-205, and amendments thereto, plus such other species which the Board may list as in danger of extinction in the wild in Illinois due to one or more causes including but not limited to, the destruction, diminution or disturbance of habitat, overexploitation, predation, pollution, disease, or other natural or manmade factors affecting its prospects of survival.

"Threatened Species" means any species of plant or animal classified as threatened under the Federal Endangered Species Act of 1973, P.L. 93-205, and amendments thereto, plus such other species which the Board may list as likely to become endangered in the wild in Illinois within the foreseeable future.

Citation: Illinois Endangered Species Protection Board. 2025. Checklist of Endangered and Threatened Animals and Plants of Illinois. Illinois Endangered Species Protection Board, Springfield, Illinois. 10 pp.



**Fishes**  
**19 Endangered, 21 Threatened**

**Endangered**

Lake Sturgeon  
Weed Shiner  
Western Sand Darter  
Cisco  
Crystal Darter  
Harlequin Darter  
Brassy Minnow  
Cypress Minnow  
Pallid Shiner  
Northern Brook Lamprey  
Sturgeon Chub  
Bigeye Shiner  
Greater Redhorse  
River Chub  
Pugnose Shiner  
Blacknose Shiner  
Taillight Shiner  
Northern Madtom  
Pallid Sturgeon\*\*

**Threatened**

Ironcolor Shiner  
Eastern Sand Darter  
Longnose Sucker  
Mottled Sculpin  
Banded Pygmy Sunfish  
Streamline Chub  
Gravel Chub  
Shawnee Hills Cavefish  
Western Banded Killifish  
Starhead Topminnow  
Bigeye Chub  
Least Brook Lamprey

Acipenser fulvescens  
Alburnops texanus  
Ammocrypta clara  
Coregonus artedi  
Crystallaria asprella  
Etheostoma histrio  
Hybognathus hankinsoni  
Hybognathus hayi  
Hybopsis amnis  
Ichthyomyzon fossor  
Macrhybopsis gelida  
Miniellus boops  
Moxostoma valenciennesi  
Nocomis micropogon  
Notropis anogenus  
Notropis heterolepis  
Notropis maculatus  
Noturus stigmosus  
Scaphirhynchus albus

Alburnops chalybaeus  
Ammocrypta pellucida  
Catostomus catostomus  
Cottus bairdii  
Elassoma zonatum  
Erimystax dissimilis  
Erimystax x-punctatus  
Forbesichthys papilliferus  
Fundulus diaphanus subsp. menona  
Fundulus dispar  
Hybopsis amblops  
Lampetra aepyptera

**Threatened (continued)**

Redspotted Sunfish  
Bantam Sunfish  
American Brook Lamprey  
Blackchin Shiner  
Ozark Minnow  
River Redhorse  
Bluebreast Darter  
Tippecanoe Darter  
Trout-perch

**Endangered**

**Salamanders**

Silvery Salamander  
Hellbender  
Spotted Dusky Salamander

**Threatened**

**Salamanders**

Jefferson Salamander  
Four-toed Salamander  
Mudpuppy

**Frogs and Toads**

Eastern Narrow-mouthed Toad  
Bird-voiced Treefrog  
Illinois Chorus Frog

**Fishes**

Lepomis miniatus  
Lepomis symmetricus  
Lethenteron appendix  
Miniellus heterodon  
Miniellus nubilus  
Moxostoma carinatum  
Nothonotus camurus  
Nothonotus tippecanoe  
Percopsis omiscomaycus

**Amphibians**

**3 Endangered, 6 Threatened**

Ambystoma platineum  
Cryptobranchus alleganiensis  
Desmognathus conanti

Ambystoma jeffersonianum  
Hemidactylium scutatum  
Necturus maculosus

Gastrophryne carolinensis  
Hyla avivoca  
Pseudacris illinoensis

**Reptiles**  
7 Endangered, 9 Threatened

**Endangered**

**Turtles**

Spotted Turtle	<i>Clemmys guttata</i>
Blanding's Turtle	<i>Emydoidea blandingii</i>
Yellow Mud Turtle	<i>Kinosternon flavescens</i>
Alligator Snapping Turtle	<i>Macrochelys temminckii</i>
River Cooter	<i>Pseudemys concinna</i>

**Snakes**

Great Plains Ratsnake	<i>Pantherophis emoryi</i>
Eastern Massasauga*	<i>Sistrurus catenatus</i>

**Threatened**

**Turtles**

Smooth Softshell	<i>Apalone mutica</i>
Ornate Box Turtle	<i>Terrapene ornata</i>

**Snakes**

Kirtland's Snake	<i>Clonophis kirtlandii</i>
Timber Rattlesnake	<i>Crotalus horridus</i>
Plains Hog-nosed Snake	<i>Heterodon nasicus</i>
Mississippi Green Watersnake	<i>Nerodia cyclopion</i>
Flat-headed Snake	<i>Tantilla gracilis</i>
Eastern Ribbonsnake	<i>Thamnophis saurita</i>
Lined Snake	<i>Tropidoclonion lineatum</i>

**Birds**  
23 Endangered, 6 Threatened

**Endangered**

Short-eared Owl	<i>Asio flammeus</i>
Upland Sandpiper	<i>Bartramia longicauda</i>
American Bittern	<i>Botaurus lentiginosus</i>
Swainson's Hawk	<i>Buteo swainsoni</i>
Piping Plover**	<i>Charadrius melodus</i>
Black Tern	<i>Chlidonias niger</i>
Northern Harrier	<i>Circus hudsonius</i>
Little Blue Heron	<i>Egretta caerulea</i>
Snowy Egret	<i>Egretta thula</i>
Common Gallinule	<i>Gallinula galeata</i>
Loggerhead Shrike	<i>Lanius ludovicianus</i>
Black Rail	<i>Laterallus jamaicensis</i>
Swainson's Warbler	<i>Limnothlypis swainsonii</i>
Yellow-crowned Night-Heron	<i>Nyctanassa violacea</i>
Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>
Wilson's Phalarope	<i>Phalaropus tricolor</i>
King Rail	<i>Rallus elegans</i>
Forster's Tern	<i>Sterna forsteri</i>
Common Tern	<i>Sterna hirundo</i>
Least Tern	<i>Sternula antillarum</i>
Bewick's Wren	<i>Thryomanes bewickii</i>
Greater Prairie-Chicken	<i>Tympanuchus cupido</i>
Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>

**Threatened**

Chuck-will's-widow	<i>Antrostomus carolinensis</i>
Rufa Red Knot*	<i>Calidris canutus rufa</i>
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>
Least Bittern	<i>Ixobrychus exilis</i>
Osprey	<i>Pandion haliaetus</i>
Cerulean Warbler	<i>Setophaga cerulea</i>

## Mammals

6 Endangered, 2 Threatened

### Endangered

Gray/Timber Wolf**	Canis lupus
Rafinesque's Big-eared Bat	Corynorhinus rafinesquii
Southeastern Myotis	Myotis austroriparius
Gray Bat**	Myotis grisescens
Northern Long-eared Bat**	Myotis septentrionalis
Indiana Bat**	Myotis sodalis

### Threatened

Eastern Small-footed Bat	Myotis leibii
Franklin's Ground Squirrel	Poliocitellus franklinii

## Invertebrates

57 Endangered, 16 Threatened

### Endangered

#### Snails

Iowa Pleistocene Snail**	Discus macclintocki
Hydrobiid Cave Snail	Fontigens antroecetes
Onyx Rocksnail	Leptoxis praerosa
Shawnee Rocksnail	Lithasia obovata

#### Mussels

Rainbow	Cambarunio iris
Fanshell**	Cyprogenia stegaria
Elephant-ear	Elliptio crassidens
Northern Riffleshell**	Epioblasma rangiana
Snuffbox**	Epioblasma triquetra
Spike	Eurynia dilatata
Pink Mucket**	Lampsilis abrupta
Wavy-rayed Lampmussel	Lampsilis fasciola
Higgins Eye**	Lampsilis higginsii
Scaleshell**	Leptodea leptodon
Spectaclecase**	Cumberlandia monodonta
Orangefoot Pimpleback**	Plethobasus cooperianus

## Invertebrates

### Endangered (continued)

#### Mussels (continued)

Sheepnose**	Plethobasus cyphus
Clubshell**	Pleurobema clava
Ohio Pigtoe	Pleurobema cordatum
Fat Pocketbook**	Potamilus capax
Kidneyshell	Ptychobranhus fasciolaris
Ebonyshell	Reginaia ebenus
Salamander Mussel	Simpsonaias ambigua
Rabbitsfoot*	Theliderma cylindrica
Purple Lilliput	Toxolasma lividum

#### Crustaceans

Isopod	Caecidotea lesliei
Anomalous Spring Amphipod	Crangonyx anomalous
Packard's Cave Amphipod	Crangonyx packardi
Indiana Crayfish	Faxonius indianensis
Kentucky Crayfish	Faxonius kentuckiensis
Shrimp Crayfish	Faxonius lancifer
Bigclaw Crayfish	Faxonius placidus
Little Wabash Crayfish	Faxonius stannardi
Illinois Cave Amphipod**	Gammarus acherondytes
Iowa Amphipod	Stygobromus iowae

#### Scorpions

Common Striped Scorpion	Centruroides vittatus
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#### Dragonflies

Elfin Skimmer	Nannothemis bella
Hine's Emerald Dragonfly**	Somatochlora hineana

#### Springtails

Madonna Cave Springtail	Pygmarrhopalites madonnensis
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**Invertebrates**

**Endangered (continued)**

**Stoneflies**

Robust Springfly  
Central Forestfly

Diploperla robusta  
Prostoia ozarkensis

**Bees**

Eastern Scaly Miner Bee  
Virginia Mining Bee  
Rusty-patched Bumble Bee\*\*  
Alumroot Cellophane Bee  
Andrews' Cellophane Bee  
Ainslie's Epeolus  
Interrupted Epeolus  
Naked Oil-collecting Bee  
Pickerelweed Long-nosed Bee

Andrena quintilis  
Andrena virginiana  
Bombus affinis  
Colletes aestivalis  
Colletes andrewsi  
Epeolus ainsliei  
Epeolus interruptus  
Macropis nuda  
Melissodes apicatus

**Leafhoppers**

Ball's Athysanella  
Leafhopper  
Leafhopper  
Sand Reed Leafhopper

Athysanella balli  
Athysanella incongrua  
Commellus colon  
Flexamia grammica

**Butterflies and Moths**

Swamp Metalmark  
Cobweb Skipper  
Hoary Elfin

Calephelis muticum  
Hesperia metea  
Incisalia polios

**Threatened**

**Mussels**

Purple Wartyback  
Butterfly  
Monkeyface

Cyclonaias tuberculata  
Ellipsaria lineolata  
Quadrula metanevra

**Invertebrates**

**Threatened (continued)**

**Bees**

Walsh's Anthophora  
Baker's Nomia  
Norton's Nomia  
Mining Bee

Anthophora walshii  
Dieunomia nevadensis bakeri  
Nomia nortoni  
Protandrena bancrofti

**Leafhoppers**

Red-tailed Prairie Leafhopper  
Fitch's Elephanthopper  
Leafhopper  
Planthopper  
Ross' Polyamia

Aflexia rubranura  
Fitchiella robertsonii  
Flexamia albida  
Poblicia fuliginosa  
Polyamia rossi

**Butterflies and Moths**

Aphrodite Fritillary  
Western Regal Fritillary  
Eryngium Stem Borer  
Purplish Copper

Argynnis aphrodite  
Argynnis idalia occidentalis  
Papaipema eryngii  
Tharsalea helloides

**Plants**

**273 Endangered, 65 Threatened**

**Endangered**

**Ferns and Allies**

Bradley's Spleenwort  
Black Spleenwort  
Prairie Moonwort  
Daisyleaf Grape Fern  
Dwarf Grape Fern  
Ground Pine  
Hickey's Groundpine  
Hay-scented Fern  
Log Fern  
Dwarf Scouring Rush  
Woodland Horsetail

Asplenium bradleyi  
Asplenium resiliens  
Botrychium campestre  
Botrychium matricariifolium  
Botrychium simplex  
Dendrolycopodium dendroideum  
Dendrolycopodium hickeyi  
Dennstaedtia punctilobula  
Dryopteris celsa  
Equisetum scirpoides  
Equisetum sylvaticum

**Plants****Endangered (continued)****Ferns and Allies (continued)**

Oak Fern  
 Butler's Quillwort  
 Bog Clubmoss  
 Running Pine  
 Long Beech Fern  
 Southern Grape Fern  
 Northern Grape Fern  
 New York Fern  
 Filmy Fern  
 Rusty Woodsia

**Gymnosperms**

Ground Juniper  
 Trailing Juniper  
 Tamarack  
 Jack Pine  
 Shortleaf Pine  
 Red Pine

**Angiosperms - Dicots**

American Bugbane  
 False Bugbane  
 Black Cohosh  
 Moschatel  
 Speckled Alder  
 Shadbush  
 Smooth False Indigo  
 Bog Rosemary  
 Bearberry  
 Dragon Wormwood  
 Woolly Milkweed  
 Mead's Milkweed\*  
 Oval Milkweed  
 Narrow-leaved Green Milkweed  
 Large Ground Plum

*Gymnocarpium dryopteris*  
*Isoetes butleri*  
*Lycopodiella inundata*  
*Lycopodium clavatum*  
*Phegopteris connectilis*  
*Sceptridium biternatum*  
*Sceptridium multifidum*  
*Thelypteris noveboracensis*  
*Vandenboschia boschiana*  
*Woodsia ilvensis*

*Juniperus communis*  
*Juniperus horizontalis*  
*Larix laricina*  
*Pinus banksiana*  
*Pinus echinata*  
*Pinus resinosa*

*Actaea podocarpa*  
*Actaea racemosa*  
*Actaea rubifolia*  
*Adoxa moschatellina*  
*Alnus incana* subsp. *rugosa*  
*Amelanchier sanguinea*  
*Amorpha nitens*  
*Andromeda glaucophylla*  
*Arctostaphylos uva-ursi*  
*Artemisia dracunculus*  
*Asclepias lanuginosa*  
*Asclepias meadii*  
*Asclepias ovalifolia*  
*Asclepias stenophylla*  
*Astragalus crassicaarpus* var. *trichocalyx*

**Plants****Endangered (continued)****Angiosperms - Dicots (continued)**

Bent Milk Vetch  
 Tennessee Milk Vetch  
 Yellow Wild Indigo  
 Screwstem  
 Supple Jack  
 Yellow Birch  
 Water Marigold  
 Pink Corydalis  
 Cuckoo Flower  
 Water Hickory  
 Pale Hickory  
 Downy Yellow Painted Cup  
 Redroot  
 Spotted Wintergreen  
 Pipsissewa  
 Small Enchanter's Nightshade  
 Pitcher's (Dune) Thistle\*  
 Yellowwood  
 Blue Jasmine  
 Leatherflower  
 Violet Collinsia  
 Sweetfern  
 Hemlock Parsley  
 Bunchberry  
 Golden Corydalis  
 Hale's Corydalis  
 Beaked Hazelnut  
 Cynosciadium  
 Leafy Prairie Clover\*\*  
 Hill Prairie Larkspur  
 Whitlow Grass  
 Round-leaved Sundew  
 Downy Willow Herb  
 Eryngo  
 Yellow Monkey Flower

*Astragalus distortus*  
*Astragalus tennesseensis*  
*Baptisia tinctoria*  
*Bartonia paniculata*  
*Berchemia scandens*  
*Betula alleghaniensis*  
*Bidens beckii*  
*Capnoides sempervirens*  
*Cardamine pratensis* var. *palustris*  
*Carya aquatica*  
*Carya pallida*  
*Castilleja sessiliflora*  
*Ceanothus herbaceus*  
*Chimaphila maculata*  
*Chimaphila umbellata*  
*Circaea alpina*  
*Cirsium pitcheri*  
*Cladrastis kentukea*  
*Clematis crispa*  
*Clematis viorna*  
*Collinsia violacea*  
*Comptonia peregrina*  
*Conioselinum chinense*  
*Cornus canadensis*  
*Corydalis aurea*  
*Corydalis halei*  
*Corylus cornuta*  
*Cynosciadium digitatum*  
*Dalea foliosa*  
*Delphinium carolinianum*  
*Draba cuneifolia*  
*Drosera rotundifolia*  
*Epilobium strictum*  
*Eryngium prostratum*  
*Erythranthe geayeri*

**Plants**

**Endangered (continued)**

**Angiosperms - Dicots (continued)**

Hyssop-leaved Thoroughwort	<i>Eupatorium hyssopifolium</i> var. <i>laciniatum</i>
Spurge	<i>Euphorbia spathulata</i>
Dwarf Bedstraw	<i>Galium virgatum</i>
Northern Cranesbill	<i>Geranium bicknellii</i>
Hedge Hyssop	<i>Gratiola quartermaniae</i>
Stickseed	<i>Hackelia deflexa</i> var. <i>americana</i>
Silverbell Tree	<i>Halesia carolina</i>
Narrow-leaved Sunflower	<i>Helianthus angustifolius</i>
Tall Sunflower	<i>Helianthus giganteus</i>
Slender Heliotrope	<i>Heliotropium tenellum</i>
False Heather	<i>Hudsonia tomentosa</i>
One-flowered Hydrolea	<i>Hydrolea uniflora</i>
Old Plainsman	<i>Hymenopappus scabiosaeus</i>
Shore St. John's Wort	<i>Hypericum adpressum</i>
Kalm's St. John's Wort	<i>Hypericum kalmianum</i>
Swink's St. John's Wort	<i>Hypericum swinkianum</i>
Kankakee Mallow	<i>Iliamna remota</i>
Bloodleaf	<i>Iresine rhizomatosa</i>
Butternut	<i>Juglans cinerea</i>
Water Willow	<i>Justicia ovata</i>
Boykin's Dioclea	<i>Lackeya multiflora</i>
Savanna Pinweed	<i>Lechea intermedia</i>
Prairie Bush Clover*	<i>Lespedeza leptostachya</i>
Red Honeysuckle	<i>Lonicera dioica</i> var. <i>glaucescens</i>
Yellow Honeysuckle	<i>Lonicera flava</i>
Round-fruited Loosestrife	<i>Ludwigia sphaerocarpa</i>
Creeping Loosestrife	<i>Lysimachia radicans</i>
Narrow-leaved Crabapple	<i>Malus angustifolia</i>
False Mallow	<i>Malvastrum hispidum</i>
Climbing Milkweed	<i>Matelea decipiens</i>
White Melanthera	<i>Melanthera nivea</i>
Stickleaf	<i>Mentzelia oligosperma</i>
Early Saxifrage	<i>Micranthes virginensis</i>
Cat's Claw	<i>Mimosa nuttallii</i>
Hairy Umbrella-wort	<i>Mirabilis hirsuta</i>

**Plants**

**Endangered (continued)**

**Angiosperms - Dicots (continued)**

Baby Blue-Eyes	<i>Nemophila aphylla</i>
Prairie Dandelion	<i>Nothocalais cuspidata</i>
Fragile Prickly Pear	<i>Opuntia fragilis</i>
Clustered Broomrape	<i>Orobanche fasciculata</i>
Large-flowered Beard Tongue	<i>Penstemon grandiflorus</i>
Tube Beard Tongue	<i>Penstemon tubaeiflorus</i>
Carey's Heartsease	<i>Persicaria careyi</i>
Ozark Phacelia	<i>Phacelia giliioides</i>
Fameflower	<i>Phemeranthus calycinus</i>
Sangamon Phlox	<i>Phlox pilosa</i> subsp. <i>sangamonensis</i>
Silvery Bladderpod	<i>Physaria ludoviciana</i>
Heart-leaved Plantain	<i>Plantago cordata</i>
James' Clammyweed	<i>Polanisia jamesii</i>
Pink Milkwort	<i>Polygala incarnata</i>
Balsam Poplar	<i>Populus balsamifera</i>
Bird's-eye Primrose	<i>Primula mistassinica</i>
Mock Bishop's Weed	<i>Ptilimnium nuttallii</i>
Nuttall's Oak	<i>Quercus texana</i>
Prairie Buttercup	<i>Ranunculus rhomboideus</i>
Alder Buckthorn	<i>Rhamnus alnifolia</i>
Dull Meadow Beauty	<i>Rhexia mariana</i>
Northern Gooseberry	<i>Ribes hirtellum</i>
Bristly Rose	<i>Rosa acicularis</i>
Prairie Rose Gentian	<i>Sabatia campestris</i>
Dune Willow	<i>Salix cordata</i>
Autumn Willow	<i>Salix serissima</i>
Red-berried Elder	<i>Sambucus racemosa</i> subsp. <i>pubens</i>
American Burnet	<i>Sanguisorba canadensis</i>
Southern Black Snakeroot	<i>Sanicula smallii</i>
Pitcher Plant	<i>Sarracenia purpurea</i>
Buffaloberry	<i>Shepherdia canadensis</i>
Woolly Buckthorn	<i>Sideroxylon lanuginosum</i>
Ovate Catchfly	<i>Silene ovata</i>
Royal Catchfly	<i>Silene regia</i>
American Mountain Ash	<i>Sorbus americana</i>

**Plants**

**Endangered (continued)**

**Angiosperms - Dicots (continued)**

Great Chickweed	<i>Stellaria pubera</i>
Patterson's Bindweed	<i>Stylisma pickeringii</i> var. <i>pattersonii</i>
Bigleaf Snowbell Bush	<i>Styrax grandifolius</i>
Snowberry	<i>Symphoricarpos albus</i> var. <i>albus</i>
Lakeside Daisy*	<i>Tetranneuris herbacea</i>
White Basswood	<i>Tilia americana</i> var. <i>heterophylla</i>
Halberd-leaved Tearthumb	<i>Tracaulon arifolium</i>
Star-flower	<i>Trientalis borealis</i>
Rock Elm	<i>Ulmus thomasii</i>
Horned Bladderwort	<i>Utricularia cornuta</i>
Small Bladderwort	<i>Utricularia minor</i>
Hair Bladderwort	<i>Utricularia subulata</i>
Highbush Blueberry	<i>Vaccinium corymbosum</i>
Large Cranberry	<i>Vaccinium macrocarpon</i>
Small Cranberry	<i>Vaccinium oxycoccos</i>
Deerberry	<i>Vaccinium stamineum</i>
Marsh Valerian	<i>Valeriana uliginosa</i>
Corn Salad	<i>Valerianella umbilicata</i>
American Brooklime	<i>Veronica americana</i>
Wood Vetch	<i>Vicia caroliniana</i>
Hairy White Violet	<i>Viola blanda</i>
Canada Violet	<i>Viola canadensis</i>
Primrose Violet	<i>Viola primulifolia</i>
Western Tall White Violet	<i>Viola rugulosa</i>
Limestone Riverbank Violet	<i>Viola viarum</i>

**Angiosperms - Monocots**

Hairgrass	<i>Avenella flexuosa</i>
American Slough Grass	<i>Beckmannia syzigachne</i>
Blue Grama	<i>Bouteloua gracilis</i>
Hollow Reed Grass	<i>Calamagrostis porteri</i> subsp. <i>insperata</i>
Water Arum	<i>Calla palustris</i>
Oklahoma Grass Pink Orchid	<i>Calopogon oklahomensis</i>
Grass Pink Orchid	<i>Calopogon tuberosus</i>
Wild Hyacinth	<i>Camassia angusta</i>

**Plants**

**Endangered (continued)**

**Angiosperms - Monocots (continued)**

Winged Sedge	<i>Carex alata</i>
Bellow's Beak Sedge	<i>Carex albicans</i> var. <i>australis</i>
Greenish-white Oval Sedge	<i>Carex albolutescens</i>
Arkansas Sedge	<i>Carex arkansana</i>
Brownish Sedge	<i>Carex brunescens</i>
Silvery Sedge	<i>Carex canescens</i>
Cordroot Sedge	<i>Carex chordorrhiza</i>
Crawford's Sedge	<i>Carex crawfordii</i>
Sedge	<i>Carex cumulata</i>
White-edge Sedge	<i>Carex debilis</i>
Cypress-knee Sedge	<i>Carex decomposita</i>
Sedge	<i>Carex diandra</i>
Shortleaf Sedge	<i>Carex disperma</i>
Sedge	<i>Carex echinata</i>
Sedge	<i>Carex formosa</i>
Elk Sedge	<i>Carex garberi</i>
Large Sedge	<i>Carex gigantea</i>
Plains Sedge	<i>Carex inops</i> subsp. <i>heliophila</i>
Mud Sedge	<i>Carex limosa</i>
Black-edged Sedge	<i>Carex nigromarginata</i>
Few-seeded Sedge	<i>Carex oligosperma</i>
Opaque Oval Sedge	<i>Carex opaca</i>
Pale Sedge	<i>Carex pallescens</i>
Plantain-leaved Sedge	<i>Carex plantaginea</i>
Reniform Sedge	<i>Carex reniformis</i>
Eastern Straw Sedge	<i>Carex straminea</i>
Three-seeded Sedge	<i>Carex trisperma</i>
Tuckerman's Sedge	<i>Carex tuckermanii</i>
Fairy Wand	<i>Chamaelirium luteum</i>
Spotted Coral-root Orchid	<i>Corallorhiza maculata</i>
Moccasin Flower	<i>Cypripedium acaule</i>
Small Yellow Lady's Slipper	<i>Cypripedium parviflorum</i> var. <i>makasin</i>
Showy Lady's Slipper	<i>Cypripedium reginae</i>
Northern Panic Grass	<i>Dichanthelium boreale</i>
Panic Grass	<i>Dichanthelium jorii</i>

**Plants**

**Endangered (continued)**

**Angiosperms - Monocots (continued)**

Hemlock Panic Grass  
 Ravenel's Panic Grass  
 Panic Grass  
 Small Burhead  
 Capitata Spikerush  
 Few-flowered Spikerush  
 Bearded Wheat Grass  
 Slender Cotton Sedge  
 Rusty Cotton Grass  
 Vahl's Fimbry  
 Arkansas Manna Grass  
 Mud Plantain  
 Crested Coralroot Orchid  
 Small Whorled Pogonia\*  
 Whorled Pogonia  
 Vasey's Rush  
 Hairy Woodrush  
 Indian Cucumber Root  
 Virginia Bunchflower  
 Two-Flowered Melic Grass  
 Orange Fringed Orchid  
 Wood Orchid  
 Eastern Prairie Fringed Orchid\*  
 Purple Fringed Orchid  
 Grove Bluegrass  
 Weak Bluegrass  
 Wolf's Bluegrass  
 Snake-mouth  
 Downy Solomon's Seal  
 White-stemmed Pondweed  
 Spotted Pondweed  
 Fern Pondweed  
 Stiff Pondweed  
 Beaked Rush  
 Clustered Beak Rush

Dichanthelium portoricense  
 Dichanthelium ravenelii  
 Dichanthelium yadkinense  
 Echinodorus tenellus  
 Eleocharis olivacea  
 Eleocharis quinqueflora  
 Elymus trachycaulus  
 Eriophorum gracile  
 Eriophorum virginicum  
 Fimbristylis vahlii  
 Glyceria arkansana  
 Heteranthera reniformis  
 Hexalectris spicata  
 Isotria medeoloides  
 Isotria verticillata  
 Juncus vaseyi  
 Luzula acuminata  
 Medeola virginiana  
 Melanthium virginicum  
 Melica mutica  
 Platanthera ciliaris  
 Platanthera clavellata  
 Platanthera leucophaea  
 Platanthera psycodes  
 Poa alsodes  
 Poa saltuensis subsp. languida  
 Poa wolfii  
 Pogonia ophioglossoides  
 Polygonatum pubescens  
 Potamogeton praelongus  
 Potamogeton pulcher  
 Potamogeton robbinsii  
 Potamogeton strictifolius  
 Rhynchospora alba  
 Rhynchospora glomerata

**Plants**

**Endangered (continued)**

**Angiosperms - Monocots (continued)**

Arrowhead  
 False Melic Grass  
 Pursh's Bulrush  
 Smith's Bulrush  
 Bulrush  
 Small-fruited Bulrush  
 Leafy Bulrush  
 Muhlenberg's Nut Rush  
 Littlehead Nutrush  
 Carolina Whipgrass  
 Eastern Blue-eyed Grass  
 Mountain Blue-eyed Grass  
 American Bur-reed  
 Green-fruited Bur-reed  
 Yellow-lipped Ladies' Tresses  
 Spring Ladies' Tresses  
 Pole Manna-Grass  
 Prairie Spiderwort  
 Tufted Bulrush  
 Nodding Trillium  
 Ill-scented Trillium  
 Green Trillium  
 White Camass

**Threatened**

**Ferns and Allies**

Meadow Horsetail  
 Cliff Clubmoss

**Angiosperms - Dicots**

Pale False Foxglove  
 Shadbush  
 Decurrent False Aster\*  
 Bluehearts  
 Sea Rocket

Sagittaria australis  
 Schizachne purpurascens  
 Schoenoplectiella purshiana  
 Schoenoplectiella smithii  
 Scirpus hattorianus  
 Scirpus microcarpus  
 Scirpus polyphyllus  
 Scleria muhlenbergii  
 Scleria oligantha  
 Scleria pauciflora  
 Sisyrinchium atlanticum  
 Sisyrinchium montanum  
 Sparganium americanum  
 Sparganium emersum  
 Spiranthes lucida  
 Spiranthes vernalis  
 Torreyochloa pallida  
 Tradescantia bracteata  
 Trichophorum cespitosum  
 Trillium cernuum  
 Trillium erectum  
 Trillium viride  
 Zigadenus elegans

Equisetum pratense  
 Huperzia porophila

Agalinis skinneriana  
 Amelanchier interior  
 Boltonia decurrens  
 Buchnera americana  
 Cakile edentula var. lacustris

**Plants**

**Threatened (continued)**

**Angiosperms - Dicots (continued)**

Leatherleaf	Chamaedaphne calyculata
French’s Shootingstar	Dodecatheon frenchii
Narrow-leaved Sundew	Drosera intermedia
American Strawberry Bush	Euonymus americanus
Seaside Spurge	Euphorbia polygonifolia
Forked Aster	Eurybia furcata
Queen-of-the-Prairie	Filipendula rubra
American Orpine	Hylotelephium telephoides
Pale Vetchling	Lathyrus ochroleucus
Squirting Cucumber	Melothria pendula
Buckbean	Menyanthes trifoliata
Slender Sandwort	Minuartia patula
White Bergamot	Monarda clinopodia
Broomrape	Orobanche ludoviciana
Illinois Wood Sorrel	Oxalis illinoensis
Small Flower-of-an-hour	Phemeranthus parviflorus
Water Elm	Planera aquatica
Rock Chestnut Oak	Quercus montana
Willow Oak	Quercus phellos
Harvey’s Buttercup	Ranunculus harveyi
Dwarf Raspberry	Rubus pubescens
Bristly Blackberry	Rubus setosus
Missouri Orange Coneflower	Rudbeckia missouriensis
Blue Sage	Salvia azurea var. grandiflora
Cliff Goldenrod	Solidago sciaphila
Storax	Styrax americanus
Sullivantia	Sullivantia sullivantii
Hairy Synandra	Synandra hispidula
Kitten Tails	Synthyris bullii
Buffalo Clover	Trifolium reflexum
Nettle	Urtica chamaedryoides
Flat-leaved Bladderwort	Utricularia intermedia
Marsh Speedwell	Veronica scutellata
Arrowwood	Viburnum molle

**Plants**

**Threatened (continued)**

**Angiosperms - Monocots**

Marram Grass	Ammophila breviligulata
Sedge	Carex atlantica
Golden Sedge	Carex aurea
Sedge	Carex bromoides
Yellow Sedge	Carex cryptolepis
Swollen Sedge	Carex intumescens
Sharp-scaled Sedge	Carex oxylepis var. oxylepis
Drooping Sedge	Carex prasina
Little Green Sedge	Carex viridula
Willdenow’s Sedge	Carex willdenowii
Umbrella Sedge	Cyperus grayoides
Galingale	Cyperus lancastriensis
Beaked Spike Rush	Eleocharis rostellata
Cluster Fescue	Festuca paradoxa
Richardson’s Rush	Juncus alpinoarticulatus
Tubercled Orchid	Platanthera flava var. flava
Grass-leaved Pondweed	Potamogeton gramineus
Hall’s Bulrush	Schoenoplectiella hallii
Grass-leaved Lily	Stenanthium gramineum
False Asphodel	Triantha glutinosa
Common Bog Arrowgrass	Triglochin maritima
Slender Bog Arrowgrass	Triglochin palustris
Florida Bellwort	Uvularia floridana

**Lichen**

Lea’s Bog Lichen	Phaeophyscia leana
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