Gile Flowage Storage Reservoir Project
FERC Project No. 15055

Exhibit E
Environmental Report

Final License Application

Prepared for

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A Wisconsin Corporation

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LIST OF ABBREVIATIONS AND TERMS

2021-1025 Plan	Iron County Outdoor Recreation Plan 2021-2025
°F	degrees Fahrenheit
§	Section
µ/L	micrograms per liter
Applicant	Northern States Power Company
APE	Area of Potential Effect
ATIS	Aquatic and Terrestrial Invasive Species
AWW	American Whitewater
BEPI	Bank Erosion Potential Index
BITP/A	Broad Incidental Take Permit/Authorization
BMPs	Best Management Practices
CFR	Code of Federal Regulations
cfs	cubic feet per second
Commission	Federal Energy Regulatory Commission
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
dam	Gile Dam
Default-FAL	Default Fish and Aquatic Life
DLA	Draft License Application
DO	Dissolved Oxygen
E. coli	*Escherichia coli*
EFH	Essential Fish Habitat
EJ	Environmental Justice
ESA	Endangered Species Act
EPA	United States Environmental Protection Agency
FAL-Coldwater	Fish and Aquatic Life-Coldwater
FERC	Federal Energy Regulatory Commission
FLA	Final License Application
FOG	Friends of the Gile Flowage
FPA	Federal Power Act
Gile Project	Gile Flowage Storage Reservoir Project
GLEC	Great Lakes Environmental Center
GPS	global positioning system
HPMP	Historic Properties Management Plan
ILP	Integrated Licensing Process
IPaC	Information for Planning and Consultation
ISR	Initial Study Report
µg/L	micrograms per liter
mg/L	milligrams per liter
MHRC	Michigan Hydro Relicensing Coalition
MIBI	macroinvertebrate index of biological integrity
min/m^2	minutes per square meter
mL	milliliter
MSW	mean stream width
MWh	megawatt hour

NHI ..... Natural Heritage Inventory
n.d. ..... no date
NEPA ..... National Environmental Policy Act
NGVD ..... National Geodetic Vertical Datum 1929
NHPA ..... National Historic Preservation Act
NLEB ..... northern long-eared bat
NMFS ..... National Marine Fisheries Service
NOI ..... Notice of Intent
NPS ..... National Park Service
NRCS ..... Natural Resource Conservation Service
NHPA ..... National Historic Preservation Act
NRHP ..... National Register of Historic Places
NR 40 ..... Chapter NR 40 of the Wisconsin Administrative Code
NR 102 ..... Chapter NR 102 of the Wisconsin Administrative Code
NR 328 ..... Chapter NR 328 of the Wisconsin Administrative Code
NSPW ..... Northern States Power Company
O&M ..... operation and maintenance
PAD ..... Pre-Application Document
PSP ..... Proposed Study Plan
Programmatic Agreement ..... refer to Section 1.3.4
Project ..... Gile Flowage Storage Reservoir Project
REA Notice ..... Notice of Acceptance and Ready for Environmental Analysis
RAW ..... River Alliance of Wisconsin
RSP ..... Revised Study Plan
RUSLE 2 ..... Revised Universal Soil Loss Equation Version 2
Saxon Falls Project ..... Saxon Falls Hydroelectric Project
SD1 ..... Scoping Document 1
SD2 ..... Scoping Document 2
SCORP ..... Statewide Outdoor Comprehensive Recreation Plan
SHPO ..... State Historic Preservation Office
SPD ..... Study Plan Determination
Superior Falls Project ..... Superior Falls Hydroelectric Project
TE ..... Threatened and Endangered (Species)
USC ..... United States Code
USCB ..... United States Census Bureau
USDA ..... United States Department of Agriculture
USFWS ..... United States Fish and Wildlife Service
USGS ..... United States Geologic Survey
USR ..... Updated Study Report
WCMP ..... Wisconsin Coastal Management Program
WDNR ..... Wisconsin Department of Natural Resources
WDNR Guidelines ..... WDNR Guidelines for Evaluating Habitat of Wadable Streams
West Fork ..... West Fork Montreal River
WisCALM ..... Wisconsin Consolidated Assessment and Listing Methodology

1. Introduction

The Gile Flowage Project (Gile Project or Project) is a headwater storage reservoir owned and operated by Northern States Power Company – Wisconsin (NSPW or Applicant). The Project is located on the West Fork Montreal River (West Fork) approximately 20 miles upstream of the Saxon Falls Hydroelectric Project within the Town of Pence and Town of Carey in Iron County, Wisconsin and approximately 2.5 miles southwest of the neighboring cities of Hurley and Ironwood located in Wisconsin and Michigan, respectively. Constructed in 1940, the Project provides seasonally uniform streamflow for hydroelectric generation at NSPW's downstream Saxon Falls (FERC No. 2610) and Superior Falls (FERC No. 2587) hydroelectric projects.

In early 2020, the Federal Energy Regulatory Commission (FERC or Commission) opened an inquiry to determine if the Gile Project is subject to the Commission's mandatory licensing jurisdiction under Section 23 of the Federal Power Act (FPA). On August 19, 2020, the inquiry found the Gile Project contributes to generation at the Saxon Falls and Superior Falls hydroelectric projects well beyond the required 2 percent.[1] The Commission's inquiry further determined the Gile Project is a part of a development that includes NSPW's two aforementioned downstream licensed hydroelectric projects. Therefore, the Gile Flowage Storage Reservoir is required to be licensed.

On November 17, 2020, NSPW submitted to the Commission a notice of intent (NOI) to license the Gile Project (FERC No. 15055). The NOI included a schedule for submitting a final license application (FLA), conforming to Part 4 and Part 5 of the Commission's regulations, no later than August 18, 2023. In accordance with the required schedule for the FLA, as outlined in NSPW's Initial Study Report (ISR) dated September 28, 2022, NSPW hereby submits this Final License Application (FLA).

1.1 Application

The Applicant prepared this FLA, which includes this Exhibit E, in accordance with the Commission's regulations under 18 Code of Federal Regulations (CFR) §5.18(b), as required under the Integrated Licensing Process (ILP) regulations, as well as the guidelines listed in the Commission's *Preparing Environmental Assessments: Guidelines of Applicants, Contractors, and Staff*. The purpose of this Exhibit E is to provide a description of the environmental setting in the vicinity of the Gile Project.

1.2 Purpose and Need for Power

The FERC must determine whether to issue a license to NSPW for the Gile Project and, if so, what conditions should be placed in said license. In deciding whether to issue a license, the FERC must determine if the Project will be best adapted to a comprehensive plan for improving or developing the waterway. In addition, the FERC must give equal consideration to the purposes of energy conservation, fish and wildlife resources, cultural resources, recreational resources, water quality, and other environmental resources.

[1] The Commission has found that a storage reservoir's contribution to downstream electric generation of at least two percent amounts to significant generation benefit. Therefore, a storage reservoir that benefits downstream generation equaling or exceeding this amount is required to be licensed by the Commission.

The FERC's issuance of a license for the continued operation of the Gile Project will allow NSPW to continue to generate electric power from a renewable resource for the term of the upcoming license, while addressing the affected environmental, land use, public recreation, and cultural resources in accordance with the Commission's public interest and equal consideration mandates under the FPA.

This Exhibit E was prepared consistent with the ILP requirements as set forth in 18 CFR §5.18(b) and designed to support the FERC's required analysis under the National Environmental Policy Act (NEPA). In this Exhibit E, NSPW evaluates the environmental and economic effects of continuing to operate the Project under the current operations alternative. NSPW also considers the effects of the proposed operations alternative, which is defined by all measures proposed in this application to be included in the future license.

Power generated at the downstream Saxon Falls and Superior Falls hydroelectric projects, enhanced by approximately 21% from the release of stored water at the Gile Project, is sold to NSPW's customers on its distribution system. The proposed operation of the Gile Project would allow for the continued efficient use of water on the West Fork to be used at the two downstream hydroelectric projects. If licensed as proposed herein, the additional power currently generated (21%) at the two downstream hydroelectric projects, from water released at the Gile Project, would continue to be generated thus helping NSPW to meet its customer's energy demand. The downstream energy benefits provided by the Gile Project would also reduce the need to acquire replacement energy sourced from fossil fuels, thereby increasing the environmental benefits.

1.3 Statutory and Regulatory Requirements

The FERC's issuance of a license for the Gile Project is subject to numerous requirements under the FPA and other applicable statutes. The major requirements, and actions NSPW has taken to address these, are described below.

1.3.1 Federal Power Act

1.3.1.1 Section 18 Fishway Prescriptions

Section 18 of the FPA, 16 United States Code (USC) §811, states the FERC is to require the construction, maintenance, and operation of such fishways as may be prescribed by the Secretary of Commerce or the Interior. Under the Commission's ILP regulations, 18 CFR §5.23(a), fishway prescriptions, if any, must be filed within 60 days of FERC's Notice of Acceptance and Ready for Environmental Analysis (REA Notice) following NSPW's filing of this FLA. During the environmental studies phase of this ILP, neither the United States Fish and Wildlife Service (USFWS) nor the National Marine Fisheries Service (NMFS) raised fish passage as a potential licensing issue.

1.3.1.2 Section 4(e) Conditions

The first proviso in Section 4(e) of the FPA, 16 U.S.C. § 797(e), provides any license issued by the Commission for a project within a federal reservation shall be subject to and contain such conditions as the Secretary of the responsible federal land management agency deems necessary for the adequate protection and use of the reservation. As explained in Exhibit A, Section 22, the Project does not occupy any federal lands.

1.3.1.3 Section 10(j) Recommendations

Under Section 10(j) of the FPA, each license issued by the FERC is required to include conditions based on recommendations of federal and state fish and wildlife agencies for the protection, mitigation, or enhancement of fish and wildlife resources affected by the Project. The Commission is required to include these conditions in the license, unless it determines they are inconsistent with the purpose and requirements of the FPA or other applicable laws. Before rejecting or modifying an agency recommendation, the Commission is required to attempt to resolve any such inconsistency with the agency, giving due weight to the recommendations, expertise, and statutory responsibilities of such agency.

During the pre-filing phase of this licensing, NSPW consulted with those agencies which have authority to submit Section 10(j) recommendations, including the USFWS and the Wisconsin Department of Natural Resources (WDNR). Under the Commission's ILP regulations, 18 CFR §5.23(a), federal and state fish and wildlife agencies will have 60 days following the FERC's issuance of the REA Notice to submit Section 10(j) recommendations.

1.3.2 Clean Water Act

Under Section 401 of the Clean Water Act (CWA), a license applicant must obtain certification from the appropriate state pollution control agency verifying compliance with the applicable provisions of the CWA, unless the certification is waived. Therefore, a Section 401 water quality certification or waiver is required from the WDNR as a prerequisite to the FERC's issuance of a license for the Project. Pursuant to 18 CFR §5.23(b), NSPW will request water quality certification from the WDNR within 60 days of the issuance of the FERC's REA Notice.

1.3.3 Endangered Species Act

Section 7 of the Endangered Species Act (ESA) requires federal agencies to ensure discretionary actions are not likely to jeopardize the continued existence of any federally listed threatened or endangered (TE) species or result in the destruction or adverse modification of critical habitat of such species.

On November 17, 2020, NSPW requested the Commission grant it designation as the FERC's non-federal representative for ESA consultation. The Commission did not respond to NSPW's request. Regardless, NSPW consulted with the USFWS and concluded that four federally listed species were potentially located within the Project vicinity. Those species are the Canada lynx (*Lynx canadensis*), gray wolf (*Canis lupus*), northern long-eared bat (*Myotis septentrionalis*), and tricolored bat (*Perimyotis subflavus*). There was also one species proposed for federal listing, the monarch butterfly (*Danaus plixippus*) (US Fish and Wildlife Service, 2023). NSPW's analysis of Project impacts on TE species is provided in Section 3.7.

1.3.4 National Historic Preservation Act

Section 106 of the National Historic Preservation Act (NHPA) requires federal agencies to consider the effects of any proposed undertaking on historic properties and to afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on the issuance of a license. Historic properties are districts, sites, buildings, structures, traditional cultural properties, and objects that are listed in or eligible

for inclusion in the National Register of Historic Places (NRHP). The FERC's issuance of a license for the Project is considered an undertaking under Section 106.

On November 17, 2020, NSPW requested the Commission grant it designation as FERC's non-federal representative for Section 106 consultation. The Commission did not respond to NSPW's request. Regardless, NSPW developed and conducted cultural resource studies in consultation with the Wisconsin State Historic Preservation Office (SHPO) and Native American Tribes, as described in Section 3.11 of this FLA. NSPW anticipates the Commission will meet its obligations under NHPA Section 106 through the execution of the Programmatic Agreement.[2] Section 106 requires, in part, the implementation of an Historic Properties Management Plan (HPMP) that addresses the management and treatment of historic properties identified within the Project's area of potential effects (APE).

1.3.5 Coastal Zone Management Act

Under Section 307(c)(3)(a) of the Coastal Zone Management Act (CZMA), the FERC cannot issue a license for a project within or affecting a state's coastal zone unless the state CZMA agency concurs with the license applicant's certification of consistency with the state's CZMA program, or the agency's concurrence is conclusively presumed by its failure to act within 180 days of its receipt of the applicant's certification request.

The Wisconsin Coastal Management Program (WCMP) is responsible for implementing Wisconsin's coastal management program, which includes 15 counties with frontage on Lake Superior or Lake Michigan. The Project is located within the designated coastal zone for Wisconsin; therefore, the Project is subject to coastal zone management review and consistency certifications are needed for the Commission's licensing of the Project. NSPW requested a formal written determination of consistency with the WCMP via e-mail on February 23, 2023. No response from WCMP has been received as of the filing of this FLA.

1.3.6 Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (Public Law 94-265) requires federal agencies to consult with NMFS on all actions that may adversely affect Essential Fish Habitat (EFH). EFH is only applicable to federally managed commercial fish species which live at least one component of their lifecycle in marine waters. None of the fish species found in the Montreal River and West Fork are managed commercially; therefore, no designated EFH is within the Project vicinity.

1.3.7 Wild and Scenic River and Wilderness Act

Section 7(a) of the Wild and Scenic Rivers Act (Public Law 90-542) requires federal agencies to make a determination as to whether the operation of a project under a license would unreasonably diminish the scenic, recreational, and fish and wildlife values present within any designated wild or scenic rivers. There are no designated wild or scenic rivers within the vicinity of the Project (National Park Service, n.d.a).

[2] On December 30, 1993, the *Programmatic Agreement among the FERC, Advisory Council on Historic Preservation, the State of Wisconsin - State Historic Preservation Officer, and the State of Michigan - State Historic Preservation Officer, for Managing Historic Properties That May Be Affected By New and Amended Licenses Issuing for the Continued Operation of Existing Hydroelectric Projects in the State of Wisconsin and Adjacent Portions of the State of Michigan* was executed (Programmatic Agreement).

The Wilderness Act (Public Law 88-577) was enacted to establish a National Wilderness Preservation System. There are no nationally designated wilderness areas within the Project vicinity (National Park Service, n.d.b).

1.4 Public Review and Comment

The FERC's regulations regarding the ILP require NSPW to consult with the appropriate resource agencies, Native American Tribes, and other entities before filing an application for license. This consultation process is the first step in complying with federal statutes including the ESA, Fish and Wildlife Coordination Act, and NHPA. Prefiling consultation must be completed and documented according to the FERC's regulations.

1.4.1 Scoping

NSPW filed a Notice of Intent to License (NOI) and a Pre-Application Document (PAD) for the Gile Project on November 17, 2020. The PAD provided a summary of existing, relevant, and reasonably available information related to the Project that was in NSPW's possession or was obtained with the exercise of due diligence. The purpose of the PAD is to provide participants in the licensing proceeding with a summary of the information necessary to identify issues and related information needs to assist with the development of study requests and study plans. In the PAD, NSPW proposed the following studies:

- A shoreline survey to identify eroding shoreline and archaeological sites impacted by the Project operation.
- An evaluation of the Project's facilities to determine if they are eligible for the NRHP.

The FERC published Scoping Document 1 (SD1) for the Project on January 19, 2021. Due to the National Emergence concerning the Novel Corona Virus disease, the Commission waived section 5.8 (b)(vii) of its regulations and did not conduct a public scoping meeting and site visit for the Project. However, several entities provided written comments (Federal Energy Regulatory Commission, 2021).

Written comments were provided by the following entities:

- American Whitewater (AWW)
- Friends of the Gile Flowage (FOG)
- Michigan Hydro Relicensing Coalition (MHRC)
- National Park Service (NPS)
- River Alliance of Wisconsin (RAW)
- United States Environmental Protection Agency (EPA)
- Wisconsin Department of Natural Resources (WDNR)

The Commission issued its Scoping Document 2 (SD2) on April 1, 2021.

1.4.2 Studies

Comments on the PAD and requests for additional studies were addressed in NSPW's Proposed Study Plan (PSP). NSPW filed the PSP with the FERC on April 30, 2021. Subsequent to the PSP filing, NSPW held a virtual PSP meeting on May 20, 2021 to discuss the PSP contents with the attendees and to provide them with an opportunity to ask questions related to the proposed studies.

On June 14, 2021, NSPW received an e-mail from the Commission requesting additional clarification on four sections of the PSP. NSPW filed its response with the Commission on July 14, 2021.

Based on comments received on the PSP, NSPW filed a Revised Study Plan (RSP) with the FERC on August 30, 2021. On September 24, 2021, the FERC issued a Study Plan Determination (SPD) approving the following studies:[3]

- Aquatic and Terrestrial Invasive Species (ATIS) Study
- Cultural Resources Study
- Minimum Flow Habitat Evaluation Study
- Mussel Study
- Recreation Study
- Shoreline Stability Study
- Water Quality Monitoring Study
- Whitewater Recreation Flow Study
- Wood Turtle Study
- Reservoir/Flow Routing Model

On September 28, 2022, NSPW filed an Initial Study Report (ISR) that described each study's objectives, progress, and remaining activities. The ISR included completed study reports for the ATIS, Cultural Resources, Mussels, Shoreline Stability, Whitewater Recreation Flow, Water Quality Monitoring, and Wood Turtle Studies. The ISR also included the status and results of the three partially completed studies from the first study season. In the ISR, NSPW requested a schedule variance (extension of time) for the Minimum Flow Habitat Evaluation, Recreation, and Reservoir/Flow Routing Model Studies.

Pursuant to the ILP regulations, NSPW held a virtual meeting to discuss the ISR on October 6, 2022. NSPW prepared an ISR meeting summary which was filed with the FERC and distributed to the licensing participants on October 27, 2022.

The following licensing participants filed written comments with the FERC in response to the ISR:

- FERC Staff
- Sokaogon Chippewa Community
- FOG
- AWW
- NPS
- Kayla Sturgeon

Several stakeholders provided comments that did not specifically request modifications to the approved studies or request new studies. Several requests for modifications were previously addressed in the SPD and one new study, regarding Tribal Cultural Resources, was requested. In its study plan modification determination letter, issued on January 13, 2023, FERC staff did not recommend any of the requested study modifications or the completion of a Tribal Cultural Resources Study.

[3] The Mussel Study, Whitewater Recreation Flow Study, and Reservoir/Flow Routing Model were the only studies modified by the Commission staff recommendations. All other studies were approved as proposed.

The recreation study was completed in October 2022 and the updated report was included in the DLA. The schedule outlined by the Commission in SD2 required the filing of the DLA prior to the second study season. Therefore, NSPW completed the Minimum Flow Habitat Evaluation Study and the Reservoir/Flow Routing Model in 2023 subsequent to the filing of the DLA.

The preliminary Reservoir/Flow Routing Model is included herein as **Appendix E-28**.

In the Commission's November 21, 2022 comments on the Initial Study Report Meeting summary, additional information on the further investigation of erosion site 5 and the proposed mitigation of the erosion site in the tailrace was requested to be included in the Updated Study Report (USR).

A partial summary of the 2023 minimum flow habitat study and additional erosion investigations is included in this FLA. NSPW will submit an Updated Study Report (USR) to the Commission with the results of the final Reservoir/Flow Routing Model, final Minimum Flow Habitat Evaluation, and a supplement to the Shoreline Stability Study report, in a separate filing no later than September 28, 2023.

1.4.3 Comments on Application

Comments on the DLA were received from RAW, MHRC, FOG, AW, NPS, and several whitewater boating enthusiasts. The comments and NSPW's responses are included in **Appendix E-29**.

2. Proposed Action and Alternatives

In accordance with the NEPA review process, the environmental analysis must consider, at a minimum, the three alternatives described in the sections below: (1) the no-action alternative, (2) NSPW's proposed action, and (3) alternatives to the proposed action.

2.1 No-Action Alternative

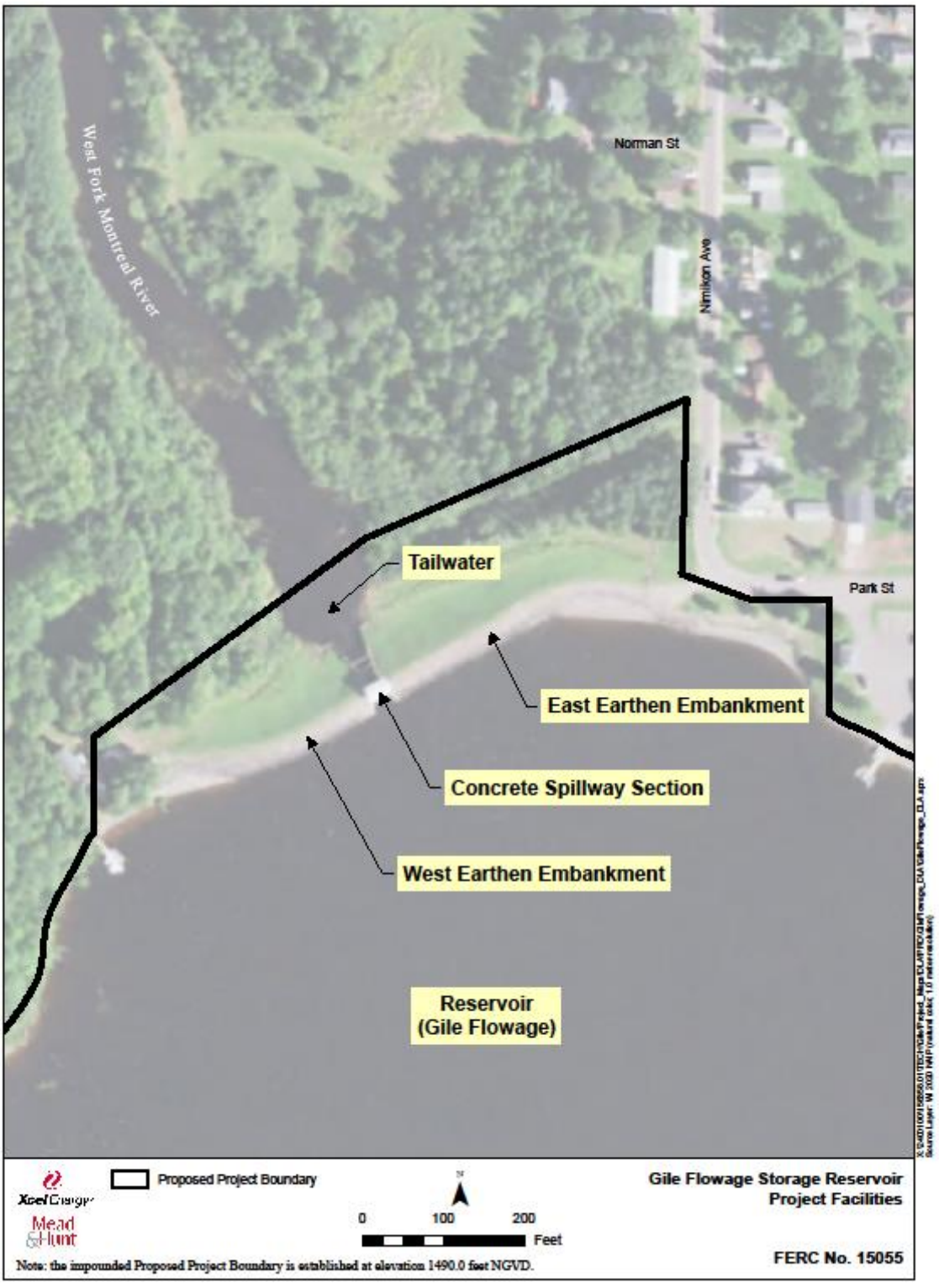
Under the no-action alternative (denial of the application), the Project would continue to operate as an unlicensed project and no environmental protection, mitigation of enhancement measures would be implemented. This alternative is defined as current operations for comparison with the other alternatives.

2.1.1 Existing Project Facilities

The Gile Project is a headwater storage reservoir located on the West Fork in Iron County, Wisconsin with no authorized capacity. It provides seasonally uniform streamflow for hydroelectric generation at the Saxon Falls and Superior Falls projects, located downstream approximately 20 and 23 miles, respectively. Project facilities include the Gile Dam with a west earthen embankment, concrete spillway section, east earthen embankment, 3,454-acre storage reservoir, and surrounding land extending landward to an elevation of 1,490 feet National Geodetic Vertical Datum 1929 (NGVD).[4] The existing Project facilities are shown in **Figure 2.1.1-1**.

[4] Calculated acreage using GIS at an elevation of 1,490 feet NGVD.

Figure 2.1.1-1 Gile Flowage Storage Reservoir Project Facilities



2.1.1.1 Gile Dam

The 903-foot-long Gile Dam is a multi-section structure. The different sections, from left to right looking downstream, consist of the west earthen embankment, concrete spillway section, east earthen embankment, and appurtenant facilities.

2.1.1.1.1 West Earthen Embankment

The west earthen embankment is approximately 300 feet long with a maximum height of 32.5 feet and a crest elevation of 1,495.0 feet NGVD. The east side of the west embankment is connected to the concrete spillway section. The cross-sectional width is approximately 144 feet. The height and width measurements are obtained from the Exhibit F drawings.

2.1.1.1.2 Concrete Spillway Section

The 27.6-foot-long concrete spillway section, with a maximum height of 32.5 feet, is a reinforced concrete gravity structure.[5] It contains a 16-foot-wide by 12-foot-high radial gate with a crest elevation of 1,478 feet NGVD and a 6-foot-wide by 5-foot-high vertical sluice gate with an invert elevation of 1,465.5 feet NGVD. A 27.5-foot-wide and 11.8-foot-high brick gate house extends approximately 10.5 feet downstream of the operator bridge on the top of the concrete spillway. The gate house provides security and protection for the gate hoist equipment. The height and width measurements are obtained from the Exhibit F drawings.

2.1.1.1.3 East Earthen Embankment

The east earthen embankment is approximately 575 feet long, with a maximum height of 32.5 feet and a crest elevation of 1,495 feet NGVD. The west side of the east embankment is connected to the concrete spillway section. The cross-sectional width is approximately 144 feet. The height and width measurements are obtained from the Exhibit F drawings.

2.1.1.1.4 Appurtenant Facilities

Appurtenant facilities at the Project include, but are not limited to, the gate hoist equipment and monitoring equipment.

2.1.1.2 Reservoir (Gile Flowage Storage Reservoir)

The Gile Flowage Storage Reservoir, formed by the impounding of the West Fork, was constructed in 1940 to store water for use in downstream hydroelectric generation. The reservoir has a surface area of 3,454 acres at an elevation of 1,490 feet NGVD. Under the current operation, the reservoir elevation is maintained between 1,475 and 1,490 feet NGVD. The reservoir has a maximum depth of 25 feet, a gross storage volume of 32,713 acre-feet, and a usable storage volume of 32,031 acre-feet.

2.1.2 Dam Safety

Dam safety concerns were considered during the development of the proposed and alternative actions described in this application to ensure the Project continues to meet the Commission's dam safety guidelines. There are no proposed modifications to the dam structures that could impact their integrity as part of this application.

[5] Excluding the gate house.

2.1.3 Current Project Operation

2.1.3.1 Normal Operations

The Wisconsin Public Service Commission issued an Order in 1937 that established the maximum elevation for the Gile Flowage at 1,490 feet NGVD. Historically, water has been withdrawn from Gile Flowage such that a minimum reservoir elevation of 1,475 feet NGVD has been reached. The annual minimum elevations have historically been reached most-often during the drier months of July, January, and February. Historically, the months of April and November have seen the highest reservoir elevations (Ayres Associates, 2016).

A review of elevation data at the Gile Project from 1994 to 2016 in Section 9 of Exhibit A showed that summer drawdowns ranged from 4.2 to 7.6 feet in years with normal precipitation, 4.7 feet to 10 feet during dry years and 1.6 feet to 7.4 feet during wet years. Winter drawdowns ranged from 4.6 feet to 8 feet during years with normal precipitation, 5.8 feet to 9.5 feet during dry years, and 2.8 feet to 9.4 feet during wet years. A minimum flow of 10 cubic feet per second (cfs) is released into the West Fork year-round.

2.1.4 Existing Environmental Measures

Existing environmental measures currently implemented by NSPW are described in the following sections.

2.1.4.1 Geologic and Soils Resources

NSPW currently implements best management practices (BMPs) for erosion control during ground disturbing activities associated with the Project operation. BMPs include temporary measures such as silt fencing, installation of straw wattles, and seeding and mulching. Permanent BMPs include establishment of vegetation and stabilization with rock riprap.

2.1.4.2 Aquatic Resources

NSPW currently adheres to the following operating parameters for the protection and enhancement of aquatic resources:

- Maintain a year-round minimum flow of 10 cfs into the West Fork
- Maintain the elevation of the Gile Flowage between 1,475 and 1,490 feet NGVD.

2.1.4.3 Terrestrial Resources

NSPW does not currently implement any specific environmental measures for terrestrial resources.

2.1.4.4 Threatened and Endangered Species

NSPW currently implements the USFWS northern long-eared bat (NLEB) guidance. Wisconsin's Broad Incidental Take Permit/Authorization (BITP/A) for Cave Bats will be followed for all tree removal activities (>3-inch diameter).

2.1.4.5 Recreation and Land Use

NSPW currently maintains a canoe portage and corresponding signage at the Project.

2.1.4.6 Cultural Resources

NSPW does not currently implement any specific environmental measures for cultural resources.

2.2 Applicant's Proposal

2.2.1 Proposed Project Facilities

NSPW is not proposing any changes to the existing Project facilities.

2.2.2 Proposed Project Operation

2.2.2.1 Operations

NSPW is proposing the following operating parameters during the license term:

- Maintain a minimum flow of 10 cfs into the West Fork for enhancement of downstream aquatic habitat.
- Conserve water in the Gile Flowage for Project purposes.
- Maintain the elevation of the Gile Flowage between 1,475 feet and 1,490 feet NGVD.
- Restrict the typical daily reservoir drawdown to approximately 0.1 feet per day, but no more than 0.2 feet per day, to balance the needs of downstream generation with the needs of recreation and the aquatic environment.[6]

2.2.2.2 Proposed Environmental Measures

In addition to the operating parameters proposed above in Section 2.2.2.1, NSPW also proposes the following environmental measures:[7]

- Develop an Aquatic and Terrestrial Invasive Species Plan and conduct biennial invasive species surveys.
- Conduct shoreline erosion surveys every 5 years.
- Develop an HPMP in consultation with the Wisconsin SHPO, Sokaogon Chippewa Community Mole Lake Band, and Fond Du Lac Band of Lake Superior Chippewa. The HPMP will follow the requirements outlined in the Programmatic Agreement.
- Develop an Operations Management Plan that includes deviation reporting and agency consultation requirements.

NSPW further proposes the following environmental measures regarding recreation resources:

- Provide discharge and reservoir elevation information via the internet.
- Review and update or replace the Take-Out and Part 8 signage at the Canoe Portage recreation site.
- Conduct routine maintenance of NSPW's FERC approved recreation site(s), including signage over the term of the original license.

[6] Except for scheduled whitewater releases and emergencies beyond the Applicant's control. Emergencies include, but are not limited to, preemptive reservoir drawdowns necessary for dam safety concerns or to accommodate major runoff events to reduce the risk of downstream flooding.

[7] The proposed operating restrictions are to be considered environmental measures. For example, during dry years, inflows to the Gile Flowage can be less than 10 cfs. However, NSPW has eliminated the "or inflow" restriction that often accompanies a minimum flow requirement. This will assure the downstream environment continually receives at least 10 cfs even during drought conditions. The same applies to the minimum reservoir elevation during drought years and conserving water for Project purposes. These restrictions preserve the aquatic habitat and recreation resources available at any given time. In addition, the typical restriction in reservoir elevation drawdown of approximately 0.1 feet per day, but no more than 0.2 feet per day, other than in times of emergency, particularly at the lower elevations, is also being proposed for the protection of recreation and aquatic resources.

- Develop a Land Management Plan to address recreation, signage, maintenance, and trash removal on islands owned by NSPW.
- Develop a Whitewater Recreation Plan that also includes the Saxon Falls Project to determine a designated schedule for the two proposed release events.
- Provide two water releases downstream annually for whitewater boating.
- Supplement water releases as needed from the Gile Dam for enhanced aesthetics at the Saxon Falls bypass reach.
- Implement the Cave Bat BITP/A for any routine vegetation maintenance activities at NSPW's FERC-approved recreation site(s).
- Implement the Wood Turtle BITP/A for routine maintenance activities at NSPW's FERC-approved recreation site(s) as long as the turtle remains a state-threatened or endangered species.

2.2.3 Proposed Project Boundary

The proposed Project boundary, included in Exhibit G of this application, encompasses all lands and waters necessary for Project purposes consistent with FERC regulations and governing precedent.

2.3 Alternatives To the Proposed Action

As part of their NEPA analysis, the Commission will consider reasonable alternatives for operational or facility modifications as well as protection, mitigation, and enhancement measures identified by the Commission, agencies, Native American Tribes, non-governmental organizations, and the public.

2.4 Alternatives Considered but Eliminated from Detailed Study

Under SD2, Commission staff has not eliminated any alternatives from detailed study.

3. Environmental Analysis

The environmental analysis was prepared by NSPW and includes a description of the affected environment and the environmental effects from continued Project operation. The information provided is based on existing sources as well as the results from studies conducted during the licensing process.

3.1 General Description of the River Basin

3.1.1 Montreal River Basin

The Gile Project is located on the West Fork, approximately 8 miles upstream of its confluence with the main branch of the Montreal River. It is a headwater storage reservoir that provides seasonally uniform streamflow for hydroelectric generation at the downstream Saxon Falls and Superior Falls projects.

The Montreal River originates near Pine Lake in east central Iron County, Wisconsin. From its headwaters it flows northerly approximately 35 miles until its confluence with the West Fork and then continues northwesterly for an additional 18 miles (NSPW, 2021a) until it reaches Oronto Bay of Lake Superior. For roughly 40 miles of its length, the river is the political boundary that separates Iron County, Wisconsin from Gogebic County, Michigan (NSPW, 2020). The Montreal River basin has a total drainage area of approximately 264 square miles (NSPW, 1991). The river drops approximately 1,000 feet in elevation from its headwaters to its confluence with Lake Superior (US Geological Survey, n.d.)

The West Fork is the largest tributary of the Montreal River and is located within the Montreal River basin. The West Fork flows approximately 26 miles from its headwaters until it reaches the Montreal River (NSPW, 2020). The Gile Flowage has a total drainage area of approximately 70 square miles (Ayres Associates, 2016).

3.1.2 Major Land Uses

While the area is known historically for mining, current land use outside of the small municipalities within the Montreal River basin is primarily devoted to forest management, wildlife habitat, outdoor recreation, and rural residential properties. A more detailed description of current land use in the Project vicinity is found in Section 3.9.

3.1.3 Major Water Uses

Water from the Gile Project serves multiple purposes including downstream hydropower generation, public recreation, and fish and wildlife habitat. A more detailed description of water use in the Project vicinity is found in Section 3.4.

3.1.4 Gile Flowage Storage Reservoir Project Flow Management

NSPW conserves water at the Project by regulating releases from Gile Dam such that the water released, when combined with the flow in the main branch of the Montreal River, allows the downstream hydroelectric projects to operate efficiently without passing surplus water over the spillway or through the radial gates. A map showing the locations of the dams within the Montreal River basin is included in **Appendix E-1**.

Water stored at the Gile Flowage is used for project purposes with an allowable minimum reservoir elevation of 1,475.0 feet NGVD.[8] A typical daily drawdown of approximately 0.1 feet per day, but no more than 0.2 feet per day[9], balances the needs of generation with recreation.[10]

The annual summer drawdown begins around May 1 and the annual winter drawdown typically begins around December 1, as shown in Exhibit A. A review of elevation data at the Gile Project from 1994 to 2016 in Section 9 of Exhibit A showed that summer drawdowns ranged from 4.2 to 7.6 feet in years with normal precipitation, 4.7 feet to 10 feet during dry years and 1.6 feet to 7.4 feet during wet years. Winter drawdowns ranged from 4.6 feet to 8 feet during years with normal precipitation, 5.8 feet to 9.5 feet during dry years, and 2.8 feet to 9.4 feet during wet years.

3.1.5 Tributary Streams

The principal tributaries to the Gile Flowage include the East River, Fifield Creek, Linnunpuro Creek, and the West Fork. A map showing the tributaries to the Montreal River and Gile Flowage is in **Appendix E-1**.

3.1.6 Climate

Iron County, Wisconsin is located within the continental climate region and experiences some moderation due to effects caused by Lake Superior. The continental climate is generally characterized by hot summers and cold winters. This weather pattern is influenced along the Lake Superior shoreline by the cold lake waters that serve to moderate summer temperatures and increase winter temperatures (Iron County, 2016).

The average monthly minimum temperatures range from 3 degrees Fahrenheit (°F) in January to 56°F in July. The average monthly maximum temperatures range from 21°F in January to 77°F in July. The average annual precipitation is 36.09 inches, with about one-third of the precipitation falling during the growing season from May through September. The area is located within the Lake Superior snowbelt and receives an average of 166 inches of snow each year (US Climate Data, 2023).

3.2 Cumulative Effects

The Commission did not identify any resources in SD1 or SD2 that have the potential to be cumulatively affected by the proposed operation and maintenance of the Project.

[8] Project purposes include power generation and mitigation or enhancement measures proposed in Exhibit E.
[9] Except for scheduled whitewater releases and emergencies beyond Applicant's control, which includes preemptive drawdowns for expected large inflow events due to precipitation or snow melt to reduce flooding and increased reservoir elevations at the downstream hydroelectric projects.
[10] The term "avoided" is specifically used only because a scheduled whitewater release later in the year as considered by several stakeholders could exceed the typical daily drawdown of approximately 0.1 feet per day, but no more than 0.2 feet per day, except in times of emergency, depending upon the storage reservoir elevation at the time of release.

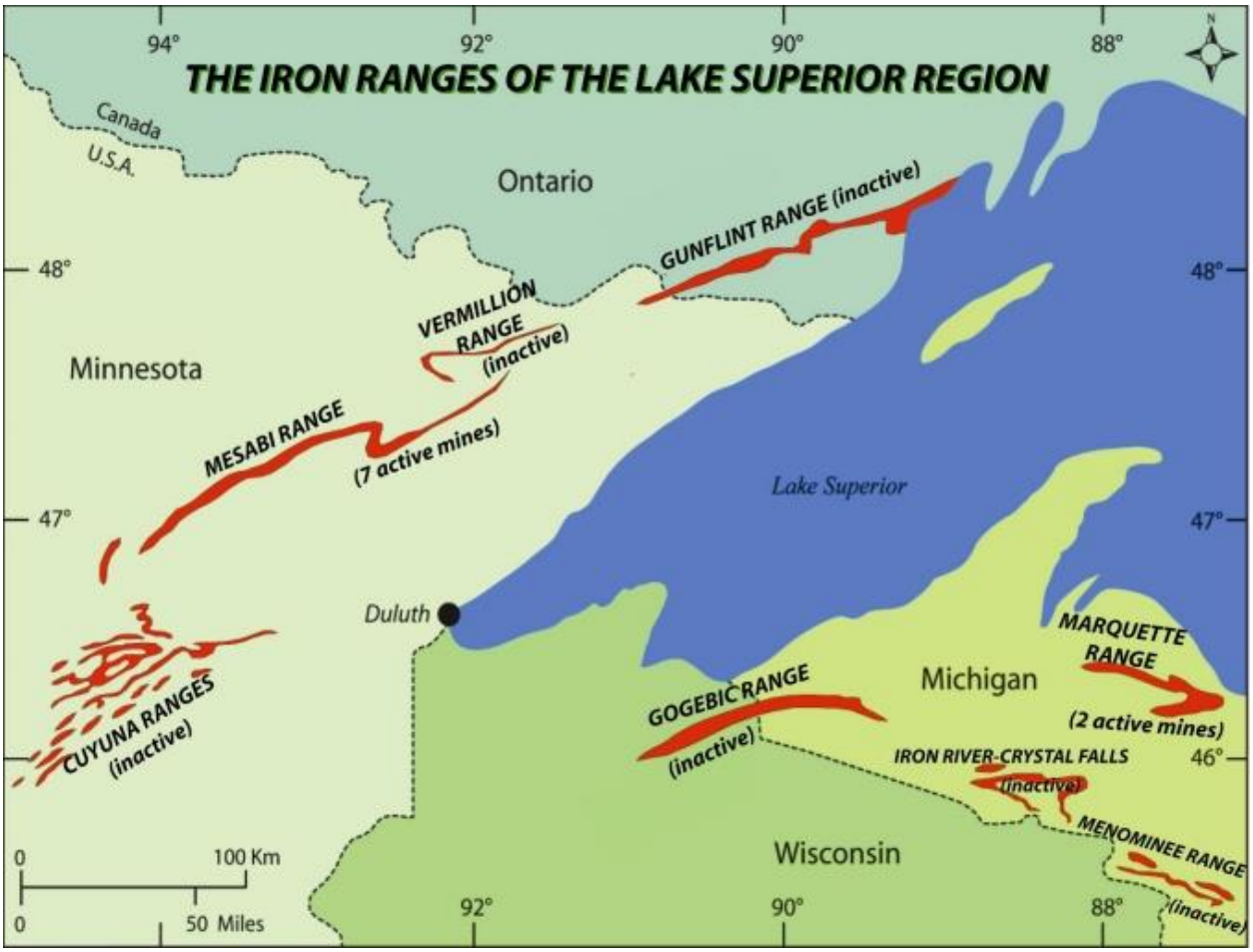
3.3 Geology and Soils

3.3.1 Affected Environment

3.3.1.1 Topography

The current topography of the area was created when glacial activity eroded the remnant mountain range known as the Gogebic Range, as illustrated in **Figure 3.3.1.1-1**.[11] North of the range, glacial activity left behind a sloping lake plain with numerous river valleys, creating a fissured pattern. Elevations within the lake plain generally increase from north to south, from a low of 601 feet NGVD at Lake Superior to 1,863 feet NGVD in the Gogebic Range. This range runs in a general west to east direction that approximates the path of State Highway 77, which is located just to the north of the Gile Project (Town of Pence, 2005a).

Figure 3.3.1.1-1 General Location of the Gogebic Range



W.F. Cannon (USGS) https://commons.wikimedia.org/w/index.php?curid=39161950

The Northern Highland geographic province is located to the south of the Gogebic Range. In this geographic province, glacial activity left behind a pitted outwash plain with heavily forested terrain and many lakes, potholes, and wetlands with generally low to moderate relief. Some of the steeper slopes in this geographic province are found along the West Fork and adjacent to the Gile Flowage (Town of Carey, 2005a).

[11] The Gogebic Range is also known as the Penokee Range.

The topography in the immediate Project vicinity varies up to 280 feet with the highest land elevation of about 1,760 feet NGVD descending to the West Fork surface elevation of 1,480 feet NGVD downstream of the Gile Dam (US Geological Survey, n.d.). A topographic map of the Project vicinity is included as **Appendix E-2**.

3.3.1.2 Geology

The Project area is part of the Gogebic Range and Trap Range, just north of the Northern Highlands geologic province. The ranges form two prominent ridges in Ashland and Iron counties in Wisconsin that extend across the Wisconsin-Michigan border to near the City of Ironwood. Both ridges are composed of relatively steeply north-dipping rock layers which are more resistant to erosion than the surrounding rock units underlying the valley separating the two ridges. The southern ridge is the Gogebic Range which is composed of interbedded iron-rich and silica-rich layers about 650 feet thick. The Precambrian bedrock is approximately 1.9 billion years old. The northern ridge is the Trap Range which is composed of younger volcanic rock, primarily basaltic lava flows, that is approximately 1.1 billion years old. The basaltic lava intruded the older Gogebic Range rock as a part of the activity associated with the Midcontinent Rift System, an extension of the earth's crust extending from Lake Superior in a gentle arc through Michigan's Upper Peninsula, Wisconsin, and Minnesota (Ayres Associates, 2016) .

The Gogebic Range is underlain conformably by the older Palms Formation, which is composed of quartzite, slate, and conglomerate. The Palms Formation is found on the southeast side of the Gogebic Range where it overlies the Bad River dolomite, where present, or lower Precambrian granite, metamorphosed basalt, and other igneous rock where the dolomite is absent. The younger Tyler Formation is located northwest of the Gogebic Range and includes slate with greywacke and siltstone that was deposited as a thick layer of sediment, up to 10,000 feet thick, which accumulated when the Gogebic Range was located at the Superior Craton edge along the Niagara Escarpment (Ayres Associates, 2016).

The surficial deposits are mainly glacial deposits characterized by ground moraines and end moraines. The thicknesses of unconsolidated materials in the vicinity of the Project are mapped at the transition between 0-50 feet deep and 50-100 feet deep (Ayres Associates, 2016).

3.3.1.3 Soils

A review of the Natural Resource Conservation Service (NRCS) Web Soil Survey was completed on September 12, 2019 and the resulting custom soil report for the Project vicinity is included in **Appendix E-3**. The four most prevalent soil series identified in the Project vicinity include Gogebic-Peshekee complex (18.4%), Tula-Gogebic complex (11.7%), Gogebic silt loam (4.6%), and Gogebic-Michigamme rock outcrop complex (3.2%). The general characteristics of each soil series are shown in **Table 3.3.1.3-1**.

Table 3.3.1.3-1 Prevalent Soil Characteristics in the Gile Project Vicinity

Soil Series	Drainage Classification	Formation	Water Transmittal Capacity	Runoff Class
Gogebic-Peshekee complex	Moderately well-drained to well-drained	Hill, backslope	Very low to low	Medium to high
Tula Gogebic complex	Moderately well-drained to somewhat poorly drained	Till plain, summit, footslope	Very low to moderately low	Low to high
Gogebic silt loam	Moderately well-drained	Till plain, summit, backslope, footslope	Very low to moderately low	High
Gogebic-Michigamme Rock outcrop complex	Moderately well-drained to well-drained	Shoulder, backslope of hills	Very low	Medium to High

Source: (USDA Natural Resources Conservation Service, n.d.)

The NRCS uses a computer software model called the Revised Universal Soil Loss Equation Version 2 (RUSLE 2) to estimate soil loss from erosion caused by rainfall on cropland. Several factors are viewed in RUSLE 2 to estimate soil erosion based on the soil type's inherent erodibility. Those factors include hydrologic group, T factor, Kf factor, and soil texture.

The hydrologic group for each soil type is based upon runoff potential for saturated and bare soils and range from Group A to Group D, with Group A having the lowest runoff potential and Group D having the highest. The T factor is an estimate of the maximum average rate of soil erosion in tons per acre that can occur without affecting crop productivity over a sustained period. T factor values range from 1 to 5 tons per acre, with higher values being less subject to damage from erosion. The T factor also relates to the ability of the soil to revegetate once it is disturbed. The Kf factor gives an indication of how susceptible a soil type is to sheet and rill erosion. Kf factor values range from 0.02 to 0.69, with 0.69 having the highest susceptibility to erosion.

The four predominant soils do not have Kf Factors listed in the soil report because the soils are very rocky and do not contain the fine earth fragments (less than 2 millimeter) that the Kf Factor measures. The remaining soils in the Project vicinity have Kf factors in the moderate range because they are moderately susceptible to detachment and can produce moderate runoff. NRCS also provides representative values of the amounts of sand, silt, and clay to describe the representative soil texture in each soil type (USDA Natural Resources Conservation Service, 2001). The amounts of sand, silt, and clay are not listed for the Gogebic Peshekee complex, Tula Gogebic complex, and Gogebic Michigamme rock outcrop complex soils because they are very rocky.

A summary of the RUSLE 2 related attributes for the four most prevalent soil series in the Project vicinity are shown in **Table 3.3.1.3-2**.

Table 3.3.1.3-2 RUSLE 2 Related Attributes for the Four Most Prevalent Soil Series in the Gile Project Vicinity

Soil name	Percent of Project Vicinity	Hydrologic Group	T Factor	Soil Texture Representative Values		
				% Sand	% Silt	% Clay
Gogebic Peshekee complex						
2-6% slopes, very stony, very rocky	8.1	D	1.0-4.0	-	-	-
6-18% slopes, very stony, very rocky	10.3	D	1.0-4.0	-	-	-
Tula-Gogebic complex						
0-6% slopes, stony	11.7	C to D	4.0	-	-	-
Gogebic silt loam						
2-6% slopes very stony	0.9	D	4.0	5.0	90.0	5.0
6-18% slopes very stony, rocky	3.7	D	4.0	5.0	90.0	5.0
Gogebic-Michigamme rock outcrop complex						
6-35% slopes, very stony	3.2	C to D	2.0-4.0	-	-	-

Source: (USDA Natural Resources Conservation Service, n.d.)

3.3.1.4 Reservoir Shoreline

The Gile Flowage has approximately 36.5 miles of shoreline with numerous areas of exposed bedrock.[12] Approximately 90% of the shoreline is under public or NSPW ownership and is maintained in a natural, forested state, reducing the likelihood of erosion (Whitewater Associates, 2005).

Project operations affect the elevation of the Gile Flowage and the river flows downstream and have the potential to cause shoreline erosion or instability, which in turn could impact environmental resources. In order to understand the Project's influence on shoreline erosion, a Shoreline Stability Assessment was conducted on August 9 and 29, 2022. The objective of the assessment was to identify areas of shoreline erosion, mass soil movement, slumping, or other forms of instability within the Project's APE (see **Appendix E-4**). The Project's APE includes the Gile Flowage shoreline (including islands) and the West Fork downstream of the Gile Dam. The survey was conducted by boat or on foot in areas that were unnavigable. Reservoir elevations and discharge from the dam were recorded during the survey.

When erosion was identified, the beginning and end of the contiguous erosion area was mapped with a handheld global positioning system (GPS) unit and representative photographs were taken. For each erosion area identified, the Bank Erosion Potential Index (BEPI) worksheet contained in Chapter NR 328 of the Wisconsin Administrative Code (NR 328) was completed and a total score was recorded.[13] NR 328 categorizes erosion intensity into three groups as shown in **Table 3.3.1.4-1**.

Table 3.3.1.4-1 BEPI Worksheet Erosion Intensity Classifications

BEPI Score	Erosion Intensity Classification
0-47	Low Energy
48-67	Moderate Energy
>67	High Energy

[12] Shoreline distance measured via GIS is based upon the maximum reservoir elevation of 1,490 feet NGVD and does not include the island shorelines.
[13] One BEPI worksheet was completed for each erosion site up to 150 feet in length; for erosion sites greater than 150 feet in length, NR 328.08 requires the completion of one worksheet per 150 feet of eroding shoreline.

During the survey, specific attention was given to the assessment of roadsides, manmade beaches, docks, or otherwise developed shoreline for evidence of soil movement or slumping. The bedrock in Iron County is resistant to erosion. The thin layer of sediment exposed in areas of erosion around the Gile Flowage overlays this bedrock. Bare rock faces and boulders are common along the shoreline. Most of the natural beaches along the reservoir are composed of gravel and cobble. Swim beaches, if present, are likely manmade and represent only a small portion of the shoreline.

Previous work completed by Whitewater Associates, on behalf of FOG, included an analysis of the substrates in the littoral zone in areas up to six feet below the full pool elevation of 1,490 feet NGVD (Whitewater Associates, 2005). This information, when combined with the observations and erosion intensity assessment from the Shoreline Stability Assessment, indicates there is very little risk of erosion on the Gile Flowage primarily due to the surrounding geology (Great Lakes Environmental Center, 2022a).

None of the developed shorelines along the reservoir showed evidence of erosion. Only six non-developed sites along the entire 36.5 miles of shoreline appeared to have active erosion with evidence of soil movement or slumping. Seven sites were scored using the BEPI worksheet, which included the six noted erosion sites and one control site (Site 3) used for comparative purposes (Great Lakes Environmental Center, 2022a).

All the erosion sites along the reservoir ranked in the low energy category (BEPI score of 0-47). Five of the six sites were located on small islands where the erosion was limited to the thin soil layer atop the bedrock. No additional investigation or mitigation was recommended at these sites. The sixth site was located along the reservoir's northwest shoreline near the dam. Although the site was located away from the dam in a wooded area, the Shoreline Stability Assessment report indicated additional investigation was warranted (Great Lakes Environmental Center, 2022a). The site was reinspected on July 17, 2023 by walking the adjacent shoreline. The site is located on private lands and above the maximum reservoir elevation of 1,490 feet NGVD.[14] From the 2023 assessment it appears that the landowner excavated a portion of a trail that leads to the site that destabilized the bank and caused trees to topple into the shoreline. The bank instability at the site and subsequent erosion do not appear to be related to Project operations. The consultant indicated that the site does not require any further assessment.

The updated study report, including photographs taken during the July 17, 2023 site visit, will be included in the USR. NSPW stands by its original assessment included in the DLA that this site requires no mitigation. NSPW supports its position based upon the following factors:

- The site is privately owned.
- The site is not easily accessible.
- It is located above the maximum storage reservoir elevation of 1490.0'.
- It will likely revegetate naturally.
- Attempts to mitigate the erosion would likely cause more disturbance than currently present.

In addition to the erosion sites documented along the reservoir shoreline, one additional erosion site was noted downstream of the dam in the tailwater area.[15] The area is located on the west bank at the toe of

[14] NSPW owns the reservoir bed in this area to maximum reservoir elevation 1,490 feet NGVD.
[15] The BEPI worksheet was not completed for this site since it is not designed to measure erosion caused by human traffic.

the water control structure, adjacent to the west wingwall downstream of the dam. It appears human traffic and possibly high flows have scoured the bank and exposed soil adjacent to the wingwall. This site was identified in the FERC's October 3, 2022 follow-up comments regarding their 2022 Annual Dam Safety Inspection, which required NSPW to address the erosion by August of 2023 (Federal Energy Regulatory Commission, 2022). The site was re-visited in July of 2023 and updated photographs prior to the repair will be included in the USR. NSPW plans to complete the erosion mitigation by August 31, 2023 using rock riprap placed over filter fabric.

Table 3.3.1.4-2 shows detailed information regarding each erosion site identified during the stability assessment. The full Shoreline Stability Assessment Report, including maps, data forms, and photographs, is included in **Appendix E-5.**

Table 3.3.1.4-2 Erosion Sites Identified in 2022 Shoreline Stability Assessment of the Gile Project

Erosion Site	Location	Length of Eroded Area (ft)	BEPI Score	Erosion Intensity Classification
Site 1	Island	74	36	Low Energy
Site 2	Island	26	36	Low Energy
Site 3	Non-erosional control site	N/A	27	Low Energy
Site 4	Island	24	42	Low Energy
Site 5	NW shoreline near dam	75	39	Low Energy
Site 6	Island	54	39	Low Energy
Site 7	Island	210	33	Low Energy
Downstream Embankment	Tailwater Area	21	N/A	N/A

3.3.2 Environmental Effects

In SD1 and SD2, the Commission identified one issue regarding geology and soils; the effect of Project operations on shoreline erosion within the Project boundary. The Shoreline Stability Assessment Report noted the risk of shoreline erosion is low due to the surrounding geology (Great Lakes Environmental Center, 2022a). However, the fluctuating water elevation of the reservoir, as well as fluctuating downstream flows for Project purposes (Section 2.2.2.1), have the potential to cause erosion along the reservoir's shoreline and in the tailwater area. The implementation of the proposed mitigation measures described below will prevent these potential adverse environmental impacts.

3.3.3 Proposed Environmental Measures

NSPW is proposing to conduct an erosion survey of the Project's shoreline, including the tailwater area, every 5 years over the term of the new license. The survey effort will include an inspection of all shorelines within the Project boundary for newly identified eroding sites, a review of the status of previously identified sites (i.e., those noted in the Shoreline Stability Assessment), and a report to be submitted to the FERC and WDNR. The report will provide a recommendation on whether mitigation of any erosion site is warranted.

NSPW has also proposed to restrict the typical drawdown of the reservoir to approximately 0.1 feet per day, but no more than 0.2 feet per day,[16] to balance the needs of generation with the needs of recreation and the aquatic environment. The proposed operation will prevent the rapid dewatering of the shoreline which, under certain conditions, can lead to erosion.

The proposed mitigation measures will benefit the environmental resources at the Project when compared to the alternatives of no-action or denial of the application. Without the issuance of an original license for the Project, the resource enhancements discussed below will not occur.

3.3.4 Unavoidable Adverse Impacts

With the implementation of the proposed environmental measures discussed above, continued Project operation is not expected to adversely affect geology and soil resources.

3.4 Water Resources

3.4.1 Affected Environment

3.4.1.1 Water Quantity

3.4.1.1.1 Existing Uses of Project Waters

A review of the WDNR's Water Quantity Data Viewer did not identify any state-permitted high-capacity wells or surface water withdrawals within the vicinity of the Project (WI Department of Natural Resources, n.d.a).

The reservoir is operated between a minimum and maximum elevation of 1,475 feet and 1,490 feet NGVD, respectively. A minimum flow of 10 cfs is released from the dam year-round. NSPW conserves water at the Project by regulating discharge from the Gile Dam such that the water released, when combined with the flow in the main branch of the Montreal River, allows the downstream hydroelectric projects to generate efficiently without passing surplus water over the spillway or through the radial gates.

When the discharge from the Gile Dam, combined with flows in the main branch of the Montreal River, exceeds the hydraulic capacities of the Saxon Falls and Superior Falls powerhouses, the surplus water must be discharged via the spillways. This would be considered "over releasing" water from the Gile Dam. Over releasing does not serve a Project purpose and can have an adverse impact upon recreation and environmental resources at the Project.[17] Therefore, "over releasing" is typically avoided and water from the Gile Dam is conservatively released for optimal generation downstream. NSPW is proposing to restrict the typical drawdown of the reservoir to approximately 0.1 feet per day, but no more than 0.2 feet per day,[18] to balance the needs of generation with the needs of recreation and the aquatic environment.

NSPW uses a stage-storage curve to calculate inflow into the Gile Flowage by comparing changes in reservoir elevation to discharge from the dam. In order to determine the flow to be discharged from the dam, NSPW calculates the volume of flow that will provide for the most-efficient generation as its downstream projects and releases the water accordingly.

[16] Except for scheduled whitewater releases and emergencies beyond Applicant's control, which includes preemptive drawdowns for expected large inflow events due to precipitation or snow melt to reduce flooding and increased reservoir elevations at the downstream hydroelectric projects.
[17] Project purposes include power generation and mitigation or enhancement measures proposed as part of this application.
[18] Except for scheduled whitewater releases and emergencies beyond Applicant's control, which includes preemptive drawdowns for expected large inflow events due to precipitation or snow melt to reduce flooding and increased reservoir elevations at the downstream hydroelectric projects.

The annual summer drawdown begins around May 1 and the annual winter drawdown typically begins around December 1. A review of elevation data at the Gile Project from 1994 to 2016 showed that summer drawdowns ranged from 4.2 to 7.6 feet in years with normal precipitation, 4.7 feet to 10 feet during dry years and 1.6 feet to 7.4 feet during wet years. Winter drawdowns ranged from 4.6 feet to 8 feet during years with normal precipitation, 5.8 feet to 9.5 feet during dry years, and 2.8 feet to 9.4 feet during wet years.[19]

According to the downstream generation benefits analysis, developed for NSPW in 2019 and filed with the Commission on February 21, 2020, the current Project operation provides a 21% increase in generation at NSPW's two downstream hydroelectric projects. This calculates to 2103.2 and 2401.6 megawatt hours (MWh) at Saxon Falls and Superior Falls, respectively, for the five-year period ending in 2021.

Based on the bathymetric map of Gile Flowage, developed as part of the 2022 ATIS study, the reservoir encompasses 3,454 acres with a gross storage capacity of 32,713 acre-feet at the maximum reservoir elevation of 1,490 feet NGVD. At the minimum elevation of 1,475.0 feet NGVD, the reservoir encompasses 396 acres with a gross storage capacity of 682 acre-feet. Therefore, the useable storage capacity of the reservoir between 1,475 and 1,490 feet NGVD is 32,031 acre-feet. The bathymetric map is included in **Appendix E-6**.

3.4.1.1.2 Proposed Uses of Project Waters

Although NSPW is not proposing any changes to Project operations, FERC approved the development of a Flow Routing Model to analyze the impacts of Project operations under various reservoir levels, inflows, and downstream releases.

In the FERC SPD dated September 24, 2021, FERC approved the Flow Routing as quoted below:

> "Therefore, we recommend that the Reservoir/Flow Routing Model be developed to be able to assess power generation and spillage at the Superior Falls Project and the Saxon Falls Project resulting from operating the project under a wide-range of reservoir levels and downstream releases, even if the reservoir levels and / or downstream releases vary hourly, daily, weekly, monthly, or seasonally. We also recommend that the reservoir / flow routing model be able to predict the effect of project operation: (1) on project reservoir levels and generation at the Superior Falls Project and Saxon Falls Project for simulated instream flows; (2) on downstream flows and generation at the Superior Falls Project and Saxon Falls Project for simulated project reservoir operations; and (3) on project reservoir levels, downstream flows, and generation at the Superior Falls Project and Saxon Falls Project both for simulated project reservoir operations and instream flows. Power generation and spillage resulting from simulated project operation should be predicted separately for the Superior Falls Project and the Saxon Falls Project."

Pursuant to FERC's ruling in the SPD, NSPW developed a preliminary model within a Microsoft Excel workbook to calculate the relationship between discharge and stage in the reservoir and to simulate routing between the Gile Flowage and the Superior Falls and Saxon Falls projects. The model calculates results for a full calendar year and can determine power generation potential at the two downstream projects.

[19] For more info on biennial drawdowns see NSPW's PSP Clarification Letter (FERC Accession No. 20210715-5011).

Three variations of the routing model have been created. Each variation requires the user to enter different information; however, they all provide results for inflows at the downstream projects, achievable power generation, and either Gile Flowage elevation or discharge from the Gile Dam. The three model variations are described below:

Model 1 – The user enters a time series of discharges from the Gile Dam. Discharge values are used to determine the elevation of the Gile Flowage.

Model 2 – The user enters a time series of Gile Flowage water elevations. Desired changes in flowage elevations are used to determine required discharges.

Model 3 – The user may enter either the elevation of the Gile Flowage or discharge from the spillway for each time step of the model.

The three models, including a technical memorandum documenting the development of said models, instructions on general use of the model worksheets, and modeling results are included in **Appendix E-28**. More specifically, the technical memorandum includes the following:

- The methodology used to evaluate the effects of reservoir levels and minimum flow releases on downstream generation;
- How the model handles the flow and varies within the time period being analyzed, including flows that vary within a 24-hour period;
- The model's capabilities;
- The model's limitations;
- Project operations used in the simulation; and
- The modeled results.

The final model will be provided in the USR to be filed no later than September, 28, 2023.

3.4.1.1.3 Hydrology and Streamflow

The primary source of inflow to the Gile Flowage comes from the West Fork. Other tributaries include East River, Fifield Creek, and Linnunpuro Creek. As outlined in the July 14, 2021 letter clarifying the proposed study plan, NSPW utilized daily outflow and storage reservoir elevation data for the period 1994 to 2021 to calculate inflows to the Project and develop flow duration curves (NSPW, 2021b). The drainage basin for the Project is 70 square miles. Mean monthly flows at the Gile Dam, based on streamflow data from January 1994 to December 2021, are shown in **Table 3.4.1.1.3-1**.

Table 3.4.1.1.3-1 Mean Monthly Flows at the Gile Project, 1994-2021

Month	Mean Monthly Flow (cfs)
January	84
February	86
March	166
April	390
May	284
June	158
July	138

Month	Mean Monthly Flow (cfs)
August	92
September	117
October	93
November	78
December	79

Source: (Mead & Hunt, 2023a)

3.4.1.2 Water Quality

3.4.1.2.1 Water Quality Standards

The State of Wisconsin established water quality standards under Chapter NR 102 of the Wisconsin Administrative Code (NR 102) to protect, maintain, and enhance surface waters for a variety of designated uses. The standards set limits for each designated use described below for which water quality cannot be artificially lowered unless a variance has been provided. NR 102 standards are consistent with CWA § 303I. A copy of NR 102 is found in **Appendix E-7**.

The West Fork upstream of the Highway 77 bridge is designated for Fish and Aquatic Life (Default-FAL). Downstream of the Highway 77 bridge the West Fork is designated as a Class II trout stream and has a designated use for Fish and Aquatic Life-Coldwater (FAL-Coldwater). The Gile Flowage has a designated use as Default-FAL.

Fish and Aquatic Life Standards

Fish and aquatic life standards in Wisconsin are as follows:

- pH shall be between 6.0 and 9.0, with no change greater than 0.5 units outside the estimated natural seasonal maximum and minimum.
- Surface water dissolved oxygen (DO) shall never be lowered below 5 milligrams per liter (mg/L).
- Total phosphorus shall be less than 100 micrograms per liter (µg/L) or 0.1 mg/L.
- Water bodies classified as trout waters by WDNR or as Great Lakes or cold-water communities may not be altered from natural background DO levels to such an extent that trout populations are adversely affected. Additionally, all the following conditions shall be met:
    - DO in classified trout streams shall not be artificially lowered to less than 6.0 mg/L at any time, nor shall the DO be lowered to less than 7.0 mg/L during the spawning season.
    - DO in Great Lakes tributaries used by stocked salmonids for spawning runs shall not be lowered below natural background during the period of habitation.

Temperature Standards

The West Fork upstream of Highway 77 is subject to the “Warm-Small” temperature standard shown in Table 2 of NR 102. The Gile Flowage is classified as a “reservoir” in the WDNR’s 2020 Water Quality Assessment. NR 102 defines a reservoir as “a waterbody with a constructed outlet structure intended to impound water and raise the depth of the water by more than two times relative to the conditions prior to construction of the dam, and that has a mean water residence time of 14 days or more under summer mean flow conditions…”. The reservoir classification makes the Gile Flowage subject to the “northern” lake temperature standards found in Table 4 of NR 102. **Table 3.4.1.2.1-1** provides the monthly acute temperature standards for waters within the Project.

Table 3.4.1.2.1-1 Maximum Acute Water Temperature Standards

Month	West Fork, Upstream of Highway 77 (Default-FAL)	Gile Flowage Storage Reservoir
	Maximum Acute Temperatures (ºF)	
	Table 2 (Warm-Small)	Table 4 (Northern)
January	76	76
February	76	76
March	77	76
April	79	78
May	82	81
June	84	85
July	85	86
August	84	86
September	82	84
October	80	80
November	77	78
December	76	76

Source: NR 102 Table 2, NR 102 Table 4

Recreational Use Standards

NR 102.04(6) indicates that a recreation use classification requires the geometric mean of bacterial counts of *Escherichia coli* (*E. coli*) to not exceed a most probable number of 200 counts per 100 milliliters (mL), based on five or more water samples per month. Under the WDNR Beach Advisory Program, a beach advisory is issued when the bacterial counts reach an action value of 235 per 100 mL and a beach closure is issued at 1,000 per 100 mL.

Public Health Standards

NR 102.14 establishes taste and odor criteria standards for public health and welfare, which are outlined by specific substance, and will not be summarized here.

Fish Consumption Standards

NR 105.07 establishes wildlife use standards, which are outlined based upon specific substance concentrations, and will not be discussed here.

Total Phosphorus Standards

Phosphorus criteria in Wisconsin are as follows:

- Stream criterion: 100 µg/L[20]
- Stratified “reservoir” criterion: 30 µg/L
- Non-stratified “reservoir” criterion: 40 µg/L[21]

[20] The stream criterion is applicable for waters downstream of the Gile Dam and upstream of the Project reservoir.
[21] Based upon water quality results from 2022, the reservoir was not stratified. Therefore, the Gile Flowage is subject to the non-stratified reservoir criterion.

3.4.1.2.2 Historic Water Quality Conditions

The City of Montreal's wastewater treatment plant is the only permitted point-source municipal discharge site in the Project vicinity. The site is located approximately 0.8 miles downstream of the Gile Dam and does not impact water quality within the Project (Great Lakes Environmental Center, 2022b).

Two historic WDNR water quality monitoring stations were identified in the vicinity of the Project. Monitoring Station 260341 is located on the reservoir approximately 0.75 miles upstream of the Gile Dam and has data available from 1994, 1997, and 2000. Monitoring Station 10029743 is located at the intersection of West Branch Road and the West Fork upstream of the reservoir and has data available from 2017. The historic data shows that Wisconsin's water quality standards were met. The pH, DO, and temperature data for each monitoring station are shown in **Table 3.4.1.2.2-1**.

Table 3.4.1.2.2-1 Historic WDNR Water Quality Monitoring Data in the vicinity of the Gile Project

Monitoring Station	Date	pH	DO (mg/L)	Temp (°F)
263041	June 21, 1994	6.9*	5.7*	69.4*
263041	August 3, 1994	7.5*	7.6*	73.0*
263041	August 14, 1997	7.2	8.5	66.2
263041	June 13, 2000	7.3*	7.9*	65.9*
263041	July 20, 2000	7.0*	6.6*	70.1*
263041	August 9, 2000	N/A	7.0	70.7
10029743	May 30, 2017	6.4	13.9	55.8
10029743	June 28, 2017	6.6	10.6	62.6
10029743	July 31, 2017	7.3	11.2	73.0
10029743	August 15, 2017	6.8	9.8	67.8
10029743	September 27, 2017	6.1	10.1	59.5
10029743	September 29, 2017	6.6	10.7	57.0
10029743	October 24, 2017	7.3	11.1	46.8

* Average of readings taken for date

FOG conducted citizen lake monitoring at the deep hole site on Gile Flowage in 1993, 1997, 2012 and from 2017-2021. Annual reports detailing this monitoring are included in **Appendix E-8**.

3.4.1.2.3 Current Water Monitoring Data

In 2022, Great Lakes Environmental Center (GLEC) conducted a water quality monitoring study on behalf of NSPW to determine if waters within the proposed Project boundary meet current State water quality standards. The study included water quality monitoring at the following four locations within the proposed Project boundary:

- Site 1 - Riverine area upstream of the main impoundment
- Site 2 - Existing deep hole monitoring station
- Site 3 - Approximately 250 feet upstream of the Gile Dam
- Site 4 - Downstream of the tailwater mixing zone.

The monitoring locations are shown in **Figure 3.4.1.2.3-1** and the water quality parameters measured during the study and monitoring frequency are shown in **Table 3.4.1.2.3-1**. The analyses were completed following written Standard Operating Procedures which are based upon EPA analytical methods and WDNR Grab Sampling Protocols. The analyses for chloride, iron, sulfate, total mercury, sulfide, and manganese were completed by Pace Laboratory located in Green Bay, Wisconsin or ALS Laboratory in Holland, Michigan. The remaining analyses were completed by GLEC staff and the GLEC Nutrient Chemistry Laboratory in Traverse City, Michigan.

Water quality monitoring was conducted on May 18, July 13-14, August 17-18, and September 6, 2022. None of the analyzed parameters, or collected samples used in laboratory analyses, exceeded Wisconsin's water quality standards (Great Lakes Environmental Center, 2022b). A summary of the laboratory analyses and field collected data is provided in **Table 3.4.1.2.3-2** and **Table 3.4.1.2.3-3**, respectively. The Water Quality Study Report is found in **Appendix E-9**.

Figure 3.4.1.2.3-1 Water Quality Study Monitoring Locations at the Gile Project

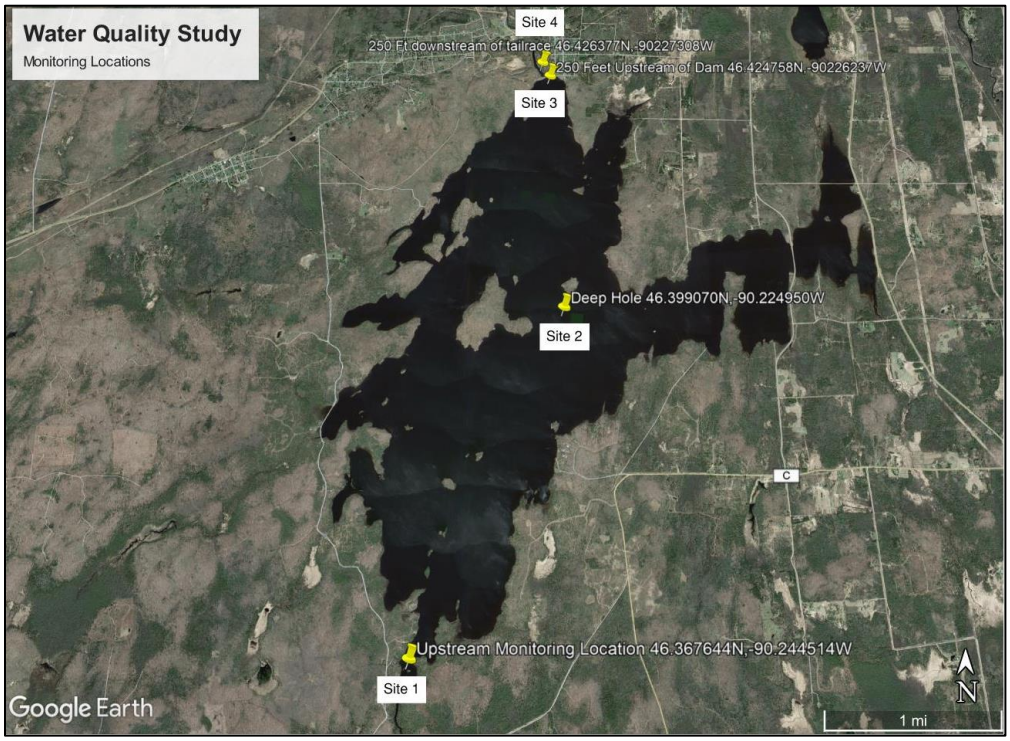


Table 3.4.1.2.3-1 Gile Project Water Quality Monitoring Parameters and Frequency at the Gile Project

Monitored Parameter	Number of Samples	Sampling Measurement	May	July	Aug	Sept
Ammonia	1	Lab		X		
Bacteria	3	Lab		X	X	X
Chloride	1	Lab	X			
Chlorophyll-a	3	Lab		X	X	X
Conductivity	4	Field Profile	X	X	X	X
Color	1			X		
DO	4	Field Profile	X	X	X	X
Dissolved Phosphorus	3	Lab		X	X	X
Iron	3	Lab		X	X	X
Manganese	3	Lab		X	X	X
Sulfide	3	Lab		X	X	X
Nitrate (plus nitrite)	1	Lab		X		
pH	4	Field Profile	X	X	X	X
Sulfate	1	Lab	X			
Total Mercury	1	Lab	X			
Temperature	4	Field Profile	X	X	X	X
Total Nitrogen	1	Field Fixed		X		
Total Phosphorus	4	Field Fixed	X	X	X	X
Total Suspended Solids	4	Lab	X	X	X	X

Table 3.4.1.2.3-2 Summary of Lab Analyzed Water Quality Monitoring Results for the Gile Flowage Storage Reservoir in 2022

Parameter	Site 1				Site 2				Site 3				Site 4			
	May	July	Aug	Sept	May	July	Aug	Sept	May	July	Aug	Sept	May	July	Aug	Sept
Ammonia (ug/L)		33.6				31.7				42.9				41.9		
E. coli (MPN)		5.2	6.3	2.0		1.0	3.1	<1.0		1.0	1.0	<1.0		1.0	16.0	1.0
Chloride (mg/L)	2.0				1.9				1.9				1.9			
Chlorophyll a (ug/L)		5.42	4.84	3.30		6.70	4.41	3.80		3.93	2.55	3.70		2.88	5.11	3.26
Color (PCU)		126				100				104				115		
Dissolved P (ug/L)		3.4	6	<1.5		3.3	5.4	1.7		5.5	4.9	1.8		6.8	2.7	2.9
Iron (ug/L)		544	614	610		415	454	458		440	412	442		463	427	435
Manganese (ug/L)		46.4	51.4	54.2		21.9	20.2	23.5		24.3	14.6	17.9		28.0	16.3	19.5
Nitrate (plus nitrite) (ug/L)		<3.4				3.4				12.0				10.2		
Sulfide (mg/L)		<1.2	<1.2	<1.2		<1.2	<1.2	<1.2		<1.2	<1.2	<1.2		<1.2	<1.2	<1.2
Sulfate (mg/L)	<7.1				<0.71				<1.40				<0.71			
Total Mercury (ug/L)	<0.16				<0.16				<0.16				<0.16			
Total N Nitrogen (mg/L)		0.67				0.62				0.60				0.58		
Total Phosphorus (ug/L)	5.2	10.1	14.1	15.1	3.5	12.1	7.7	12.7	3.7	10.9	10.2	12.3	4.7	11.7	9.6	15.8
Total suspended solids (mg/L)	2.6	8.6	4.1	4.8	4.6	7.3	6.0	3.1	3.4	4.1	4.2	3.9	3.3	8.4	4.3	3.4

Source: (Great Lakes Environmental Center, 2022b)

Table 3.4.1.2.3-3 Summary of Field Analyzed Water Quality Monitoring Results for Gile Flowage Storage Reservoir (2022)

Parameter[22]	Site 1				Site 2				Site 3			
	May	July	Aug	Sept	May	July	Aug	Sept	May	July	Aug	Sept
Specific Conductance (µmhos/cm)^	36.2	44.7	50.2	51.5	35.5	42	46.5	47.7	36.3	42	46.1	47.7
DO (mg/L)	9.35	8.41	7.71	7.26	9.14	7.33	7.9	7.54	9.26	6.61	8.28	8.39
pH (su)	7.22	7.28	7.13	7.21	7.23	6.69	6.9	7.42	7.29	6.89	7.04	7.57
Secchi Depth (inches)	VOB*	33	44	40	50	46	55	59	NC**	50	65	67
Temperature (°C)	15.4	24.5	21.2	19.5	15.2	22	21.1	20.4	15	21.3	21.8	21.5
Temperature (°F)	59.7	76.1	70.2	67.1	59.4	71.6	70	68.8	59	70.3	71.2	70.7

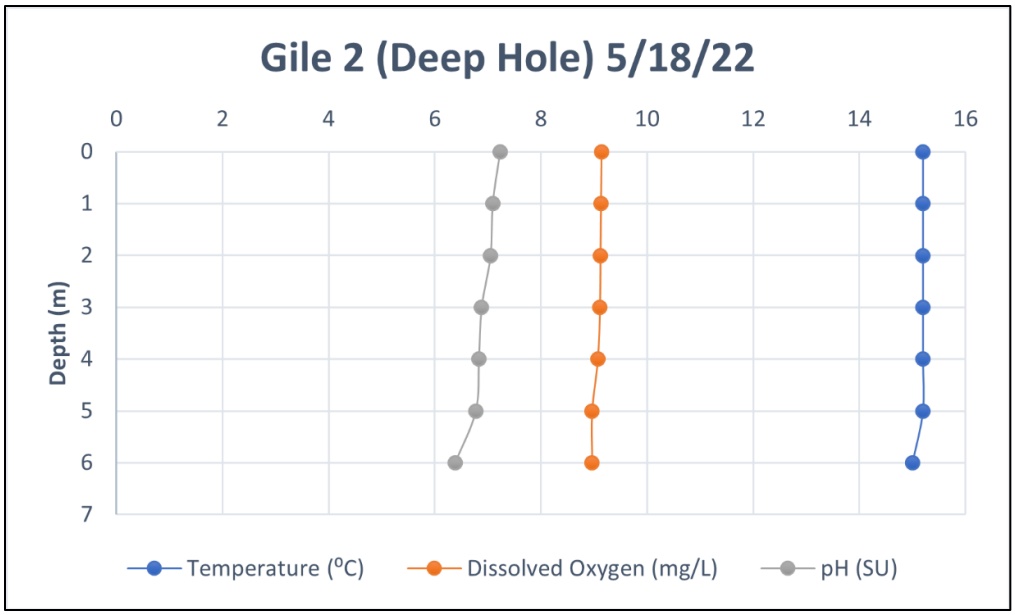
^ micromhos per centimeter; * Visible on bottom; ** Not collected
Source: (Great Lakes Environmental Center, 2022b)

Depth Profiles

Depth profile monitoring for temperature, DO, pH, and specific conductance was completed at monitoring Site 1, Site 2, and Site 3. The depth was too shallow to develop a profile at Site 1. Poor weather prohibited the profiling of Site 3 during the May sampling. Depth profiles for temperature, DO, and pH at Sites 2 and 3 are shown in **Figures 3.4.1.2.3-2** through **3.4.1.2.3-8**. Specific conductance varied little from the water surface to the bottom and therefore was not plotted.

All parameters measured during the depth profile monitoring met Wisconsin's water quality standards. Analysis of the study data indicates the Gile Flowage was not stratified at any location.

Figure 3.4.1.2.3-2 Site 2 May Profiles



[22] Near surface measurements only.

Figure 3.4.1.2.3-3 Site 2 July Profiles

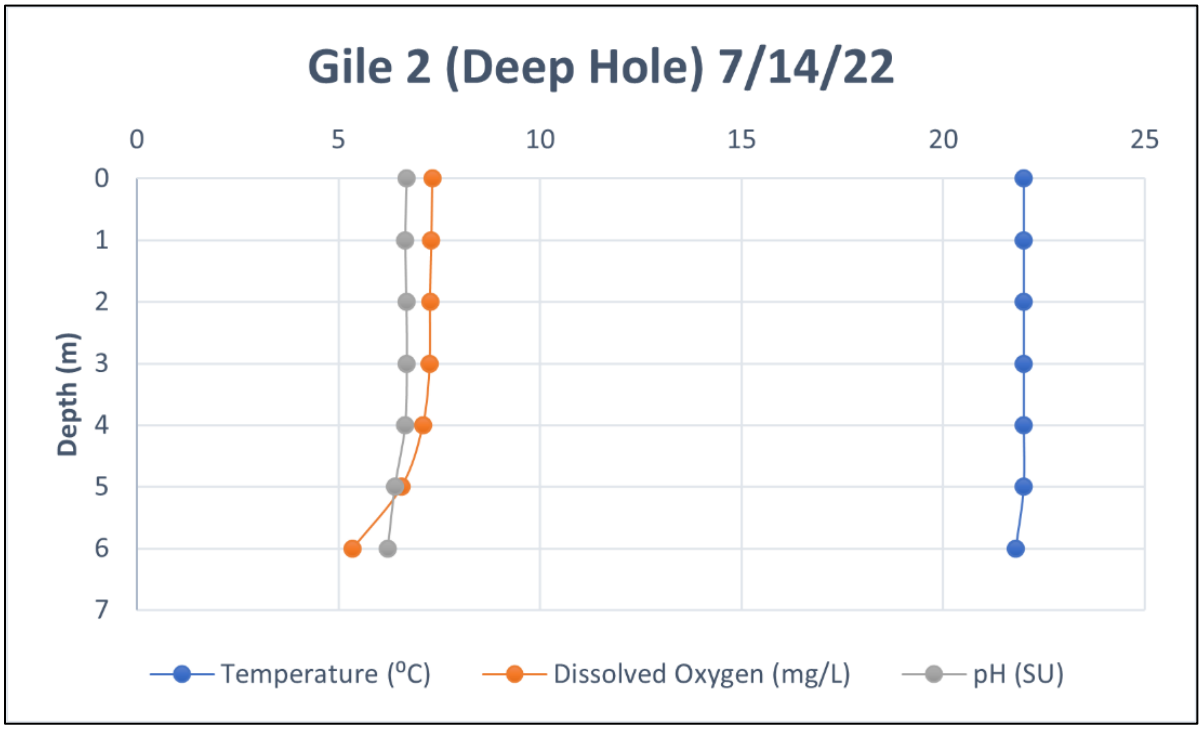


Figure 3.4.1.2.3-4 Site 3 July Profiles

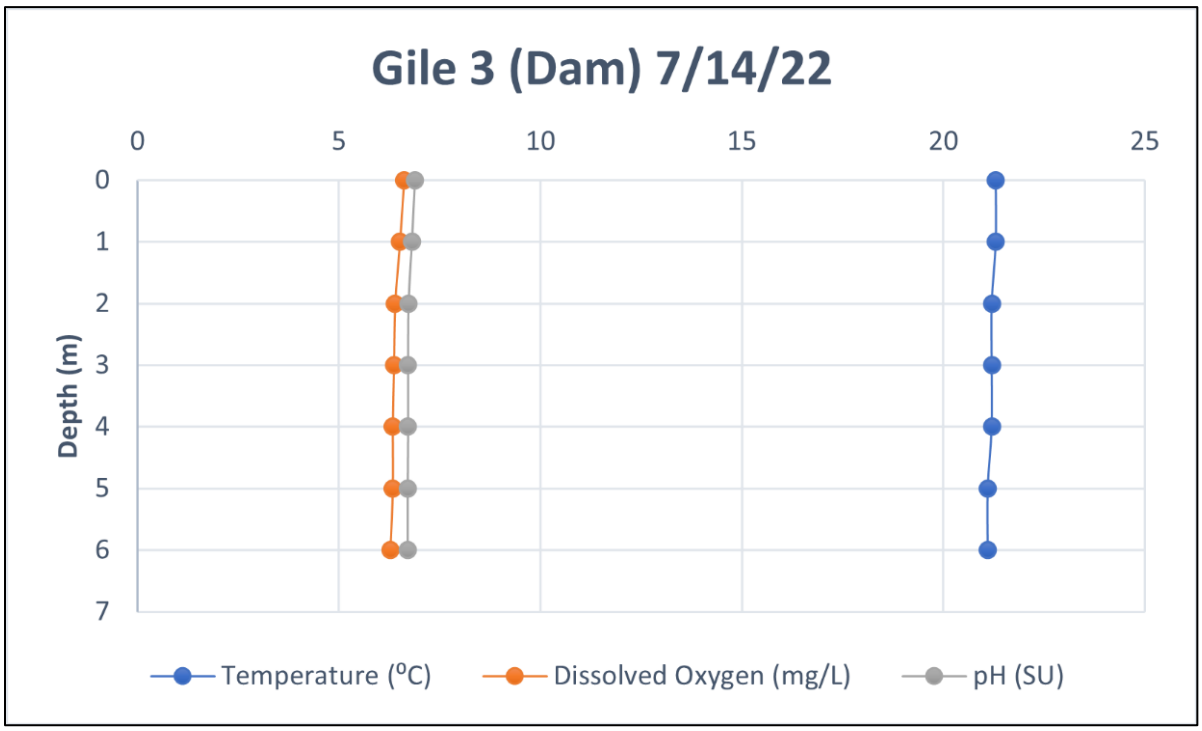


Figure 3.4.1.2.3-5 Site 2 August Profiles

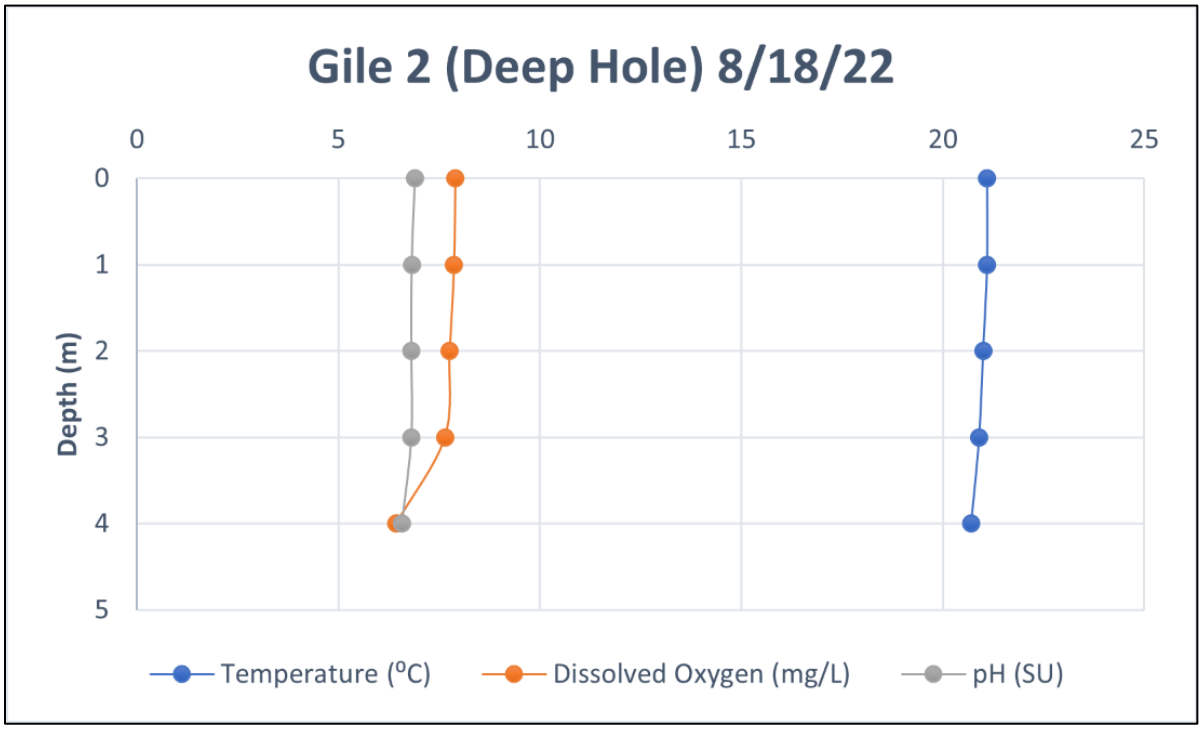


Figure 3.4.1.2.3-6 Site 3 August Profiles

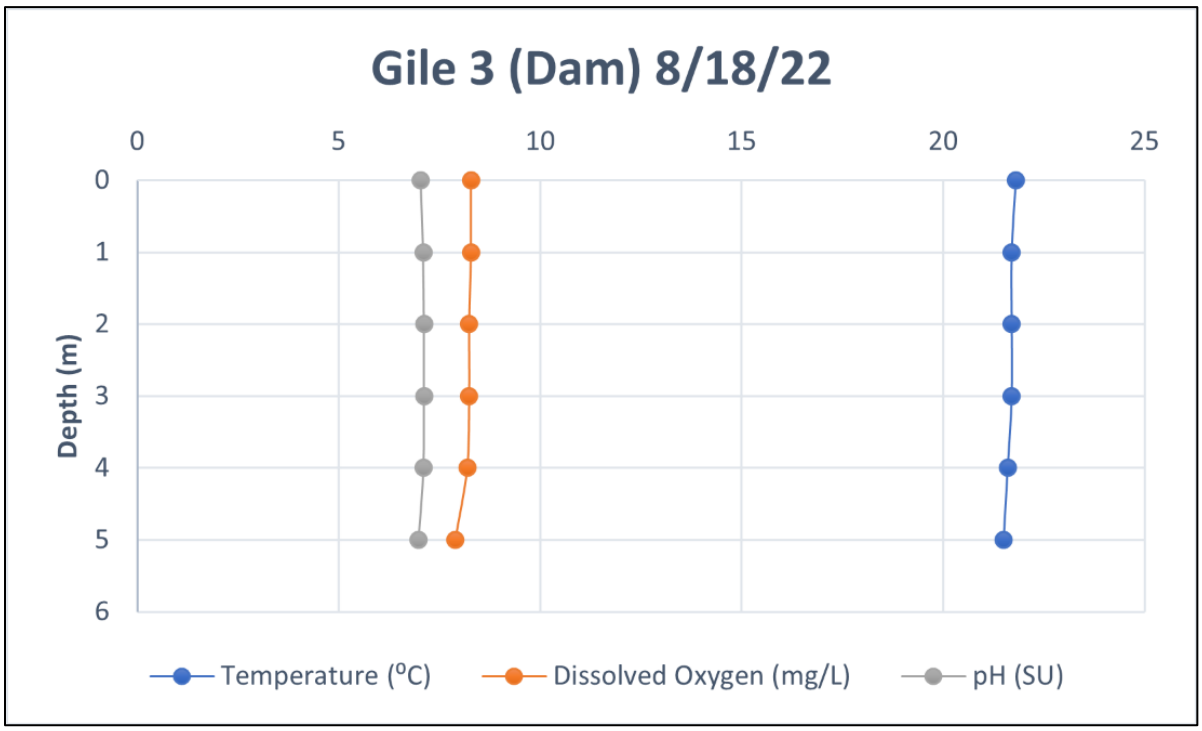


Figure 3.4.1.2.3-7 Site 2 September Profiles

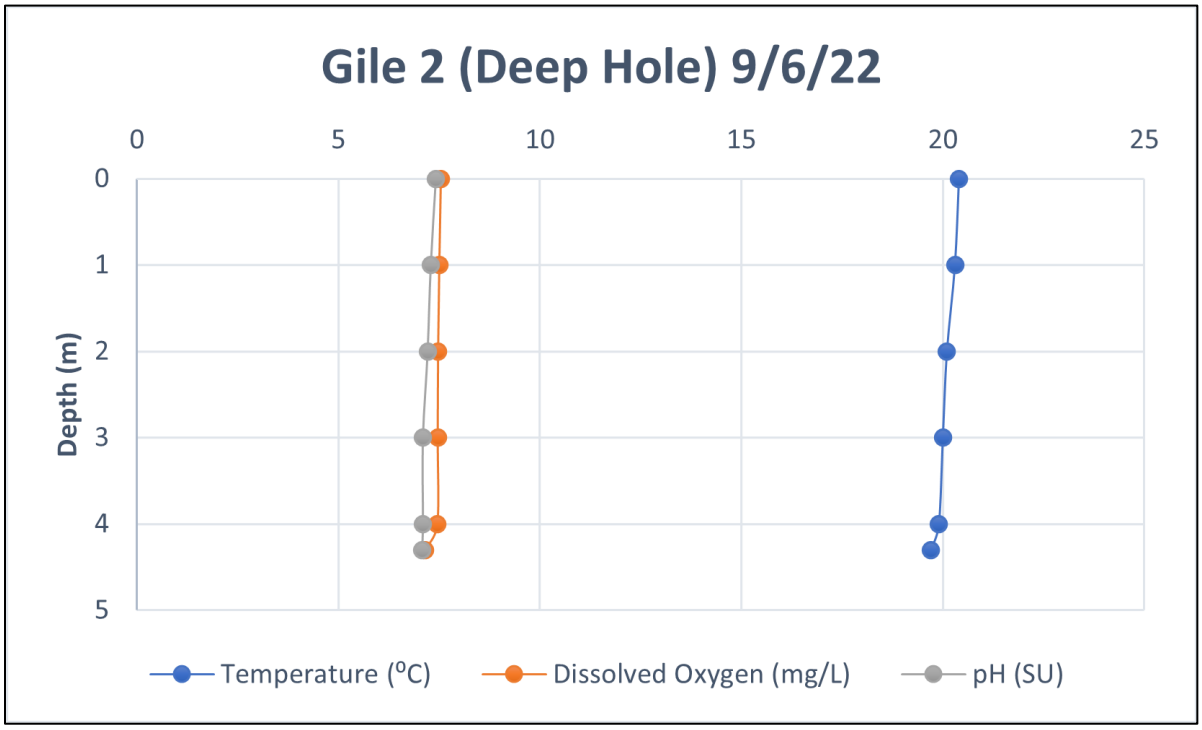
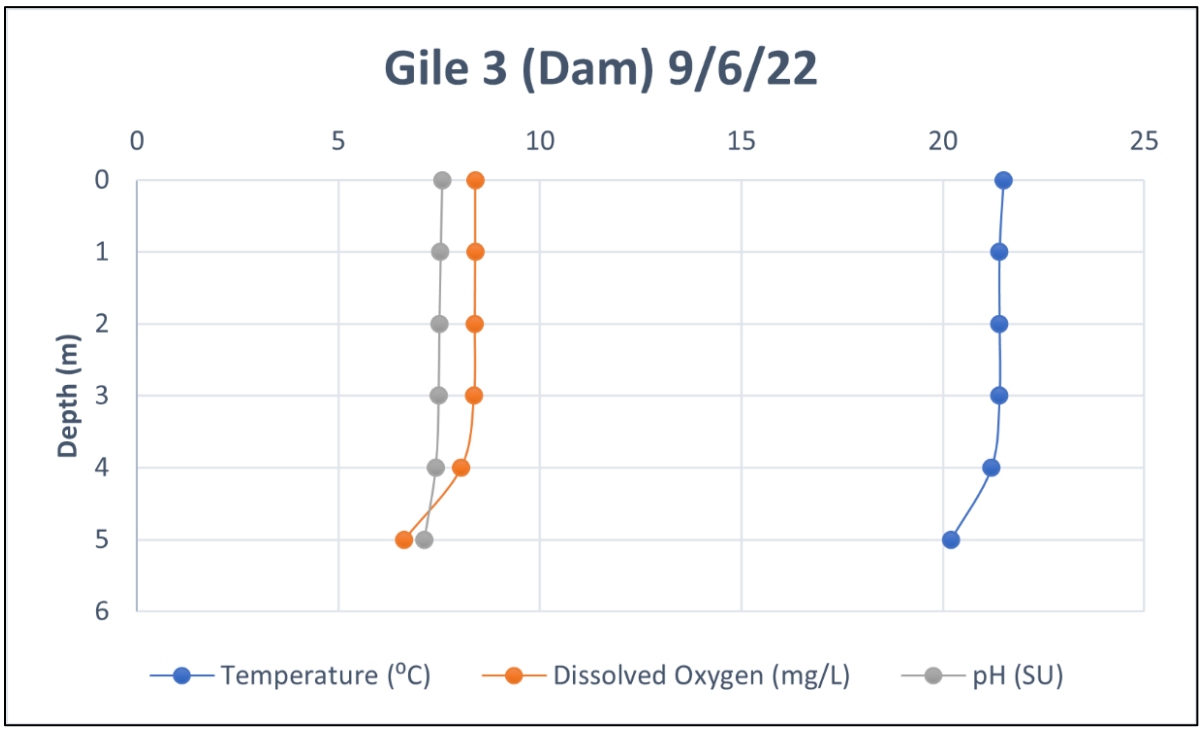


Figure 3.4.1.2.3-8 Site 3 September Profiles



3.4.2 Environmental Effects

In SD1 and SD2, the Commission identified one issue related to water quality; the effect of Project operations on water quality within the Project boundary (reservoir and tailwater).

The Gile Flowage is listed as a "Healthy Waterbody" in WDNR's 2022 Health Waters List (WI Department of Natural Resources, 2022a). Water quality monitoring conducted within the reservoir and tailwater in 2022 indicated all analyzed water quality parameters exceeded Wisconsin's water quality standards. Therefore, continued operation of the Project is not expected to cause adverse impacts to water quality (Great Lakes Environmental Center, 2022b). However, adverse environmental impacts are possible if there are deviations from the required minimum flow of 10 cfs, the minimum reservoir elevation of 1,475 feet NGVD, or the maximum reservoir elevation of 1,490 ft NGVD.

3.4.3 Proposed Environmental Measures

To protect water quality, the Applicant will continue to operate the Project according to the operating restrictions in place during the 2022 monitoring season. This includes a restriction on the typical daily drawdown of approximately 0.1 feet per day, but no more than 0.2 feet per day.[23] The proposed environmental measures are an enhancement for water resources at the Project when compared to the alternative of no-action or denial of the license application. Without the issuance of an original license for the Project, the water resource enhancements will not occur.

3.4.4 Unavoidable Adverse Impacts

With the implementation of the proposed environmental measures, continued Project operation is not expected to adversely affect water resources.

3.5 Fish and Aquatic Resources

3.5.1 Affected Environment

3.5.1.1 Aquatic Vegetation

In order to obtain information on the aquatic and terrestrial plant species found within the vicinity of the Project, including invasive species, an ATIS Study was conducted in 2022. Aquatic plants were sampled using WDNR's point-intercept protocols as listed in *Recommended Baseline Monitoring of Aquatic Plans in Wisconsin* (WI Department of Natural Resources, 2010).

To account for both early and late season species, two aquatic vegetation surveys were conducted in 2022, one in mid-June and one in late July. The June surveys were conducted on the 13th, 14th, and 17th and the July surveys on the 26th, 27th, and 28th. The WDNR provided a point-intercept grid with 957 sample points distributed evenly throughout the Gile Flowage.

The vegetation survey was conducted from a boat using a GPS with submeter accuracy to navigate to grid point locations. Points were sampled using a double-sided rake mounted on a pole. The rake was lowered until it rested gently on the bottom, twisted twice, and then raised straight up out of the water.

[23] Except for scheduled whitewater releases and emergencies beyond Applicant's control, which includes preemptive drawdowns for expected large inflow events due to precipitation or snow melt to reduce flooding and increased reservoir elevations at the downstream hydroelectric projects.

The density for each rake sample was recorded based on rake fullness. Plants not collected on the rake sample, but visible within six feet of the sample point, were recorded as visual sightings. A meander survey was also conducted of the near shore/littoral zone, which is defined as the area less than five feet in depth, but only to the maximum depth of plant colonization. The ATIS Study Report is included in **Appendix E-10**.

During the June survey, a total of 679 of the 957 grid points were sampled. The remaining grid points were not sampled for the following reasons:

- Non-navigable due to thick emergent plant growth (4)
- Terrestrial (2)
- Water depths were over 15 feet (272)

Among the points sampled, 154 were shallower than the maximum rooting depth of plants (7.6 feet) of which 38 had vegetation present. Twenty-four native species were identified during the June survey. Six of these species were observed visually, but not present on the rake at the sample point. Overall, the three most predominant species were variable leaf pondweed (*Potamogeton gramineus*), alternate-flowered water milfoil (*Myriophyllum alterniflorum*), and Narrow-leaf bur-reed (*Sparganium angustifolium*) (GAI Consultants, Inc., 2022a).

During the July survey, a total of 165 of the 957 grid points were sampled. The remaining grid points were not sampled for the following reasons:

- Non-navigable due to thick emergent plant growth (4)
- Terrestrial (2)
- Water depths exceeded the observed June rooting depth of 7.6 feet (786)

Among the points sampled,133 points were within the littoral zone of which 49 had vegetation present. Twenty-seven native species were identified during the July survey. Four of these species were observed visually, but not present on the rake at the sample point. Overall, the predominant species were various leaved watermilfoil (*Myriophylum heterophyllum*), slender waterweed (*Elodea nutallii*), and common waterweed (*Elodea canadensis*) (GAI Consultants, Inc., 2022a).

A list of all aquatic species identified during the June and July surveys is shown in **Table 3.5.1.1-1**. **Table 3.5.1.1-2** provides an overall summary of the point-intercept vegetation survey. The ATIS Study Report, including maps and datasheets, is found in **Appendix E-10**.

The ATIS Study Report concluded the aquatic plant community in the Gile Flowage is unique. Several uncommon species were observed, and although plant abundance was low, the quality of species was high as evidenced by the Floristic Quality Index scores shown in **Table 3.5.1.1-2**.

The low plant density can be explained by the size and depth of the waterbody. Plants were primarily found growing in shallow, near shore areas and in protected bays. The depth of much of the flowage, combined with the tannin-stained waters and wind fetch, makes only the shallow, protected areas conducive to plant growth (GAI Consultants, Inc., 2022a).

Table 3.5.1.1-1 Species of Aquatic Vegetation Observed during ATIS Surveys

Common Name	Scientific Name	June Survey	July Survey
Alternate-flowered watermilfoil	*Myriophyllum alterniflorum*	X	X
Arrowhead sp.	*Sagittaria sp.*	X	
Common bladderwort	*Utricularia vulgaris*		X
Common water-starwort	*Callitriche palustris*	X	X
Common waterweed	*Elodea canadensis*	X	X
Creeping spearwort	*Ranunculus flammula*	X	X
Large-leaf pondweed	*Potamogeton amplifolius*	X	X
Long-leaf pondweed	*Potamogeton nodosus*	X	X
Hardstem bulrush	*Schoenoplectus acutus*	X	X
Narrowleaf bur-reed	*Sparganium angustifolium*	X	X
Northern blue flag	*Iris versicolor*	X	X
Ribbon-leaf pondweed	*Potamogeton epihydrus*	X	X
Slender naiad	*Najas flexilis*		X
Slender waterweed	*Elodea nuttallii*	X	X
Small bladderwort	*Utricularia minor*		X
Small pondweed	*Potamogeton pusillus*	X	X
Spatterdock	*Nuphar variegata*	X	X
Spiny hornwort	*Ceratophyllum echinatum*	X	X
Spiral-fruited pondweed	*Potamogeton spirillus*		X
Stoneworts	*Nitella sp.*	X	X
Variable-leaf pondweed	*Potamogeton gramineus*	X	X
Various-leaved watermilfoil	*Myriophyllum heterophyllum*	X	X
Water bulrush	*Schoenoplectus subterminalis*	X	X
Water smartweed	*Persicaria amphibia*	X	X
Waterwort	*Elatine minima*	X	
White-stem pondweed	*Potamogeton praelongus*		X
Whorled watermilfoil	*Myriophyllum verticullatum*	X	X
Wild celery	*Vallusneria americana*		X
Wild rice	*Zizania sp.*	X	X

Source: (GAI Consultants, Inc., 2022a)

Table 3.5.1.1-2 Overall Point-Intercept Vegetation Survey Summary

Statistic	June 2022	July 2022
Frequency of Occurrence	24.9	36.8
Maximum Rooting Depth	7.6 feet	6.1 feet
Species Richness	18	23
Floristic Quality Index	32.0	36.9

3.5.1.2 Wetlands

Wetlands are transition habitats between land and water which have unique hydrologic, soil, and vegetative qualities that allow them to be differentiated (delineated) from other habitat types. Wetlands function to improve water quality, wildlife habitat, nutrient cycling and storage, aesthetics, and recreation. Large wetlands absent from human influence are generally of higher quality. In riverine systems, wetlands provide for floodwater storage and filtration of water contaminants and sediment, as well as an environmental corridor for enhanced aesthetics and recreation.

The National Wetland Inventory was used to determine the types of wetlands and their acreages within the proposed Project boundary as shown in **Table 3.5.1.2-1**. Wetlands identified, in order of abundance, were as follows: lacustrine, freshwater forested shrub, freshwater emergent, freshwater pond, and riverine. A map illustrating the wetlands within the proposed Project boundary is found in **Appendix E-11**.

Table 3.5.1.2-1 Wetlands Identified within the Proposed Gile Project Boundary

Wetland Type	Upstream of Dam	
	Acres	Percentage
Lacustrine	3,073.5	96.5
Freshwater Forested/Shrub	87.5	2.7
Freshwater Emergent	23.8	0.7
Freshwater Pond	0.3	<0.1
Riverine	0.2	<0.1
Total Wetlands	3,185.3	100.00

Source: (Mead & Hunt, 2022)

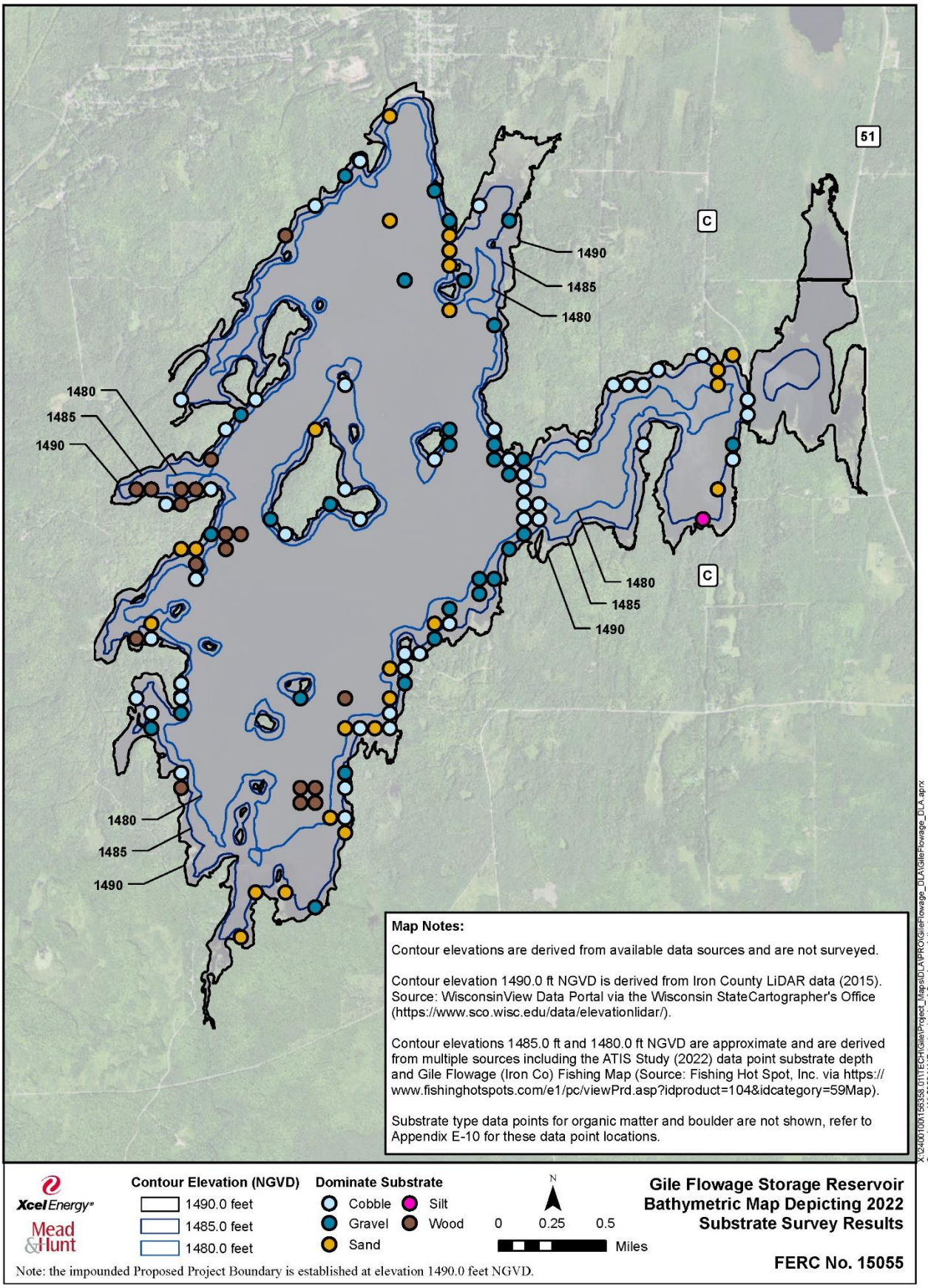
3.5.1.3 Storage Reservoir Substrate

Information regarding the reservoir's substrate was collected during the vegetation survey in 2022. The survey was conducted from a boat using a GPS with submeter accuracy to navigate to grid point locations. At each grid point location, the bottom was probed or visually inspected in order to classify the primary substrate composition into the following categories: boulder, cobble, gravel, sand, silt, wood, or organic (muck or decomposing detritus).

The majority of the reservoir's substrate is organic. Substrates other than organic (boulder, cobble, gravel, sand, silt, wood) were restricted primarily between elevations 1,490 feet and 1,480 feet NGVD; however, the majority of the substrate within this same elevation range was classified as organic. A bathymetric map showing the substrate identified at each survey point on the intercept grid, other than organic, is shown in **Figure 3.5.1.3-1**. Information used to develop this figure is included in the ATIS Study Report found in **Appendix E-10**.

The information collected in 2022 correlates well with the littoral zone information collected by FOG in 2005, which extended to a depth of 1,484 feet NGVD (Friends of the Gile Flowage, 2005).

Figure 3.5.1.3-1 Bathymetric Map Depicting 2022 Substrate Survey Results



3.5.1.4 Fisheries

3.5.1.4.1 Fish Assemblage

The historic fish assemblage within the Gile Flowage, as discussed in the PAD, came from the WDNR's online Fish Mapper Application, which has since been discontinued. The WDNR provided additional fisheries information from surveys completed from 1955 through 2019 which is included in **Appendix E-12**. An evaluation of the fishery was conducted based on data from 2000 to 2019. During that timeframe, fish survey data was collected in 2000, 2003, and each year between 2008 and 2019. The fish species identified in the surveys are shown in **Table 3.5.1.4.1-1**.

Of the 27,803 fish collected during that timeframe, the five most predominant species included:

- Walleye at 16,797 or 60.4%
- Pumpkinseed at 2,709 or 9.7%
- Smallmouth bass at 2,267 or 8.2%
- Black bullhead at 1,685 or 6.1%
- Bluegill at 1,108 or 4%

Table 3.5.1.4.1-1: Fish Species Known to Occur in the Project Storage Reservoir

Fish Species	Scientific Name
Black bullhead	*Ameiurus melas*
Black crappie	*Pomoxis nigromaculatus*
Blacknose shiner	*Notropis heterolepis*
Bluegill	*Lepomis macrochirus*
Brown bullhead	*Ameiurus nebulosus*
Bullheads	*Ameiurus spp.*
Central mudminnow	*Umbra limi*
Common shiner	*Luxilus cornutus*
Crappies	*Pomoxis spp.*
Golden shiner	*Notemigonus crysoleucas*
Iowa darter	*Etheostoma exile*
Johnny darter	*Etheostoma nigrum*
Muskellunge	*Esox masquinongy*
Northern pike	*Esox lucius*
Pumpkinseed	*Lepomis gibbosus*
Rock bass	*Ambloplites rupestris*
Smallmouth bass	*Micropterus dolomieu*
Spottail shiner	*Notropus hudsonius*
Suckers spp.	*Castomus spp.*
Walleye	*Sander vitreus*
White sucker	*Catostomus commersonii*
Yellow bullhead	*Ameiurus natalis*
Yellow perch	*Perca flavescens*

3.5.1.4.2 Fish Entrainment and Impingement

The Gile Project has no generating facilities, therefore, there is no risk of fish injury or death due to turbine entrainment. Although there is no risk of turbine entrainment, there is a trash rack in the sluiceway, and as such, there is a risk of fish impingement.[24] The sluiceway normally acts as a minimum flow release structure; however, it is also used to pass water downstream during periods of high flow or during winter when ice accumulation prevents operation of the radial gate. The trash rack is 18 feet in height (15.75 feet open area) and 6 feet wide. It has 0.375-inch bars spaced at 3 inches on center with a clear spacing of 2.575 inches. Intake velocities calculated at different flows are shown in **Table 3.5.1.4.2-1**. Since fish larger than three inches feature sustained or burst swim speeds greater than 2.1 feet per second, the risk of fish impingement at the Project is low.

Table 3.5.1.4.2-1 Sluiceway Approach Velocities at the Gile Dam

Flow Through Sluiceway	Approach Velocity Feet Per Second
10 cfs (minimum flow)	0.1
12 cfs	0.1
24 cfs	0.2
36 cfs	0.4
200 cfs[25]	2.1

3.5.1.4.3 Minimum Flow Fish Habitat Evaluation

GLEC conducted a Minimum Flow Habitat Evaluation study in 2022 to evaluate whether the minimum flow at the Project is sufficient to provide suitable habitat for aquatic resources in the West Fork downstream of the Gile Dam. The study proposed to analyze three flows (12 cfs, 24 cfs, and 36 cfs) to determine the available habitat for each flow. The study included two reaches downstream of the dam based on the WDNR's 2017 fisheries data and the WDNR's Guidelines for Evaluating Habitat of Wadable Streams (WDNR Guidelines). Reach A began just downstream of the Highway 77 bridge and Reach B included areas both upstream and downstream of South Drive. These locations corresponded with the locations of previous WDNR fish sampling efforts.

Water depth and velocity information were to be collected at both reaches at baseflow conditions reported as 12 cfs. The water depth information was collected by hand measurements and velocities were collected with an electromagnetic flow meter mounted to a top-setting wading rod. The sampling methodology for each reach for the general sampling procedures was outlined in the aforementioned guidelines.

A Son Tek River Surveyor was used to verify discharge below the dam prior to collecting the first set of habitat data. These initial discharge measurements averaged 35.25 cfs when the sluice gate was closed as far as possible (i.e., to the minimum flow gate setting). This contradicted the assumed discharge of 12 cfs at the minimum gate setting. Therefore, only the highest flow was able to be studied in 2022. The remaining flows (24 cfs and 12 cfs) were subsequently evaluated in July of 2023. Results from the WDNR's 2017 fish sampling are shown in **Table 3.5.1.4.3-1**.

[24] Impingement occurs when intake velocities at a barrier structure, such as a trash rack, are too high to allow fish to escape and they become pinned against the barrier.
[25] This is maximum flow that would generally be released for downstream flow augmentation for power production at the downstream Saxon Falls Project and Superior Falls Project.

Table 3.5.1.4.3-1 Fish Species Collected by WDNR in the Minimum Flow Habitat Evaluation Reaches at the Gile Project

Fish Species	Scientific Name	Number of Fish Collected	Percent Abundance
Longnose dace	*Rhinichthys cataractae*	329	42.6
Creek chub	*Semotilus atromaculatus*	84	10.9
Pumpkinseed	*Lepomis gibbosus*	81	10.5
Smallmouth bass	*Micropterus dolomieu*	70	9.1
Hornyhead chub	*Nacomis biguttatus*	52	6.7
White sucker	*Catostomus commersonii*	49	6.3
Yellow perch	*Perca flavescens*	29	3.8
Common shiner	*Luxilus cornutus*	24	3.1
Blacknose shiner	*Notropis heterolepis.*	23	3.0
Walleye	*Sander vitreus*	13	1.7
Mottled sculpin	*Cottus bairdii*	9	1.2
Rock bass	*Ambloplites rupestris*	4	0.5
Western blacknose dace	*Rhinichthys obtusus*	3	0.4
Brook trout	*Salvelinus fontinalis*	2	0.3
Central mudminnow	*Unbra limi*	1	0.1

For each reach in the habitat evaluation study, the mean stream width (MSW) was determined and reach length was then calculated as 35 times MSW. Twelve transects were established within each reach. The first transect was established 1 MSW from the upstream end of each study reach and the remaining transects were spaced 3 MSW apart.

The following data was collected at each transect:

- Distance from start of study reach
- Wetted width
- Habitat type
- Depth at deepest point along transect (thalweg)
- Length of each transect containing various types of cover for adult fish
- Amount of bank erosion
- Riparian land uses within 5 meters of stream edge
- Riparian buffer width

Four equally spaced sampling points were established along each transect which effectively divided each transect into five equal segments. Within a 0.3 meter x 0.3-meter quadrate on the stream bottom, centered on the transect point, the following data was collected:

- Water depth
- Depth of fines and water
- Embeddedness or coarse gravel and rubble/cobble
- Percent of the stream bottom covered by various substrate types, algae, and macrophytes
- Percent of the transect shaded by canopy
- Water velocity

An overall fish habitat score was calculated for each reach using the habitat data collected and the Fish Habitat Rating system developed by WDNR. This score method ranges from 0 to 100 and is designed to provide a qualitative rating of fish habitat. The fish habitat ratings are shown in **Table 3.5.1.4.3-2**.

Table 3.5.1.4.3-2 WDNR Fish Habitat Rating

Worksheet Score	Fish Habitat Rating
<20	Poor
20-60	Fair
60-80	Good
≥80	Excellent

36 CFS Results

When the habitat data was entered into the WDNR fish habitat scoring worksheet for the 36 cfs flow, both study reaches scored in the "good" range. Reach A received a score of 69 and Reach B received a 61. Deductions from the top score of 100 were due primarily to shallow depths and a lack of bends or other stream complexes which add to the overall diversity of the stream structure (Great Lakes Environmental Center, 2022a).

Habitat suitability values for each species are shown in **Table 3.5.1.4.3-3**. The habitat suitability curves for each species are included in the Minimum Flow Habitat Study and Shoreline Stability Assessment Report found in **Appendix E-5**.

Table 3.5.1.4.3-3 Overall Habitat Suitability Values for 36 cfs (35.25) Flow below the Gile Dam

Fish Species	Reach A			Reach B		
	Depth (%)	Velocity (%)	Depth and Velocity (%)[26]	Depth (%)	Velocity (%)	Depth and Velocity (%)
Longnose dace	65.2	36.1	50.7	63.1	27.7	45.4
Creek chub	76.5	80.9	78.7	91.8	89.2	90.5
Pumpkinseed	4.0	10.5	7.3	3.7	15.0	9.4
Smallmouth bass	22.4	81.8	52.1	21.9	89.8	55.9
Hornyhead chub	26.6	89.5	58.1	26.0	89.0	57.6
White Sucker	14.3	93.3	53.8	13.4	91.9	52.6
Yellow Perch	22.8	61.8	42.3	17.1	77.9	47.5
Common shiner	49.3	88.7	69.0	52.7	87.3	70.0
Blacknose shiner	7.5	35.9	21.7	7.4	50.3	28.8
Walleye	12.0	51.1	31.5	11.8	68.8	40.3
Average	30.1	63.0	46.5	30.9	68.7	49.8

Source: (Great Lakes Environmental Center, 2022a)

[26] The depth and velocity percentages for species 2-9 shown in Table 3.5.1.4.3-3 for Reach A incorrectly used a formula that was calculated using the total area for Reach B instead of the total area for Reach A in the original study report provided in the ISR and DLA. The corrected numbers have been included in Table 3.5.1.4.3-3 in this FLA and will be included in the final study report filed with the USR.

24 CFS Results

When the preliminary habitat data was entered into the WDNR fish habitat scoring worksheet for the 24 cfs flow, both study reaches scored in the "good" range. Reach A received a score of 69 and Reach B received a 61. Deductions from the top score of 100 were due primarily to shallow depths and a lack of bends or other stream complexes which add to the overall diversity of the stream structure (Great Lakes Environmental Center, 2023).

Habitat suitability values for each species are shown in **Table 3.5.1.4.3-4**. The habitat suitability curves for each species and the final Minimum Flow Habitat Study and Shoreline Stability Assessment Report will be included in the USR when it is filed with the Commission, no later than September 28, 2023.

Table 3.5.1.4.3-4 Overall Habitat Suitability Values for 24 cfs Flow Below the Gile Dam

Fish Species	Reach A			Reach B		
	Depth (%)	Velocity (%)	Depth and Velocity (%)	Depth (%)	Velocity (%)	Depth and Velocity (%)
Longnose dace	72.0	20.6	46.3	74.8	18.2	46.5
Creek chub	65.0	83.2	74.1	78.9	92.0	85.5
Pumpkinseed	3.0	35.3	19.1	2.7	27.7	15.2
Smallmouth bass	15.9	83.9	49.9	14.2	93.5	53.8
Hornyhead chub	19.6	80.6	50.1	17.9	83.4	50.6
White Sucker	9.6	86.4	48.0	8.0	87.5	47.7
Yellow Perch	18.8	73.1	46.0	4.5	85.7	45.1
Common shiner	39.1	76.2	57.6	39.4	79.7	59.5
Blacknose shiner	6.1	55.6	30.8	5.8	68.3	37.1
Walleye	9.2	66.2	37.7	8.7	83.4	46.0
Average	25.8	66.1	46.0	25.5	71.9	48.7

Source: (Great Lakes Environmental Center, 2023)

12 CFS Results

When the preliminary habitat data was entered into the WDNR fish habitat scoring worksheet for the 12 cfs flow, both study reaches scored in the "good" range with a score of 61. Deductions from the top score of 100 were due primarily to shallow depths and a lack of bends or other stream complexes which add to the overall diversity of the stream structure (Great Lakes Environmental Center, 2023).

Habitat suitability values for each species are shown in **Table 3.5.1.4.3-5**. The habitat suitability curves for each species and the final Minimum Flow Habitat Study and Shoreline Stability Assessment Report will be included in the USR when it is filed with the Commission, no later than September 28, 2023.

Table 3.5.1.4.3-5 Overall Habitat Suitability Values for 12 cfs Flow below the Gile Dam

Fish Species	Reach A			Reach B		
	Depth (%)	Velocity (%)	Depth and Velocity (%)	Depth (%)	Velocity (%)	Depth and Velocity (%)
Longnose dace	72.5	16.3	44.4	78.7	17.4	48.1
Creek chub	61.7	83.0	72.4	71.3	88.4	79.8
Pumpkinseed	2.7	43.6	23.1	2.4	34.7	18.6
Smallmouth bass	14.0	84.1	49.1	12.2	91.0	51.6
Hornyhead chub	17.6	77.9	47.8	15.7	80.3	48.0
White Sucker	8.3	84.4	46.3	6.6	85.8	46.2
Yellow Perch	12.6	74.3	43.5	3.8	79.4	41.6
Common shiner	36.1	72.2	54.2	35.1	75.7	55.4
Blacknose shiner	5.7	64.4	35.1	5.4	74.7	40.1
Walleye	8.4	69.6	39.0	7.8	81.5	44.6
Average	24.0	67.0	45.5	23.9	70.9	47.4

Source: (Great Lakes Environmental Center, 2023)

Habitat Suitability Comparison between 12, 24, and 36 CFS Flows

Each study flow (12, 24, and 36 cfs) received a “good” rating based upon the WDNR’s fish habitat scoring method. The scores were negatively influenced by the lack of meanders and deep pools in this stretch of the West Fork, which is typical in this section of the river (Great Lakes Environmental Center, 2023).

The evaluation of habitat suitability for individual fish and the estimation of overall habitat suitability based upon depth and velocity provides a more quantitative evaluation of the expected changes in habitat between the different flows than the use of the WDNR ratings. As flows increased from 12 cfs to 36 cfs, the total available aquatic habitat increased between 8% and 13% in Reach A and between 4.2% and 10.2% in Reach B. The total amount of wetted aquatic habitat increased between 6.1% and 11.6% (Great Lakes Environmental Center, 2023).

The average habitat suitability for all fish species changed very little between the three study flows. When combining depth and velocity as an overall habitat suitability score, the percentage of optimum habitat available to all species averaged between 45.5% and 46.5% in Reach A and between 47.4% and 49.8% in Reach B (Great Lakes Environmental Center, 2023).

The increase in depth and velocity from 12 cfs to 36 cfs changed the overall habitat suitability by less than 3 percentage points (Great Lakes Environmental Center, 2023). Therefore, there is no need to increase the minimum flow releases for habitat purposes.

3.5.1.5 Mussel Species

3.5.1.5.1 Historic Mussel Information

Limited historic mussel information is available within the Project vicinity. When preparing the PAD, NSPW searched the WDNR's mussel observation database. The search did not identify any mussel species within the West Fork; however, it did identify two known mussel species within the Montreal River, the cylindrical papershell (*Anondontoides ferussacianus*) and eastern Elliptio (*Elliptio complanata*) (WI Department of Natural Resources, 2019a). This database is no longer accessible on the WDNR's website.

3.5.1.5.2 Current Mussel Information

In order to characterize mussel habitat and determine mussel abundance and species richness in the Project vicinity, NSPW conducted mussel surveys between June 22 and June 26, 2022. Surveys were conducted in a riverine area within the upper reaches of the reservoir, a riverine area downstream of the Gile Dam, and eight locations within the reservoir. The Mussel Study Report is included in **Appendix E-13**.

Riverine Surveys

A series of transects extending from bank to bank were established every 100 meters to create 10 possible transects per reach. Transects were numbered sequentially from downstream to upstream and a random number generating function was used to select five transects for sampling within each reach.

Searches along each sampled transect were conducted in 10 meter segments and extended 0.5 meters on each side of the transect line. Each transect was evaluated for mussels using an adaptive sampling approach. A rapid visual search was conducted first, which entailed an initial search of 0.2 minutes per square meter (min/m^2) along each 10 meter segment to determine if mussels were present. If mussels were present in a segment, a semi-quantitative search was triggered and the search time was extended to 1 min/m^2. During the semi-quantitative search, divers visually searched the area, probed the substrate, and turned over rocks to detect small, burrowed mussels. General stream conditions and morphology were recorded within the study area. Water depth and river bottom substrate composition using the Wentworth Scale (% observed of silt, sand, grave, etc.), were recorded for each 10 meter transect segment. In addition, a general description of mussel habitat was recorded.

Reach 1 was located where the West Fork flows into upper reaches of the reservoir. Surrounding land use was primarily forest. Large boulders and rock outcrops were scattered throughout the area. Within this reach, transects 2, 4, 5, 8, and 9 were randomly selected for sampling. Transects 8 and 9 were located within a narrow reach where the wetted width of the channel was approximately 20 meters. Water depths generally increased from upstream to downstream and reached a maximum of 4.6 meters in transect 4. Substrates consisted of large boulders interspersed with cobble, gravel, sand, and silt in transects 8 and 9. Substrate along transects 4 and 5 contained some boulder and silt with submerged aquatic vegetation. Substrates in transect 2 consisted exclusively of deep silt and clay. A single paper pondshell mussel (*Utterbackia imbecillis*) was collected along transect 2. No other mussels were observed within Reach 1.

Reach 2 was located in the tailwater below the Gile Dam. Surrounding land use was primarily forest and low intensity residential. The reach is bisected by Gile Falls, where the stream is constricted by steep rock walls and undergoes a rapid elevation change. Transects 1, 3, 4, 8, and 9 were randomly selected for sampling. However, transect 4 fell within Gile Falls. Since it could not be sampled safely, transect 6

was sampled instead. Transects 8 and 9 both featured similar habitat conditions with a substrate primarily of sand with silt and large woody debris on the surface. Water depths within these transects ranged from 0.6 to 1.5 meters. Transect 6 was located downstream of a riffle but upstream of the Gile Falls where substrate consisted of cobble, gravel, and sand. Transects 1 and 3 were located downstream of the Gile Falls in riffle habitat where substrate was considerably coarser than upstream of the falls, consisting entirely of boulder, cobble, and gravel. Water depths in these transects were shallow and current velocity was swift. No evidence of mussels was observed within any of the transects sampled in Reach 2.

Reservoir Surveys

Eight locations were designated for sampling within the reservoir. Reconnaissance at each location indicated that habitat was generally more suitable for mussels near the bank. Therefore, most of the sampling was conducted near the reservoir shoreline or islands, while still ensuring a variety of water depths were included in the surveys.

Locations 1, 2, 7, and 8 were selected for sampling as they were located in an area that would be impacted by winter drawdowns. Water depths during timed searches as these locations did not exceed 1.5 meters. Locations 1 and 2 were located at the southeast and southwest ends of the reservoir, respectively. Substrate in both locations consisted of cobble, gravel, sand, and silt in varying proportions, with some boulders also present in Location 1. Locations 7 and 8 were in the eastern area of the reservoir. Substrates at these two locations consisted of varying proportions of boulder, cobble, gravel, sand, and silt, although silt was more abundant in Location 8 (Enviroscience, 2022).

Locations 2, 4, 5, and 6 were selected for sampling because they were located in areas that are typically inundated under normal drawdown conditions. Water depths in these areas ranged from 2.1 to 3.7 meters. Although heterogeneous substrate was present along the shoreline in the shallower searches, substrate farther from the shore was dominated by deep silt. Smaller proportions of boulder, cobble, gravel, and sand were present at locations 4 and 5. Location 3, featured large deposits of woody debris (Enviroscience, 2022).

Live mussels were collected at Locations 1, 2, 5, 7, and 8; however, species diversity was low. A total of 57 live paper pondshell and one live giant floater (*Pyganodon grandis*) were collected during timed searches from all locations combined. Fresh-dead paper pondshell shells were also collected at Location 4. Both mussel species are tolerant of impounded conditions and soft substrates such as those observed within the reservoir (Enviroscience, 2022).

An abbreviated Phase 2 quantitative effort was conducted at Locations 5, 7, and 8. This sampling yielded 1 live paper pondshell in Location 5 and one in Location 7 for a density of 0.4 mussels per square meter at each location. No mussels were found in Location 8 (Enviroscience, 2022).

Catch per unit effort at the five locations where mussels were found ranged from 0.03 mussels per minute to 0.45 mussels per minute and averaged 0.12 mussels per minute across all 8 sampled locations. Despite the shallower areas being subject to periodic drawdowns, mussel abundance was higher at these locations. Live mussels were present at all four of the shallow sampling locations, but only one of the deeper sampling locations. The heterogeneous substrate observed near the shoreline is more suitable for mussel colonization than the deep silt observed farther from shore.

Mussel Study Conclusions

The Mussel Study Report concluded mussel abundance and diversity were low in both the riverine and reservoir locations and that habitat is likely the limiting factor in regard to abundance. The riverine reaches do not appear to provide high-quality mussel habitat due to loose, unstable substate in Reach 1 and the portion of Reach 2 upstream of Gile Falls. The portion of Reach 2 downstream of Gile Falls consisted of large, very coarse substrate and swift currents that likely prevent mussels from burrowing and maintaining position in the substrate (Enviroscience, 2022).

Within the reservoir, abundance was higher in the shallower areas versus the deeper areas despite being subject to periodic drawdowns. This was likely due to the deeper areas featuring a deep silt substrate as observed in samples farther from the shore. The limited quantitative sampling completed supported the results of the Phase 1 sampling which indicated mussel density was very low, even in those locations that had the highest abundance (Enviroscience, 2022).

3.5.1.6 Aquatic Invasive Species

During the point-intercept surveys discussed in Section 3.5.1.1, NSPW also inspected the area for aquatic invasive species. The number of aquatic invasive plant species on the reservoir was minimal. No aquatic invasive species were identified at any of the points sampled. However, two individual purple loosestrife plants (*Lythrum salicaria*) were observed at one location. The flower heads from those plants were removed and disposed of appropriately to prevent future spread of the species. One observation of suspected narrow-leaf cattail was made; however, it was not confirmed since the population had not yet gone to seed at the time of the survey and seed heads are required for positive identification.

In addition to the aquatic vegetation surveys, two water samples were collected (one in the reservoir and one in the tailwater) on July 27 using WDNR protocols. Those samples were sent to the State Lab of Hygiene to be analyzed for the presence of zebra mussels (*Dreissena polymorpha*). No zebra mussels were identified in either of the samples. Spiny water fleas (*Bythotrephes longimanus*) were already known to occur within the reservoir, so no water samples were collected for that species. However, spiny water fleas were observed in the reservoir during the ATIS study (GAI Consultants, Inc., 2022a).

Sediment samples were also collected to monitor for invasive macroinvertebrates at the following sites:

- Sucker Hole Boat Landing
- Town of Pence Landing (described as 4-H Landing off Spring Camp Road in the ATIS report)
- Gile Park Landing
- County Hwy C Landing
- East Side of Road from County Hwy C Landing

A shovel was used to scoop approximately six inches of sediment into a 10-inch Tetra Pond Planter Basket with a 1/32nd inch mesh. Fine sediment was flushed out of the basket and the remaining materials were examined for Asian clam (*Corbicula fluminea*), faucet snail (*Bithynia tentaculata*), New Zealand mud snail (*Potamopyrgus antipodarum*), Malaysian trumpet snail (*Melanoides tuberculata*), rusty crayfish (*Orconectes rusticus*), and other invasive macroinvertebrates. Areas around the access sites were also visually examined for live snails, crayfish, and shells. None of the sediment samples had any invasive macroinvertebrates. Only Chinese and banded mystery snails were observed from the visual inspections of the public access sites (GAI Consultants, Inc., 2022a). Both species were previously known to occur within the Project.

3.5.1.7 Macroinvertebrates

Macroinvertebrates are used by the WDNR to assess the health of streams. Since the majority of aquatic invertebrates are limited in mobility, they are good indicators of localized conditions, upstream land use impacts, and water quality degradation. The WDNR uses the macroinvertebrate index of biological integrity (MIBI) to interpret macroinvertebrate sampling data (WI Department of Natural Resources, 2021). MIBI condition category thresholds for wadable streams used in the state are shown in **Table 3.5.1.7-1**.

Table 3.5.1.7-1 WDNR MIBI Condition Category Thresholds

MIBI Thresholds Wadable Stream	Condition Category
<7.5	Excellent
5.0 - 7.4	Good
2.5-4.9	Fair
<2.5	Poor

Source: (WI Department of Natural Resources, 2021)

While no macroinvertebrate sampling occurred within the proposed Project boundary, the WDNR has conducted recent macroinvertebrate sampling in the Project vicinity. Sampling was conducted in 2017 at four tributaries entering the Gile Flowage. Additionally, the WDNR completed sampling downstream of the Gile Dam at one location in 2010 and one location in 2017. **Figure 3.5.1.7-1** shows the location of the monitoring and **Table 3.5.1.7-2** details the results from the monitoring. Sampling data is found in **Appendix E-14**. No other macroinvertebrate information is available.

Figure 3.5.1.7-1 WDNR Macroinvertebrate Sampling Locations

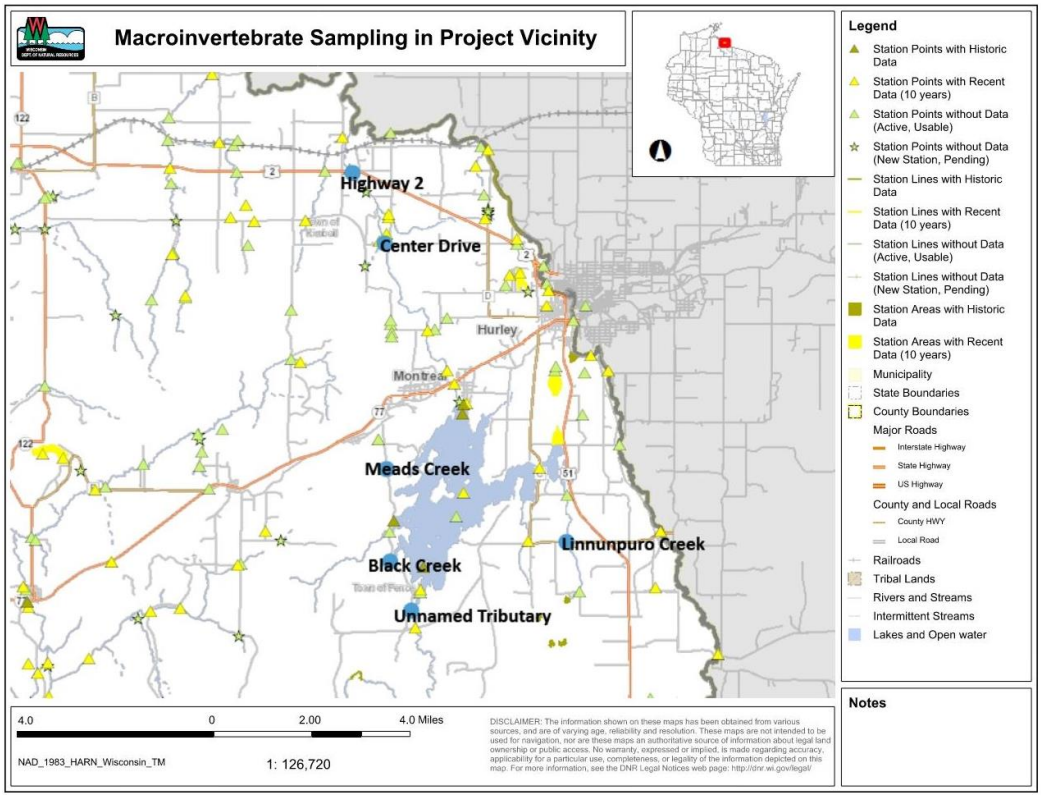


Table 3.5.1.7-2 WDNR Macroinvertebrate Sampling Results

Monitoring Site Number	Location Description	Year Sampled	MIBI Score	Condition
10032141	Meads Creek (Gile Tributary)	2017	10.81	Excellent
10032145	Black Creek (Gile Tributary)	2017	9.96	Excellent
10049233	Unnamed Gile Tributary	2017	6.4	Good
1032140	Linnunpuro Creek (Gile Tributary)	2017	5.75	Good
1022049	Center Drive (3.5 mi. downstream)	2017	8.77	Excellent
1022050	Highway 2 (5.0 miles downstream)	2010	10.07	Excellent

The MIBI scores of the Gile Flowage tributary sites showed good or excellent water quality conditions. The downstream sites both showed excellent water quality conditions.

3.5.2 Environmental Effects

In SD1 and SD2, the Commission identified one issue related to fish and aquatic resources and that was the potential effects of seasonal reservoir drawdowns on fish and other aquatic resources.

3.5.2.1 Effects of Seasonal Drawdowns on Fish and Other Aquatic Resources

3.5.2.1.1 Aquatic Vegetation

The ATIS Study Report concluded the aquatic plant community in the Gile Flowage was unique. Although plant abundance was low, several uncommon species were observed and the quality of species was high as evidenced by the Floristic Quality Index scores.

Low plant density can be explained by the size and depth of the waterbody. Plants were primarily found growing in shallow, near shore areas and in protected bays. The depth of much of the reservoir, combined with tannin-stained waters and wind fetch, make only the shallow, protected areas conducive to plant growth (GAI Consultants, Inc., 2022a). Low plant density was unrelated to reservoir fluctuation since all vegetation noted was within shallow areas of the reservoir subject to drawdown impacts.[27] Rather, wind fetch and substrate composition were listed as the primary reasons for low plant abundance.

NSPW is proposing to operate the Project in the same manner it has been operated since the dam began operations. More specifically, the storage reservoir has been maintained between a minimum elevation of 1,475 feet NGVD and a maximum elevation of 1,490 feet NGVD with annual summer and winter drawdowns to supplement downstream river flows for Project purposes (Section 2.2.2.1). During that time, aquatic vegetation in the vicinity of the Project has adjusted to the seasonal reservoir fluctuations. The floristic quality of the aquatic vegetation is currently high and the low plant abundance is due to tannin-

[27] This is contrary to the unsupported hypothesis provided by FOG in its 2005 littoral survey.

stained waters, not Project operations. No significant adverse effects to aquatic vegetation are anticipated due to continued Project operation.

3.5.2.1.2 Wetlands

NSPW is proposing to operate the Project in the same manner it has been operated since the dam began operations. More specifically, the storage reservoir has been maintained between a minimum elevation of 1,475 feet NGVD and a maximum elevation of 1,490 feet NGVD with annual summer and winter drawdowns to supplement downstream river flows for Project purposes (Section 2.2.2.1). During that timeframe, the abundant wetland resources in the Project vicinity have adjusted to these seasonal reservoir fluctuations. No significant adverse effects to wetland resources are anticipated due to continued Project operation.

3.5.2.1.3 Reservoir Bottom Substrate

Studies indicate organic material is the primary substrate on the reservoir bottom. Within the elevation range of 1,490 feet to 1,480 feet NGVD, the substrate is also dominated by organic material, but there are also areas of boulder, cobble, gravel, sand, silt, or wood. These other types of substrates are important to the reservoir's resident fish species during their spawning seasons, many of which begin in early spring and continue through mid-June. Fortunately, the annual reservoir drawdown cycle follows the natural hydrologic cycle of the river system. Thus, the substrates critical for resident fish during their spawning season can be utilized because they generally remain submerged during the spring and early summer. Therefore, the proposed operation of the Project is not expected to adversely affect critical spawning habitat.

3.5.2.1.4 Fisheries

NSPW is proposing to operate the Project in the same manner it has been operated since the dam began operations. More specifically, the storage reservoir has been maintained between a minimum elevation of 1,475 feet NGVD and a maximum elevation of 1,490 feet NGVD with annual summer and winter drawdowns to supplement downstream river flows for Project purposes (Section 2.2.2.1).

Reservoir Fishery

The vast amount of available fisheries data for the Gile Flowage indicates the reservoir contains a diverse, healthy fishery. Fish populations currently found in the reservoir are healthy and have adjusted to these seasonal reservoir fluctuations. No new adverse effects to fish populations or habitat within the reservoir are anticipated due to continued Project operation.

Fish Entrainment/Impingement

As noted in Section 3.5.1.4.2, there is currently no risk of fish entrainment and little risk of fish impingement under current operations. Therefore, continued Project operation is not expected to adversely impact the fish community through impingement.

West Fork Fishery and Fish Habitat Downstream of Gile Dam

The Minimum Flow Fish Habitat Assessment completed in 2022 and 2023 found "good" fish habitat available in the two reaches assessed for each study flow. Based upon the average habitat suitability percentage for all fish, the average habitat suitability changed very little between the study flows. The

incremental increase in depth and velocity between the flows changed the average habitat suitability values very little. Therefore, NSPW is proposing to maintain the existing 10 cfs minimum flow.

3.5.2.1.5 Mussel Species

The Mussel Study Report concluded that mussel abundance and diversity were low in both the riverine and reservoir areas and that habitat (primarily bed substrates) was likely the limiting factor in regard to their abundance. Reservoir fluctuations were not listed as a reason for low mussel abundance and diversity. Within the reservoir, mussel abundance was higher near the shore than in the deep silt substrate observed in samples farther from shore. The composition of mussels was consistent with species that are tolerant of impounded conditions and soft substrates such as those observed within the reservoir.

NSPW is proposing to operate the Project in the same manner it has been operated since the dam began operations. More specifically, the storage reservoir has been maintained between a minimum elevation of 1,475 feet NGVD and a maximum elevation of 1,490 feet NGVD with annual summer and winter drawdowns to supplement downstream river flows for Project purposes (Section 2.2.2.1). During that time, mussel habitat in the Project vicinity has adjusted to the seasonal fluctuations of the reservoir.

The mussel population upstream of the reservoir was limited. Populations were also not very high within the reservoir and those mussels that were identified were found only in the shallow areas most subject to drawdown impacts. This would indicate that mussels have adjusted to the existing operation of the Project. Since there are few mussels upstream, it is not unexpected that few mussels colonize the reservoir. Adverse effects to mussel habitat are not anticipated from continued Project operation.

3.5.2.1.6 Aquatic Invasive Species

Recreational activities at the Project have the potential to increase the risk of spread or transfer of aquatic invasive species. NSPW has proposed mitigation measures in Section 3.5.3 to address these risks.

3.5.2.1.7 Macroinvertebrates

Macroinvertebrate populations are used as bio-indicators to help determine water quality. There is existing macroinvertebrate information for the four tributaries entering the Gile Flowage and the two locations below the Gile Dam. All tributaries sampled had MIBI scores either in the good or excellent range. Both downstream locations had MIBI scores in the excellent range. This information, combined with the results of the water quality monitoring study, indicates good water quality in both the reservoir and the tailwater area. Therefore, no adverse impacts to macroinvertebrates are anticipated due to continued Project operation.

3.5.3 Proposed Environmental Measures

Under Section 9 of Exhibit A, NSPW is propsing to maintain a minimum flow of 10 cfs year-round into the West Fork for enhancement of downstream aquatic habitat.

Under Section 9 of Exhibit A, NSPW proposes to operate the Project in a manner that conserves water in the reservoir and minimizes the extent of seasonal drawdowns by limiting releases for Project purposes only. More specifically, water is released from the Gile Dam for the following Project purposes: (a) to augment streamflow during the summer and winter low-flow periods for downstream hydroelectric

generation, (b) maintain minimum flow releases downstream, and (c) scheduled releases for whitewater boating opportunities downstream. This proposed operation limits summer and winter drawdowns thereby minimizing the impacts on recreation from seasonal drawdowns and replicating natural river conditions where the extent of seasonal drawdowns will be commensurate with the natural flows of both branches of the Montreal River.

Under Section 9 of Exhibit A, NSPW is proposing to maintain the elevation of the Gile Flowage between a minimum elevation of 1,475 feet NGVD and a maximum of 1,490 feet NGVD.

Under Section 9 of Exhibit A, NSPW proposes to limit the typical daily drawdown to approximately 0.1 feet, but no more than 0.2 feet per day[28] during normal operation to minimize impacts on recreation, fish, and aquatic resources. Limiting rapid changes in the reservoir elevation allows fish and aquatic resources to more easily adapt to changing water levels.

To mitigate the spread of invasive species, the Applicant will develop a rapid response invasive species monitoring plan to monitor for the introduction of new invasive species and limit the dispersal of established species. Within one year of license issuance, the Applicant proposes to develop said plan in consultation with the WDNR prior to filing the plan with the FERC. The plan will incorporate measures for both aquatic and terrestrial invasive species and biennial surveys.

In an effort to maintain the current quality of aquatic habitat in the upstream and downstream portions of the Project, NSPW will notify the FERC, USFWS, and WDNR of planned deviations with a duration of up to three weeks. This advanced notification will allow the Applicant to implement agency-recommended measures to minimize adverse environmental impacts during planned deviations.

An after-the-fact notification process for unplanned deviations will allow the FERC, USFWS, and WDNR to respond to any stakeholder questions about the deviations in an informed manner.[29] This process will also allow the Applicant to track deviations. Should a deviation result in unanticipated adverse environmental impacts, as identified by the responding operator(s), the Applicant will address the cause of the deviation to prevent similar occurrences from happening in the future.

The Applicant recommends the following deviation requirements be incorporated into any issued license:

> *<u>Planned Deviations</u>*
> *Project operation may be temporarily modified for short periods, of up to 3 weeks, upon mutual agreement among the USFWS, and WDNR (collectively, agencies) and the Licensee. After concurrence from the agencies, the Licensee must file a report with the Secretary of the Commission as soon as possible, but no later than 14 calendar days after the onset of the planned deviation. Each report must include: (1) reasons for the deviation and how project operations were modified, (2) duration and magnitude of the deviation, (3) any observed or reported environmental effects and how the observations were made, and (4) documentation of consultation with the agencies. For planned*

[28] Except for scheduled whitewater releases and emergencies beyond Applicant's control, which includes preemptive drawdowns for expected large inflow events due to precipitation or snow melt to reduce flooding and increased reservoir elevations at the downstream hydroelectric projects.

[29] Unplanned deviations may include but are not limited to, operating gates to sluice debris collecting on the dam that has the potential to impact gate operations and surcharging the reservoir up to 6 inches to allow water to flow over the gates only long enough to remove ice that could prevent proper gate operations.

deviations exceeding 3 weeks, the Licensee shall file for Commission approval an application for a temporary amendment of license.

Unplanned Deviations

Operations may be temporarily modified if required by operating emergencies beyond the control of the Licensee (i.e., unplanned deviations). For any unplanned deviation that lasts longer than 3 hours ***or*** *results in visible adverse environmental effects such as a fish kill, turbidity plume, bank erosion, or downstream flooding, the Licensee shall file a report with the Secretary of the Commission as soon as possible, but no later than 14 days after each such incident. The report must include: (1) cause of the deviation, (2) duration and magnitude of the deviation, (3) any pertinent operational and/or monitoring data, (4) a timeline of the incident and the Licensee's response, (5) any comments or correspondence received from the agencies, or confirmation that no comments were received from the agencies, (6) documentation of any observed or reported environmental effects, and (7) a description of measures implemented to prevent similar deviations in the future.*

For unplanned deviations lasting 3 hours or less that do not result in visible adverse environmental effects, the Licensee must file an annual report, by March 1, describing each incident that occurred during the prior calendar year. The report must include: (1) cause of the deviation, (2) duration and magnitude of the deviation, (3) any pertinent operational and/or monitoring data, (4) a timeline of the incident and the Licensee's response to each deviation, (5) any comments or correspondence received from the resource agencies, or confirmation that no comments were received from the agencies, and (6) a description of measures implemented to prevent similar deviations in the future.

The Applicant will develop an operations monitoring plan in consultation with the WDNR to document how it will comply with the operational requirements of the license, including reservoir elevation and minimum flow requirements. The plan will also include the following:

- locations of headwater monitoring gages,
- frequency of monitoring,
- procedures for maintaining and calibrating monitoring equipment,
- standard operating procedures to be implemented outside of normal operating conditions, such as scheduled or emergency facility shutdowns or maintenance activities, and
- schedule for installing and operating the monitoring equipment.

The proposed environmental measures are beneficial for fish and aquatic resources when compared to the alternative of no-action or denial of the license application. Without the issuance of an original license for the Project, the aquatic resource improvements will not occur.

3.5.4 Unavoidable Adverse Impacts

With the implementation of the proposed environmental measures, continued Project operation is not expected to result in unavoidable adverse impacts to fish and aquatic resources.

3.6 Terrestrial Resources

3.6.1 Affected Environment

3.6.1.1 Botanical Resources

Wisconsin is divided into 16 ecological landscapes primarily defined by the physical environment, which includes climate, geology and landforms, and hydrology. A map depicting the 16 ecological landscapes within Wisconsin is found in **Appendix E-15**. The Project is located within the North Central Forest Ecological Landscape (WI Department of Natural Resources, 2015). Historic vegetation maps developed from General Land Office surveyor's notes and inferences from physical and ecological characteristics and cultural uses show this ecological landscape contained an extensive area of Hemlock/Yellow Birch/Sugar Maple/Pine Forest. Two areas mapped as Swamp Conifers occur in low areas on either side of the reservoir (Finley, R., 1976).

The shorelines downstream of the Gile Dam and along the reservoir are primarily undeveloped. A review of the vegetation types shown on the United States Geologic Survey (USGS) "The National Map" indicates vegetation in the Project vicinity consists of three main cover types, including deciduous forest, mixed forest, and wooded wetlands (US Geological Survey, n.d.). The main hardwood forest species in the North Central Forest Ecological Landscape include sugar maple (*Acer saccharum*), basswood (*Tilia americana*), red maple (*Acer rubrum*), green ash (*Fraxinus pennsylvanica*), and white ash (*Fraxinus americana*). Mixed forest areas also include conifer species such as white pine (*Pinus strobus*), white spruce (*Picea glauca*), balsam fir (*Abies balsamea*), and eastern hemlock (*Tsuga canadensis*). Wooded wetlands include northern white cedar (*Thuja occidentalis*), white pine, black ash (*Fraxinus nigra*), and yellow birch (*Betula alleghaniensis*) (WI Department of Natural Resources, 2015).

3.6.1.1.1 Terrestrial Shoreline Community Characterization

The ATIS Study examined terrestrial areas within the proposed Project boundary. To characterize the plant communities, an upland shoreline survey along the reservoir and island shorelines was conducted. The survey was conducted by boat or on foot where use of a boat was not feasible. An overall characterization of the terrestrial plant composition was made using the *Wisconsin Natural Heritage Inventory Recognized Natural Communities Natural Working Document*.

Shoreline plant composition was studied within a 10 meter riparian zone visible from the water. The reservoir shoreline, including 26 islands, was divided into 17 segments based on changes in land use or vegetative communities. In addition to the shoreline survey, an upland terrestrial meander survey was conducted near the Gile Dam and Gile Park. An overall characterization of the terrestrial plant community was recorded and any invasive species listed in Chapter NR 40 of the Wisconsin Administrative Code (NR 40) were documented. A discussion on terrestrial invasive species is located in Section 3.6.1.1.2.

The study revealed a largely undeveloped shoreline marked by bedrock outcrops and large boulders. Several natural community types found along the shoreline are described in the ATIS Study. The majority of the shoreline (85.53%) is comprised of forested communities. Among the various forest types, the greatest percentage is comprised of Northern Mesic/Wet Mesic Forest (32.12%) followed by Northern Mesic Forest (28.42%), Northern Mesic/Talus Forest (13.88%) and Talus Forest (11.11%). A breakdown of all forested communities identified during the study is shown in **Table 3.6.1.1.1-1**. Herbaceous and woody species commonly found within the terrestrial shoreline community are summarized in **Table 3.6.1.1.1-2**.

Table 3.6.1.1.1-1 Terrestrial Shoreline Community Types Observed During ATIS Study

Terrestrial Shoreline Community	Mileage of Shoreline	Percentage of Shoreline
Boulder	0.39	1.11%
Emergent Wetland/Tag Alder	0.82	2.35%
Northern Mesic Forest	9.94	28.42%
Northern Mesic Forest/Boulder	1.03	2.95%
Northern Mesic/ Talus Forest	4.86	13.88%
Northern Mesic/Wet Mesic Forest	11.24	32.12%
Northern Wet Mesic Forest	1.07	3.06%
Roadside	0.80	2.29%
Tag Alder/ Northern Wet Mesic Forest	0.51	1.46%
Talus Forest	3.89	11.10%
Mowed/Maintained	0.44	1.26%
Totals	34.99	100%

Source: (GAI Consultants, Inc., 2022b)

Table 3.6.1.1.1-2 Common Terrestrial Shoreline Species Observed during ATIS Study.

Common Name	Scientific Name	Natural Community Type
Balsam fir	*Abies balsamea*	Northern Mesic Forest/Northern Wet Mesic Forest
Basswood	*Tilia americana*	Northern Mesic Forest
Beaked hazelnut	*Corylus cornuta*	Boulder
Black ash	*Fraxinus nigra*	Northern Wet Mesic Forest
Black spruce	*Picea mariana*	Northern Wet Mesic Forest
Dogwoods	*Cornus* spp.	Tag Alder
Eastern hemlock	*Tsuga canadensis*	Northern Mesic Forest
Eastern white pine	*Pinus strobus*	Northern Mesic Forest/Talus Forest
Ferns		Northern Mesic Forest/Northern Wet Mesic Forest/Talus Forest
Narrow-leaf bur-reed	*Sparganium angustifolium*	Emergent Wetland
Northern pin oak	*Quercus ellipsoidalis*	Northern Mesic Forest
Northern white cedar	*Thuja occidentalis*	Northern Wet Mesic Forest/Talus Forest
Paper birch	*Betula papyrifera*	Northern Mesic Forest/Talus Forest
Red pine	*Pinus resinosa*	Talus Forest
Reed canary grass	*Phalaris arundinacea*	Emergent Wetland/Tag Alder/Northern Wet Mesic Forest
Sedges	*Carex* spp.	Emergent Wetland/Northern Mesic Forest
Smooth serviceberry	*Amelanchier laevis*	Boulder
Sugar maple	*Acer saccharum*	Northern Mesic Forest
Sweet flag	*Acorus calamus*	Emergent Wetland
Tag alder	*Alnus incana*	Tag Alder
Trembling aspen	*Populus tremuloides*	Northern Wet Mesic Forest
White spruce	*Picea glauca*	Northern Mesic Forest
Willows	*Salix* spp.	Tag Alder

Source: (GAI Consultants, Inc., 2022a)

3.6.1.1.2 Terrestrial Invasive Plant Species

Chapter NR 40 of the Wisconsin Administrative Code makes it illegal to possess, transport, transfer, or introduce certain invasive species into the state without a permit. NR 40 lists which species are subject to Wisconsin's invasive species regulations (WI Department of Natural Resources, n.d.b).

NR 40.03 classifies invasive species into two categories: prohibited and restricted. Prohibited species are invasive species not currently found in Wisconsin, or are only found in a few places, but if introduced are likely to survive, spread, and potentially cause negative environmental and economic impacts. Restricted species are invasive species already widely established in Wisconsin and have caused or are believed to cause negative environmental and economic impacts. Since restricted species are already widely established, complete eradication is unlikely. NR 40 further categorizes invasive species by group which include plants, aquatic invertebrates, terrestrial and aquatic vertebrates (except fish), fungus, algae and cyanobacteria, fish and crayfish, and terrestrial invertebrates and plant disease-causing microorganisms (WI Department of Natural Resources, n.d.b).

The WDNR Lakes and AIS Mapping Tool identified one invasive wetland plant species along the Gile Flowage shoreline, reed canary grass (*Phalaris arundinacea*) (WI Department of Natural Resources, n.d.c). While reed canary grass is present within the Project vicinity, only one cultivar (*Phalaris arundinacea var picta*) is listed as a restricted species under NR 40 (WI Department of Natural Resources, n.d.b). This cultivar is not known to be in the vicinity of the Project. Purple loosestrife (*Lythrum salicaria*), classified as a restricted species, is often found at impoundments and is an ever-present concern at lakes throughout the state. Japanese barberry (*Berberis thunbergii*) is a restricted shrub that has been documented as being present in the reservoir by FOG, however, these species were not identified during the ATIS Study.

During the shoreline and terrestrial meander surveys, as described in Section 3.6.1.1.1, any invasive species listed in NR 40 that was observed had its location recorded via a handheld GPS unit. Maps showing the location of terrestrial invasive species identified during the study are located in Figure 7 of the ATIS Study Report (**Appendix E-10**). A summary of terrestrial invasive species observed during the ATIS Study are shown in **Table 3.6.1.1.2-1**.

During the study, few terrestrial invasive species were documented in the Project vicinity. Distribution and density varied among species observed. Honeysuckle was the most common species and was found sporadically along the reservoir shoreline and most of the islands as individual plants or small populations. Glossy buckthorn (*Frangula alnus*) was also found on the islands but in lower density. Cattails (*Typha* spp.) suspected to be of the invasive narrow-leaf species, were scattered throughout the Project at low density, with a single high density patch at the north end of the reservoir. Purple loosestrife was observed in only one location and spotted knapweed (*Centaurea stoebe*) and tansy were limited to higher traffic areas such as roadsides (GAI Consultants, Inc., 2022a). The report concluded that the Project overall appears to support a healthy terrestrial and aquatic plant community with low populations of invasive plants and high floristic quality index values.

Table 3.6.1.1.2-1 Terrestrial Invasive Species Observed During ATIS Study

Common Name	Scientific Name	Mileage of Shoreline	Percentage of Shoreline	NR 40 Status
Cattail spp. (suspected to be invasive or hybrid)	*Typha* spp.	*0.352*	*1.01%*	*Restricted*
Eurasian bush honeysuckle	*Lonicera* spp.	*0.295*	*0.84%*	*Restricted*
Glossy buckthorn	*Frangula alnus*	*0.009*	*0.03%*	*Restricted*
Purple loosestrife	*Lythrum salicaria*	*0.002*	*0.01%*	*Restricted*
Spotted knapweed	*Centaurea stoebe*	*1.168*	*3.34%*	*Restricted*
Tansy	*Tanacetum vulgare*	*0.329*	*0.945*	*Restricted*

Source: (GAI Consultants, Inc., 2022a)

3.6.1.2 Wildlife Resources

3.6.1.2.1 Mammal Species

The North Central Forest Ecological landscape was historically important for a variety of large mammals including wide-ranging species such as the American black bear (*Ursus americanus*), gray wolf (*Canis lupus*), fisher (*Martes pennanti*), American marten (*Martes americana*), bobcat (*Lynx rufus*), American beaver (*Castor canadensis*), and North American river otter (*Lontra canadensis*). Several species have been in decline or were extirpated; however, with reintroduction efforts and careful management, populations of the gray wolf, black bear, fisher, beaver, and American river otter have expanded throughout the region. The formerly extirpated American marten has been reintroduced in two areas of northern Wisconsin within their historic range and have maintained small populations. White-tailed deer populations, aided by historic logging and other human activities and relatively mild winters, have increased in many northern Wisconsin forests (WI Department of Natural Resources, 2015).

The federally listed northern long-eared bat, little brown bat, and gray wolf are also potentially located in the Project vicinity and are discussed further in Section 3.7.

Species typically found in the North Central Forest Ecological Landscape in the Project vicinity are listed in **Table 3.6.1.2.1-1**.

Table 3.6.1.2.1-1 Mammal Species in the Project Vicinity

Mammal Species	Scientific Name
Badger	*Taxidea taxus*
Big brown bat	*Eptesicus fuscus*
Black bear	*Ursus americanus*
Deer mouse	*Peromyscus maniculatus*
Coyote	*Canis latrans*
Eastern chipmunk	*Tamias striatus*
Fisher	*Martes pennanti*
Gray wolf	*Canis lupus*
Masked shrew	*Sorex cinereus*
Least chipmunk	*Tamias minimus*
Little brown bat	*Myotis lucifugus*
Long-tailed weasel	*Mustela frenata*

Mammal Species	Scientific Name
Marten	*Martes americana*
Masked shrew	*Sorex cinerus*
Meadow jumping mouse	*Zapus hudsonius*
Meadow vole	*Microtus pennsylvanicus*
Muskrat	*Ondontra zibethicus*
Mink	*Mustela vison*
Porcupine	*Erethizon dorsatum*
Northern flying squirrel	*Glaucomys sabrinus*
Northern long-eared bat	*Myotis septentrionalis*
Raccoon	*Procyon lotor*
Redbacked vole	*Clethrionomys gapperi*
Red fox	*Vulpes vulpes*
Red squirrel	*Tamiasciurus hudsonicus*
River otter	*Lutra canadensis*
Short-tailed weasel	*Mustela erminea*
Shorttail shrew	*Blarina brevicauda*
Shrew mole	*Neurotrichus gibbsi*
Snowshoe hare	*Lepus americanus*
Striped skunk	*Mephitis mephitus*
White-tailed deer	*Odocoileus virginianus*
Woodland jumping mouse	*Napaeozapus insignis*
Woodchuck	*Marmota monax*

Source: (NSPW, 1988) (NSPW, 1991) (WI Department of Natural Resources, 2015)

3.6.1.2.2 Avian Species

A checklist provided by the Cornell eBird web site lists 148 avian species that have been identified at the Gile Flowage in Iron County, Wisconsin (eBird, 2023). The checklist is found in **Appendix E-16**. Bird species from the eBird checklist, and additional avian species previously identified in the PAD, are included in **Table 3.6.1.2.2-1**.

According to eBird, waterfowl, shorebirds, and blackbirds most often observed at the reservoir including bufflehead (*Bucephala albeola*), mallard (*Anas platyrhynchos*), hooded merganser (*Lophodytes cucullatus*), lesser scaup (*Aythya affinis*), rusty blackbird (*Euphagus carolinus*), ring-necked duck (*Aythya collaris*), red-breasted merganser (*Mergus serrator*), trumpeter swan (*Cygnus buccinator*), greater scaup (*Aythya marila*), and killdeer (*Charadrius vociferus*) (Cornell Ebird, 2023).

Raptor species identified at the reservoir include bald eagle (*Haliaeetus leucocephalus*), broad-winged hawk (*Buteo platypterus*), Cooper's hawk (*Accipiter cooperii*), osprey (*Pandoin haliaetus*), sharp-shinned hawk (*Accipiter striatus*), and red-tailed hawk (*Buteo jamaicensis*) (Cornell Ebird, 2023).

The Gile Flowage provides summer feeding and breeding habitat for many avian species. Gulls, herons, woodpeckers, flycatchers, and swallows are among the non-game birds found at the reservoir each year. A diverse array of waterfowl such as geese, dabbling and diving ducks, shorebirds, and perching birds are also present at the reservoir.

Table 3.6.1.2.2-1 Avian Species in the Project Vicinity

Bird Species	Scientific Name
Alder flycatcher	*Empidonax alnorum*
American bittern	*Botaurus lentiginosus*
American black duck	*Anas rubripes*
American coot	*Fulica americana*
American crow	*Corvus brachyrhynchos*
American golden-plover	*Pluvialis dominica*
American goldfinch	*Spinus tristis*
American redstart	*Setophaga ruticilla*
American robin	*Turdus migratorius*
American tree sparrow	*Spizelloides arborea*
American wigeon	*Mareca americana*
American woodcock	*Scolopax minor*
Bald eagle	*Haliaeetus leucocephalus*
Bank swallow	*Riparia riparia*
Barn swallow	*Hirundo rustica*
Belted kingfisher	*Megaceryle alcyon*
Black tern	*Chlidonias niger*
Black-and-white warbler	*Mniotilta varia*
Blackburnian warbler	*Setophaga fusca*
Black-capped chickadee	*Poecile atricapillus*
Black-throated green warbler	*Setophaga virens*
Blue jay	*Cyanocitta cristata*
Blue-winged teal	*Spatula discors*
Bonaparte's gull	*Chroicocephalus philadelphia*
Boreal chickadee	*Poecile hudsonicus*
Brewer's blackbird	*Euphagus cyanocephalus*
Broad-winged hawk	*Buteo platypterus*
Brown creeper	*Certhia americana*
Brown-headed cowbird	*Molothrus ater*
Bufflehead	*Bucephala albeola*
Canada goose	*Branta canadensis*
Canada warbler	*Cardellina canadensis*
Canvasback	*Aythya valisineria*
Cape May warbler	*Setophaga tigrina*
Caspian tern	*Hydroprogne caspia*
Cedar waxwing	*Bombycilla cedrorum*
Chestnut-sided warbler	*Setophaga pensylvanica*
Chimney swift	*Chaetura pelagica*

Bird Species	Scientific Name
Chipping sparrow	*Spizella passerina*
Clay-colored sparrow	*Spizella pallida*
Cliff swallow	*Petrochelidon pyrrhonota*
Common goldeneye	*Bucephala clangula*
Common grackle	*Quiscalus quiscula*
Common loon	*Gavia immer*
Common merganser	*Mergus merganser*
Common raven	*Corvus corax*
Common redpoll	*Acanthis flammea*
Common snipe	*Gallinago gallinago*
Common tern	*Sterna hirundo*
Common yellowthroat	*Geothlypis trichas*
Cooper's hawk	*Accipiter cooperii*
Dark-eyed junco	*Junco hyemalis*
Double-crested cormorant	*Phalacrocorax auritus*
Downy woodpecker	*Dryobates pubescens*
Eastern bluebird	*Sialia sialis*
Eastern kingbird	*Tyrannus tyrannus*
Eastern phoebe	*Sayornis phoebe*
Eastern wood-pewee	*Contopus virens*
European starling	*Sturnus vulgaris*
Field sparrow	*Spizella pusilla*
Golden-crowned kinglet	*Regulus satrapa*
Gray catbird	*Dumetella carolinensis*
Great blue heron	*Ardea herodias*
Great egret	*Ardea alba*
Greater scaup	*Aythya marila*
Greater yellowlegs	*Tringa melanoleuca*
Green heron	*Butorides virescens*
Green-winged teal	*Anas crecca*
Hairy woodpecker	*Dryobates villosus*
Hermit thrush	*Catharus guttatus*
Herring gull	*Larus argentatus*
Hooded merganser	*Lophodytes cucullatus*
Horned grebe	*Podiceps auritus*
Horned lark	*Eremophila alpestris*
House finch	*Haemorhous mexicanus*
House wren	*Troglodytes aedon*
Indigo bunting	*Passerina cyanea*

Bird Species	Scientific Name
Killdeer	*Charadrius vociferus*
Least flycatcher	*Empidonax minimus*
Least sandpiper	*Calidris minutilla*
LeConte's sparrow	*Ammospiza leconteii*
Lesser scaup	*Aythya affinis*
Lesser yellowlegs	*Tringa flavipes*
Lincoln's sparrow	*Melospiza lincolnii*
Long-billed dowitcher	*Limnodromus scolopaceus*
Magnolia warbler	*Setophaga magnolia*
Mallard	*Anas platyrhynchos*
Merlin	*Falco columbarius*
Mourning dove	*Zenaida macroura*
Mourning warbler	*Geothlypis philadelphia*
Nashville warbler	*Leiothlypis ruficapilla*
Northern cardinal	*Cardinalis cardinalis*
Northern flicker	*Colaptes auratus*
Northern goshawk	*Accipiter gentilis*
Northern parula	*Setophaga americana*
Northern pintail	*Anas acuta*
Northern rough-winged swallow	*Stelgidopteryx serripennis*
Northern shoveler	*Spatula clypeata*
Northern waterthrush	*Parkesia noveboracensis*
Olive-sided flycatcher	*Contopus cooperi*
Osprey	*Pandion haliaetus*
Ovenbird	*Seiurus aurocapilla*
Palm warbler	*Setophaga palmarum*
Pectoral sandpiper	*Calidris melanotos*
Pied-billed grebe	*Podilymbus podiceps*
Pileated woodpecker	*Dryocopus pileatus*
Pine grosbeak	*Pinicola enucleator*
Pine siskin	*Spinus pinus*
Pine warbler	*Setophaga pinus*
Purple finch	*Haemorhous purpureus*
Red-breasted merganser	*Mergus serrator*
Red-breasted nuthatch	*Sitta canadensis*
Red-eyed vireo	*Vireo olivaceus*
Redhead	*Aythya americana*
Red-necked grebe	*Podiceps grisegena*
Red-tailed hawk	*Buteo jamaicensis*

Bird Species	Scientific Name
Red-winged blackbird	*Agelaius phoeniceus*
Ring-billed gull	*Larus delawarensis*
Ring-necked duck	*Aythya collaris*
Rock pigeon	*Columba livia*
Rose-breasted grosbeak	*Pheucticus ludovicianus*
Ruby-crowned kinglet	*Corthylio calendula*
Ruby-throated hummingbird	*Archilochus colubris*
Ruffed grouse	*Bonasa umbellus*
Rusty blackbird	*Euphagus carolinus*
Sabine's gull	*Xema sabini*
Sandhill crane	*Antigone canadensis*
Savannah sparrow	*Passerculus sandwichensis*
Scarlet tanager	*Piranga olivacea*
Semipalmated plover	*Charadrius semipalmatus*
Semipalmated sandpiper	*Calidris pusilla*
Sharp-shinned hawk	*Accipiter striatus*
Short-billed dowitcher	*Limnodromus griseus*
Snow bunting	*Plectrophenax nivalis*
Snow goose	*Anser caerulescens*
Solitary sandpiper	*Tringa solitaria*
Song sparrow	*Melospiza melodia*
Sora	*Porzana carolina*
Spotted sandpiper	*Actitis macularius*
Swainson's thrush	*Catharus ustulatus*
Swamp sparrow	*Melospiza georgiana*
Tennessee warbler	*Leiothlypis peregrina*
Tree swallow	*Tachycineta bicolor*
Trumpeter swan	*Cygnus buccinator*
Tundra swan	*Cygnus columbianus*
Turkey vulture	*Cathartes aura*
Veery	*Catharus fuscescens*
Warbling vireo	*Vireo gilvus*
White-breasted nuthatch	*Sitta carolinensis*
White-crowned sparrow	*Zonotrichia leucophrys*
White-throated sparrow	*Zonotrichia albicollis*
White-winged scoter	*Melanitta deglandi*
Wild turkey	*Meleagris gallopavo*
Wilson's snipe	*Gallinago delicata*
Winter wren	*Troglodytes hiemalis*

Bird Species	Scientific Name
Wood duck	*Aix sponsa*
Yellow warbler	*Setophaga petechia*
Yellow-bellied sapsucker	*Sphyrapicus varius*
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*
Yellow-rumped warbler	*Setophaga coronata*

Source: (Cornell Ebird, 2023) (NSPW, 1991) (NSPW, 1988) (WI Department of Natural Resources, 2015)

3.6.1.2.3 Herptile Species

No records of herpetological surveys were found during literature review. However, based on the existing habitat within Iron County and the geographical range, it is likely a variety of frogs, snakes, turtles, and salamanders exist in the Project vicinity. Reptiles and amphibians likely to be found in the vicinity of the Gile Flowage are detailed below in **Table 3.6.1.2.3-1**.

The iNaturalist online citizen science platform (iNaturalist.org) contains publicly-sourced observations of flora and fauna throughout the world. Reported herptile observations in the Project vicinity include the northern leopard frog (*Lithobates pipiens*), green frog (*Lithobates clamitans*), spring peeper (*Pseudacris crucifer*), American toad (*Anaxyrus americanus*), and blue-spotted salamander (*Ambystoma laterale*). One snake was observed, the red-bellied snake (*Storeria occipitomaculata*), and there was one reported observation of a painted turtle (*Chrysemys picta*) (iNaturalist, 2023).

Table 3.6.1.2.3-1: Reptile and Amphibian Species Presumed in Project Vicinity

Reptiles and amphibians	Scientific Name
American toad	*Anaxyrus americanus*
Blue spotted salamander	*Ambystoma laterale*
Eastern gartersnake	*Thamnophis sirtalis*
Eastern gray treefrog	*Hyla versicolor*
Fox snake	*Elaphe vulpina*
Green frog	*Lithobates clamitans*
Northern Leopard frog	*Lithobates pipiens*
Northern ring-necked snake	*Diadophis punctatus edwardsii*
Spring peeper	*Pseudacris crucifer*
Painted turtle	*Chrysemys picta*
Red bellied snake	*Storeria occipitomaculata*
Wood frog	*Lithobates sylvaticus*
Wood turtle	*Glyptemys insculpta*

Source: (iNaturalist, 2023) (NSPW, 1991) (NSPW, 1988) (WI Department of Natural Resources, 2015) (iNaturalist, 2023)

The wood turtle (*Glyptemys insculpta)* is a threatened species in Wisconsin and is known to be present in the upper Montreal River watershed. This turtle species is found in rivers and streams with adjacent riparian wetlands and upland deciduous forests (WI Department of Natural Resources, n.d.d). A wood turtle study was conducted in June and early July 2022 to determine if wood turtles, wood turtle nesting

habitat, or evidence of wood turtle nesting was present in three specific areas identified by the WDNR as having suitable habitat for the species. The Wood Turtle Study results are discussed in Section 3.7.

3.6.2 Environmental Effects

In SD1 and SD2, the Commission identified one issue related to geology and soils, which is the effect of Project operation on riparian habitat.

3.6.2.1 Botanical Resources

3.6.2.1.1 Terrestrial Shoreline Vegetation

The terrestrial shoreline vegetation present at the Project is common throughout the Project vicinity. NSPW is proposing to operate the Project in the same manner it has been operated since the dam began operations; the reservoir has been maintained between a minimum elevation of 1,475 feet NGVD and a maximum elevation of 1,490 feet NGVD with annual summer and winter drawdowns to supplement downstream river flows for Project purposes (Section 2.2.2.1). During that time, botanical resources in the Project vicinity have adapted to the seasonal reservoir fluctuations. No new adverse effects to terrestrial resources are anticipated due to continued Project operation.

3.6.2.1.2 Terrestrial Invasive Species

Maintenance of Project facilities and Project works have the potential to spread or transfer terrestrial invasive species if the work takes place within existing invasive species populations. NSPW has proposed mitigation measures in Section 3.6.3 to address this risk.

3.6.2.2 Wildlife Resources

Environmental impacts to threatened and endangered species are discussed in Section 3.7. The wildlife resources in the Project vicinity are classified as common for the area. NSPW is proposing to operate the Project in the same manner it has been operated since the dam began operations with the reservoir maintained between a minimum elevation of 1,475 feet NGVD and a maximum elevation of 1,490 feet NGVD including annual summer and winter drawdowns to supplement downstream river flows for Project purposes (Section 2.2.2.1). During that time, wildlife in the Project vicinity have adapted to the seasonal reservoir fluctuations. No new effects to terrestrial wildlife resources are anticipated due to continued Project operation.

3.6.3 Proposed Environmental Measures

The Applicant will develop a rapid response invasive species monitoring plan to monitor for the introduction of new invasive species and limit the dispersal of established species. Within one year of license issuance, the Applicant proposes to develop said plan in consultation with the WDNR prior to filing the plan with the FERC. The plan will incorporate measures for both aquatic and terrestrial invasive species and include a proposal for biennial surveys.

The proposed environmental measures will provide additional benefit for terrestrial resources when compared to the alternative of no-action or denial of the license application. Without issuance of an original license for the Project, the proposed terrestrial resource improvements will not occur.

3.6.4 Unavoidable Adverse Impacts

With the implementation of the proposed terrestrial mitigation measures, no unavoidable adverse effects to terrestrial resources are anticipated due to continued Project operation.

3.7 Threatened and Endangered Resources

3.7.1 Affected Environment

3.7.1.1. Federally Listed Species

The USFWS Information for Planning and Conservation (IPaC) website was accessed on February 27, 2022 to develop an Official Species List for the Gile Project. The list identified the potential presence of three federally listed species, one proposed species, and one candidate species in the Project vicinity. In addition to the threatened, endangered, proposed, and candidate species, the official species list also identified the potential presence of the bald eagle within the Project vicinity. The IPaC Species List is summarized in **Table 3.7.1-1** and described in the following sections. The official species list is found in **Appendix E-17**.

Table 3.7.1-1 Threatened, Endangered, Candidate, and Proposed Species Identified in IPaC Official Species Lists

Common Name	Scientific Name	Group	Status
Canada Lynx	*Lynx canadensis*	Mammal	Threatened
Gray wolf	*Canis lupus*	Mammal	Endangered
Northern long-eared bat	*Myotis septentrionalis*	Mammal	Endangered
Tricolored bat	*Perimyotis subflavus*	Mammal	Proposed Endangered
Monarch butterfly	*Danaus plexippus*	Insect	Candidate

Source: (US Fish and Wildlife Service, 2023)

3.7.1.1.1 Canada Lynx

The Canada lynx is a federally endangered mammal species associated with moist, cool, boreal spruce-fir forests with rolling terrain. They are dependent upon snowshoe hare populations and need persistent deep powdery snow, which limits competition from other predators. There is no designated critical habitat for the species in Wisconsin (USFWS, 2021a). A breeding population has never been discovered in Wisconsin and it is believed that most occurrences are drifters coming through Michigan or Minnesota. Wisconsin removed the lynx from the state's endangered species list due to the lack of a breeding population in the state. The species is now listed as protected by the state (UW Stevens Point, n.d.). While it is possible that lynx may pass through the Project vicinity, it is unlikely. Therefore, the proposed operation of the Project is not expected to impact the species.

3.7.1.1.2 Gray Wolf

The gray wolf was removed from the Wisconsin state endangered species list in 2004. In 2007, the USFWS delisted the Western Great Lakes wolf population (including Wisconsin and Michigan). The delisting rule was challenged in federal court and vacated in 2008 resulting in the gray wolf being relisted as federally endangered in Wisconsin and Michigan. In 2009, the USFWS again delisted the Western Great Lakes wolf population. Due to the failure to hold public hearings on the delisting, the rule was vacated via a federal court order in 2009 and wolves were relisted as endangered in Wisconsin and Michigan. Wolves retained this status until 2011 when the USFWS issued a new delisting rule. The rule was vacated by a federal court and wolves reverted back to federally endangered status in 2014. In 2020, the gray wolf was again delisted by a USFWS delisting rule. On February 10, 2022, the order was again vacated by a federal court restoring the endangered status for wolves in Wisconsin and Michigan, which remains in effect (WI Department of Natural Resources, 2022b).

The gray wolf is a federally endangered mammal that lives in family groups or packs. The wolf is a habitat generalist. During the winter of 2020-2021, there were an estimated 292 wolf packs in Wisconsin with an average territory size of 63.4 square miles (WI Department of Natural Resources, 2022b). They prefer areas which consist primarily of forestland and other wildland areas. They are common in northern Wisconsin and the Upper Peninsula of Michigan. Although wolves were not identified in Wisconsin's Natural Heritage Inventory review for the Project vicinity, they may occasionally pass through the Project.

3.7.1.1.3 Northern Long-Eared Bat

The NLEB is a federally and state threatened mammal. The species was reclassified from a federally threatened status to federally endangered status on November 30, 2022 (US Fish and Wildlife Service, 2022). The NLEB roosts during the summer months underneath loose bark or in cavities or crevices of both live and dead trees. Non-reproducing females and males may also roost in cool places such as caves or mines. The NLEB feeds in the forest interior and hibernates in caves and mines during the months of October through April. The location of hibernacula and maternity roost trees are tracked in Wisconsin's NHI. Iron County, Wisconsin is within the NLEB range. However, there are no known hibernacula or roost trees in the Project vicinity (WI Department of Natural Resources, 2022c). Project operations that involve tree removal activities may impact unknown maternity roosts.

3.7.1.1.4 Tricolored Bat

On September 13, 2022, the USFWS proposed to list the tricolored bat as an endangered species under the Endangered Species Act. The bat faces extinction due to the impacts of white-nose syndrome, a deadly disease affecting cave-dwelling bats across the country (US Fish and Wildlife Service, n.d.). The tricolored bat is active from spring to fall, primarily roosting among live and dead leaf clusters of live or recently dead hardwood trees. The bat has also been known to roost in other areas including among pine needles, eastern red cedar, and within artificial roosts like barns, bridges, concrete bunkers, and rarely within caves. Female bats return to the same summer roosting locations year after year. The bat typically hibernates in caves and mines during the winter. Where caves are not common, it often hibernates in road culverts and sometimes in tree cavities and abandoned wells. The tricolored bat typically returns to the same hibernaculum each year (US Fish and Wildlife Service, n.d.).

The tricolored bat is also a state threatened species whose location is tracked in Wisconsin's NHI database. However, there are no known occurrences of the species within the Project vicinity (WI Department of Natural Resources, 2022c). Project operations that involve tree removal may impact unknown roost trees.

3.7.1.1.5 Monarch Butterfly

On December 17, 2020, the USFWS announced the listing of the monarch butterfly as endangered or threatened was warranted but was precluded from making a formal announcement because of higher priority listing actions. The decision is the result of extensive species status review that evaluated the monarch's current and future status. The monarch is now a candidate species under the ESA. As a candidate species, its status will be reviewed annually until a listing decision is made (US Fish and Wildlife Service, 2020).

The monarch butterfly is one of the most recognized North American butterflies with its 3.5- to 4-inch-long orange and black wings. Wisconsin's monarchs are migratory, journeying to central Mexico for the winter each year. Adults feed on nectar collected from flowers (WI Department of Natural Resources, n.d.g).

3.7.1.2 State Listed Species

A review of the Wisconsin NHI database, conducted on December 22, 2022 by the WDNR, indicated three state threatened species are likely to be found in the vicinity of the Project. It also noted several bald eagle (*Haliaeetus leucocephalus*) nests located within the Project vicinity (WI Department of Natural Resources, 2022c). The threatened and endangered species likely to occur in the vicinity of the Project are shown in **Table 3.7.1.2-1** and the NHI review is found in **Appendix E-18** (privileged document).

Table 3.7.1.2-1 State Threatened or Endangered Species Likely to Occur in the Project Vicinity

Common Name	Scientific Name	Group	State Status
Little Brown Bat	*Myotis lucifugus*	Mammal	Threatened
Wood turtle	*Glyptemys insculpta*	Reptile	Threatened
Bald eagle	*Haliaeetus leucocephalus*	Bird	Federally Protected
Broad-leaved Twayblade	*Listera convallarioides*	Plant	Threatened

Source: (WI Department of Natural Resources, 2022c)

3.7.1.2.1 Little Brown Bat

The little brown bat is a state threatened mammal species. It is insectivorous and forages primarily over open water and along edge habitat feeding on soft-bodied aquatic insects. The bat roosts in warm microclimates provide by tree snags, bat houses, and buildings during the summer and hibernates in caves and mines from October through April (WI Department of Natural Resources, n.d.h). Tree removal or construction work on structures occupied by the bat may impact the species.

3.7.1.2.2 Wood Turtle

The wood turtle is a state threated reptile species that prefers rivers and streams with adjacent riparian wetlands and upland deciduous forests. The species often forages in open wet meadows or shrub-carr habitats dominated by speckled alder. They overwinter in streams and rivers in deep holes or undercut banks where there is enough water flow to prevent freezing. The species typically remains within 300 meters of rivers and streams. The species nests in open or semi-open canopy areas containing gravel or sandy soils, typically within 60 meters (200 feet) of the water (WI Department of Natural Resources, n.d.d). Several tributaries entering the Gile Flowage may provide suitable habitat for the species.

A Wood Turtle Study was completed in 2022 to provide additional information regarding the presence or absence of wood turtles within the Project boundary. The report is included as **Appendix E-21** and has been filed as privileged information per the WDNR's request in order to protect sensitive locational information. The objective of the study was to determine if wood turtles, wood turtle nesting habitat, or evidence of wood turtle nesting was present in three specific areas identified by the WDNR as having suitable habitat.

The study was conducted over the course of several weeks and consisted of presence/absence and nesting habitat surveys conducted via boat and on foot. Prior to performing field work, a 200-foot

shoreline buffer was mapped within the three survey areas.[30] The buffer area was evaluated for feasibility of terrestrial access and aerial imagery was reviewed to determine likely nesting areas. Surveys for presence/absence and nesting sites were conducted concurrently. A visual encounter survey for presence/absence of basking and nesting wood turtles on Project shorelines was conducted by approximating WDNR survey guidelines. The presence/absence of suitable wood turtle nesting habitat was mapped in the month of June on sunny days when the temperature was between 50°F and 80°F. On June 16, 2022, the visual encounter survey was completed on the uplands and shorelines downstream of the dam. Areas upstream of the dam were surveyed on June 29, 2022.

Nesting Habitat Surveys

Suitable wood turtle nesting habitat was mapped on June 1, 2022 using a GPS device. A cool spring resulted in this date being one of the first days where the temperatures were above the minimum of 50°F required to conduct the survey. Observations were made at each location by driving a boat slowly along the shoreline. Two observers assessed the visible shoreline within 50 feet of the water's edge using binoculars when necessary to look for suitable nesting habitat. Suitable nesting habitat was defined as sand or gravel substrate that was either unvegetated or sparsely vegetated, received sun exposure for most of the day during the survey period, and was located within 200 feet of the water's edge.

During the survey, the shoreline was also monitored for potential basking areas and observers looked for and identified any basking turtles. Once the boat survey was completed, potentially suitable nesting areas that could not be seen from the water were assessed from terrestrial access points. These areas primarily consisted of gravel roads and road shoulders. Private properties were assessed via a desktop review of aerial imagery.

Property owned by the Applicant within 200 feet of the water was meandered on foot. Within this area, two surveyors walked abreast along the shoreline at approximately 10-15 meters apart, adjusting the distance to accommodate for topography and vegetation. Shoreline areas not owned by the Applicant were inspected using a boat and motoring slowly along the shoreline with the aid of binoculars to provide a good view into the upland understory.

Presence/Absence Surveys

Visual encounter surveys for the presence/absence of wood turtles were conducted by approximating the WDNR survey guidelines (DNR PUB-ER-684). The surveys were performed within 200 feet of the shoreline in the three locations identified by the WDNR. Surveys were conducted two days per week for four weeks and were completed by boat or on foot. Boat surveys consisted of visual searches of areas visible within approximately 50 feet of the shoreline where wood turtles, if present, could be found basking, nesting, or foraging. Binoculars were used to assist with turtle identification. The presence of baking turtles and evidence of nesting were recorded via a handheld GPS unit. The areas inspected on foot were completed by two surveyors walking abreast at approximately 10-15 meters apart along the shoreline, adjusting their spacing based upon topography and vegetation restrictions. Meander routes, visual turtle encounters, and turtle nests were recorded via a handheld GPS unit. **Table 3.7.1.2.2-1** presents a summary of the presence/absence survey results.

[30] Since the WDNR requested locational information for wood turtles in the Project vicinity be excluded from public documents, Exhibit E refers to the three study areas as Area 1, Area 2, and Area 3. These correspond to the Wood Turtle Study Report areas in Sections 4.1, 4.2, and 4.3, respectively. The full study report has been filed as privileged information per the WDNR's request.

Table 3.7.1.2.2-1 Summary of Turtle Study Observations within Study Area

Date 2022	Observed		
	Basking Turtles	**Nesting Turtles**	**Wood Turtles**
Study Area 1			
6/01	None	None	None
6/14	Painted - 3	None	None
6/15	N/A	Painted - 1	None
6/17	None	Painted - 1	None
6/22	None	None	None
6/23	None	None	None
6/28	None	None	None
6/30	Painted - 7	None	None
7/06	Painted - 3	None	None
7/08	Painted - 4	None	None
Study Area 2			
6/01	Painted - 1	None	None
6/14	None	None	None
6/15	N/A	None	None
6/17	None	None	None
6/22	None	None	None
6/23	None	None	None
6/28	None	None	None
6/30	None	None	None
7/06	None	None	None
7/08	None	None	None
Study Area 3			
6/01	None	None	None
6/14	None	None	None
6/15	N/A	Snapping - 2; Painted - 1	None
6/17	None	None	None
6/22	None	None	None
6/23	None	None	None
6/28	None	None	None
6/30	None	None	None
7/06	None	None	None
7/08	None	Snapping predated nests - 2	None

Source: (GAI Consultants, Inc., 2022b)

At Study Area 1, no evidence of wood turtles or wood turtle nesting was observed. However, painted turtles were observed basking and nesting at this site. In this area, a total of 0.77 acres of suitable wood turtle nesting habitat was mapped within 200 feet of the reservoir shoreline. Since this area is an impounded portion of the reservoir, a lack of flowing water likely restricts its use by wood turtles. One nesting wood turtle was observed upstream of this study area outside of the Project boundary in a

free-flowing reach of the stream, indicating the study was conducted during the appropriate timeframe.[31] Wood turtles were already known to be present in that location (GAI Consultants, Inc., 2022b).

At Area 2, no evidence of wood turtles or wood turtle nesting was observed during the study. A painted turtle, however, was observed basking at this site. This area had the least amount of suitable nesting habitat (0.07 acres) of the three areas surveyed. The report noted it was unlikely that wood turtles are using the area for nesting (GAI Consultants, Inc., 2022b).

At Area 3, no evidence of wood turtles or wood turtle nesting was observed. A painted turtle and snapping turtles, however, were observed nesting in this area. There was a total of 0.50 acres of suitable nesting habitat within 200 feet of the reservoir. This habitat was restricted to gravel areas along two roads within the study area (GAI Consultants, Inc., 2022b).

The report concluded that while the study area provides foraging habitat for wood turtles, it is unlikely that they are nesting in the impounded areas studied (GAI Consultants, Inc., 2022b). It is more likely that nesting wood turtles would be limited to the free-flowing areas upstream of the reservoir and the areas studied.

3.7.1.2.3 Bald Eagle

The bald eagle lives near rivers, lakes, and marshes. In winter, birds congregate near open water in tall trees to locate prey and roost at night for sheltering. The bird mates for life and chooses the tops of large trees to build nests, which they typically use and enlarge each year. They may have one or more alternate nests within their breeding territory. Bald eagles typically return to breeding grounds within 100 miles of where they were raised. Project activities (e.g., maintenance, construction, etc.) that involve disturbance within 660 feet of a nest during the nesting season may cause impacts to the species (US Fish and Wildlife Service, 2021).

Several bald eagle nests have been recorded within the Project vicinity. Vegetation management and construction activities that may occur between January 15 and July 30 within 660 feet of an active bald eagle nest may cause impacts to the species (WI Department of Natural Resources, 2022c).

3.7.1.2.4 Broad leaved Twayblade

Broad-leaved twayblade is a Wisconsin threatened plant found on seepage slopes and ravine bottoms in hardwoods or mixed forests. Blooming occurs from early June through late July and fruiting occurs from early July through late August. The optimal identification period for this species is from late June through late July (WI Department of Natural Resources, n.d.e). Ground disturbing or vegetation management activities occurring within areas of suitable habitat may impact the species.

[31] Nesting wood turtle was observed from the road adjacent to a free-flowing reach of stream outside of the study area.

3.7.2 Environmental Effects

In SD1 and SD2, the Commission identified several issues regarding the potential effects from Project operations on federally threatened and endangered resources, specifically, the federally listed Canada lynx and NLEB. In addition to the concerns raised by the Commission, the following sections also describe the effects of continued Project operation on other federal and state listed species identified in the IPaC Official Species List (Section 3.7.1.1) and the WDNR NHI review (Section 3.7.1.2).

3.7.2.1 Effects of Continued Project Operations on Federally Listed species

3.7.2.1.1 Canada Lynx

In the NHI review, there were no Canada lynx occurrences identified within a one-mile buffer of the Project vicinity and any lynx in the Project vicinity would likely be travelling through the area rather than full-time residents. Therefore, there are no impacts to the species from current Project operations and continued operation, as proposed, is not expected to impact the species.

3.7.2.1.2 Gray Wolf

Since no gray wolf occurrences were identified within a 1-mile buffer of the Project vicinity during the NHI review, any wolves in the Project vicinity would likely be travelling through the area rather than full time residents. Therefore, there are no impacts to the species from current Project operations and continued operation, as proposed, is not expected to impact the species.

3.7.2.1.3 Northern Long-Eared Bat

Although NSPW has not identified any specific activities in this application that could have a direct adverse effect upon the species, day-to-day operational activities, such as removal of a hazard tree at a recreation site, could cause a local indirect effects on a NLEB if occupying said tree. Therefore, NSPW has proposed mitigation measures in Section 3.7.3 to address these types of potential impacts.

3.7.2.1.4 Tricolored Bat

Although NSPW has not identified any specific activities in this application that could have a direct adverse effect upon the species, it is believed day-to-day operational activities, such as removal of a hazard tree at a recreation site, could cause a local indirect effect on a tricolored bat if occupying said hazard tree.

Therefore, NSPW has proposed mitigation measures in Section 3.7.3 to address these types of potential impacts.

3.7.2.1.5 Monarch Butterfly

Habitat for the monarch butterfly is located within the Project vicinity. However, the proposed operation is not expected to result in the direct take of the species during any life stage nor is it expected to result in any loss of habitat. Therefore, the proposed operation is not expected to have an adverse impact upon the species.

3.7.2.2 Effects of Continued Project Operations on State-Listed Species

3.7.2.2.1 Little Brown Bat

Tree removal activities or disturbance of structures occupied by little brown bats during their active period have the potential to impact the species. NSPW has proposed mitigation measures in Section 3.7.3 to address these potential effects.

3.7.2.2.2 Wood Turtle

As noted in the Wood Turtle Study Report, no evidence of wood turtles or wood turtle nesting sites were identified during the 2022 surveys. The report concluded that while the study area provides foraging habitat for wood turtles, it is unlikely wood turtles are nesting in the impounded areas studied. It is more likely that any nesting wood turtles would be limited to the free-flowing areas upstream of the reservoir and the areas studied.

NSPW has not identified any specific activities in this application that could have a direct adverse effect upon the species. However, day-to-day operational activities, such as routine maintenance at a recreation site, could have an impact on wood turtles nesting at the site. Therefore, NSPW has proposed mitigation measures in Section 3.7.3 to address these potential effects. The measures would remain in effect as long as wood turtles remain a state-listed species.

3.7.2.2.3 Bald Eagle

NSPW has not identified any specific activities in this application that involve vegetation management or construction activities within 660 feet of any active eagle nest that could result in adverse impacts to the species.[32]

3.7.2.2.4 Broad-leaved Twayblade

Vegetation management or ground disturbing construction activities that impact suitable habitat have the potential to impact the broad-leaved twayblade. In the NHI review, the WDNR identified two sections where the species may be present. There are no Applicant-owned facilities or recreation sites in these sections where vegetation management or construction activities could take place over the term of the license. Therefore, no impacts to this species are anticipated.

3.7.3 Proposed Environmental Measures

The environmental measures discussed below are being proposed by NSPW to address potential impacts to threatened, endangered, and candidate species caused by current and continued Project operation.

The proposed environmental measures discussed below for the NLEB, tricolored bat, wood turtle, and little brown bat are a significant advancement for threatened and endangered resources at the Project when compared to the alternative of no-action or denial of the application. Without the issuance of an original license for the Project, the threatened and endangered resource improvements will not occur.

[32] Since routine maintenance of recreation sites has been occurring, eagles with existing nests located within a 660-foot buffer of the recreation sites are accustomed to the activities and will not be adversely affected. Likewise, new nests established within a 660-foot buffer of the recreation site are not likely to be adversely affected as eagles are establishing a new nest despite the presence of the recreation site and its associated activities.

3.7.3.1 Northern Long-Eared Bat

Wisconsin implements the requirements of a Broad Incidental Take Permit and Broad Incidental Take Authorization for Wisconsin Cave Bats (Cave Bat BITP/A), last updated in November 2022, and included herein as **Appendix E-20**. NSPW proposes to follow the applicable mitigation measures outlined in the Cave Bat BITP/A during routine recreation site maintenance. By following these recommended mitigation measures, Project activities (e.g., maintenance, construction, etc.) are not likely to jeopardize the continued existence and recovery of the state population of the protected bats or the whole plant-animal community to which they belong.

3.7.3.2 Tricolored Bat

Wisconsin implements the requirements of the Cave Bat BITP/A, last updated in November 2022 and included herein as **Appendix E-20**. NSPW will follow these requirements to provide protection to any NLEB within the Project vicinity during routine recreation site maintenance. NSPW proposes to follow the applicable mitigation measures outlined in the Cave Bat BITP/A. Under the Cave Bat BITP/A, Project activities are not likely to jeopardize the continued existence and recovery of the state population of the protected bats or the whole plant-animal community to which they belong.

3.7.3.3 Wood Turtle

The WDNR has implemented an Incidental Take Permit/Authorization for Common Activities for the Wood Turtle (Wood Turtle BITP/A) last updated in 2016. As long as wood turtles remain a state-listed species, NSPW is proposing to follow the terms of the Wood Turtle BITP/A during routine recreation site maintenance. Under the Wood Turtle BITP/A, Project activities are not likely to jeopardize the continued existence and recovery of the state population of the protected turtle or the whole plant community to which they belong.[33] The Wood Turtle BITP/A is included in **Appendix E-19**.

3.7.3.4 Little Brown Bat

Wisconsin implements the requirements of the Cave Bat BITP/A, last updated in 2022 and included herein as **Appendix E-20**. NSPW will follow the applicable mitigation measures outlined in the Cave Bat BITP/A. Under the Cave Bat BITP/A, Project activities are not likely to jeopardize the continued existence and recovery of the state population of the protected bats or the whole plant-animal community to which they belong.

3.7.4 Unavoidable Adverse Impacts

With the implementation of the proposed environmental measures, continued Project operation is not expected to result in unavoidable adverse effects to threatened, endangered, or candidate species.

3.8 Recreation Resources

The Gile Flowage was formed in 1940 when the Gile Dam was constructed thereby impounding the West Fork. The Project is located within the Town of Pence and Town of Carey in Iron County, Wisconsin and is approximately 2.5 miles southwest of the City of Hurley in Wisconsin and City of Ironwood in Michigan, and approximately 33 miles southeast of the City of Ashland in Wisconsin. The storage reservoir has a

[33] The three areas identified by the WDNR as having suitable wood turtle habitat are the three study areas shown in Figures 1 and 2 the Wood Turtle Study Report.

surface area of 3,454 acres at an elevation of 1,490 feet NGVD and features approximately 36.5 miles of shoreline, numerous islands, and a maximum depth of 25 feet.[34]

The Gile Flowage provides opportunities for fishing, wildlife viewing, and water sports. It is also popular for ice fishing and snowmobiling in the winter season and acts as an all-terrain vehicle destination. During the open-water season, the flowage is used for sportfishing, pleasure boating, and swimming (EA Engineering, Science, and Technology, Inc., 2023). The West Fork downstream of the Gile Dam and the Montreal River downstream of the Saxon Falls Project are popular for whitewater boating when higher flows are available. Although neither of these popular whitewater boating reaches are part of the Gile Project, water releases from the Gile Dam have direct effect on the navigability of both.

3.8.1 Affected Environment

3.8.1.1 Existing Recreational Resources

NSPW operates and maintains the canoe portage at the Gile Dam. Four additional non-project recreation sites are located at the Project, however, none of these are operated or owned in their entirety by NSPW. The canoe portage is listed in **Table 3.8.1.1-1** and the four non-project sites are listed in **Table 3.8.1.1-2**. The locations of all recreation sites are shown in **Figure 3.8.1.1-1**.

Table 3.8.1.1-1 FERC-Approved Recreation Sites within the Gile Flowage Storage Reservoir Project Boundary

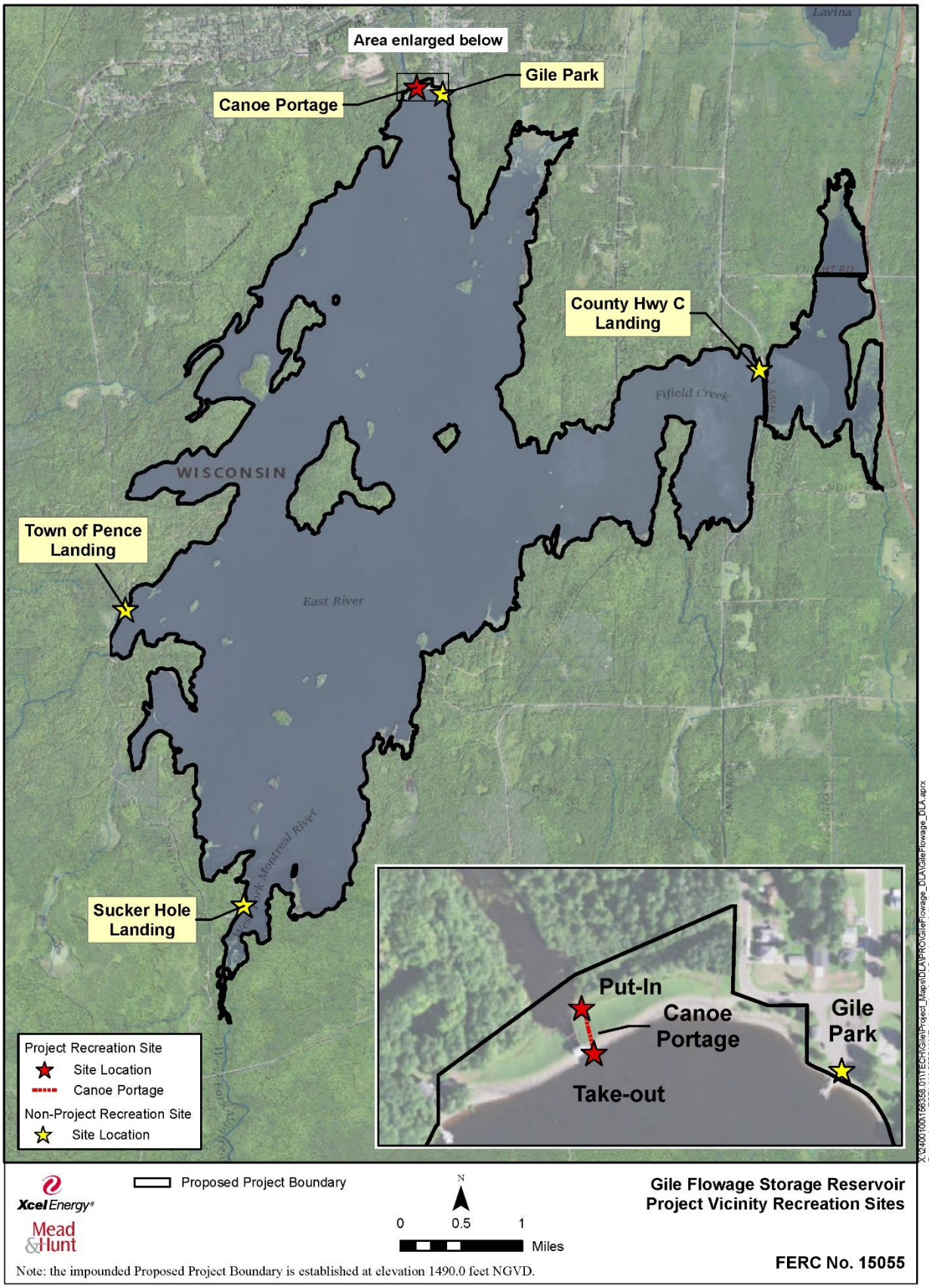
Recreation Site	Type	County	Owner	Operator
Gile Dam Canoe Portage	Project Recreation Site	Iron	NSPW	NSPW

Table 3.8.1.1-2 Project Recreation Sites in the Gile Flowage Storage Reservoir Project Vicinity

Recreation Site	Type	County	Owner	Operator
Sucker Hole Landing	Non-Project Recreation Site	Iron	Iron County	Iron County
Town of Pence Landing	Non-Project Recreation Site	Iron	Town of Pence	Town of Pence
County Hwy C Landing	Non-Project Recreation Site	Iron	Iron County	Iron County
Gile Park	Non-Project Recreation Site	Iron	City of Montreal	City of Montreal

[34] Maximum reservoir depth from the WDNR Find a Lake Gile Flowage webpage (WI Department of Natural Resources, n.d.f).

Figure 3.8.1.1-1 Recreation Sites Gile Flowage Storage Reservoir Project



3.8.1.2 Recreation Plans

The Gile Project is currently unlicensed; therefore, a recreation plan has not been previously developed. Wisconsin approved its Statewide Comprehensive Outdoor Recreation Plan (SCORP) in 2019 and Iron County developed an outdoor recreation plan for 2021-2025. Both entities recognize the importance of recreation and its contribution to the quality of life for its citizens.

3.8.1.2.1 Wisconsin Statewide Comprehensive Outdoor Recreation Plan

Wisconsin regularly publishes a SCORP as required by the Federal Land and Water Conservation Fund Act of 1965. The SCORP is used to help allocate federal funds among local communities and focuses on preserving and improving recreational opportunities in Wisconsin while targeting relationships such as public health and wellness, urban access to outdoor recreation, and public and private partnerships. The latest SCORP, covering the period 2019-2023, recognizes that one of the top-priority needs is to provide more recreation places near urban centers to support a variety of nature-based recreation (WI Department of Natural Resources, 2019b). A copy of the SCORP was provided in the PAD as Appendix 4.8.2.1-1.

3.8.1.2.2 Iron County Outdoor Recreation Plan

The Iron County Outdoor Recreation Plan 2021-2025 (2021-2025 Plan) places a high priority on maintenance of existing facilities and increasing the promotion of recreational opportunities in the county. The plan specifies continued maintenance of existing recreation sites, motorized trails, and non-motorized trails, and also includes continued cooperation with the North Country Trail Association in regards to expansion of the North Country National Scenic Trail. No specific needs identified in Iron County's Plan are located within the immediate Project vicinity (Iron County, 2021). A copy of the 2021-2025 Plan is included in **Appendix E-22**.

3.8.1.3 Recreation Study

Pursuant to the study plan determination issued on September 24, 2021, NSPW conducted a Recreation Study. The intent of the study was to develop a subjective assessment of recreation facility conditions and needed enhancements; determine capacity of existing facilities to address current and future user demand; and provide sufficient information for making recommendations regarding recreation enhancements. The study is described in the sections below and consisted of the following study protocols:

- Recreation Inventory and Facility Condition Assessment
- Recreation Use Survey
- Recreation Spot Counts
- Evaluation of Existing Recreation on Undeveloped Islands

3.8.1.3.1 Recreation Inventory Facility Condition Assessment

An inventory of recreation amenities was conducted in May 2022 at each of the five recreation sites shown in **Figure 3.8.1.3-1**. Recreation amenities identified at each site are included in **Table 3.8.1.3.1-1**.

The condition of each amenity was assigned a rating according to the following scale:

- Not Usable and Needs Replacement
- Needs Repair
- Needs Maintenance or Cleaning
- Good Working Condition (does not need any attention)
- Facility Lacking; need to install facility or otherwise add enhancement (identify item)

Table 3.8.1.3.1-1 Summary of Recreational Amenities at Project and Non-Project Recreation Sites

Recreation Site	Number of Each Amenity Per Site						
	Launch Ramp, Lane, Portage	Dock or Pier	Pavilion	Picnic Table	Restroom	Trash Receptacle	Other
Gile Dam Canoe Portage (Project Site)	1	-	-	-	-	-	-
Sucker Hole Landing (Non-Project Site)	1	-	-	-	-	-	-
Town of Pence Landing (Non-Project Site)	1	-	-	-	-	-	-
County Hwy C Landing (Non-Project Site)	2	-	-	-	-	-	-
Gile Park (Non-Project Site)	2	1	1	10	1	2	5 benches 2 grills

Source: (EA Engineering, Science, and Technology, Inc., 2023)

The completed Recreation Facility Inventory and Condition forms and more detailed descriptions of the amenities found at each recreation site are in the Recreation Study Report included as **Appendix E-23**. A summary of the amenities for each recreation site is provided below.

Gile Dam Canoe Portage

The canoe portage is located on the downstream side of the dam on the east earthen embankment. The portage trail put-in received a rating of "Needs Maintenance" due to erosion. The area of minor erosion in question is illustrated in photographs 31 through 34 of Appendix 2 of the Recreation Study Report. Mitigation of the erosion through the placement of rock riprap and erosion filter fabric is scheduled for the end of August 2023.

Gile Dam Canoe Portage Signage

A Take-Out directional sign is posted in front of the concrete spillway section.[35] NSPW determined that a "Take-Out Here" sign would be appropriate at the actual take-out location on the east earthen embankment shoreline. Once arriving at the take-out location on the upstream side of the dam, it will be intuitive for paddlers to walk to the top of the earthen embankment and see where they can re-enter the water downstream. NSPW does not believe put-in signage is necessary at the site.

Since the Project has not been previously licensed, NSPW will install a recreation sign for the canoe portage and shoreline fishing area that meets the requirements of Part 8 of the FPA.

Sucker Hole Landing

This single-lane boat ramp features concrete planks with a gravel driveway and received a rating of "Good Working Condition." The Recreation Study Report (**Appendix E-23**) indicates there is rill erosion down the ramp which will require minimal maintenance (grading). The extent of the minor erosion is shown in photographs 55 and 65 of Appendix 2 of the Recreation Study Report.

[35] The Take-Out direction sign is shown in Picture 38 in Appendix 2 of the Recreation Study Report (**Appendix E-23**).

Sucker Hole Landing Signage

The site's wooden regulation sign and some of the paper regulation sheets need replacement.

Town of Pence Landing

This single-lane concrete boat ramp received a rating of "Good Working Condition."

Town of Pence Landing Signage

The WDNR's walleye regulation sign needs to be replaced. Photograph 68 of Appendix 2 of the Recreation Study Report (**Appendix E-23**) shows the condition of the signage.

County Hwy C Landing

This two-lane boat ramp is composed of concrete planks with a courtesy pier between the lanes. These amenities received a rating of "Good Working Condition". The Recreation Study Report (**Appendix E-23**) indicates the concrete launching surfaces are cracked and uneven. The condition of the launch is depicted in photographs 78 and 87 of Appendix 2 of the Recreation Study Report.

County Hwy C Landing Signage

The regulation, directional, and interpretive signs are in good condition.

Gile Park

This two-lane concrete boat ramp and courtesy pier located between the lanes received a rating of "Good Working Condition". Amenities also include a pavilion area, ten picnic tables, combined restroom and changing rooms, trash receptacles, benches, grills, fireplace, drinking water, playground facilities, swimming beach, and shoreline fishing. The park provides a paved parking lot with barrier-free parking.[36] All amenities received a rating of "Good Working Condition".

Gile Park Signage

The regulation, directional, and interpretive signs are in good condition.

3.8.1.3.2 Recreation Use Survey

According to the approved study plan, NSPW developed a recreation use survey form to collect visitor information regarding the following:

- General use information,
- Resident/visitor,
- Purpose/duration of visit,
- Distance traveled,
- Day use/overnight lodging,
- History of site/area visitation,
- Types of recreational activity participation,
- Other sites visited,
- General satisfaction with recreation sites and areas in need of improvement, and
- Effects of Project operations on recreation.

[36] Barrier-free amenities are Americans with Disabilities Act accessible.

The recreation use survey was conducted between January and October 2022 and resulted in 168 user interviews among the five sites. The majority of user interviews were completed at Gile Park (74), followed by County Hwy C Landing (50), Sucker Hole Landing (17), Town of Pence Landing (17), and Gile Dam Canoe Portage (10).

Of the 168 total interviews, eight were acquired in winter (January), 72 in spring (May and June), 82 in summer (July, August, and September) and 6 in the fall (October). In terms of visit frequency, 137 of the 168 respondents (81.5%) considered themselves regular visitors who visited three or more times per year.

Visitors were asked which of ten activities they participated in during their visit. A total of 277 responses were provided with the most popular activities being boat fishing (33%) and bank fishing (15%). **Table 3.8.1.3.2-1** shows all user interview responses for activities.

Table 3.8.1.3.2-1 Recreation Activities Listed for Current Visit of Each Interview

Location	Bank Fishing	Boat Fishing	Boating	PWC*	Picnic	Swim	Sight-seeing	Hunting	Raft or Tube	Wildlife Viewing
Gile Dam Canoe Portage	**9**	**0**	**0**	**0**	**2**	**2**	**4**	**0**	**1**	**4**
Sucker Hole Landing	**8**	**8**	**2**	**1**	**2**	**3**	**5**	**1**	**0**	**6**
Town of Pence Landing	**6**	**9**	**2**	**2**	**1**	**1**	**2**	**1**	**1**	**3**
County Hwy C Landing	**7**	**41**	**10**	**1**	**2**	**3**	**9**	**4**	**2**	**7**
Gile Park	**13**	**34**	**7**	**6**	**7**	**10**	**16**	**0**	**2**	**10**
Total	**43**	**92**	**21**	**10**	**14**	**19**	**36**	**6**	**6**	**30**

* Personal Watercraft

Of the 168 respondents, 62.5% were from zip codes in the immediate area (i.e., Ironwood 49938, Hurley 54534, Montreal 54525, Pence 54550, and Iron Belt 54536) while 73% stated they traveled less than 50 miles to visit the Project. Among those who traveled to the Project from more than 50 miles, 26% stated they were spending the night, and of those, 77% were staying in a vacation or rental home. Among the respondents, 74% stated they were going home after their visit.

In regard to the activities they participated in, respondents were asked to rate the following during their visit: safety, enjoyment, crowding, overall experience, and amenity condition. During their current visit, respondents were asked to rate the amenities as totally acceptable, acceptable, neutral, unacceptable, or totally unacceptable. Of the 179 ratings provided regarding amenities, 168 (94%) were rated neutral or better and 85% were acceptable or totally acceptable.

Visitors were also asked to rate present or past activities at the five recreation sites as totally acceptable, acceptable, neutral, unacceptable, or totally unacceptable. Of the 984 ratings provided, 97% (952) were neutral or better and 89% were acceptable or totally acceptable.

NSPW also analyzed reservoir elevation data to determine if water levels adversely impact recreation at existing public boat ramps, piers, docks, and landing points as well as the islands. More specifically, the analysis evaluated how often and how long these features or sites would be inaccessible or inoperable due to low water levels. During the survey, visitors were asked to indicate if low water levels affected their current activities for launching a boat, boating safety, and using docks. Specifically, they were asked if low water was no problem (5), a small problem (4), neutral (3), moderate problem (2), or large problem (1). During the lowest water level of the open water season, the responses ranged from a small problem at Gile Park on October 20, 2022 with a water elevation of 1,486.0 feet NGVD, to a large problem for launching and a moderate problem for boating safely and using docks at the County Hwy C Landing at a water elevation of 1,486.2 feet NGVD on October 8, 2022. The average response during low water was 4.20 for launching, 4.39 for boating safely, and 4.25 for using docks.

Additional water depth information is presented in Section 3.8.1.4. A more detailed listing of results and comments received during the interviews are in the Recreation Study Report included in **Appendix E-23**.

3.8.1.3.3 Recreation Spot Counts

Each recreation site listed in **Table 3.8.1.3.1-1** (Section 3.8.1.3.1-1) was surveyed for usage on two weekdays and two weekend days in January, June, August, and October; and two weekdays, two weekend days, and one holiday weekend day in the months of May, July, and September. Recreation spot counts were completed between 7:00AM and 7:00PM and included counting individuals and vehicles and classifying the recreational activities at the sites. During each survey, a total of two hours were spent at each site. Efforts were made to vary the survey times for each site throughout the study period.

The most popular recreational activities observed during the winter were ice fishing and snowmobiling. During non-winter months, the most popular activities were boat fishing, shoreline fishing, sightseeing/wildlife viewing, power boating, and non-power boating. **Table 3.8.1.3.3-1** shows the total number of visitors and vehicles observed at each recreation site for all survey days. Gile Park had the greatest number of visitors followed by County Hwy C Landing. A more detailed description of the results from the recreation survey, including the completed survey forms, is available in the Recreation Study Report in **Appendix E-23**.

Table 3.8.1.3.3-1 Total Visitors and Vehicles Observed at Each Surveyed Site for All Survey Days

Recreation Site	Type of Recreation Site	Total Number Observed	
		Visitors	Vehicles
Gile Dam Canoe Portage	Project Site	50	4
Sucker Hole Landing	Non-Project Site	36	19
Town of Pence Landing	Non-Project Site	42	29
County Hwy C Landing	Non-Project Site	139	109
Gile Park	Non-Project Site	153	136
Total Number Observed-All Sites		**420**	**287**

3.8.1.3.4 Evaluation of Existing Recreation on Undeveloped Islands

Recreational use was evaluated on the islands owned by NSPW or the public through spot counts and interviews during the July 4th holiday weekend. Observations included evidence of beaching or mooring of boats, shoreline fishing, picnicking, or the location of any erosion caused by recreational access and user-developed facilities.

Of the 43 islands surveyed, 22 exhibited no sign of past or present recreational use. Five islands had obvious landing areas, eight exhibited user-created hiking trails, 13 had at least one fire ring, 11 showed signs of at least one camp, and several had trash. One island had a duck blind while another island had a memorial plaque fixed to a rock. Those islands under private ownership were only viewed from the water.

Given the rocky nature of many islands, erosion was limited. The only likely examples of human-caused erosion were observed on two Islands, both of which were likely related to landing boats and foot traffic. Specific information about each island is enclosed in the Recreation Study Report in **Appendix E-23**.

Spot counts were conducted on all islands. Active recreational activity was absent from all islands except one. That activity involved an individual camping on an island and was interviewed on July 2, 2022. The individual had been camping there since June 30, 2022 and expected to leave on July 4, 2022. The person considered themselves to be a regular visitor at Gile Park and the islands primarily in June, July, and October to partake in bank fishing, boat fishing, pleasure boating, personal watercraft, swimming, rafting/tubing, and camping, including the current trip.

3.8.1.3.5 Adequacy of Existing Facilities to Address Current and Future Demand

Results from the Recreation Study spot counts showed 410 users were observed over 27 observations during the open water recreation season for an average of 15.2 users per day.[37] During the winter recreation survey period, 10 users were observed over four observations for an average of 2.5 users per day. Assuming each observation accounted for an entire recreation day, the total recreation days as surveyed during the 2022 primary recreation season was 3,252.8 (214 days at 15.2 users per day). The total recreation days during the month of January was 77.5 (31 days at 2.5 users per day).[38] In order to estimate winter recreation use, NSPW assumed recreation remained constant November through April. Therefore, it is estimated the Project experienced 387.5 (77.5 recreation days for each of 5 months) winter recreation days. This calculates to an annual total of 3,646.3 recreation days in 2022.

As stated in the Recreation Study Report, 73% of recreationists interviewed traveled less than 50 miles to visit the Project. Therefore, it is appropriate to utilize projected population growths from Iron County, Wisconsin and Gogebic County, Michigan to address current and future demand. As outlined in Section 3.12 of this application, Iron County and Gogebic County are not projected to increase in population from 2020 to 2040. Therefore, the number of recreation days for recreation facilities at the Project is not expected to increase by 2040.

[37] Primary recreation season is defined as April through October.
[38] According to Table 5-7 outlined in the Recreation Study Report (**Appendix E-23**), the January average duration in 17:00 hours and stays for the other months range from 2:46 hours to 12:09 hours.

Parking is generally a limiting factor regarding the capacity of recreation sites at small projects. The two sites with the highest vehicle counts were Gile Park and County Hwy C Landing. As determined during the recreation site inventory, Gile Park has a capacity for eight vehicles with trailers, four vehicles without trailers and one designated barrier-free parking space in the paved parking area. There is also overflow parking available along streets in the City of Montreal immediately adjacent to the park. County Hwy C Landing has a capacity for 20 vehicles with trailers in an unpaved parking area.

At Gile Park, peak vehicle parking occurred during the month of July with 39 vehicles observed over five spot counts (average 7.8 vehicles per count) followed by June which saw 33 vehicles during four spot counts (average 8.25 vehicles per count). Gile Park has a capacity of 13 parking spaces and an average use of 7.8 vehicles during the peak parking month of July. Therefore, with no expected population growth from 2020 to 2040, Gile Park has the necessary capacity for the foreseeable future.

The County Hwy C Landing has a capacity of 20 parking spaces (with trailers) and the average parking use during the peak month of June was 8.25 vehicles. Therefore, with no population growth expected from 2020 to 2040, this facility has capacity for the foreseeable future. A more detailed listing of vehicle counts is found in Table 5-1 of the Recreation Study Report included in **Appendix E-23**.

3.8.1.4 Water Level Data

To evaluate the impacts of water levels on recreation, NSPW measured water depths from the lowest end of the boat launch concrete surfaces at the Sucker Hole Landing and Town of Pence Landings during the open-water survey season. Water depths were also measured at the end of the docks at Gile Park and County Hwy C Landing. **Table 3.8.1.4-1** shows the depth measurements and maximum depth at the concrete surfaces and docks. The measurements were taken on September 10, 2022 at the end of the summer recreation season (after Labor Day).[39] Water levels on Gile Flowage typically begin to drop more-rapidly after the end of the summer recreation season. Boat fishing is the primary open water recreation activity during the fall season. Despite lower water levels in the fall, several boat landings still provide reasonable access.

Table 3.8.1.4-1 September 10, 2022 Water Depth Measurements

Recreation Site	Depth Concrete End	Depth Pier End[40]	Storage Reservoir Elevation at Time of Measurement	Lowest Elevation of Concrete
Sucker Hole Landing	0.0 feet	N/A	1,487.0 feet	1,487.0 feet
Town of Pence Landing	2.5 feet	N/A	1,487.0 feet	1,484.5 feet
County Hwy C Landing	2.5 feet	1.9 feet	1,487.0 feet	1,484.5 feet
Gile Park	3.5 feet	3.0 feet	1,487.0 feet	1,483.5 feet

The deepest end of the concrete ramp at Sucker Hole Landing (known as “Low Water Landing” by the FOG) is very shallow during much of the open water season. Regardless, individuals continue to use this landing even though other ramps remain deeper at lower water levels, with Gile Park being the deepest.

[39] Between the October 8 and October 18, 2022 site visit, the County removed the pier at the County Hwy C Landing for the season. As of the October 20, 2022 visit, the Gile Park pier was still installed.
[40] Both piers are movable and can be moved to deeper water as needed.

During the interviews, summarized in Section 3.8.1.3.2, there were some comments about the boat launch being too shallow. However, there are other comments indicating the launch works well during lower water levels. It appears the recent replacement of the concrete surface has improved launching during lower water levels.

An interview on August 4, 2022 with a frequent visitor indicated that launching becomes difficult at the County Hwy C Landing when the water level is low; however, this individual uses the other landings, mainly the Town of Pence Landing and Gile Park landings when water levels are low. This individual's comments are consistent with the information included in **Table 3.8.1.4-1** and Section 3.8.1.3.2. Therefore, if the County Hwy C Landing is not usable at low water levels, the nearby Town of Pence Landing and Gile Park landings are appropriate substitutes. A more detailed description of the results and comments received during the interviews are included in the Recreation Study Report found in **Appendix E-23**.

3.8.1.5 Whitewater Recreation Flow Study

Pursuant to the study plan determination issued by the Commission on September 24, 2021, NSPW conducted a Whitewater Recreation Flow Study. The study was conducted with volunteer boaters on Jun 11, 2022 and evaluated flows releases of 600 cfs and 1,200 cfs.[41] The goal of the study was to evaluate the effects of flow releases from the Gile Dam on whitewater boating opportunities on the West Fork, beginning immediately below the Gile Dam and ending 5.7 miles downstream at Kimball Falls Park. More specifically, the study was to: (a) evaluate incremental flow releases to determine optimal boating opportunities for different skill sets; (b) use flow duration curves to determine the number of days per year when river flows equal or exceed optimal whitewater flows and assess the feasibility of recreational flow releases; (c) quantify the effects on downstream generation and Gile Flowage water levels for any 4-hour period of proposed releases; (d) develop an estimate of potential whitewater boating use; (e) identify competing recreation needs or environmental concerns; and (f) verify the difficulty rating for the reach at varying flows.

A map of the whitewater study area is provided as Figure 4.3.2-1 in **Appendix E-24**. The whitewater study area was divided into three reaches; Reach 1 from below the Gile Dam to South Drive bridge, Reach 2 from South Drive bridge to Center Drive bridge, and Reach 3 from Center Drive bridge to Kimballs Falls Park. According to the responses from study participants, 600 cfs was an insufficient flow, with 76% of boaters indicating a higher flow would be preferable in Reach 1, 82% in Reach 2, and 87% in Reach 3. One boater indicated they would prefer a much higher flow than 600 cfs in Reach 1. The majority of boaters indicated 1,200 cfs was either too high or optimal, with 70% of boaters indicating a lower flow would be preferred for Reach 1 and 80% stating the flow was optimal for Reach 2 and Reach 3. At the conclusion of the last run, the results from the overall evaluation forms showed that releases of between 1,000 to 1,100 cfs had the highest rating for acceptable boating opportunities downstream of Gile Dam. The evaluation forms also indicate that the majority of boaters would return for a release in the range of 1,200 cfs. All ten of the boaters polled would return if optimal flows were released during the summer months of June, July, or August. Nine

[41] Ten boaters (56%) ranked themselves at an expert skill level, while the remaining eight boaters were equally split between intermediate (22%) and advanced (22%). Intermediate boaters have been boating an average of 4.5 years at this level; the greatest number of years was seven and the fewest was two. Advanced boaters have been boating an average of 9.75 years at this level; the greatest number of years was 20 and the fewest was four. Expert boaters had been boating an average of 8.5 years at this level; the greatest number of years was 20 and the fewest was three. Ten boaters indicated their preferred craft is a kayak, while six preferred a raft. Two boaters did not indicate a preferred boating craft.

boaters stated they would return in September, six in October, five in May, and three in both April and November. The boater-rated difficulty of each reach at both flow releases is outlined in **Table 3.8.1.5**.

Table 3.8.1.5 Boater-Rated Difficulty Class for Each Reach and Flow Release

Difficulty	Reach 1 Majority	Reach 1 Range	Reach 2 Majority	Reach 2 Range	Reach 3 Majority	Reach 3 Range
Flow 1 (600 cfs)	**Class III**	Classes III, III+, IV	**Class IV**	Classes III, III+, III-IV, IV	**Class III**	Classes III, III+, III-IV, IV
Flow 2 (1,200 cfs)	**Class IV**	Classes III, IV, IV+	**Class IV**	Classes I-II, II-III, III, IV, IV+	**Class III-IV**	Classes III-IV, IV

According to the flow duration curves (**Appendix E-3**), it is not possible to have suitable whitewater flow conditions downstream of the Gile Dam on a regular basis without scheduling releases from the Gile Dam. Any scheduled flow release would lower the reservoir elevation. The extent to which the reservoir elevation would decrease would be dependent on the amount of flow released, the duration of said release, and the starting elevation of the reservoir at the time of the release. The greater the reservoir is lowered, the greater the anticipated affect upon the reservoir's environment and water-based recreation.

The put-in location below the Gile Dam and take-out area at Kimball Falls Park were both found to be adequate and preferred at the suitable flow levels. The Gile Dam put-in location is very close to Gile Park and numerous other parking spots street-side. Several boaters indicated they would not run Reach 1 and would put-in at the beginning of Reach 2 (South Drive bridge). The South Drive bridge is along an unpaved road with very little traffic. The put-in is accessible; however, the parking is limited to the roadside. If the boaters choose to begin their whitewater route at South Drive bridge, parking is not a concern because boaters will help to "shuttle" other boaters, particularly during scheduled releases.

Even though the put-in at South Drive bridge has limited roadside parking, boaters would most likely choose to first "drop" all their equipment, along with one or two boaters, at South Drive bridge and then drive all vehicles to the downstream take-out at Kimball Falls Park. Next, they would bring one or two vehicles back to South Drive bridge as shuttles for the boaters who parked at Kimball Falls Park. Therefore, there is no need to have a large number of parking spaces at both the put-in and take-out areas.

Videos of each run taken by a volunteer boater have been posted to the licensing webpage at http://hydrorelicensing.com/gile-flowage/. More information collected during the study is included within the Whitewater Recreation Flow Study Report (**Appendix E-24**).

3.8.2 Environmental Effects

In SD1 and SD2, the Commission identified the following issues regarding recreation resources; (1) whether the existing recreation facilities and public access locations are adequate to meet current and future recreation demand; (2) the effects of Project operation on flow-dependent recreational opportunities; and (3) the effects of proposed reservoir fluctuations on land use and recreation access.

3.8.2.1 Adequacy of Recreation Facilities

Information included in Section 3.8.1 indicates recreation facilities are adequate for the Project vicinity. The Recreation Study Report (**Appendix E-23**) outlines recommended improvements for the owners and operators of the non-Project recreation sites to consider. A minor improvement is recommended for the Gile Dam Canoe Portage site owned and operated by NSPW. The recommendation is discussed below in Section 3.8.3.

3.8.2.2 Effects of Project Operation on Flow-Dependent Opportunities

Section 3.8.1 indicates the natural hydrology of the inflows to Gile Flowage are inadequate to provide suitable recreational flow conditions downstream of the Gile Dam on a regular basis without supplementing water releases from the Project. Measures to enhance the flow-dependent recreation (whitewater boating) are described in Section 3.8.3.

3.8.2.3 Effects of Reservoir Fluctuations on Land Use Recreation Access

The information included in Section 3.8.1 indicates a gradual drawdown has fewer impacts on land use and recreation than a rapid drawdown because structures such as docks can be adjusted when water levels recede slowly. In addition, the greater the drawdown during the open water season, the greater the impact upon boat landings. However, there are alternatives for launching a boat during the summer drawdown, such as Gile Park and Town of Pence Landing, which remain accessible during low water conditions. Regardless, summer drawdowns should be limited to the extent required for Project purposes.

A drawdown during the winter season does not appear to have an adverse effect on winter recreation and public access (snowmobiling and ice fishing). It should be noted that interviews of several ice anglers indicated that the fish school in different locations during lower water elevations in the winter than in summer. Regardless, winter drawdowns should be limited to the extent required for Project purposes.

3.8.3 Proposed Environmental Measures

NSPW is proposing to install a new Take-Out Here sign and Part 8 sign at the Gile Dam recreation site.

Under Section 9 of Exhibit A, NSPW proposes to conserve water by minimizing the extent of seasonal drawdowns at the Project by regulating discharge from Gile Dam such that the water released, combined with the flow in the main branch of the Montreal River, allows the downstream hydroelectric projects to generate efficiently without passing surplus water over the spillway or through the radial gates. Releases from the Gile Dam will only be used for the following Project purposes: (a) augment streamflow in the summer and winter low-flow periods for hydroelectric generation downstream, (b) minimum flow releases downstream, and (c) scheduled releases for whitewater boating opportunities downstream. This proposed operation limits summer and winter drawdowns thereby minimizing impacts on recreation from seasonal drawdowns and replicating natural river conditions where the extent of seasonal drawdowns will be

commensurate with natural flows of both branches of the Montreal River,[42] or emergencies beyond Applicant's control.

Under Section 9 of Exhibit A, NSPW is proposing a Project operation that limits the typical daily drawdown to approximately 0.1 feet per day, but no more than 0.2 feet per day,[43] during normal operation. Restricting rapid changes in reservoir elevation allows structures such as boat launch piers to be adjusted as needed to maintain their usability during seasonal drawdowns. Restricting the daily drawdown also improves the boating experience and maintains a relatively consistent water depth for limiting potential (submerged) hazards. The restricted drawdown will help minimize adverse impacts to recreational use on the reservoir.

NSPW is proposing to conduct routine maintenance of the FERC-approved recreation site(s) (Canoe Portage) throughout the term of the original license.

NSPW is proposing to review and update or replace the Take-Out sign and Part 8 sign at the Canoe Portage recreation site.

NSPW is proposing to provide daily discharge and reservoir elevation information for the Gile Dam to afford paddlers within a reasonable proximity of the Project to take advantage of natural high flow events in the West Fork and consequently in the Saxon Falls Gorge downstream. A similar proposal is included in the FLA for the Saxon Falls Project.

NSPW proposes to develop a Land Management Plan for its island ownership within one year of license issuance to formalize its existing land management policy and address issues regarding public access, signage, maintenance, and trash removal. The plan will be developed in consultation with the FOG, NPS, and WDNR. In the long-term, NSPW intends to pursue a sale of its islands to Iron County or other interested public entity such that they would remain open to the public in perpetuity. Should a sale agreement be reached, NSPW will submit a request for a license amendment to the Commission seeking removal of the islands from the Project boundary.

NSPW is proposing two water releases each year (one in June and one in September) from the Gile Dam for whitewater boating in the West Fork, and consequently the downstream Saxon Falls Gorge. Each release would consist of a discharge of 1,200 cfs for three hours beginning in the morning. The travel time for water released from Gile Dam to reach Saxon Falls is approximately 10 to 12 hours; therefore, the West Fork and Saxon Falls Gorge could both be boated the same day.

Each three-hour release, including an additional hour each to ramp up and ramp down flow, will require a release of approximately 400 acre-feet from the reservoir. For the first release, proposed in June, the 50% exceedance inflow to the reservoir is 101 cfs. Therefore, the June release on average is expected to result in a loss of 363 acre-feet. During the second release, proposed during the month of September

[42] If the Montreal River basin experiences a wetter than normal season, recreation activities on the Gile Flowage will benefit from higher water levels (higher elevations throughout the season). If the Montreal River experiences a dryer than normal season, the recreation on the storage reservoir will experience a dryer than normal season.

[43] Except for scheduled whitewater releases and emergencies beyond Applicant's control, which includes preemptive drawdowns for expected large inflow events due to precipitation or snow melt to reduce flooding and increased reservoir elevations at the downstream hydroelectric projects.

(after Labor Day weekend), the 50% exceedance inflow to the reservoir is 35 cfs. Therefore, the September release, on average, is expected to result in a loss of 385 acre-feet.

Approximately 10-12 hours after 1,200 cfs is released from the Gile Dam, flows at the Saxon Falls Gorge are estimated to be 1,331 cfs during the June release and 1,578 cfs during the September release.[44] These flows are considered optimal for boating the Saxon Falls Gorge.

NSPW is proposing to develop a Whitewater Recreation Plan in consultation with AW and NPS within one year of license issuance. The plan will include specific information including the exact weekend each year the flows should be released and the time of day each flow release should begin. A similar plan is specified in the license application for the Saxon Falls Project. NSPW proposes to develop the Gile Flowage Whitewater Recreation Plan in conjunction with the Saxon Falls Whitewater Recreation Plan.[45]

Under the proposed reservoir elevation restrictions, the proposed flow releases in June and September are not expected to result in significant adverse effects to water-based recreation because the first release in June typically coincides with higher reservoir inflows at that time of year. The September release is scheduled to occur after the primary open water recreation season, which generally ends on the first weekend in September (Labor Day Weekend).

The technical memo included with the Reservoir Flow Routing Model in **Appendix E-28** details modeled generation changes at the two downstream projects as a result of proposed whitewater releases during dry, normal, and wet years. In all cases, the whitewater releases increased the amount of generation at both projects, likely due to the additional flows allowing each turbine to be more fully utilized.

The proposed environmental measures are a significant advancement for recreation at the Project when compared to the alternative of no-action or denial of the license application. Without the issuance of an original license for the Project, the recreation improvements will not occur.

3.8.4 Unavoidable Adverse Impacts

Continued Project operation, with the implementation of the proposed environmental measures, will not result in unavoidable adverse impacts to recreation resources.

3.9 Land Use

3.9.1 Affected Environment

3.9.1.1 Existing Land Use

Based on the USGS National Land Cover Database, major land uses within the Project vicinity include deciduous forest, wooded wetland, mixed forest, and emergent herbaceous wetlands. There is a limited

[44] Drainage Saxon Falls 262 square miles, Gile Dam 70 square miles. This method is utilized because the flow duration curves included in the Saxon Falls Project FLA are not adjusted for the effect of storage at the Gile Project and skewed accordingly. Using a basin multiplier of 3.74 to convert the 50% exceedance flow upstream of the Project to the 50% exceedance flow at the Saxon Falls Gorge, results in a 50% exceedance flow of 378 cfs for June and 131 cfs for September.

[45] The Whitewater Recreation Plan requirements outlined in the Saxon Falls Project license application indicated the plan would determine the number, timing, and duration of flows to be released and the associated ramping rates. After additional analysis as part of this application, it has been determined those factors are better determined in this application because the greatest potential negative environmental impacts will occur at the Gile Project and not at the Saxon Falls Project.

amount of medium intensity development on the north end of the reservoir associated with the City of Montreal. A map showing the major land uses in the Project vicinity is included as **Appendix E-25**.

The Project is located within the Town of Carey and Town of Pence in Iron County, Wisconsin. Major land uses in the Town of Carey consist of 98.9% woodlands or other natural areas, 0.6% open space, 0.3% agriculture, and 0.1% residential (Town of Carey, 2005b). The Town of Pence has similar land uses with 99.7% woodlands or other natural areas, 0.1% primary residential, 0.1% open space and less than 0.1% each for parks and recreation, industrial, commercial, and government and institutional (Town of Pence, 2005b).

3.9.2 Environmental Effects

In SD1 and SD2, the Commission identified one issue regarding land use, which is the effects of proposed reservoir fluctuations on land use.

3.9.2.1 Effects of Proposed Reservoir Fluctuations on Land Use

Land use surrounding the Project has developed into a healthy mix of residential areas, recreational access sites, and open space utilized as a benefit to the local resource. NSPW is proposing to operate the Project in the same manner it has been operated since the dam began operations. More specifically, the storage reservoir has been maintained between a minimum elevation of 1,475 feet NGVD and a maximum elevation of 1,490 feet NGVD with annual summer and winter drawdowns to supplement river flows for Project purposes (Section 2.2.2.1). During that time, land use has adjusted to the seasonal reservoir fluctuations and no significant adverse impacts to land use have been identified as a result of the current Project operation. Therefore, no new adverse effects to land use are anticipated due to continued Project operation as proposed.

There are no proposed environmental measures regarding land use at the Project. No changes to land use are expected should a license not be issued for the Project.

3.9.3 Proposed Environmental Measures

No environmental measures for land use have been proposed in this application.

3.9.4 Unavoidable Adverse Impacts

Continued Project operation is not expected to cause unavoidable adverse impacts to land use.

3.10 Aesthetic Resources

3.10.1 Affected Environment

The Gile Dam forms the 3,454-acre Gile Flowage Storage Reservoir. The reservoir features a primarily undeveloped wooded shoreline with numerous rock outcrops and bedrock islands that greatly enhances the aesthetics (**Figure 3.10.1-1** through **Figure 3.10-1-5**). There are several waterfalls accessible to the public downstream of the Project on both the West Fork and the Montreal River below its confluence with the West Fork as shown in **Figures 3.10.1-6** and **3.10-1-9**.

Figure 3.10.1-1View of Gile Flowage Storage Reservoir Upstream of the Gile Dam

Figure 3.10.1-2 View of Gile Dam Looking West

Figure 3.10.1-3 View of Gile Dam and Canoe Portage Take-out Looking East

Figure 3.10.1-4 View of the Canoe Portage Put-In and West Fork Downstream of the Gile Dam

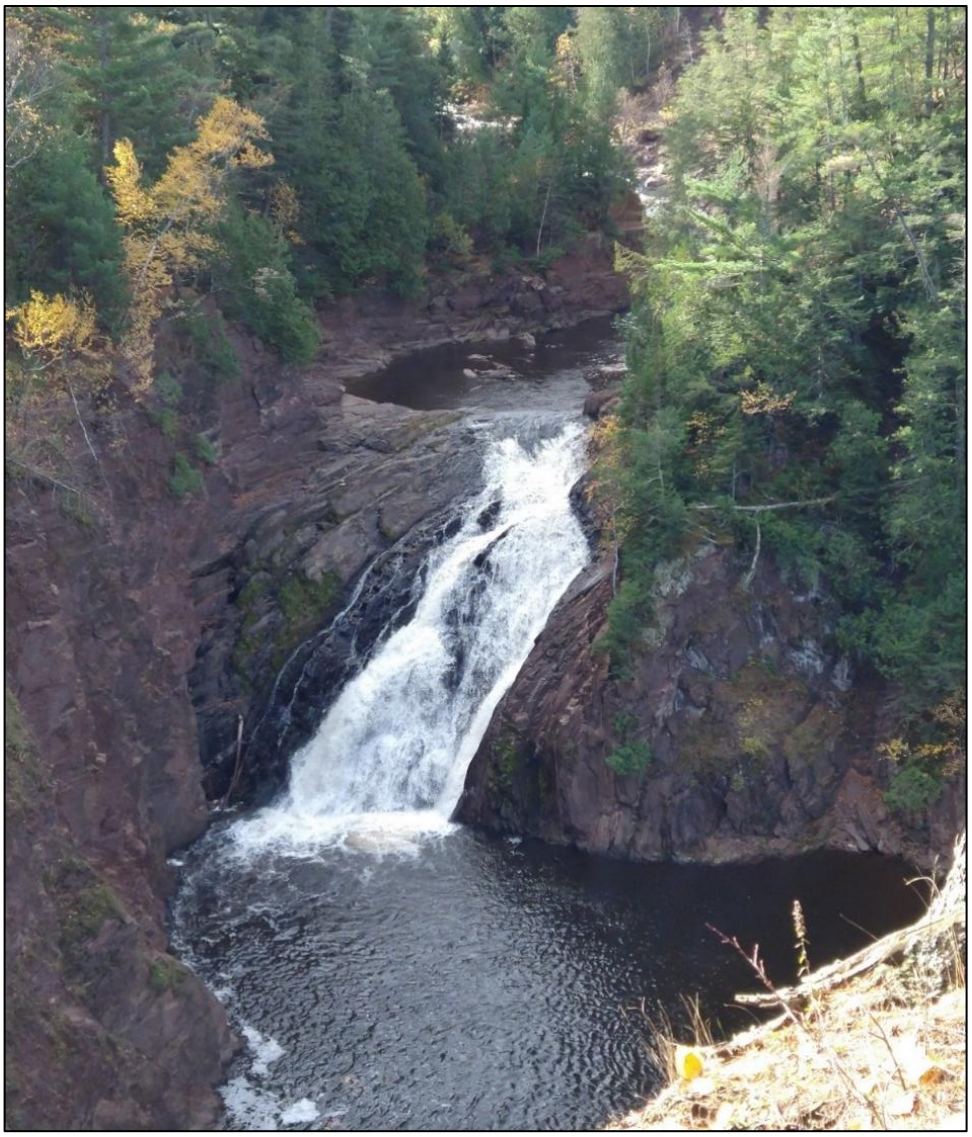
Figure 3.10.1-5 View of a Gile Flowage Storage Reservoir Island

Figure 3.10.1-6 View of Gile Falls Looking Upstream on the West Fork

Figure 3.10.1-7 View of Kimball Falls Looking Downstream on the West Fork

Figure 3.10.1-8 View of Saxon Falls on the Montreal River from NSPW Scenic Overlook

Figure 3.10.1-9 View of Superior Falls on Montreal River from NSPW Scenic Overlook



3.10.2 Environmental Effects

The Commission did not identify any potential issues related to aesthetic resources in SD1 or SD2. The Gile Flowage provides for an aesthetically pleasing setting which is not expected to be impacted by continued operation of the Project.

3.10.3 Proposed Environmental Measures

The proposed operation of the Gile Project will allow for the proposed increase to the current minimum flow in the bypass reach at the Saxon Falls Project. Therefore, the proposed operation of the Gile Project will enhance aesthetic resources in the vicinity of the Project, specifically the downstream bypass reach at Saxon Falls.

The proposed environmental measures are a significant advancement for aesthetic resources in the Project vicinity when compared to the alternative of no-action or denial of the license application. Without the issuance of an original license for the Project, the aesthetic resource enhancements will not occur.

3.10.4 Unavoidable Adverse Impacts

Continued Project operation will not result in unavoidable adverse impacts to aesthetic resources.

3.11 Cultural Resources

Section 106 of the NHPA directs federal agencies to take into account the effects of their undertakings on historic properties within the APE and to afford the Advisory Council on Historic Preservation a reasonable opportunity to comment. The regulations implementing Section 106 define “historic properties” as any pre-contact or historic period district, site, building, structure, or individual object included in or eligible for inclusion in the NRHP. This term includes artifacts, records, and remains related to and located within historic properties, as well as Traditional Cultural Properties that meet the NRHP criteria.

To meet the interests and requirements of all consulting parties, NSPW identified historic and archaeological properties within the Project’s APE in accordance with Section 106 of the NHPA and 36 CFR 800 - Protection of Historic Properties. In Wisconsin, the specific monitoring requirements are outlined in the December 30, 1993, Programmatic Agreement (Section 1.3.4).

The Programmatic Agreement defines the APE as:

- Lands enclosed by the Project boundary as delineated in the existing license.
- Attached or associated buildings and structures extending beyond the Project boundary, which contribute to the NRHP eligibility of the hydroelectric generating facility.
- Lands or properties outside the Project boundary where the Project may cause changes in the character or use of historic properties, if any historic properties exist.

The Cultural Resources Study is composed of two efforts, an Architecture/History Investigation and Archaeological Shoreline Monitoring.

3.11.1 Affected Environment

3.11.1.1 Area of Potential Effect

The APE for the Project as defined in the Programmatic Agreement is coincident with the proposed Project boundary. More specifically, the APE encompasses land up to 1,490 feet NGVD and the lands immediately surrounding the Gile Dam and its appurtenant facilities. The Project boundary is depicted in Exhibit G of this application.

3.11.1.2 Cultural Historical Properties

Per the requirements of the Programmatic Agreement, an investigation of historical properties identified the Gile Dam as a property within the APE. The Archaeological Shoreline Monitoring Study identified one known cultural resource site adjacent to and overlapping the APE (Montreal Company Historic District) and one Government Land Office-mapped trail within the APE. The field survey effort did not identify any archaeological properties impacted by Project operations. The Cultural Resources Study Report is found in **Appendix E-26**.

3.11.1.3 Historic Properties Management Plan

A Historic Properties Management Plan (HPMP) is a compliance and management plan that integrates the entirety of federal and state cultural resources program requirements with ongoing practices, such as water level changes, allowing for the identification of potential compliance and preservation actions that may occur over the course of the upcoming license period. The intent is to ensure historic properties, as defined under federal law, and which may be affected by Project operation, are appropriately managed for future generations. The HPMP is designed to comply with the requirements of applicable federal and state laws and regulations, including the NHPA, Native American Graves Protection and Repatriation Act of 1990, Archaeological Resources Protection Act of 1979, the Commission guidelines for development of the HPMP, and the Programmatic Agreement.

Per the requirements of the Programmatic Agreement, an HPMP will be developed in consultation with the Wisconsin SHPO, Fond du Lac Band of Lake Superior Chippewa, and Sokaogon Chippewa Community Mole Lake Band. The plan will be developed within one year of license issuance.

3.11.2 Environmental Effects

In SD1 and SD 2, the Commission raised concerns regarding the potential effects of Project operation and maintenance on properties that are included in, or are eligible for inclusion in, the NRHP.

3.11.2.1 Effects of Project Operation of the APE

The Cultural Resource Study concluded there are no properties eligible for the NRHP within the Project APE. The only recommended future work is to revisit erosion site E-3 for any changes within 5 years of license issuance.

3.11.2.2 Effects of Project Operation on Historic and Archaeological Resources

The Cultural Resource Study findings and recommendations were provided to the Wisconsin SHPO for their review and comment. On February 15, 2023, the Wisconsin SHPO concurred with the

archaeological and architectural history report recommendations (Mead & Hunt, 2023b). There are currently no adverse effects of Project operation on cultural resources.

3.11.3 Proposed Environmental Measures

Per the requirements of the Programmatic Agreement, NSPW proposes to develop an HPMP in consultation with the Wisconsin SHPO, Fond du Lac Band of Lake Superior Chippewa, and Sokaogon Chippewa Community Mole Lake Band within one year of license issuance. The HPMP shall include a requirement to revisit erosion site E-3 and monitor the entire shoreline for the occurrence of any substantial shoreline erosion not previously documented within five years of license issuance. The HPMP will also include measures to protect, mitigate, or enhance cultural, historical and archaeological resources such that the proposed Project operation does not adversely impact properties currently identified and properties that may be identified in the future.

The proposed environmental measure is a significant advancement for cultural resources when compared to the alternative of no-action or denial of the license application. Without the issuance of an original license for the Project, the cultural resource enhancements and development of an HPMP will not occur.

3.11.4 Unavoidable Adverse Impacts

Continued Project operation is not expected to result in unavoidable adverse impacts to cultural resources.

3.12 Socioeconomic Resources

3.12.1 Affected Environment

3.12.1.1 Population Size and Density

The two largest cities in the vicinity of the Project are the neighboring cities of Hurley (Iron County, Wisconsin) and Ironwood (Gogebic County, Michigan). Data from the 2020 census indicated the population of the City of Hurley was 1,561, which is an increase of 1.9% from the 2010 census (Citypopulation, n.d.a). The population of the City of Ironwood was 5,045, which is a decrease of 6.3% from the 2010 census.

The 2020 population of Iron County was 6,137, which is an increase of 3.7% over the 2010 census. This results in an average population density of 8.1 persons per square mile. From 2017 to 2021, there were an estimated 2,801 households in Iron County with an average of 2.13 persons per household (US Census Bureau, n.d.b).

The 2020 population of Gogebic County was 14,380, which is a decrease of 12.5% from the 2010 census. This results in an average population density of 13.0 persons per square mile. From 2017 to 2021, there were an estimated 6,770 households in Gogebic County with an average of 2.09 persons per household (US Census Bureau, n.d.b).

Table 3.12.1.1-1 depicts the City of Hurley, City of Ironwood, Iron County, and Gogebic County population changes from 1990 to 2020. Between 1990 and 2020, Hurley's population decreased 12.6%, and Ironwood's decreased 27.5%. During the same period, Iron County decreased 0.3% and Gogebic County decreased 20.3% (US Census Bureau, n.d.a) (US Census Bureau, n.d.b) (Citypopulation, n.d.a) (Citypopulation, n.d.b).

Table 3.12.1.1-1 City of Hurley, City of Ironwood, Iron County and Gogebic County Historic Population

Municipality[46]	1990	2000	2010	2020
City of Hurley	1,787	1,822	1,531	1,561
City of Ironwood	6,957	6,281	5,387	5,045
Iron County, Wisconsin	6,153	6,861	5,916	6,137
Gogebic County, Michigan	18,052	17,370	16,427	14,380

*-Source (Citypopulation, n.d.a) (Citypopulation, n.d.b) (US Census Bureau, n.d.a) (US Census Bureau, n.d.b):

Population projections from the Demographic Services Center of the State of Wisconsin's Department of Administration for the City of Hurley and Iron County from 2020 through 2040, as well as the population projections from the Michigan Bureau of Labor Market Information and Strategic Initiatives for the City of Ironwood and Gogebic County, are shown in **Table 3.12.1.1-2**.

Table 3.12.1.1-2 City of Hurley, City of Ironwood, Iron County, and Gogebic County Population Projections

Municipality	Population					
	2020 Census	2025	2030	2035	2040	Decrease (%)
City of Hurley	1,561	1,440	1,440	1,370	1,240	20.6%
City of Ironwood*	5,045	4,760	4,696	4,599	4,476	11.3%
Iron County, Wisconsin	6,137	5,850	5,970	5,825	5,420	11.7%
Gogebic County, Michigan	14,380	13,569	13,384	13,108	12,758	11.3%

*City of Ironwood projections calculated based on the same rate of change as Gogebic County.
Source: (MBLMISI, 2019) (WI Department of Administration, 2013a) (WI Department of Administration, 2013b)

3.12.1.2 Labor Force and Employment

The largest employment sectors for the City of Hurley, as shown in **Table 3.11.1.2-1**, include the following in order of prevalence: educational services, health care, and social assistance; construction; manufacturing; and public administration.

The largest employment sectors for the City of Ironwood, as shown in **Table 3.11.1.2-2**, include the following in order of prevalence: manufacturing; education services, health care, and social assistance; arts, entertainment, recreation, accommodation, and food services; and retail trade.

The largest employment sectors for Iron County, as shown in **Table 3.11.1.2-3**, include the following in order of prevalence: educational services, health care, and social assistance; manufacturing; arts, entertainment, recreation, accommodation, and food services; and construction.

The largest employment sectors for Gogebic County, as shown in **Table 3.11.1.2-4**, include the following in order of prevalence: educational services, health care, and social assistance; manufacturing; retail trade; and arts, entertainment, recreation, accommodation, and food services.

[46] City of Hurley 2020 Population from (US Census Bureau, n.d.a) and 1990 to 2010 population from (Citypopulation, n.d.a). City of Ironwood, Gogebic County, and Iron County 2010 to 2020 population from (US Census Bureau, n.d.b), 1990 to 2000 population from (Citypopulation, n.d.a) and (Citypopulation, n.d.b).

Table 3.12.1.2-1 Employment Status, City of Hurley

Industry	Estimate	% Jobs*
Civilian employed population 16 years and over	625	100%
Agriculture, forestry, fishing, hunting, and mining	5	0.8%
Construction	**106**	**17.0%**
Manufacturing	**83**	**13.3%**
Wholesale trade	23	3.7%
Retail trade	51	8.2%
Transportation, warehousing, and utilities	12	1.9%
Information	26	4.2%
Finance and insurance, real estate, rental, and leasing	38	6.1%
Professional, scientific, and management; administrative; and waste management services	22	3.5%
Educational services, health care, and social assistance	**113**	**18.1%**
Arts, entertainment, recreation, accommodation, and food services	38	6.1%
Other services, except public administration	38	6.1%
Public administration	**70**	**11.2%**

**Does not add to 100% due to rounding; Source: USCB, 2020*

Table 3.12.1.2-2 Employment Status, City of Ironwood

Industry	Estimate	% Jobs*
Civilian employed population 16 years and over	2,130	100%
Agriculture, forestry, fishing, hunting, and mining	70	3.3%
Construction	119	5.6%
Manufacturing	**389**	**18.3%**
Wholesale trade	59	2.8%
Retail trade	**276**	**13.0%**
Transportation, warehousing, and utilities	115	5.4%
Information	37	1.7%
Finance and insurance, real estate, rental, and leasing	74	3.5%
Professional, scientific, and management; administrative; and waste management services	103	4.8%
Educational services, health care, and social assistance	**372**	**17.5%**
Arts, entertainment, recreation, accommodation, and food services	**287**	**13.5%**
Other services, except public administration	92	4.3%
Public administration	137	6.4%

**Does not add to 100% due to rounding; Source: USCB, 2020*

Table 3.12.1.2-3 Employment Status, Iron County

Industry	Estimate	% Jobs*
Civilian employed population 16 years and over	2,478	100%
Agriculture, forestry, fishing, hunting, and mining	94	3.8%
Construction	**252**	**10.2%**
Manufacturing	**271**	**10.9%**
Wholesale trade	76	3.1%
Retail trade	209	8.4%
Transportation, warehousing, and utilities	103	4.2%
Information	52	2.1%
Finance and insurance, real estate, rental, and leasing	111	4.5%
Professional, scientific, and management; administrative; and waste management services	156	6.3%
Educational services, health care, and social assistance	**577**	**23.3%**
Arts, entertainment, recreation, accommodation, and food services	**260**	**10.5%**
Other services, except public administration	101	4.1%
Public administration	216	8.7%

**Does not add to 100% due to rounding; Source: USCB, 2020*

Table 3.12.1.2-4 Employment Status, Gogebic County

Industry	Estimate	% Jobs*
Civilian employed population 16 years and over	6,083	100%
Agriculture, forestry, fishing, hunting, and mining	268	4.4%
Construction	463	7.6%
Manufacturing	**810**	**13.3%**
Wholesale trade	82	1.3%
Retail trade	**761**	**12.5%**
Transportation, warehousing, and utilities	301	4.9%
Information	84	1.4%
Finance and insurance, real estate, rental, and leasing	348	5.7%
Professional, scientific, and management; administrative; and waste management services	336	5.5%
Educational services, health care, and social assistance	**1,246**	**20.5%**
Arts, entertainment, recreation, accommodation, and food services	**675**	**11.1%**
Other services, except public administration	297	4.9%
Public administration	412	6.8%

**Does not add to 100% due to rounding; Source: USCB, 2020*

3.12.2 Environmental Effects

The Commission did not identify any issues regarding socioeconomic resources in SD1 or SD2.

The Project has a beneficial effect to the socioeconomic resources in the Project vicinity by providing outdoor recreational opportunities on the reservoir as well as downstream in the West Fork. These recreational opportunities contribute to the local economy.

3.12.3 Proposed Environmental Measures

NSPW is not proposing any new measures related to socioeconomic resources.

The proposed environmental measures for recreation are an advancement for recreation, and consequently socioeconomic resources, in the Project vicinity when compared to the alternative of no-action or denial of the license application. Without the issuance of an original license for the Project, the recreation and socioeconomic resource enhancements will not occur.

3.12.4 Unavoidable Adverse Impacts

Continued Project operation will not result in unavoidable adverse impacts to socioeconomic resources.

3.13 Environmental Justice

3.13.1 Affected Environment

Environmental Justice (EJ) communities are communities composed of a substantial proportion of people of minority heritage or a substantial proportion of people living below the poverty level. The following sections provide information on EJ communities within the geographic scope of the proposed Project boundary, which includes areas within the Town of Carey and Town of Pence in Iron County, Wisconsin.[47]

3.13.1.1 Race, Ethnicity and Low-Income Data

The US Census Bureau's 2020 five-year estimates were reviewed for race, ethnicity, and low-income data within the geographic scope of the Project. The state, county, census block group, and census tract data are summarized in **Table 3.13.1.1-1**.

Table 3.13.1.1-1 Gile Flowage Storage Reservoir Project Environmental Justice Community Information

	RACE AND ETHNICITY DATA										LOW INCOME DATA
Gile Flowage Storage Reservoir Storage Reservoir Project Geographic Scope	**Total Population (count)**	**White Alone Not Hispanic (count)**	**African American (count)**	**Native American/ Alaska Native (count)**	**Asian (count)**	**Native Hawaiian & Other Pacific Islander (count)**	**Some Other Race (count)**	**Two or More Races (count)**	**Hispanic or Latino (count)**	**Total Minority (%)**	**Households Below Poverty Level (%)**
State of Wisconsin	5,806,975	4,681,072	360,526	43,830	162,010	2,174	14,407	134,689	408,267	19.4	10.7
Iron County	5,679	5,414	10	63	25	0	0	90	77	4.7	13.0
Census Tract 1801 Block Group 1	505	488	5	6	0	0	0	3	3	3.4	**20.2**
Census Tract 1801 Block Group 2	579	564	0	12	3	0	0	0	0	2.6	**20.1**

[47] The area within one mile of the proposed Project boundary is known as the geographic scope in regard to EJ communities when there are no major construction activities planned at the Project.

Gile Flowage Storage Reservoir Storage Reservoir Project Geographic Scope	RACE AND ETHNICITY DATA										LOW INCOME DATA
	Total Population (count)	White Alone Not Hispanic (count)	African American (count)	Native American/ Alaska Native (count)	Asian (count)	Native Hawaiian & Other Pacific Islander (count)	Some Other Race (count)	Two or More Races (count)	Hispanic or Latino (count)	Total Minority (%)	Households Below Poverty Level (%)
Census Tract 1801 Block Group 4	677	583	0	28	1	0	0	42	23	**13.9**	**18.4**
Census Tract 1802 Block Group 1	846	822	0	3	2	0	0	19	0	2.8	**14.1**
Census Tract 1803 Block Group 1	1,197	1,134	5	8	3	0	0	9	38	**5.3**	8.3

Source: (US Census Bureau, n.d.c) (US Census Bureau, n.d.d)

3.13.1.2 Environmental Justice Communities

NSPW evaluated the census block groups and tracts within the Project's geographic scope to determine if any EJ communities are present. Three evaluation methods were used to make this determination, which include the 50% analysis method, meaningful greater analysis method, and low-income threshold method.

To qualify as an EJ community under the 50% analysis method, the total percentage of the minority population must exceed 50% of the total population.

To qualify as an EJ community under the meaningful greater analysis method, the block group minority population must exceed 5.2% for block groups in Iron County.[48]

To qualify as an EJ community under the low-income threshold method, the percent of the population below the poverty level must equal or exceed the poverty level in Iron County, which is 13% (**Table 3.12.1.1-1**).

The three analysis methods identified five EJ communities within the Project's geographic scope, which are indicated with a "Yes" in **Table 3.13.1.2-1**.

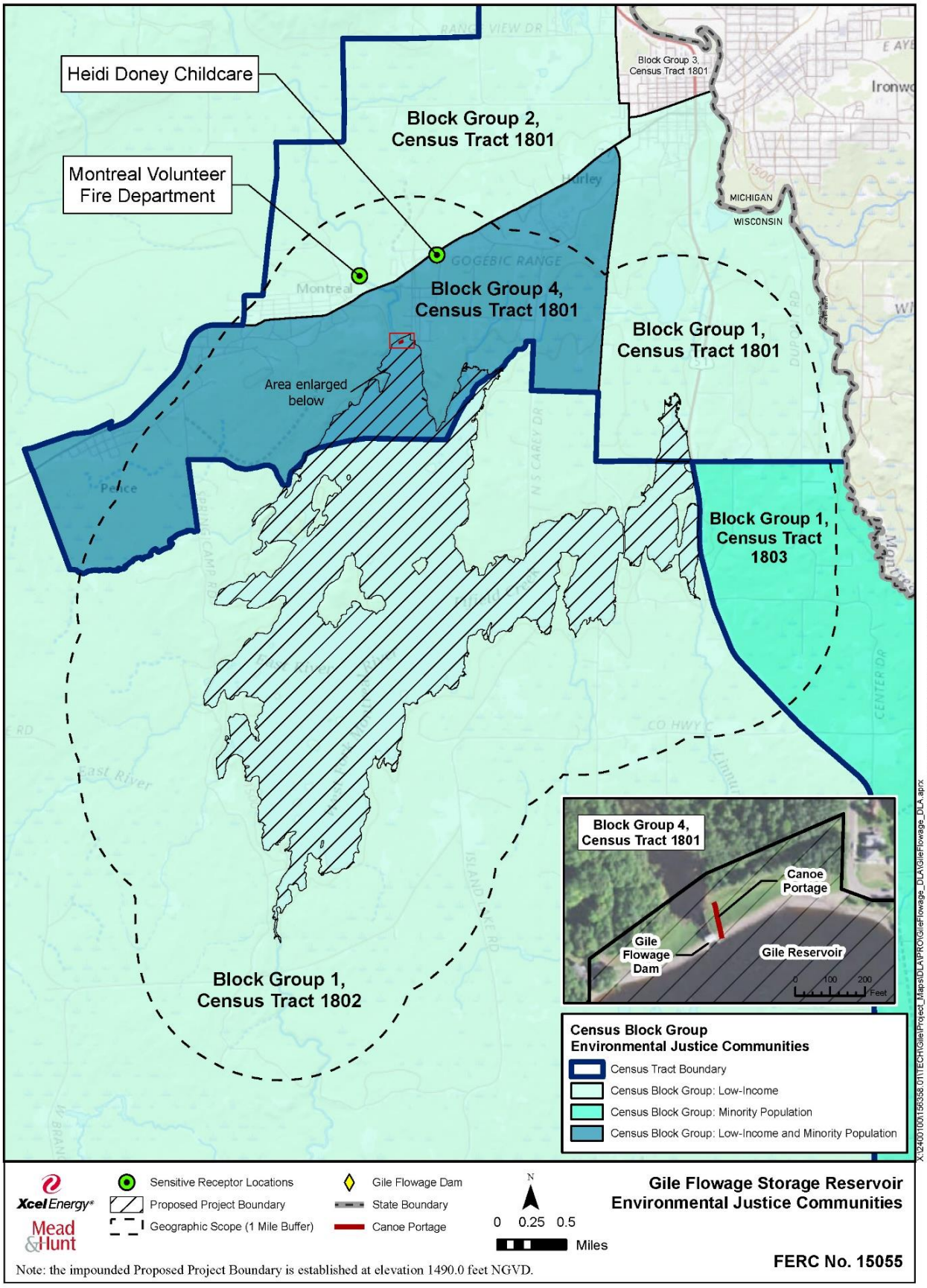
Table 3.13.1.2-1 Environmental Justice Communities within the Geographic Scope of the Project

Census Tract and Block Group Number	50% Analysis Method (Y/N)	Meaningful Analysis Method (Y/N)	Low Income Threshold Method (Y/N)
Tract 1801, Block Group 1	No	No	**Yes**
Tract 1801, Block Group 2	No	No	**Yes**
Tract 1801, Block Group 4	No	**Yes**	**Yes**
Tract 1802, Block Group 1	No	No	**Yes**
Tract 1803, Block Group 1	No	**Yes**	No

A map showing the Project boundary and location of project-related construction in relation to all identified EJ communities within the Project's geographic scope are shown in **Figure 3.13.1.2-1**. The map also identifies all sensitive receptor locations, including childcare centers, fire departments, hospitals, nursing homes, police stations, and schools located within the same geographic scope.

[48] Meaningful Greater Analysis Method: Iron County minority population 4.7% X 1.1 = 5.2%.

Figure 3.13.1.2-1 Gile Project Sensitive Receptor Location Map



Detailed information regarding each of the sensitive receptor locations within the Project's geographic scope is shown in **Table 3.13.1.2-2**.

Table 3.13.1.2-2 Sensitive Receptor Locations within the Geographic Scope of the Project

Sensitive Receptor Location	Distance from Existing Project Boundary	Project Related Effects	Mitigation Measures to Minimize Project-Related Impacts
Heidi Doney Child Care	0.61 miles	None	None
Montreal Volunteer Fire Department	0.54 miles	None	None

3.12.1.3 Project Related Impacts to EJ Communities and Sensitive Receptor Locations

NSPW does not believe there are any adverse Project-related impacts on any EJ communities or sensitive receptor locations due to the current operation of the Project.

The Gile Project is headwater storage reservoir that provides seasonally uniform streamflow for hydroelectric generation at the downstream Saxon Falls and Superior Falls projects. The Gile Project was originally authorized via a 1937 Wisconsin Public Service Commission Order and constructed in 1940. The 1937 order that set the maximum storage reservoir elevation at 1,490 feet NGVD. NSPW has historically operated the Project, and proposes to continue to do so, according to the following parameters:

- Discharge a year-round minimum flow of 10 cfs, or inflow, whichever is less, into the West Fork.
- Maintain Gile Flowage between a minimum elevation of 1,475 feet and a maximum of 1,490 feet NGVD.

NSPW has not proposed any construction as part of this application. Several recreational enhancements have been proposed in this application and are expected to have a positive impact on recreation. Since there are no proposed operational changes and no construction-related impacts, no adverse impacts to EJ communities or sensitive receptor locations are anticipated from continued Project operation.

The proposed environmental measures are an advancement for recreation resources, and consequently EJ communities in the Project vicinity, when compared to the alternative of no-action or denial of the license application. Without the issuance of an original license for the Project, the EJ community improvements will not occur.

3.13.1.4 Public Outreach

NSPW conducted numerous public outreach activities as outlined in Section 1.4. In order to determine if additional outreach was needed for non-English speaking communities, NSPW reviewed the 2020 American Community Survey Table S1601 Language Spoken At Home data. This review indicated 99.7% of the population of Iron County speaks English only or speaks English "very well" (US Census Bureau, 2020). Based on this data, language does not appear to be a major barrier in the Project vicinity. Therefore, no mitigation measures for non-English-speaking communities or EJ communities have been proposed in this application. Information regarding languages spoken in the Project vicinity is shown in **Table 3.13.1.4-1**.

Table 3.13.1.4-1 Languages Spoken in the Project Vicinity

Location	Speak Only English (%)	Speak English only or Speak English " Very Well" (%)	Speak Language Other Than English (%)	Other Languages Spoken (%)			
				Spanish	Asian and Pacific Islander	Indo-European	Other Languages
Iron County	97.1	99.7	2.9	1.1	0.1	1.5	0.2

Source: (US Census Bureau, 2020)

3.13.2 Environmental Effects

Based upon NSPW's review of EJ communities and sensitive receptor locations within the Project's geographic scope, no adverse impacts to EJ communities have been identified.

3.13.3 Proposed Environmental Measures

NSPW is not proposing any new environmental measures related to EJ communities at the Project.

3.13.4 Unavoidable Adverse Impacts

Continued Project operation is not expected to result in unavoidable adverse impacts to EJ communities.

4. Developmental Analysis

This section analyzes the cost of continued operation and maintenance of the Gile Project under the No Action and Proposed Operation Alternatives. Costs are associated with the operation and maintenance of the Gile Project's facilities, as well as the cost of providing proposed environmental mitigation measures.

4.1 Power and Economic Benefits of the Project

According to the existing storage benefits report developed for NSPW in 2019, the current operation provides a 21% increase in generation for the downstream Saxon Falls and Superior Falls projects. This calculates to 2,103.2 MWh for Saxon Falls and 2,401.6 MWh for Superior Falls for the five-year period ending in 2021.[49]

4.1.1 Current Annual Value of Developmental Resources

Based upon an average energy value of $27.32 per MWh, the average annual gross revenue from 2017 to 2021 was $284,322 for the Saxon Falls Project and $312,442 for the Superior Falls Project with $125,320 (21%) attributed to the operation of the Gile Project.[50,51,52] As noted in Exhibit A, the proposed Project operation is not expected to result in any lost generation due to lost storage because the proposed operating range is expected to provide adequate storage such that downstream generation will not be adversely impacted by the proposed environmental mitigation and enhancement measures.

4.1.2 Current Annual Cost of Project Operations, Maintenance, Repairs, and Administration

Estimated annual cost of Project operations, including the costs of operation and maintenance expenses, FERC fees, depreciation, and administrative and general expenses is identified in Section 20 of Exhibit A.

4.2 Comparison of Alternatives

4.2.1 No Action

Under the No Action alternative, NSPW would continue to operate the Gile Project as an unlicensed storage reservoir according to the following protocol:

- Continue to release a minimum flow of 10 cfs year-round to maintain fish and aquatic habitat within the West Fork downstream of the Project.
- Continue to operate the Gile Flowage Storage Reservoir between an elevation of 1,475 feet and 1,490 feet NGVD.
- Continue to operate the Gile Flowage Storage Reservoir at a maximum elevation of 1,490 feet NGVD.
- Attempt to restrict the typical daily reservoir drawdown to approximately 0.1 feet per day, but no more than 0.2 feet per day[53] to balance the needs of generation with the needs of recreation and the aquatic environment.

[49] Accession No.20200221-5033.
[50] FLA for the Saxon Falls and Superior Falls Hydroelectric Project Exhibit H, Accession No. 20221230-5395.
[51] Calculated from the ratio of authorized capacity at the Superior Falls Project (1.65 MW) versus the Saxon Falls Project (1.5 MW). Saxon Falls has 0.91 the capacity of Superior Falls.
[52] Calculated from replacement power value and the average annual generation figure from the FLA for the Saxon Falls and Superior Falls Hydroelectric Project Exhibit H, Accession No. 20221230-5395.
[53] Except for scheduled whitewater releases and emergencies beyond Applicant's control, which includes preemptive drawdowns for expected large inflow events due to precipitation or snow melt to reduce flooding and increased reservoir elevations at the downstream hydroelectric projects.

Under the No Action alternative, the Project would not be subject to FERC jurisdiction and no environmental mitigation or enhancement measures would be implemented.

4.2.2 Proposed Operation Alternative

Under the Proposed Operation alternative, NSPW will:

- Continue to release a minimum flow of 10 cfs year-round to maintain fish and aquatic habitat within the West Fork downstream of the Project.
- Continue to operate the Gile Flowage Storage Reservoir between elevation of 1,475 feet and 1,490 feet NGVD.
- Restrict the typical daily reservoir drawdown to approximately 0.1 feet per day, but no more than 0.2 feet per day[54] to balance the needs of generation with the needs of recreation and the aquatic environment.

Under the Proposed Operation alternative, NSPW would also implement several new proposed environmental measures, including the following:

- Develop an Aquatic and Terrestrial Invasive Species Plan and conduct biennial invasive species surveys.
- Conduct shoreline erosion surveys every 5 years.
- Develop a Historic Resources Management Plan and revisit eroding sites noted in previous shoreline surveys every 5 years.
- Develop an Operations Management Plan that includes deviation reporting and consultation requirements.

NSPW is also proposing the following environmental measures regarding recreation resources:

- Provide discharge and reservoir elevation information via the internet.
- Conduct routine maintenance of the FERC-approved recreation site(s) (Canoe Portage) throughout the term of the original license.
- Review and update or replace the Take-Out sign and Part 8 sign at the Canoe Portage recreation site.
- Develop a Land Management Plan to address recreation, signage, maintenance, and trash removal at NSPW owned islands.
- Develop a Whitewater Recreation Plan in coordination with the Saxon Falls Project to determine a designated schedule for the two proposed whitewater release events.
- Provide two annual whitewater releases downstream of the Gile Dam for whitewater boating.
- Supplement water releases as needed from the Gile Dam for enhanced aesthetics at the Saxon Falls bypass reach.
- Implement the Cave Bat BITP/A for any routine vegetation maintenance activities at NSPW's FERC-approved recreation site(s).
- Implement the Wood Turtle BITP/A for routine maintenance activities at NSPW's FERC-approved recreation site(s) as long as the turtle remains a state-threatened or endangered species.

[54] Except for scheduled whitewater releases and emergencies beyond Applicant's control, which includes preemptive drawdowns for expected large inflow events due to precipitation or snow melt to reduce flooding and increased reservoir elevations at the downstream hydroelectric projects.

NSPW is also proposing to implement several environmental measures for yet to be fully defined in-kind maintenance work that may occur during the term of the original license. The following environmental measures are being proposed to avoid any potential adverse impacts from any yet to be fully defined in-kind maintenance activities that could occur during the subsequent license (see Section 6.0 for a list of the types of activities):

- Implement the Cave Bat BITP/A.
- Implement the Wood Turtle BITP/A, as long as wood turtles remain a state threatened or endangered species.
- Review the Wisconsin NHI to determine the location of bald eagle nests and provide a 660-foot buffer between any vegetation management or construction activities as identified.

4.3 Cost of Environmental Measures

The additional estimated capital and estimated annual Operation and Management (O&M) costs for proposed environmental measures are outlined in **Table 4.3-1**.

Table 4.3-1 Estimated Capital and Additional O&M Costs for Proposed Environmental Measures[55]

Item		Capital Cost	Annual O&M Cost
Maintain a minimum flow of 10 cfs into the West Fork for enhancement of downstream aquatic habitat.		$0	$0[56]
Restrict the typical daily drawdown of the reservoir to approximately 0.1 feet per day, but no more than 0.2 feet per day, to balance the needs of generation with the needs of recreation and the aquatic environment.		$0	$0[57]
Develop Aquatic and Terrestrial Species Plan and conduct biennial invasive species surveys.		$40,000	$35,000*
Complete shoreline erosion survey every 5 years.		$0	$15,000*
Develop Historic Resources Management Plan and revisit shoreline surveys every 5 years.		$20,000	$15,000*
Develop an Operations Monitoring Plan.		$25,000	$0
Comply with operations deviation reporting and consultation.		$0	$10,000
Provide discharges and storage reservoir elevation information via the internet.		$50,000	$1,000
Recreation Measures	Review and update or replace the Take-Out and Part 8 signage at the Canoe Portage site.	$5,000	$0
	Conduct routine maintenance of NSPW's FERC approved recreation site(s) (Canoe Portage Site), including signage, over the term of the license.	$0	$750
	Develop a Land Management Plan for NSPW-owned islands	$25,000	$30,000
	Develop Whitewater Recreation Plan that also includes the Saxon Falls Hydroelectric Project.	$15,000	$0
	Provide 2 releases annually for downstream whitewater boating.	$0	$1,000[58]
	Supplement water releases as needed from the Gile Dam for enhanced aesthetics at the Saxon Falls bypass reach.	$0	$0[59]
	Implement the Cave Bat BITP/A and Wood Turtle BITP/A for any routine vegetation maintenance activities at NSPW's FERC-approved recreation site(s).	$0	$2,000
Total Cost		**$180,000**	**$NA[60]**

*cost per survey event

[55] All costs are estimated in 2023 dollars.
[56] No cost is included for the minimum flow releases because the proposed operating range is expected to provide adequate storage reserves such that the downstream generation will not be adversely impacted by the proposed environmental mitigation and enhancement measures. It is also currently being implemented and is not a change.
[57] No cost is included for the typical daily drawdown of approximately 0.1 foot per day, but no more than 0.2 feet per day, restriction because the proposed operating range is expected to provide adequate storage reserves such that the downstream generation will not be adversely impacted by the proposed environmental mitigation and enhancement measures. It is also currently being implemented and is not a change.
[58] The annual cost for whitewater flow releases is $1,000 for the operators to be dispatched on a weekend to adjust the flows. The lost generation for it does not include any cost for lost generation due to lost storage because the proposed operating range is expected to provide adequate storage reserves such that the downstream generation will not be adversely impacted by the proposed environmental mitigation and enhancement measures.
[59] No cost is included for the additional aesthetic flows that could result in lost generation downstream because the proposed operating range is expected to provide adequate storage reserves such that the downstream generation will not be adversely impacted by the proposed environmental mitigation and enhancement measures.
[60] The total O&M costs are not listed here because not all the costs are incurred annually.

5. Conclusions and Recommendations

5.1 Comprehensive Development and Recommended Alternative

This section is completed by the FERC in the NEPA document.

5.2 Unavoidable Adverse Effects

With the implementation of the environmental measures proposed in this application, continued Project operation is not expected to adversely affect geology and soils, water resources, fish and aquatic resources, terrestrial resources, TE resources, recreation resources, land use and shoreline management, aesthetic resources, cultural resources, socioeconomic resources, or EJ communities.

5.3 Recommendations of Fish and Wildlife Agencies

Recommendations received from the fish and wildlife agencies will be addressed by the FERC in the NEPA document.

5.4 Consistency with Comprehensive Plans

Section 10(a)(2) of the FPA requires the FERC to consider the extent to which a proposed project is consistent with existing federal and state comprehensive plans, as defined in Section 2.19 under Part 2 of Chapter 1, Title 18, CFR.

Below is a list of FERC-approved comprehensive plans identified in SD2 that may be applicable to the licensing of the Gile Project. This application was prepared in consultation with various resource agencies, including those that prepared the comprehensive plans outlined in the following sections.

If environmental reviews conducted by resource agencies identified any operational characteristics that require mitigation, appropriate mitigation has been proposed herein. As such, continued Project operation with the proposed mitigation measures is not expected to adversely impact resources in its vicinity.

5.4.1 National Park Service Plans

5.4.1.1 The Nationwide Rivers Inventory (1993)

The Nationwide Rivers Inventory is a listing of more than 3,200 free-flowing river segments in the United States that are believed to possess one or more “outstandingly remarkable” values. The West Fork is not listed in the inventory (National Park Service, n.d.c).

5.4.2 US Fish and Wildlife Service Plans

5.4.2.1 North American Waterfowl Management Plan (1986)

The North American Waterfowl Management Plan developed a strategy to restore waterfowl populations through habitat protection, restoration, and enhancement in Canada, Mexico, and the United States. The plan is general in nature and outlines specific policies, goals, and recommendations. The plan does not establish goals or recommendations specific to the Project vicinity; however, it does stress the importance of resource conservation, management, and enhancement (US Fish and Wildlife Service, 1986).

This FLA has been developed to evaluate impacts based upon resource conservation, management, and enhancement. There are no conflicts between this plan and continued Project operation.

5.4.2.2 Upper Mississippi River & Great Lakes Region Joint Venture Implementation Plan (1993)

The Joint Venture is a partnership of resource agencies, Native American Tribes, corporations, individuals, and organizations that have accepted the responsibility of implementing conservation plans within this geographic region. The Joint Venture conducts activities that support bird conservation goals and are the standard for effective, science-based delivery of bird conservation through partnerships (US Fish and Wildlife Service, 1993).

This FLA has been developed to evaluate impacts based upon resource conservation, management, and enhancement. There are no conflicts between this plan and continued Project operation.

5.4.2.3 Fisheries USA: The Recreational Fisheries Policy of the US Fish and Wildlife Service (1989)

The plan unites all USFWS recreational fisheries capabilities under a single policy to focus the organization's entire capability on enhancing the Nation's recreational fisheries. The plan is general in nature and outlines specific policies, goals, and recommendations. The plan does not establish goals or recommendations specific to the Project; however, it does stress the importance of resource conservation, management, and enhancement (US Fish and Wildlife Service, 1989).

The Project provides recreational fishing opportunities for the public. There are no conflicts between this plan and continued Project operation.

5.4.3 State of Wisconsin Plans

5.4.3.1 Lake Superior WDNR Basin Area Wide Water Quality Management Plan (1979)

This plan provides a snapshot of the current condition of land and water resources in the basin and creates a means for increased interagency cooperation and public involvement through identification and prioritization of issues and objectives (WI Department of Natural Resources, 1979).

There are no conflicts between this plan and continued Project operation.

5.4.3.2 Statewide WDNR Comprehensive Outdoor Recreation Plan for 2019-2023 (2019)

The SCORP is discussed in Section 3.8 and is included in the PAD.

There are no conflicts between this plan and continued Project operation.

5.4.3.3 Wisconsin's Water Quality Report to Congress (2022)

This report details water quality assessment findings in the state and describes specific state programs that control, manage, and prevent water quality degradation (WI Department of Natural Resources, 2022d). This report indicates the Project (Gile Flowage) meets water quality standards.

5.4.3.4 Wisconsin's Biodiversity as a Management Issue (1995)

This document provides a strategy for the conservation of biological diversity and presents general strategic recommendations and possible actions for specific biological community types (WI Department of Natural Resources, 1995).

This FLA has been developed to analyze biodiversity and resource conservation, management, and proposed enhancements. There are no conflicts between this plan and continued Project operation.

5.4.3.5 Wisconsin's Lake Superior Fisheries Management Plan (2020)

This plan guides the management of sport and commercial fisheries management in Wisconsin's Lake Superior waters from the 2020-2029. The established goals and objectives guide practical management of Wisconsin's Lake Superior fisheries to benefit Wisconsin citizens with the productive capacity of the resources (WI Department of Natural Resources, 2020).

This FLA has been developed to analyze impacts based upon resource conservation, management, and enhancement. There are no conflicts between this plan and continued Project operation.

5.4.3.6 WDNR Fishery Management Plan: Gile Flowage, Iron County, Wisconsin (2005)

This is a long-term strategic plan that guides WDNR's fishery management efforts on the Gile Flowage Storage Reservoir (WI Department of Natural Resources, 2005).

There are no conflicts between this plan and continued Project operation.

6. Maintenance Work - Yet to Be Fully Defined

In this FLA, NSPW provided analyses of the potential effects of the proposed operation of the Project regarding reasonably foreseeable future actions required under the license for the operation and maintenance of the Project. However, in the future, certain activities may become necessary for the day-to-day operations of the Project for which the schedule and full scope of environmental effects cannot be fully defined at this time. Some of these activities will require separate approval from the Commission prior to implementation. However, many activities can be considered in-kind replacements which would not require prior authorization from the resource agencies or Commission.

Examples of such yet to be fully defined maintenance work that may occur during the term of the license include, but are not limited to, the following:

- Replacement of gate seals, gate repairs, concrete repairs, etc. that do not require a drawdown;
- Grading of existing roads and parking areas;
- Replacement of existing or placement of new signs;
- Mowing and vegetation management at recreation sites and other Project facilities;
- Removal of hazardous trees from recreation sites or Project facilities, and;
- Any maintenance to existing facilities that occurs above or below the ordinary high-water mark that does not result in a required change to the Project's approved license exhibits or plans, provided all local, state, and federal permits are obtained prior to construction.

Impacts from yet to be fully defined in-kind maintenance work can generally be separated into categories based on areas of impact whereby specific mitigation measures can be implemented to avoid adverse impacts to the resource. The three general areas of potential impact are as follows:

- Structural or facility impacts, such as concrete replacement, equipment replacement, or equipment repair; or
- Terrestrial impacts; or
- Aquatic impacts.

The Commission is aware of the need for yet to be fully defined in-kind maintenance work to occur over the course of the new license. Therefore, it has previously established guidelines that allow such activities to occur. All constructed major hydroelectric projects are subject to the standard Form L-3 Article for constructed major projects affecting navigable waters of the United States. Article 3 of Form L-3 allows the Licensee to conduct maintenance work without prior commission approval under certain conditions/requirements. Article 3 states the following (emphasis added):

> *The project area and project works shall be in substantial conformity with the approved exhibits referred to in Article 2 herein or as changed in accordance with the provisions of said article. Except when emergency shall require for the protection of navigation, life, health, or property, there shall not be made without prior approval of the Commission any substantial alteration or addition not in conformity with the approved plans to any dam or other project works under the license or any substantial use of project lands and waters not authorized herein; and any emergency alteration, addition, or use so made shall thereafter be subject to such modification and change as the Commission may direct.* ***Minor changes in project works, or in uses of project lands and waters, or divergence from such approved exhibits may be made if such***

> ***changes will not result in a decrease in efficiency, in a material increase in cost, in an adverse environmental impact, or in impairment of the general scheme of development****; but any of such minor changes made without the prior approval of the Commission, which in its judgment have produced or will produce any of such results, shall be subject to such alteration as the Commission may direct.*

NSPW proposes that the conditions and requirements listed in Sections 6.1 through 6.3 below be included in the original license regarding yet to be fully defined in-kind maintenance activities that may occur during the term of the license. NSPW further proposes to complete yet to be fully defined, in-kind maintenance activities under Article 3 of Form L-3 as "minor changes in project works"[61] or in uses of Project lands or waters, without prior Commission approval because the activity will not and cannot be considered to "result in an adverse environmental impact or an impairment of the general scheme of development within the judgement of the Commission."[62]

The conditions described in Section 6.1 shall be implemented by NSPW, as applicable, in the planning and/or execution of any yet to be fully defined in-kind maintenance activities that will occur during the term of the original license. If the activity is unable to meet the requirements, there may be adverse environmental impacts, and the activity cannot proceed without prior Commission approval and cannot be considered a minor change as defined in the L-Form Article 3.

6.1 Structures or Facilities

Yet to be fully defined in-kind future maintenance activities could produce adverse impacts to historical structures, facilities or cultural properties which would be contrary to the conditions and intent of the license. Adverse impacts can be avoided if the following conditions/requirements are followed:

- No changes will be made to the structure without following the requirements outlined in the Programmatic Agreement or proposed Historic Properties Management Plan (Section 3.11);
- No changes will be made to the structure or facilities such that they no longer substantially conform to the approved Exhibits in the original license; and
- No changes will be made to the structure or facilities such that they no longer comply with the requirements of compliance plans developed as a result of the original license.

6.2 Terrestrial Areas

Yet to be fully defined future maintenance activities could result in adverse impacts to terrestrial areas within the Project boundary, which would be contrary to the conditions and intent of the original license. Adverse impacts can be avoided if the following conditions/requirements are followed:

- No ground-disturbing activities can occur without following the requirements outlined in the Programmatic Agreement or proposed Historic Properties Management Plan (Section 3.11);
- All applicable local, state, and federal permits will be obtained prior to construction and will be complied with during construction;[63]

[61] Language from Article 3 of Form L-3.
[62] Ibid.
[63] The Wisconsin permit process includes review and consultation on mitigation measures for all state and federally listed species.

- For ground-disturbing activities, appropriate erosion and sediment control BMPs from the current Wisconsin Construction Site Erosion Control Field Guide (NASECA, 2019) will be implemented;[64]
- Prior to undertaking the activity, NSPW will review the Wisconsin NHI database to determine the location of bald eagle nests and provide a 660-foot buffer between any vegetation management or construction activities and identified nests during the nesting season;
- Prior to undertaking the activity, NSPW will complete a search of the IPaC database and review the current Wisconsin NHI Endangered Resources review for the Project and follow any required conditions to avoid adverse impacts to any listed species;
- For activities involving the removal of any trees >3 inches in diameter, the current USFWS NLEB guidance and Wisconsin's BITP/A for Cave Bats (**Appendix E 20**) will be followed;
- NSPW proposes to follow the terms of the current Wood Turtle BITP/A (**Appendix E-19**) as long as the wood turtle remains a threatened or endangered species; and
- NSPW will follow the current terrestrial invasive species BMPs identified in the Invasive Species Monitoring and Control Plan, to be developed under the original license, for ground disturbing or vegetation maintenance activities that have the potential to spread existing or introduce new terrestrial invasive species.

6.3 Aquatic Areas

Yet to be fully defined in-kind maintenance activities may result in adverse impacts to the Project's aquatic environment which would be contrary to the conditions and intent of the original license. Adverse impacts can be avoided if the following conditions/requirements are followed:

- Prior to undertaking the activity, NSPW will obtain all local, state, and federal permits as applicable and comply with all permit conditions during construction;
- For any deviation from license prescribed reservoir elevation or minimum flow requirements not exceeding three weeks,[65] NSPW will implement the planned deviation reporting process as outlined in Section 3.5.3;
- Prior to undertaking the activity, NSPW will review the Wisconsin NHI to determine the location of bald eagle nests and provide a 660-foot buffer between any vegetation management or construction activities and identified nests during the nesting season;
- Prior to undertaking the activity, NSPW will complete a search of the IPaC database and follow any required measures included in the current Wisconsin NHI Endangered Resources review for the Project;
- For equipment used for in-water work, the current WDNR manual *Code # 9183.1 Boat, Gear, and Equipment Decontamination and Disinfection Protocol* (WI Department of Natural Resources, 2016) or equivalent, will be followed; and
- NSPW proposes to follow the terms of the current Wood Turtle BITP/A (**Appendix E-19**) as long as the wood turtle remains a state-listed threatened or endangered species.

[64] Field guide is included in **Appendix E-27**.
[65] Any planned change exceeding three weeks requires independent Commission approval prior to implementation.

7. Consultation Documentation

A distribution list that includes the names and addresses of federal, state, and interstate resource agencies; Native American Tribes; and interested members of the public consulted in the preparation of this Exhibit E is attached to the cover letter of this filing and will not be duplicated in this section.

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