Preliminary Application Document

Superior Falls Project

FERC Project No. 2587

Saxon Falls Project

FERC Project No. 2610

Montreal River, Iron County, Wisconsin and Gogebic County, Michigan

Submitted by
Northern States Power Company
Eau Claire, Wisconsin

Report prepared by
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List of Abbreviations

ACHP	Advisory Council on Historic Preservation
ADA	Americans with Disabilities Act
Applicant	Northern States Power Company
CEII	Critical Energy Infrastructure Information
CFR	Code of Federal Regulations
cfs	Cubic Feet per Second
Commission	Federal Energy Regulatory Commission
Dam	Superior Falls, Saxon Falls, or Gile Flowage dam, dependent on section heading
EGLE	Michigan Department of Environment, Great Lakes, and Energy
DLA	Draft License Application
DO	Dissolved oxygen
EA	Environmental Assessment
Eagle Creek	Eagle Creek Renewable Energy, LLC
EIS	Environmental Impact Statement
°F	Temperature in degrees Fahrenheit
FERC	Federal Energy Regulatory Commission
FLA	Final License Application
hp	Horsepower
IPaC	Information for Planning and Consultation
JAM	Joint Agency Meeting
kV	Kilovolts
kVA	Kilovolt-amperes
kW	Kilowatts
Licensee	Northern States Power Company
MiSWIMS	Michigan Surface Water Information System
MDNR	Michigan Department of Natural Resources
MWh	Megawatts per Hour
NEPA	National Environmental Policy Act
NGVD	National Geodetic Vertical Datum
NHI	National Heritage Inventory
NLEB	Northern long-eared bat
No.	Number
Nos.	Numbers
NOI	Notice of Intent
NOAA	National Oceanic Atmospheric Association
NPS	National Park Service
NRCS	Natural Resource Conservation Service
NR	Natural Resources
NR 40	Chapter NR 40 of the Wisconsin Administrative Code
NRHP	National Register of Historic Places
PAD	Preliminary Application Document
PCB	Polychlorinated biphenyl
PDF	Portable Document Format
Project	Either Superior Falls Project or Saxon Falls Project, dependent on section heading
Projects	Superior Falls Hydroelectric Project and Saxon Falls Hydroelectric Project
RCP	Reinforced Concrete Pipe
rpm	Revolutions per minute
RAW	River Alliance of Wisconsin
RUSLE2	Revised Universal Soil Loss Equation, Version 2
§	Section
SCORP	Statewide Comprehensive Outdoor Recreation Plan

SHPO	Wisconsin Historical Society State Historic Preservation Office
TLP	Traditional Licensing Process
USDA	United States Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UW-M	University of Wisconsin-Madison
WDNR	Wisconsin Department of Natural Resources
WDOA	Wisconsin Department of Administration
WHPD	Wisconsin Historic Preservation Database
WDPI	Wisconsin Department of Public Instruction

1. Introduction

Xcel Energy Services Inc., on behalf of Northern States Power Company, a Wisconsin Corporation (Licensee, Applicant) currently is licensed by the Federal Energy Regulatory Commission (FERC or Commission) to operate the Saxon Falls Hydroelectric Project (Saxon Falls Project) and the Superior Falls Hydroelectric Project (Superior Falls Project), collectively (Projects) or individually (Project).

The Saxon Falls Project (FERC Project No. 2610) is located on the Montreal River in Iron County, Wisconsin and Gogebic County, Michigan. The Saxon Falls Project license was issued on December 22, 1989 for a term of 30 years with an effective date of January 1, 1990 and an expiration date of December 31, 2019 (FERC, 1989). The Superior Falls Project (FERC Project No. 2587) is also located on the Montreal River in Iron County, Wisconsin and Gogebic County, Michigan.

The Superior Falls Project license was issued on January 19, 1995 for a term of 30 years with an effective date of January 1, 1995 and an expiration date of December 31, 2024 (FERC, 1994). The Projects are located within approximately 4 river miles of each other on the Montreal River. In addition to these licensed Projects, the Licensee also operates the Gile Flowage, an unlicensed headwater storage reservoir approximately 20 miles upstream of the Saxon Falls Project. For the purposes of this Preliminary Application Document (PAD), the Licensee is providing information regarding both Projects and the Gile Flowage to assist with evaluating the environmental impacts of both Projects. The location of all three facilities is shown in **Figure 1.1**.

As described above, the current Project licenses were originally set to expire on two different dates. On July 18, 2014, Northern States Power Company filed a request for an extension of the license term for the Saxon Falls Project (with an expiration date of December 31, 2019) to align with the license expiration date of the Superior Falls Project (**Appendix 1-1**). The FERC subsequently issued an Order on November 6, 2014, extending the license term of the Saxon Falls Project to expire in conjunction with the Superior Falls Project on December 31, 2024 (FERC, 2014) (**Appendix 1-2**). This realignment should enhance process efficiencies; reduce workloads for the Licensee, Commission, and stakeholders; and facilitate more comprehensive analysis of common resources.

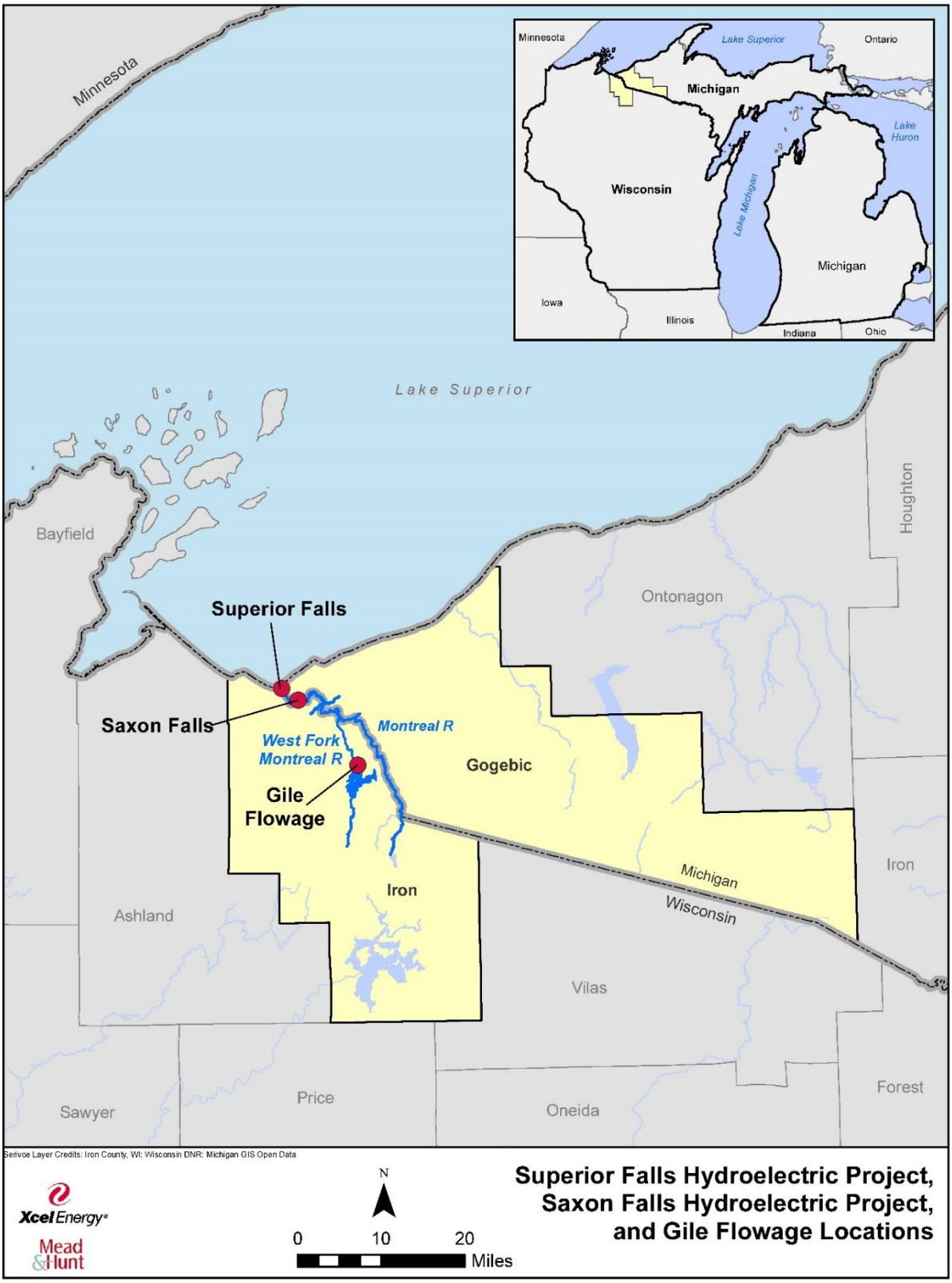
Northern States Power Company must submit new license applications for both Projects to the Commission no later than December 31, 2022 in order to receive new licenses prior to their December 31, 2024 expiration date. A similar relicensing schedule will be implemented for both Projects in order to consolidate efforts of the Licensee, Commission, resource agencies, and other stakeholders.

Applying for a new license requires the Licensee to first prepare a Notice of Intent (NOI) and PAD pursuant to 18 Code of Federal Regulations (CFR) Part 5 (CFR, 2016). As such, an NOI will be prepared for each Project and one PAD will be developed for both Projects.

The FERC requires a Licensee to use the Integrated Licensing Process unless the Commission grants a request to use an alternative process. Pursuant to 18 CFR § 5.3, such a request must accompany the NOI and PAD and set forth specific information justifying the request. A request to use the FERC's Traditional Licensing Process (TLP) for the Saxon Falls Project and Superior Falls Project will also be included with the NOIs and PADs. This PAD includes the required information consistent with 18 CFR § 5.6 for the Saxon Falls Project and Superior Falls Project.

When the license applications are filed for each Project, a public notice will be published in a local newspaper providing interested persons and agencies an opportunity to present any concerns they may have. A separate license application will be filed, and a subsequent license will be obtained for each of the Projects.

Figure 1-1: Locations along the Montreal River in Wisconsin and Michigan



1.1 Authorized Agents (18 CFR § 5.6(d)(2)(i))

The following are authorized to act as agents for the Applicant pursuant to 18 CFR § 5.6(d)(2)(i):

Matthew J. Miller
Hydro License Compliance Consultant
Northern States Power Company
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1.2 PAD Content

The PAD is generally organized based upon requirements set forth in 18 CFR § 5.6(c), § 5.6 (d), and § 16.7 (CFR, 2018). The purpose of the PAD is to:

- Describe the existing hydroelectric project and its proposed operations,
- Summarize existing information relevant to the evaluation of the project's impact on the area,
- Determine initial concerns or issues various resource agencies may have concerning the Project, and
- Begin to identify potential studies that may need to be conducted to support a new license application.

To assist with this PAD development, various entities at the federal, state, regional, and local level, as well as Indian tribes, were contacted to gather input regarding information and studies that may be relevant to the Projects, as well as any possible concerns or issues they may have. Consultation is summarized in Section 6 of this PAD.

1.3 References

- Federal Energy Regulatory Commission. 1989. Order Issuing Subsequent License P-2610 (Minor Project). Issued December 22, 1989.
- Federal Energy Regulatory Commission. 1995. Order Issuing New License P-2587 (Major Project). Issued January 19, 1995.
- Federal Energy Regulatory Commission. 2014. Request for Extension of License Term under P-2610. July,18, 2014.
- Federal Energy Regulatory Commission. 2014. Order Extending Term of License under P-2610. Issued November 6, 2014.
- United States Code of Federal Regulations. 2016. Title 18, Part 5. Revised April 1, 2016.
- United States Code of Federal Regulations. 2018. Title 18, Part 16. Updated April 1, 2018.

2. Process Plan and Schedule (18 CFR § 5.6(d)(1))

2.1 Process Plan and Schedule Through Filing of License Application

This PAD represents one of the first steps in the Licensee's effort to obtain new licenses from the FERC which will allow for the continued operation and maintenance of the Projects. Concurrent with the filing of this PAD, Northern States Power Company filed an NOI for each Project. Pursuant to 18 CFR § 5.5, the NOI filings mark the beginning of the relicensing process and set the schedule for further licensing activities. In addition to filing the PAD and NOIs, Northern States Power Company filed a request with the FERC seeking approval to utilize the Traditional Licensing Process for each Project. The requests to use the TLP were filed as related submittals under 18 CFR § 5.3. Northern States Power Company's justification to utilize the TLP for each Project is included in the request.

Initial activities under the plan and schedule (**Figure 2.1-1** and **Table 2.1-1**) include filing the PAD and NOIs, as well as requests to use the TLP, by December 31, 2019[1]. Based upon a tentative filing date of December 30, 2019, comments regarding the proposed use of the TLP must be filed with the FERC no later than January 29, 2020. It is anticipated the FERC will approve the Licensee's request to use the TLP for both Projects by February 28, 2020, at which time Stage 1 of the formal three-stage consultation process would begin for each Project.

In accordance with the above-referenced plan and schedule, within 30 days of receiving TLP approvals from the FERC, Northern States Power Company will issue a Notice for a Joint Agency Meeting (JAM) with stakeholders that includes resource agencies and Indian tribes. Northern States Power Company anticipates holding one JAM for both Projects. Based upon the anticipated February 28, 2020 approval to utilize the TLP, the JAM will be held no later than April 28, 2020. Based upon this schedule, stakeholder comments on the PAD would be due by June 27, 2020.

Stage 2 consultation begins after written comments are received on the PAD, or 120 days after the JAM, whichever occurs first. It is anticipated this stage will include consultations with resource agencies regarding study requests. Coordination with resource agencies for the development of study plans is expected to occur prior to the implementation of the studies.

Northern States Power Company will submit one Draft License Application (DLA) for each Project. Preparation of the DLAs will begin by November 1, 2021 and will be filed by June 2, 2022. Stakeholder review of the DLAs is expected to occur between June 2, 2022 and August 31, 2022 (90 days).

Preparation of the Final License Application (FLA) is expected to begin by November 1, 2022 and filed with the FERC no later than December 31, 2022. Once the FLA is filed, Stage 3 consultation would begin. Based on the December 31, 2022 FLA filing date, it is anticipated the following will occur between December 31, 2022 and December 31, 2024:

- Review of the FLA by the FERC
- Issuance of the FERC FLA acceptance letter

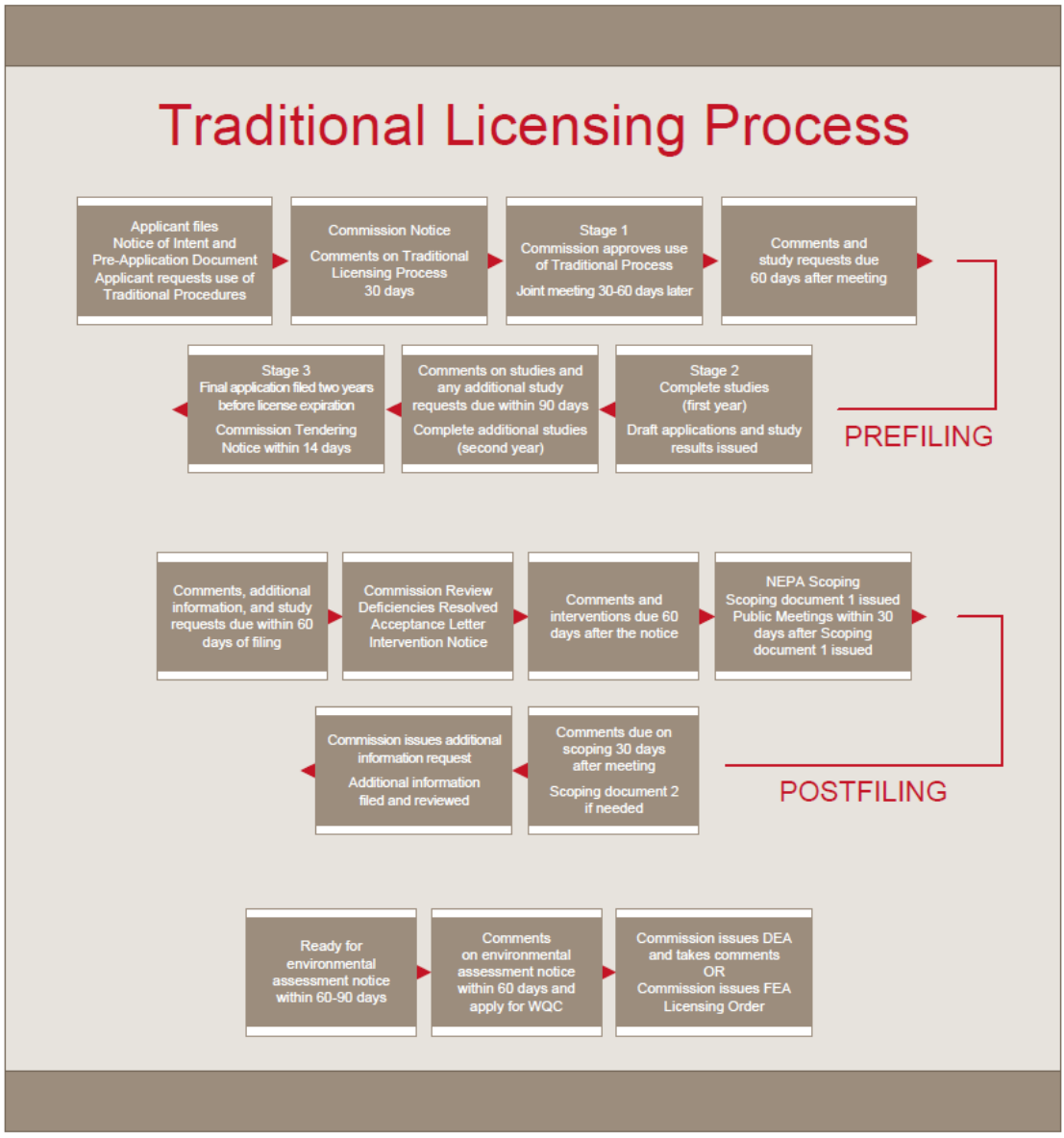
[1] Northern States Power Company intends to file the PAD, NOI, and request to use the TLP one day earlier than the required date.

- Submittal of stakeholder comments, terms, and conditions
- Scoping under the National Environmental Policy Act (NEPA)
- Preparation of Draft Environmental Assessment (EA) or Environmental Impact Statement (EIS)
- Resolution of issues, if any, under Federal Power Act § 10(j)
- Preparation of final EA or EIS

Based on this anticipated schedule, the FERC would issue a License Order by December 31, 2024.

A graphic outlining the TLP schedule is displayed below in **Figure 2.1-1**.

Figure 2.1-1: FERC Traditional Licensing Process Planned Schedule



The TLP plan and schedule for both Projects are summarized in **Table 2.1-1.**

Table 2.1-1: Traditional Licensing Process Plan and Schedule

TLP Steps	Timelines	Due Date*
Initial Activities		
Licensee submits PAD, NOIs, and TLP Requests	5 years before the license expiration date	12/30/2019
Stakeholders provide comments regarding TLP	30 days after the request	01/29/2020
FERC approval of TLP	60 days after the request	02/28/2020
Stage 1 Consultation		
Licensee conducts Joint Meeting and site visits with potential stakeholders	30 to 60 days after the TLP approval	04/28/2020
Stakeholders submit comments on PAD/Study Requests	Comments and study requests due 60 days after Joint Meeting	06/27/2020
Stage 2 Consultation		
Licensee's Study, Year 1	Begins after receipt of study requests	2020
Licensee's Study, Year 2, if necessary	Begins after completion of Study Year 1	2021
Licensee submits Draft License Application to FERC and relicensing participants for comment	Begins after completion of Study Year 2 (soft deadline)	06/02/2022
Stakeholders and FERC provide comments on the Draft Application	Within 90-days after receipt of Draft License Application	08/31/2022
Licensee Files Final Application	At least two years prior to license expiration	12/31/2022
Stage 3 Consultation		
FERC review of Final Application	Planned for 6 months	TBD*
FERC Additional Information Request	Response planned within 90 days	TBD
FERC Notice Ready for Environmental Analysis	Task expected to take 90 days	TBD
Northern States Power Applies for 401 Water Quality Certification	Apply no earlier than Final License Application filing and later than 60 days after FERC Notice Ready for Environmental Analysis	TBD
FERC NEPA Scoping	Planned for 6 months	TBD
FERC Issues EA/EIS	Comment period planned for 65 days	TBD
FERC Order Issuing New License	FERC goal is to issue the new license before the current license expires	12/31/2024

* Once the Final License Application is filed, the FERC determines the actual schedule for activities.

2.2 Proposed Communications Protocols

The TLP is a consultation-intensive process during which stakeholders have an opportunity to provide input during several stages. The current distribution list for this PAD is included as part of the Certificate of Service. The distribution list will be updated throughout the relicensing process based upon feedback from the participants.

2.2.1 General Communications

Primary means of communication and document distribution will be via email, unless email addresses are not available or unless otherwise requested. A mailing service will be used for distribution of hardcopies. The telephone will serve as an informal method of communication. In addition, a relicensing website, as shown below in Section 2.2.3, has been developed to include major document submissions, major FERC orders, and other relevant documents. All filings related to the relicensing process are available from the FERC's eLibrary website at elibrary.ferc.gov. Search for filings by Project using P-2610 for information regarding the Saxon Falls Project or Project P-2587 for information regarding the Superior Falls Project.

2.2.2 Meetings

All meetings that are an essential part of the relicensing process will be scheduled on weekdays (Monday through Friday) to allow for participation during the hours of 9:00 a.m. to 3:00 p.m. Central Standard Time (CST). Meetings will occur in person at a reasonable location in close proximity to the Projects or by conference call. It may become impractical to accommodate each relicensing stakeholder's unique schedule; however, every effort will be made to schedule meetings to accommodate the majority of stakeholders. Northern States Power Company will strive to provide all stakeholders with a notification of any process-required meeting at least two weeks prior to the scheduled meeting date. A meeting agenda and any necessary meeting materials will be provided prior to the meeting as well.

2.2.3 Documents

A hard copy of the NOIs, TLP requests, and this PAD will be available for public viewing in the public reference file in the cities of Hurley, Wisconsin and Ironwood, Michigan at the following locations:

- Hurley Public Library – 405 5th Avenue North, Hurley, Wisconsin
- Ironwood Carnegie Library – 235 East Aurora Street, Ironwood, Michigan

Copies of process-related documents can be viewed and printed electronically in portable document format (PDF) from the relicensing website at: Hydrorelicensing.com or FERC's eLibrary system. Certain documents will contain Critical Energy Infrastructure Information (CEII) or will contain sensitive/privileged information and will be designated as such. Not all stakeholders will be able to view CEII or privileged documents. Information on obtaining access to view CEII, sensitive/privileged information can be found by following the instructions contained at: https://ferc.gov/legal/ceii-foia/foia.asp.

Requests for hard copies of relicensing documents should be sent to Matthew J. Miller using the contact information provided in Section 1.1 and should clearly indicate the document name, publication date (if known), and the FERC Project No. A reproduction charge ($0.25/page) and postage costs may

be assessed for hard copies requested by the public. The United States Fish and Wildlife Service (USFWS), Wisconsin Department of Natural Resources (WDNR), Michigan Department of Natural Resources (MDNR), and Indian tribes will not be subject to document processing or postage fees.

2.2.4 Study Requests

The TLP allows stakeholders to request studies in order to provide information that was not available during the development of this PAD. Study requests must be submitted within 60 days after the JAM resulting from the filing of this PAD.

As specified by 18 CFR § 16.8(b)(5) of the FERC regulations, each interested resource agency, Indian tribe, or member of the public must provide the following information in their study request:

- Identify its determination of necessary studies to be performed or information to be provided by the Applicant;
- Identify the basis for its determination;
- Discuss its understanding of the resource issues and goals and objectives for these resources;
- Explain why each study methodology recommended is more appropriate than any other methodology alternatives, including those by the Applicant;
- Document the use of each study methodology recommended is a generally accepted practice; and
- Explain how the studies and information requested will be useful to the agency, Indian tribe, or member of the public in furthering its resource goals and objectives.

Any study requests should be filed directly with the Commission with a courtesy copy provided to Shawn Puzen at shawn.puzen@meadhunt.com.

3. Project Location, Facilities, and Operation (18 CFR § 5.6(d)(2))

3.1 Project Location (18 CFR § 5.6(d)(2)(ii))

3.1.1 Saxon Falls Project

The Saxon Falls Project Dam is located on the Montreal River, 4.3 miles upstream of its confluence with Lake Superior in the town of Saxon, Iron County, Wisconsin and Ironwood Township, Gogebic County, Michigan. The Project is located 11 miles northwest of the neighboring cities of Hurley, Wisconsin and Ironwood, Michigan and roughly 25 miles east of the city of Ashland, Wisconsin.

3.1.2 Gile Flowage

The Gile Flowage is an unlicensed headwater storage reservoir that provides seasonally uniform streamflow for hydroelectric generation at the downstream Saxon Falls and Superior Falls Projects. The Gile Flowage is located on the West Fork of the Montreal River approximately 20 miles upstream of the Saxon Falls Project. The Gile Flowage is located within the towns of Pence and Carey, Iron County, Wisconsin; approximately 2.5 miles southwest of the neighboring cities of Hurley, Wisconsin and Ironwood, Michigan; and approximately 33 miles southeast of the city of Ashland, Wisconsin.

3.1.3 Superior Falls Project

The Superior Falls Project Dam is located on the Montreal River approximately 0.4 miles upstream of its confluence with Lake Superior in the town of Saxon, Iron County, Wisconsin and Ironwood Township, Gogebic County, Michigan. The Project is located approximately 14 miles northwest of the neighboring cities of Hurley, Wisconsin and Ironwood, Michigan and roughly 23 miles east of the city of Ashland, Wisconsin.

3.2 Saxon Falls Project Facilities (18 CFR § 5.6(d)(2)(iii))

3.2.1 Saxon Falls Current Facilities

From right to left looking downstream[2], Project structures include a dam with seven sections, a steel conduit downstream of the dam which conveys water from the intake to the surge tank, and two penstocks which extend from the surge tank to the powerhouse. The current Project facilities are shown in **Figure 3.2.1-1** on the following page. A description of each structure from right to left, as well as the tailrace, transmission equipment, reservoir, and appurtenant equipment is provided in the following paragraphs.[3]

3.2.1.1 Saxon Falls Dam

The dam is 510 feet long, 40 feet high, and consists of seven sections: a right spillway abutment section, overflow spillway section, gated spillway section, non-overflow concrete gravity dam section, intake structure section, non-overflow mass concrete dam section, and earth dam section.

[2] Direction of left or right, when describing facilities, is given looking downstream.

[3] Unless otherwise cited, all facility description attributes are from the Supporting Technical Information Document filed with the FERC on March 13, 2014 (Northern States Power Company, 2014).

Right Spillway Abutment Section

The right spillway abutment section consists of a concrete training wall founded on bedrock and a concrete core wall that extends 20 feet into the earth fill to the right of the spillway.

Overflow Spillway Section

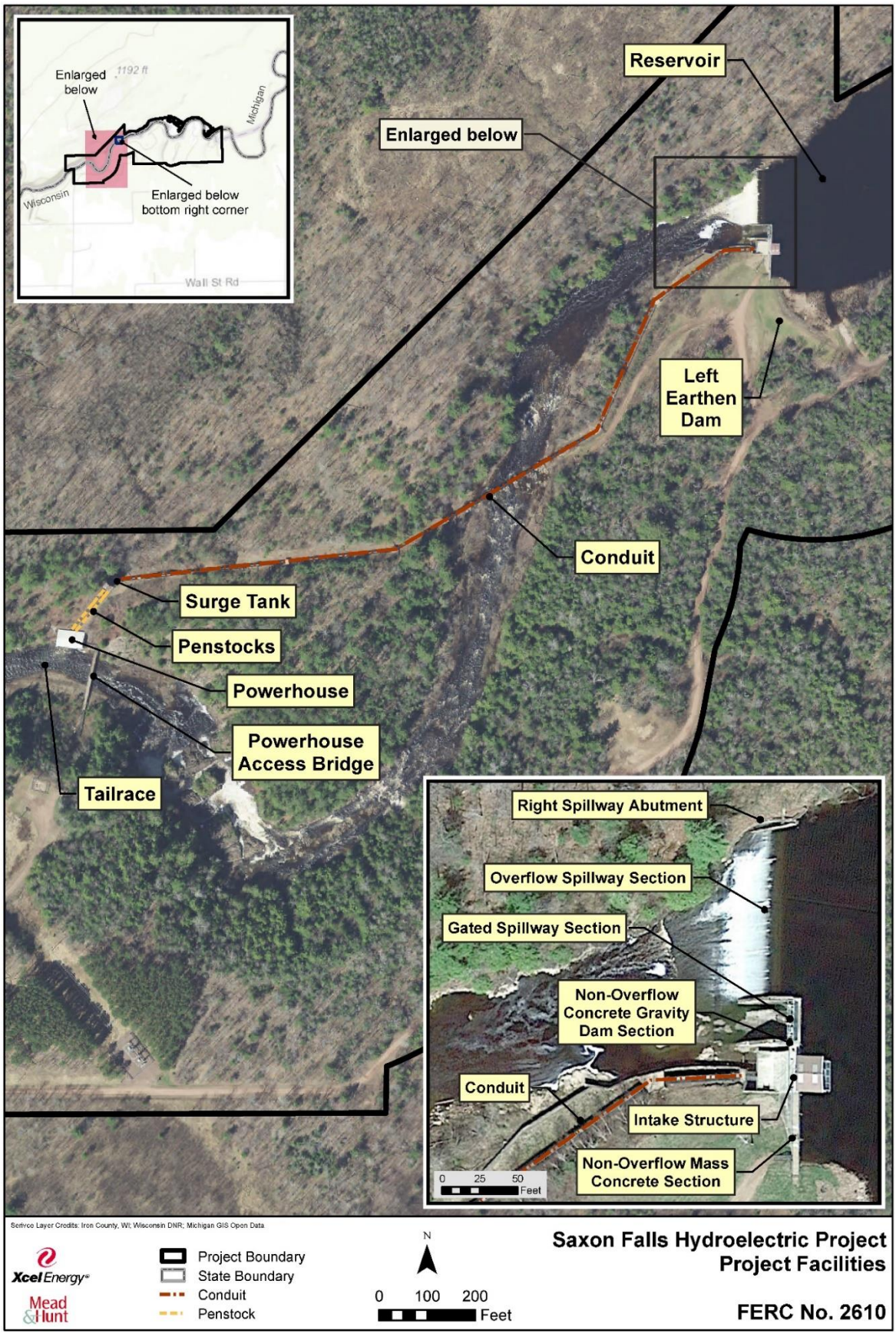
The overflow spillway section is an Ambursen-type concrete structure that is 126.75 feet in length at the crest. The elevation of the spillway section is 997.0 feet 1929 National Geodetic Vertical Datum (NGVD) at the crest and 964.0 feet (NGVD) at the downstream apron.[4] The spillway is founded on bedrock and the right end is keyed into the near vertical bedrock riverbank. The interior chamber of the spillway is separated into bays by 2.5-foot-thick concrete buttresses spaced 16 feet on center. The left side of the left bay is supported by the mass concrete gated spillway and the pier. Each bay except the last two bays on the right have vents and a drain on the downstream of the structure.

Gated Spillway Section

The gated spillway section is a mass concrete structure with an ogee shaped crest and downstream face located between the overflow spillway and right non-overflow concrete dam structure. The spillway crest elevation is 984.0 feet. The mass concrete section has an access tunnel extending from the non-overflow dam to the overflow spillway interior chambers. Concrete piers are located on either end of this section and support a steel tainter gate, concrete operator's deck, and gate hoist equipment. The tainter gate is 12 feet high and 26 feet wide. The gate hoist has an electric motor-driven lift mechanism that can also be manually operated.

[4] All elevations in this document are referenced in the 1929 National Geodetic Vertical datum (NGVD).

Figure 3.2.1-1: Saxon Falls Project Facilities



Non-Overflow Concrete Gravity Dam Section

The non-overflow gravity dam section consists of one 12-foot-wide bay with a crest elevation of 1,004.1 feet. This section was modified as part of a 1990 reconstruction of the intake structure.

Intake Structure Section

The intake structure section was reconstructed in 1990. It consists of a 19-foot-wide mass concrete structure located between the two non-overflow dam sections. This structure provides water to the steel conduit, which extends downstream, for the production of hydropower at the powerhouse. Trashracks, a flap gate for dewatering the penstock and a hoist for the flap gate are also located on the upstream end of this section. A low-flow orifice outlet is located on the downstream face of this section, providing minimum flows to the river channel between the dam and powerhouse. The trashracks are 15 feet high by 20 feet wide with 1-inch clear spacing. The top elevation of the mass concrete structure is 1,004.1 feet. A steel frame gatehouse is located over the intake, housing the gate hoist as well as operation and maintenance equipment.

Non-Overflow Mass Concrete Dam Section

The non-overflow mass concrete dam section extends 57 feet to the left of the intake structure and serves as a transition between the concrete structure and the earthen dam. The crest elevation of this section is 1,004.1 feet.

Left Earthen Dam Section

The left earthen dam extends 260 feet southeast from the concrete structures. The earthen dam is constructed of a homogenous earth fill and contains a sheet pile cutoff wall driven into bedrock. Downstream drainage is provided by means of a 4-inch vitrified clay tile line. At the downstream toe, the drain tile lines discharge to a drainage ditch which carries the water to the Montreal River. The crest elevation of the left earthen dam varies from 1,005.0 feet to 1,007.6 feet.

3.2.1.2 Saxon Falls Conduit

The conduit consists of a steel pipe that extends 1,607 feet downstream from the dam to the surge tank. It crosses the Montreal River from the Wisconsin side to the Michigan side approximately 700 feet downstream of the dam. The 5/16-inch-thick steel pipe has an inside diameter of 6 feet. The conduit is supported by six concrete anchor piers and 29 ring anchor supports.

3.2.1.3 Saxon Falls Surge Tank

The 3/8-inch-thick steel surge tank is 23.5 feet in diameter and 59.5 feet high. It is located at the edge of the high riverbank on the Michigan side of the Montreal River overlooking the powerhouse.

3.2.1.4 Saxon Falls Penstocks

The penstocks consist of two steel pipes that extend 156 feet downward from the surge tank to the powerhouse. Each ½-inch-thick pipe is 54 inches in diameter. Each penstock has a gate valve located in a small masonry gate house just downstream of the surge tank.

3.2.1.5 Saxon Falls Powerhouse

The reinforced concrete powerhouse is 52 feet long by 30 feet wide and is 16 feet high from the generator floor to the ceiling. The powerhouse is located in Michigan.

Turbines

The powerhouse contains two horizontal-type units manufactured by the James A. Leffel Company and are rated at 1,000 horsepower (hp) each. The minimum flow to operate one turbine is 48 cfs. The maximum hydraulic capacity with both turbines operating is 170 cfs.

Generators

The Project uses two General Electric 2300-volt, 600 rpm, 0.8 power factor AC generators with an original nameplate capacity of 625 kW each. The generators were rewound in 1957 and are now rated at 750 kW each. The combined plant capacity is 1,500 kW.

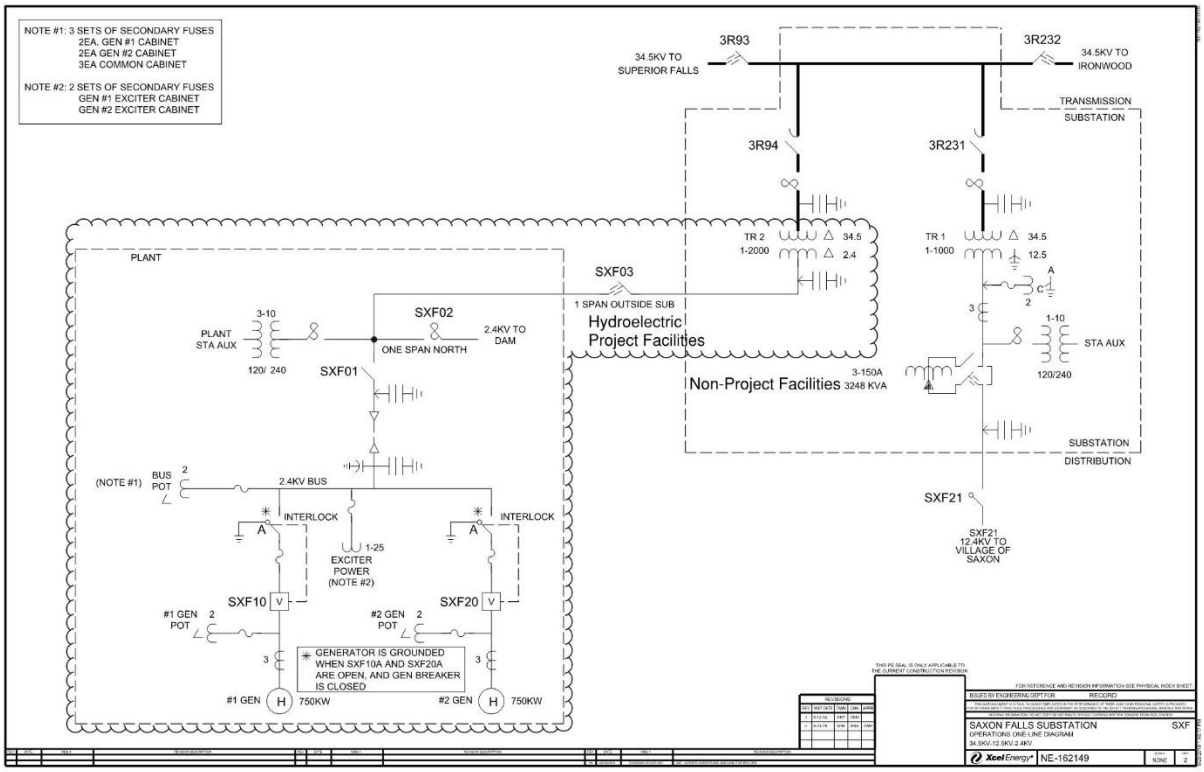
3.2.1.6 Saxon Falls Tailrace

Water is released from the powerhouse directly to the Montreal River. The Project boundary extends downstream on the Wisconsin side of the River for approximately 675 feet and on the Michigan side of the River for approximately 1,350 feet.

3.2.1.7 Saxon Falls Transmission Equipment

There is a 0.25-mile-long, 2.4 kV transmission line extending from the powerhouse to the non-project distribution substation. Equipment required to transmit the electrical generation to the non-project distribution system contains a step-up transformer. The transformer steps up the voltage that connects to the non-project distribution system from 2.4 kV to 34.5 kV. A diagram of principal electrical circuits associated with the Project is included in **Figure 3.2.1.7-1**

Figure 3.2.1.7-1: Saxon Falls Project One-line Diagram of Principal Electrical Circuits



3.2.1.8 Saxon Falls Reservoir

The reservoir encompasses approximately 69 acres with a storage capacity of about 550 acre-feet at the maximum reservoir elevation of 997.0 feet. It has a maximum depth of 12 feet and an estimated average depth of 8 feet. The substrate consists of 70% sand, 0% gravel, 0% rock, and 30% muck (WDNR, 2019).

3.2.1.9 Saxon Falls Appurtenant Equipment

Appurtenant equipment includes but is not limited to equipment such as bearing lubrication systems, generator ventilation systems, switchboards, additional gate hoist equipment, switchgear, protective devices, and metering devices.

3.2.2 Saxon Falls Project Boundary

The current FERC license (issued December 22, 1989) established the Project boundary to include approximately 158 upland acres of which about 129 acres are in Wisconsin and the remaining 49 acres in Michigan. Project lands include the dam, conduit, surge tank, penstocks, and powerhouse. The current and proposed Project boundaries are depicted in **Figure 3.2.2-1** on the following page and the existing Exhibit G is enclosed in **Appendix 3.2.2-1**. The Licensee is proposing to reduce the acreage within the Project boundary to only include areas required for Project operation and areas upstream of the dam to an elevation of 997.0 feet.

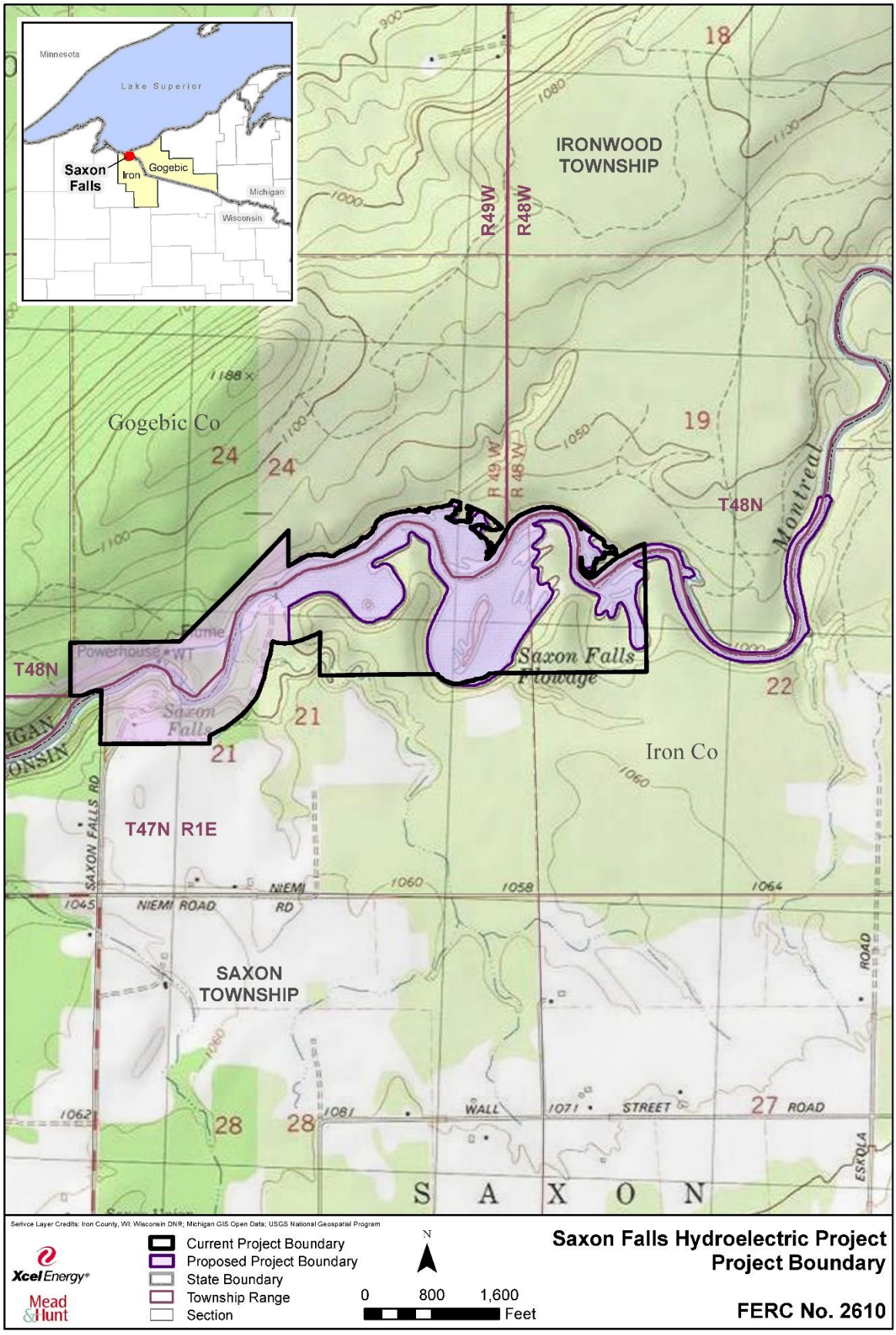
3.2.3 Proposed Facilities

No new facilities are proposed as part of this relicensing effort.

3.2.4 References

- Northern State Power Company. 1988. Application for a Minor Water Power Project Pursuant to Section 4(e) of the Federal Power Act for the Saxon Falls Hydro Project, FERC No. 2610. December 16, 1988.
- Northern States Power Company. 1991. Application for a License for a Minor Water Power Project, Superior Falls Hydroelectric Project, FERC Project No. 2587. December 17, 1991.
- Northern States Power Company. 2014. Saxon Falls Hydroelectric Project FERC No. 2610 Supporting Technical Information Document. March 13, 2014.
- Federal Energy Regulatory Commission. 1989. Order Issuing Subsequent License P-2610 (Minor Project). Issued December 22, 1989.
- Federal Energy Regulatory Commission. 1995. Order Issuing New License P-2587 (Major Project). Issued January 19, 1995.
- Wisconsin Department of Natural Resources. 2019. WDNR Lakes Pages-Saxon Falls Flowage. ttps://dnr.wi.gov/lakes/lakepages/LakeDetail.aspx?wbic=2941100&page=facts. Accessed September 19, 2019.

Figure 3.2.2-1: Saxon Falls Project Boundary



3.3 Gile Flowage Facilities (18 CFR § 5.6(d)(2)(iii))

3.3.1 Gile Flowage Current Facilities

From right to left looking downstream[5], Project structures include a right earthen dam section, concrete spillway section with two gates, and left earthen dam section. The current Project facilities are shown in **Figure 3.3.1-1** on the following page. A description of each structure from right to left, as well as the reservoir and appurtenant equipment is provided in the following paragraphs.

3.3.1.1 Gile Flowage Dam

Right Earthen Dam Section

The right earthen dam section is approximately 30 feet high and 575 feet long and has a 10-foot-wide top with 3:1 side-slopes. The dam crest elevation is 1,495.0 feet. A vertical sheet pile wall forms a cutoff under the concrete gated section and the center of the embankments has a top elevation of 1,493.0 feet. The sheet pile wall extends approximately 323 feet from the outside face of the right abutment. The upstream side of the embankment is protected by riprap on filter fabric to elevation 1,493.0 feet. The downstream portion of the embankment near the tailrace is also protected with riprap. A drain system consisting of vitrified clay pipe spaced 14 feet wide on center extends from the sheet pile cutoff wall to the embankment toe. A seepage drainage ditch collects water from the drains and conveys it to the tailrace (Ayres, 2016).

Concrete Spillway Section

The concrete spillway section consists of a reinforced concrete structure with a left abutment, one left sluiceway bay, a pier, one right tainter gate bay, and a right abutment. A steel sheet pile cutoff is located under the structure on the upstream side of the spillway. The majority of the structure is founded on wood piles. A concrete operator's bridge spans the structure (Ayres, 2016).

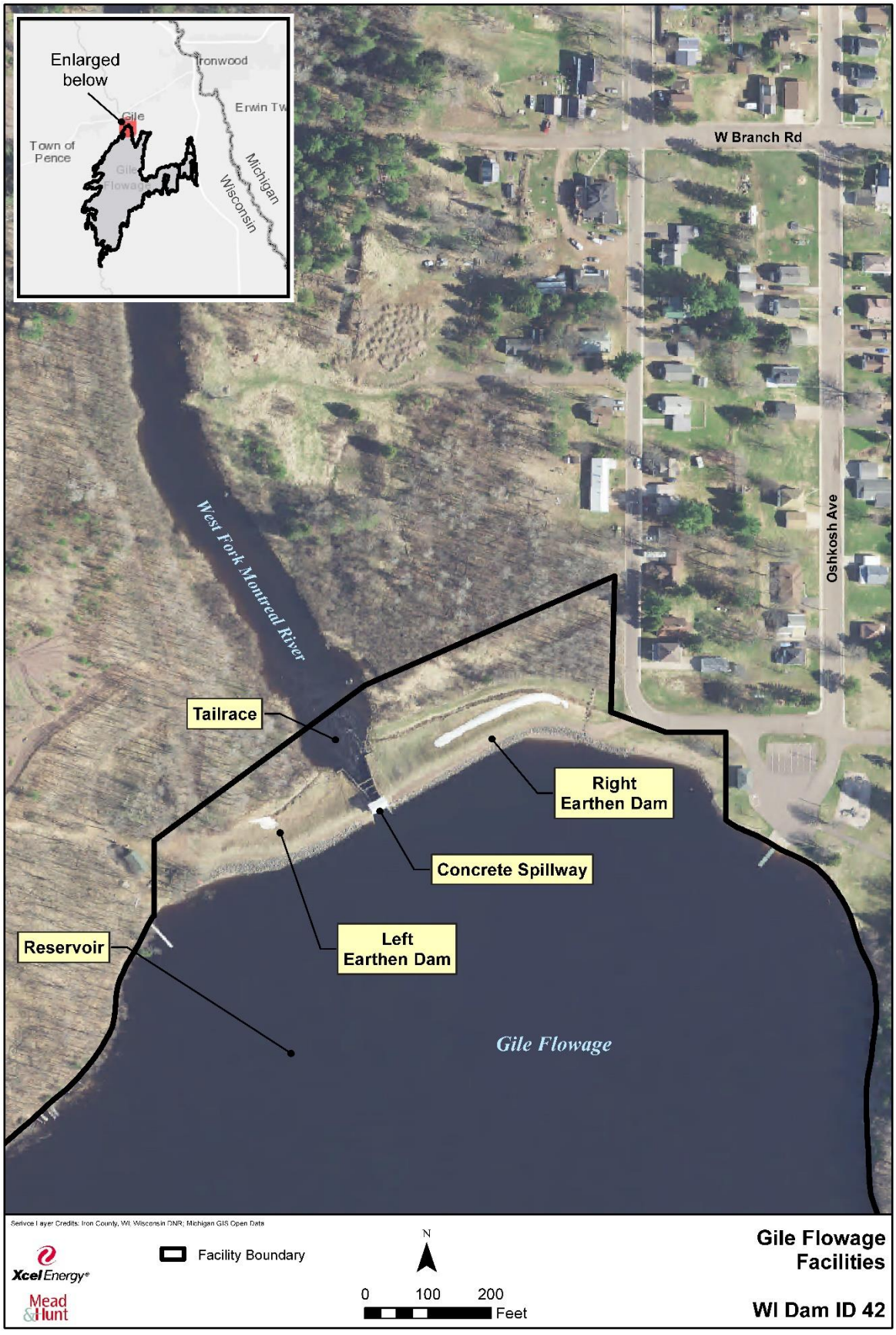
The sluiceway bay consists of an intake structure with a trashrack, vertical slide gate, and a rectangular outlet that conveys flow to the stilling basin. The slide gate is 6 feet wide and 6 feet high and the outlet is approximately 35 feet long, 6 feet wide, and 5 feet high. The sluiceway bay has an invert elevation of 1,465.5 feet. The sluice gate is operated by an electric hoist located inside the gate house. There is no back up method for sluice gate operation (Ayres, 2016).

The tainter gate bay is a hollow structure with foundation drains and a crest elevation of 1,478.0 feet. The riveted steel tainter gate is 16 feet wide and 12 feet high and is operated with an electric hoist located inside the gatehouse. A powerhead with a generator and a handwheel are available for backup power. The handwheel is located inside the gatehouse. The powerhead and generator are available from the Superior Falls Project, located about 30 minutes from the dam (Ayres, 2016).

A concrete slab supports the rollway and downstream walls and forms the bottom of the stilling basin. The upstream wingwalls are constructed at a 15-degree skew to the centerline of the water flows and the downstream wingwalls are constructed at a 12-degree skew to the centerline of the water flow. The wingwalls vary in height to match the embankment cross-section. Buttresses are located on the outside of the wingwalls and concrete strut beams brace the downstream walls. Weep holes are located at various locations through the wingwalls (Ayres, 2016).

[5] Direction of right or left, when describing facilities, is given looking downstream.

Figure 3.3.1-1: Gile Flowage Facilities



The large tainter gate is typically only used to pass water downstream during periods of high flow (i.e. precipitation events, spring runoff). The small sluice gate is used to pass water downstream, both during periods of low and high flow (Northern States Power Company, 2019). A block was installed on the sill of the sluice gate to pass the minimum flow of 10 cfs downstream, which approximates the natural inflow into the Gile Flowage (Friends of the Gile Flowage, 2019).

Left Earthen Dam Section

The left earthen dam section is approximately 30 feet high and 300 feet long and has a 10-foot-wide top with 3:1 side-slopes. The dam crest elevation is 1,495.0 feet. A vertical sheet pile wall forms a cutoff under the concrete gated section and the center of the embankment has a top elevation of 1,493.0 feet. The sheet pile wall extends approximately 204 feet from the outside face of the left abutment. The upstream side of the embankment is protected by riprap on filter fabric to elevation 1,493.0 feet. The downstream portion of the embankment near the tailrace is also protected with riprap. A drain system consisting of vitrified clay pipe spaced 14 feet wide on center extends from the sheet pile cutoff wall to the embankment toe. A seepage drainage ditch collects water from the drains and conveys it to the tailrace (Ayres, 2016).

3.3.1.2 Gile Flowage Reservoir

The Gile Flowage encompasses approximately 3,317 acres and has a maximum depth of 25 feet, as shown in **Figure 3.3.1.2-1** on the following page. The reservoir has a usable storage capacity of 37,064 acre-feet with a 15-foot drawdown (Northern States Power Company, 2019). The substrate consists of 45% sand, 15% gravel, 20% rock, and 20% muck (WDNR, 2019a).

3.3.2 Gile Flowage Facility Boundary

The Gile Flowage is not a FERC-licensed facility and thus no FERC project boundary exists. For the purpose of this PAD, the Licensee has developed a facility boundary for the Gile Flowage that includes the facilities, dam, reservoir, and shoreline areas to the maximum allowed reservoir elevation of 1,490 feet (Northern States Power Company, 2019). Northern States Power Company operates and maintains the facility and currently owns approximately 1,200 acres of land around the reservoir (Friends of the Gile Flowage, 2019). Most submerged lands are owned in fee title or Northern States Power Company has obtained flowage rights for them. Approximately 90% of the shoreline is in Northern States Power Company or public ownership (towns of Pence and Carey, Iron County), resulting in the existing natural shoreline (Northern States Power Company, 2019). A review of the Licensee's land holdings around the Gile Flowage is currently underway. The Licensee is in discussions with adjacent property owners and Iron County regarding the potential sale of some land parcels. Any parcels identified for sale will be located outside of the proposed facility boundary and would not be subject to this proceeding.

3.3.3 Gile Flowage Proposed Facilities

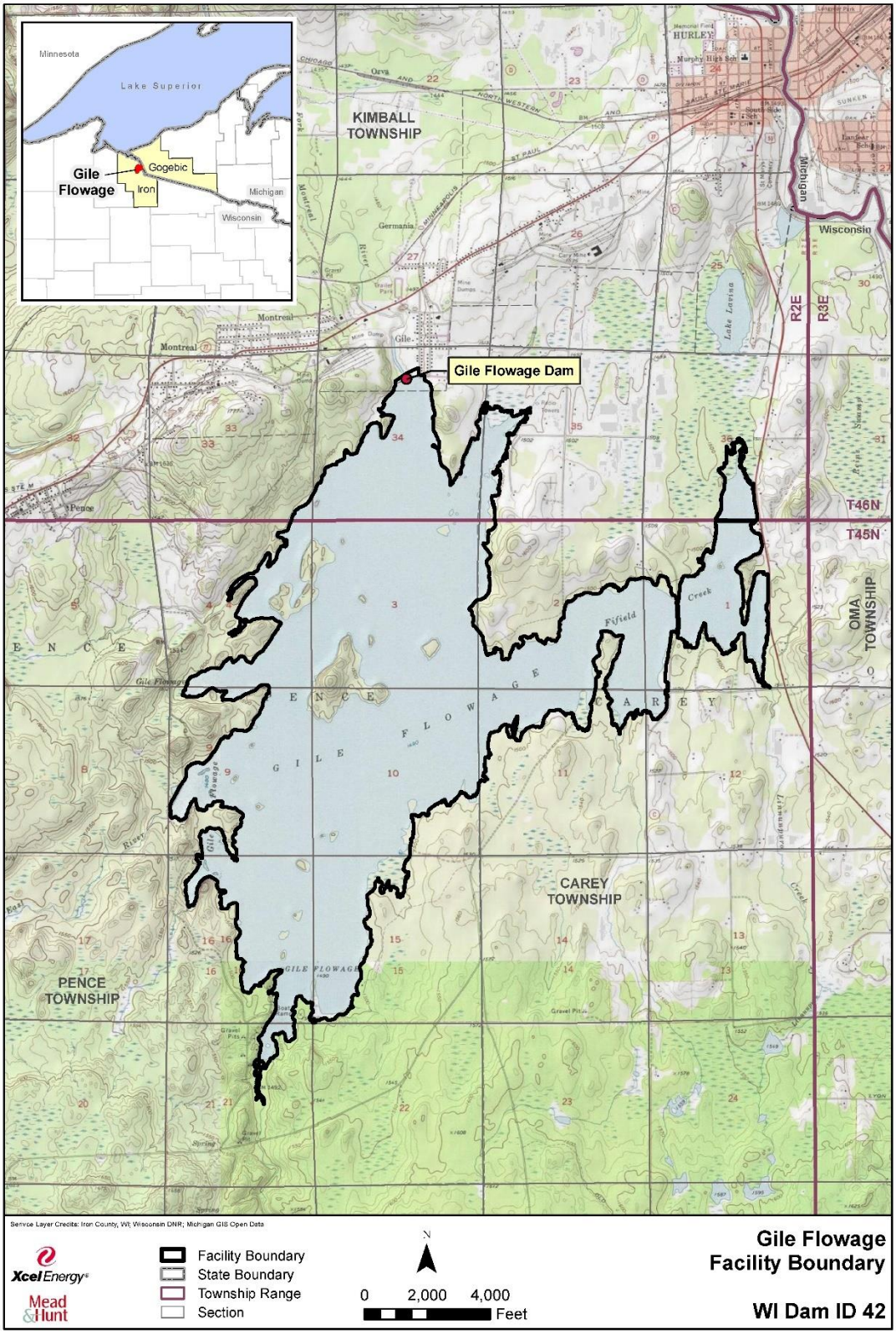
No new facilities are proposed as part of this relicensing effort.

3.3.4 References

- Ayres Associates. 2016. 2016 Consultant Safety Inspection Report, Gile Reservoir Dam, Iron County, Wisconsin, WDNR Field File No. 26.09. October 2016.
- Friends of the Gile Flowage. 2019. Brief History of the Gile Flowage. http://www.friendsofthegile.org/home/flowage-. Accessed September 12, 2019.

- Northern States Power Company, 2019. Matt Miller personal communication. October 3, 2019.
- Wisconsin Department of Natural Resources, 2019a. WDNR Lake Pages-Gile Flowage. https://dnr.wi.gov/lakes/lakepages/LakeDetail.aspx?wbic=2942300&page=facts. Accessed September 13, 2019.

Figure 3.3.1.2-1: Gile Flowage



3.4 Superior Falls Project Facilities (18 CFR § 5.6(d)(2)(iii))

3.4.1 Superior Falls Current Facilities

From right to left looking downstream, the Project structures include a dam with a right non-overflow section, intake section, middle non-overflow section, and overflow weir section. Downstream of the dam, on the Michigan side of the Montreal River, is a concrete conduit that conveys water from the intake to the surge tank. Two penstocks extend from the surge tank to the powerhouse. The current Project facilities are shown in **Figure 3.4.1-1**. A description of each structure from right to left, as well as the tailrace, transmission equipment, reservoir, and appurtenant equipment, is provided in the following paragraphs.[6] Exhibit F drawings will be provided in the Draft License Application.

3.4.1.1 Superior Falls Dam

The Superior Falls Project Dam is 240 feet long and 29[7] feet high and consists of five sections: a right non-overflow section with intake, right tainter gate section, middle overflow section, left tainter gate section, and left overflow weir section.

Non-Overflow Section

The non-overflow section on the right side of the dam is a mass concrete wall approximately 70 feet long with buttresses on the downstream side. The non-overflow section is divided into three parts, the approximately 27-foot-long right non-overflow section, 23-foot-long intake section, and 20-foot-long middle non-overflow section. The intake section contains a 15-foot-high by 23-foot-wide intake structure for the reinforced concrete pipe (RCP) conduit, which includes a metal trashrack with one-inch spaced vertical bars; a mechanical trash rake for maintenance; a mechanically operated timber headgate; an air shaft which also acts as an accessway; and a concrete collar connecting the intake to the 84-inch-diameter RCP conduit. A walkway with handrails is located on the entire non-overflow section.

Original Gated Spillway Section

The gated spillway section originally included two larger bays housing steel tainter gates 1 and 2 and three smaller bays with timber tainter gates. In 1999, a spillway rehabilitation project was completed, and the original gated spillway section was divided into three new dam sections: the right tainter gate section, the middle overflow section and the left tainter gate section. Each section is described below.

Right Tainter Gate Section

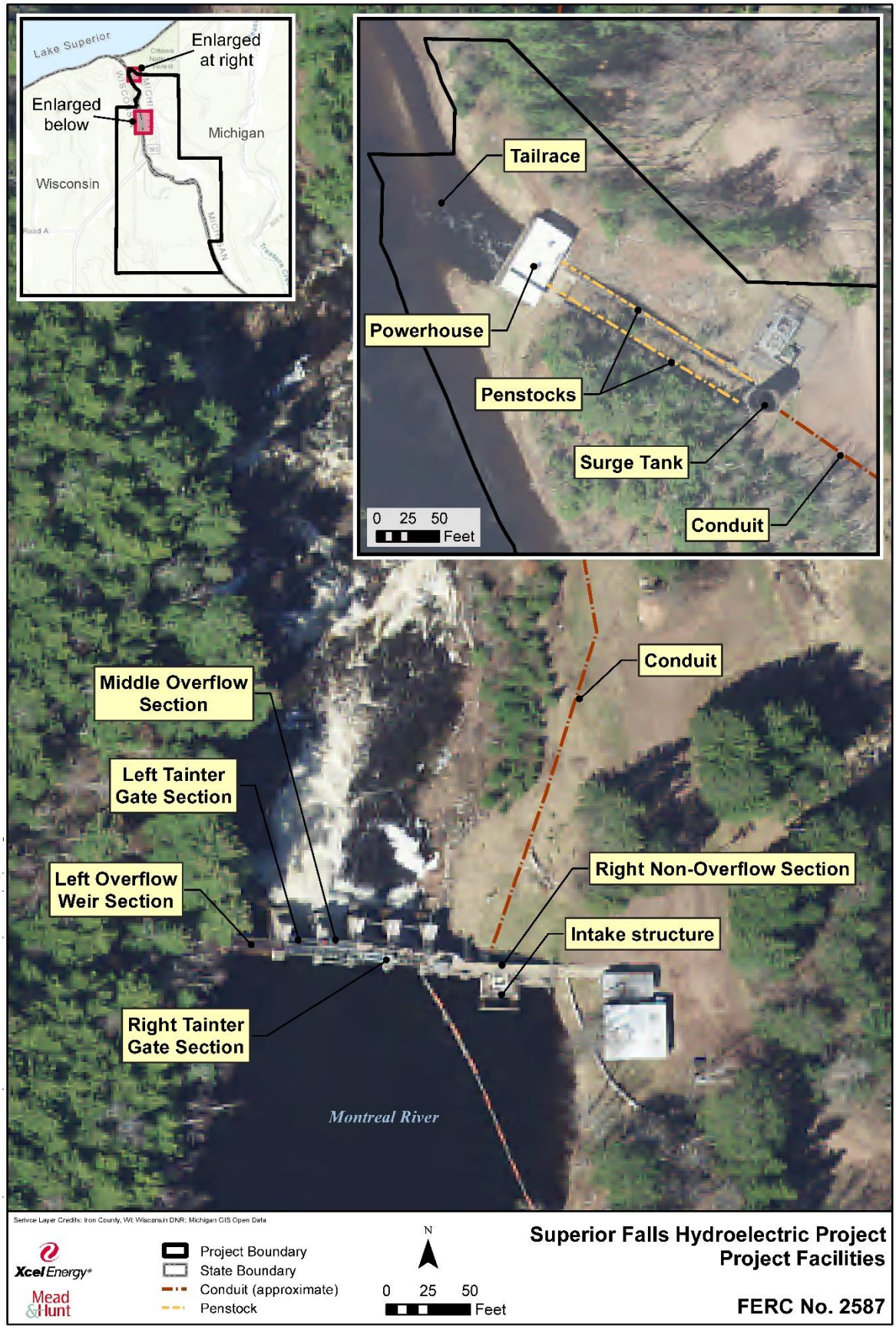
The original two steel tainter gates were replaced in 1999 with new steel tainter gates approximately 16 feet wide and 18 feet high with a crest elevation of 722.2 feet National Geodetic Vertical Datum (NGVD)[8]. A hydraulic cylinder hoist system is used to raise the tainter gates. The hoist is located on a steel frame with wheels and is moved on a concrete bridge with steel tracks between the two large bays.

[6] Unless otherwise cited, all Superior Falls Project facility description attributes are from the Supporting Technical Information Document dated March 22, 2014 (Northern States Power Company, 2014).

[7] The height of 29 feet matches the current Exhibit A and Exhibit F drawing F-2. The current Standard Technical Information Document (STID) lists the height as 28 feet.

[8] All elevations in this document are referenced in the 1929 National Geodetic Vertical datum (NGVD).

Figure 3.4.1-1: Superior Falls Project Facilities



Middle Overflow Section

The middle overflow section, which replaced a portion of the original wooden tainter gates in 1999, was created by filling the old Ambursen-style dam with mass concrete and extending the crest to an elevation of 740.2 feet. Piers were added on each side, with the remaining overflow section width of 11.5 feet. The crest is an ogee shape and has two small trash gates. The right trash gate is a vertical slide gate with a hand-winch operator. The left trash gate is a sluice-type gate with a handwheel and threaded stem operator.

Left Tainter Gate Section

A new steel tainter gate, which replaced a portion of the original wooden tainter gates, was installed in 1999 between the new middle overflow section and the existing left overflow weir section. This gate, which is referenced as gate 3, is 18 feet wide and 15 feet high with a crest elevation of 726.2 feet.

Left Overflow Weir Section

On the left end of the dam are three concrete bulkhead overflow weir bays, which are referenced as Bay 6, Bay 7, and Bay 8. Each bay is 12 feet wide with a crest elevation of 740.2 feet. Bays 6 and 7 are spanned by a steel beam and grating walkway with handrails. Bay 8 is spanned by a concrete walkway with handrails.

3.4.1.2 Superior Falls Conduit

The conduit conveys water from the intake structure to the surge tank along and above the steep riverbank for hydropower use. The conduit is a buried 84-inch-diameter RCP approximately 1,697 feet long. The conduit makes three, small 7.5-degree bends near the intake and one large 45-degree bend just upstream of the surge tank. The conduit was installed in 1972, replacing the original wood-stave structure.

3.4.1.3 Superior Falls Surge Tank

The surge tank was installed in 1972 and reduces pressure variations by storing or releasing water during changing or transient turbine flow conditions. The surge tank is a 28-foot-diameter tank, with a concrete base and a lower concrete section extending 13 feet high and a steel upper section extending 28 feet above the concrete. The 84-inch-diameter conduit enters the surge tank on the upstream end and two 54-inch-diameter steel penstocks exit the tank on the downstream end. The conduit and penstocks are anchored to the surge tank structure with reinforced concrete collars.

3.4.1.4 Superior Falls Penstocks

Two steel penstocks were installed in 1964 and extend down the steep 100-foot-high bank from the surge tank to the powerhouse. Each penstock is 54 inches in diameter and extends 190 feet from the surge tank to the thrust block. The penstocks have concrete collars at the surge tank and expansion joints a short distance downstream from the surge tank. They are suspended approximately 3 feet above the ground from a series of steel frames. Each frame is oriented to the pipe and steep bank and consists of steel I-beam columns, a double channel beam, and a 1.25-inch-diameter U-shaped hoop around a flat ring girder on each penstock. The columns are founded on small concrete footings keyed into the exposed bedrock. A stairway leading down the steep slope between the surge tank and the powerhouse is located on the right penstock. The stairway consists of wooden stringers spanning between the penstock support frames, aluminum treads, and wood handrails. In 1987, the

concrete thrust block at the base of the penstocks and the portion of penstocks from the thrust block into the powerhouse were replaced.

3.4.1.5 Superior Falls Powerhouse

The powerhouse is located approximately 190 feet downstream of the surge tank and 1,800 feet downstream of the dam. It consists of a 32-foot long by 62-foot-wide reinforced concrete building and includes a generating room, lower level tailpits, and conical steel draft tubes. The Exhibit F drawings indicate the powerhouse is founded on piles. However, the bedrock surface is exposed in surrounding areas and the structure could very well be founded on bedrock. The powerhouse superstructure consists of reinforced concrete walls and a composite steel beam and concrete roof. The roof beams span in the upstream and downstream direction. Several pilasters are attached on the outside of the left wall. Each pilaster is approximately 2 feet wide and 6 inches deep and extends from the base of the structure to approximately 5 feet below the roof.

The tailpits are located below the powerhouse and are rectangular in shape with an upstream wall, side piers, and a base slab. The tailpits direct vertical flow from the draft tube downstream. Each tailpit is about 11.5 feet wide by 25 feet long. Three piers with varying widths support the powerhouse structure above. The approximate width of each pier is as follows: left pier 4.5 feet, center pier 13.5 feet, and right pier 22 feet. In 1987, the pier walls were armored with steel plates near the waterline in conjunction with concrete repairs to the piers.

Turbine

The powerhouse contains two horizontal shaft, Francis-type turbines. Each turbine has a rated capacity of 1,250 horsepower (hp) at an operating head of 127 feet and speed of 600 revolutions per minute (rpm). The turbines have a combined hydraulic capacity of 144 cubic feet per second (cfs) at normal operation a combined minimum hydraulic capacity of 25 cfs and a combined maximum hydraulic capacity of 220 cfs.

Generator

The Project contains two generator units with original capacities of 660 kilowatts (kW) each. The generators were rewound in 1954 and 1957 and each now has the capability to produce 825 kW at unity power factor.

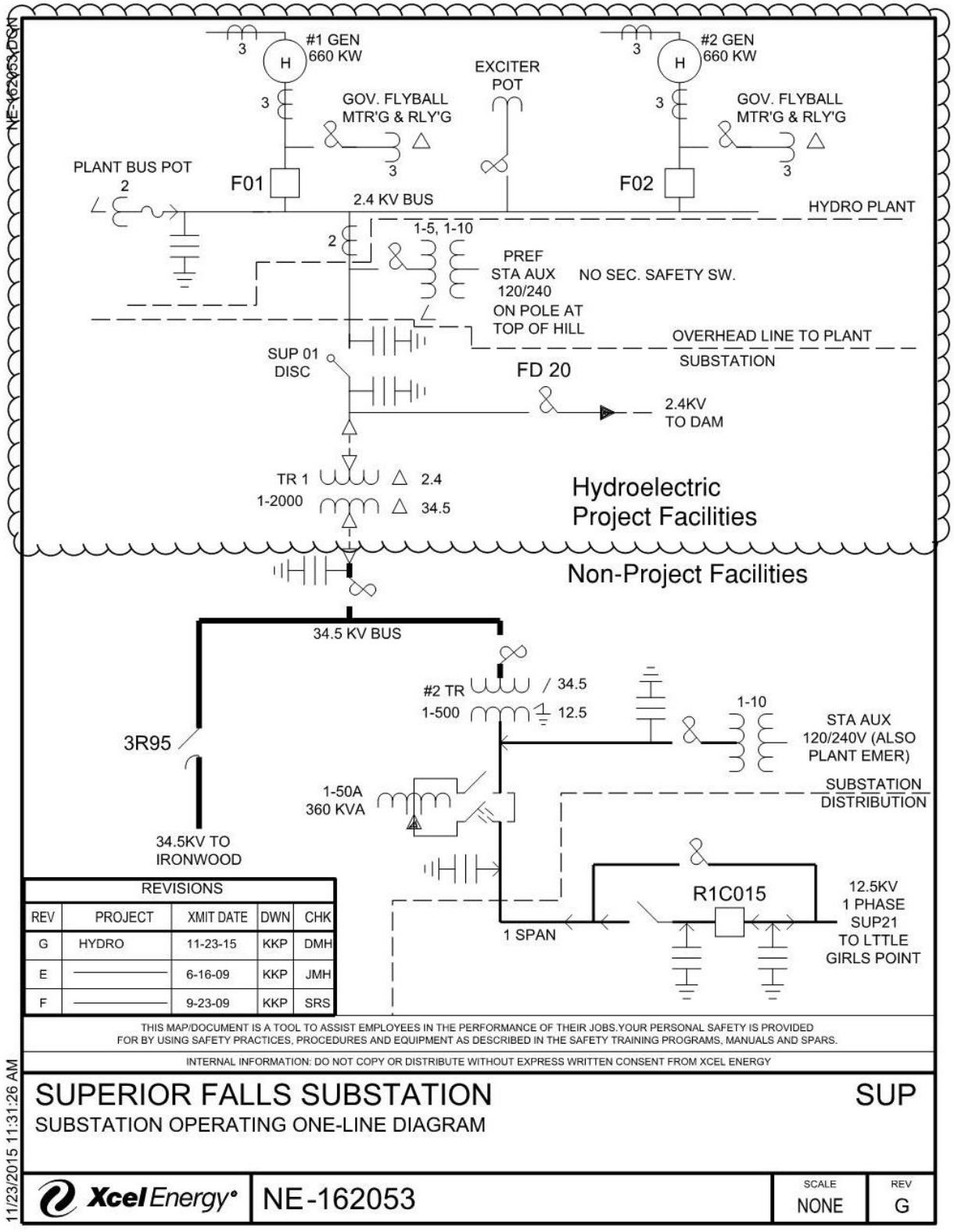
3.4.1.6 Superior Falls Tailrace

The tailrace is approximately 55 feet wide at the powerhouse and extends downstream from the dam for approximately 80 feet to its confluence with the Montreal River.

3.4.1.7 Superior Falls Transmission Equipment

There is a 200-foot-long, 2.4 kilovolt (kV) transmission line extending from the powerhouse to the distribution substation. Equipment required to transmit the electrical generation to the non-project distribution system contains one 3-phase, 2000 kilovolt-amperes (kVA) transformer. The transformer steps up the voltage that connects to the non-project distribution system from 2.4 kV to 34.5 kV. A diagram of principal electrical circuits associated with the Project is included in **Figure 3.4.1.7-1**.

Figure 3.4.1.7-1: Superior Falls Project One-line Diagram of Principal Electrical Circuits



3.4.1.8 Superior Falls Reservoir

Based on a 1991 survey, the reservoir encompasses approximately 16.9 acres with a storage capacity of 80.9 acre-feet at the maximum reservoir elevation of 740.0 feet. It has a maximum depth of 18 feet near the dam and an average depth of 4.8 feet (Northern States Power Company, 1991). The substrate consists of 55% sand, 22% gravel, 3% rock, and 20% muck (WDNR, 2019).

3.4.1.9 Superior Falls Appurtenant Equipment

Appurtenant equipment includes but is not limited to equipment such as a log boom upstream of the intake, bearing lubrication systems, generator ventilation systems, switchboards, additional gate hoist equipment, switchgear, protective devices, and metering devices.

3.4.2 Superior Falls Project Boundary

The current FERC license (issued January 19, 1995) established the Project boundary to include 353.6 acres of which 212.6 acres are located in Wisconsin and the remaining 141 acres are in Michigan. Project lands include the dam, conduit, surge tank, penstocks, powerhouse, substation, canoe and kayak take-out, parking area, Superior Falls Scenic overlook, and tailrace fishing area. The current and proposed Project boundaries are depicted in **Figure 3.4.2-1** on the following page and the existing Exhibit G map is enclosed in **Appendix 3.4.2-1**. The Licensee is proposing to reduce the acreage within the Project boundary to only include areas required for Project operation and areas upstream of the dam to an elevation of 740.0 feet.

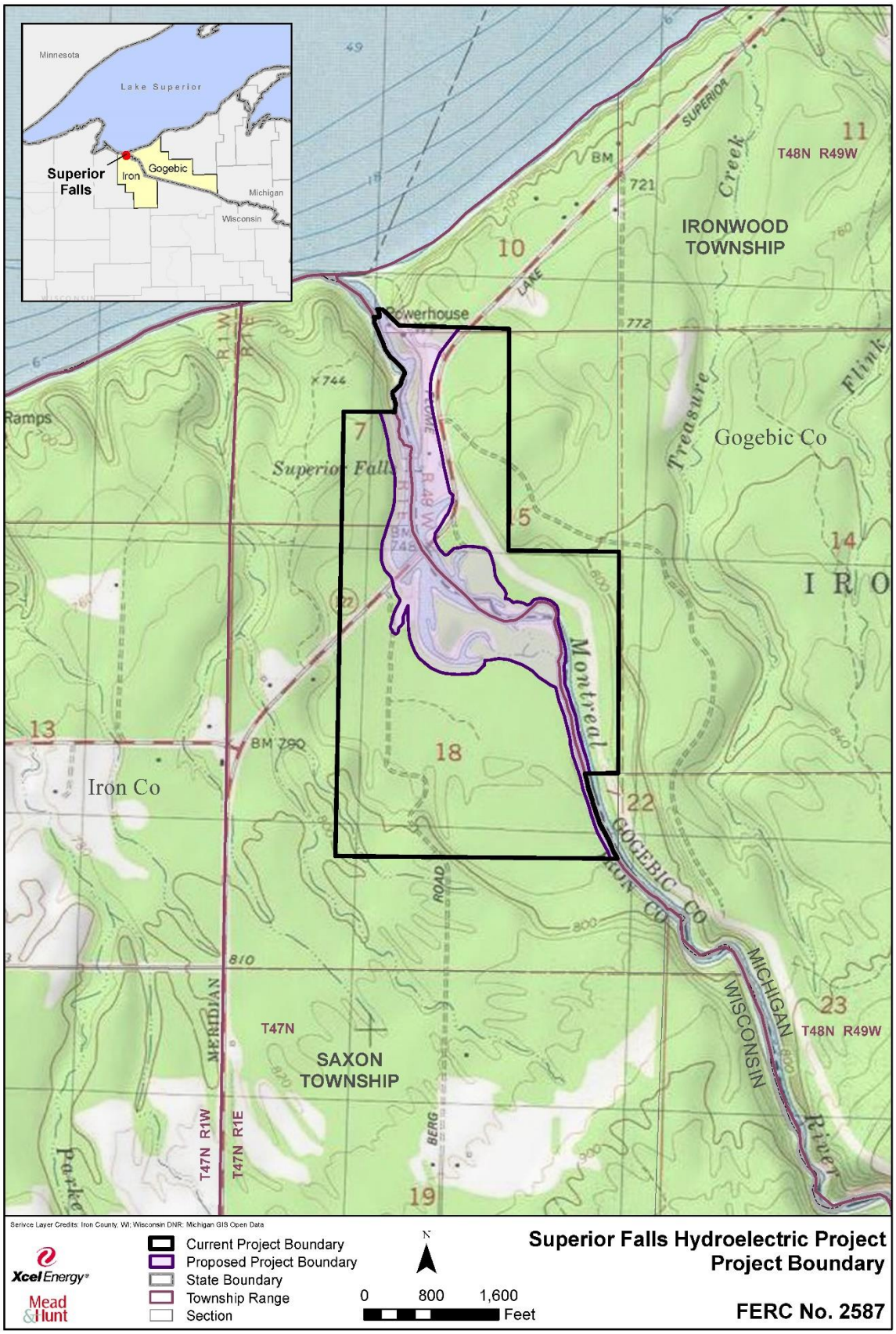
3.4.3 Proposed Facilities

No new facilities are proposed as part of this relicensing effort.

3.4.4 References

- Northern States Power Company. 1991. Application for a License for a Minor Water Power Project, Superior Falls Hydroelectric Project, FERC Project No. 2587. December 17, 1991.
- Northern States Power Company. 2014. Superior Falls Hydroelectric Project FERC No. 2587 Supporting Technical Information Document. March 22, 2014.
- Federal Energy Regulatory Commission. 1995. Order Issuing New License P-2587 (Major Project). Issued January 19, 1995.
- Wisconsin Department of Natural Resources. 2019. WDNR Lakes Pages-Superior Falls Flowage. https://dnr.wi.gov/lakes/lakepages/LakeDetail.aspx?wbic=2940600&page=facts. Accessed September 19, 2019.

Figure 3.4.2-1: Superior Falls Project Boundary



3.5 Project Operation (18 CFR § 5.6(d)(2)(iv))

3.5.1 Saxon Falls Project Operation

3.5.1.1 Current Operation

The Project currently operates in a run-of-river mode where discharge measured immediately downstream of the Project tailrace approximates the sum of inflows into the Project reservoir. This operation mode protects water quality, fish, and wildlife resources in the Montreal River. A minimum flow of 5 cfs or inflow, whichever is less, is released into the bypass reach of the Montreal River immediately below the Saxon Falls Dam during the ice-free season (i.e. ice-out to October 31) to protect aquatic and aesthetic resources.

In order to minimize reservoir fluctuations, a minimum reservoir elevation of 997.0 feet is required to be maintained from ice-out to June 1. Between June 1 and ice-out, the reservoir is required to be maintained between elevations 996.5 feet and 997.0 feet.

The Project is operated in conjunction with the Superior Falls Project located a short distance downstream. Two operators are assigned to oversee the daily operation and routine maintenance of both Projects. Eight-hour coverage is provided five days a week, Monday-Friday. An operator for the facility is on call 24 hours per day, seven days per week. The plant is manually operated with controls installed for automatic shutdown in case of operational emergencies. Whenever a plant shutdown occurs or if high or low water occurs, the continually staffed control center at the Licensee's Wissota Hydroelectric Project is automatically notified.

For emergency operation of the facility, an operator is available 24 hours a day and can also be supported by the operator at White River Hydro (approximately 6 miles south of Ashland), local line crews, the Ashland Bay Front Plant maintenance staff, and personnel from the Xcel Energy's Hydro Maintenance Department in Chippewa Falls, Wisconsin.

3.5.1.2 Proposed Operation

Northern States Power Company is proposing to continue operating the Saxon Falls Project in the same manner it is currently operated.

3.5.2 Gile Flowage Operation

3.5.2.1 Current Operation

The Wisconsin Public Service Commission issued an Order on August 26, 1937, authorizing construction of the Gile Flowage Dam and set the maximum pool elevation at 1490.0 feet. The Licensee's records document a "gentleman's agreement" allowing for a maximum drawdown of 15 feet or elevation 1475.0'. The dam was completed in 1940 and the gates were closed in April 1941 commencing the initial fill of the reservoir. The Gile Flowage was created to augment river flows during summer and winter low-flow periods at the downstream Saxon Falls and Superior Falls Projects. Both Projects are heavily dependent upon flow augmentation from the Gile Flowage during these low-flow periods. A minimum flow of 10 cfs has historically been passed in accordance with an agreement with the Village of Montreal. A block in the bottom of the sluice gate is used to ensure 10 cfs of flow is maintained at all times.

While a 15-foot drawdown is allowed, Northern States Power Company has minimized the drawdowns. The summer drawdown averaged 5.2 feet and the winter drawdown averaged 6.8 feet between 1984 and 2017. The maximum summer drawdown during this timeframe was 7.8 feet and the minimum was 1.8 feet. The maximum winter drawdown during this timeframe was 10.9 feet and the minimum was 1.4 feet. **Table 3.5.2.1-1** on the following page shows the extent of the summer and winter drawdowns to supplement low flows in the West Fork of the Montreal River between 1984 and 2017. Summer drawdown typically begins around May 1 of each year or after spring runoff has passed. Autumn rains replenish the reservoir. Winter drawdowns generally begin around December 1 each year and continue into the spring when the flowage is replenished from spring runoff and rainfall.

There are two operators that typically maintain the dam and make necessary spillway gate changes. Operators typically check the reservoir two to three times per week under normal flow conditions. The reservoir is checked on a daily basis during high river flows and significant runoff events.

3.5.2.2 Proposed Operation

Northern States Power Company is proposing to continue operating the Giles Flowage in the same manner it is currently operated.

Table 3.5.2.1-1: Gile Flowage Historical Drawdown Levels

Year	Summer Minimum Elevation	Summer Drawdown (ft)	Winter Minimum Elevation	Winter Drawdown (ft)
1984	1483.5	6.5	1485.4	4.6
1985	1486.9	3.1	1481.2	8.8
1986	1483.9	6.1	1479.1	10.9
1987*	1484.6	5.4	1482.9	7.2
1988*	1482.2	7.8	1482.7	7.3
1989	1483.8	6.2	1481.0	9.0
1990	1487.0	3.0	1481.3	8.7
1991	1485.6	4.4	1483.0	7.0
1992	1484.6	5.4	1485.5	4.5
1993	1483.7	6.3	1482.1	7.9
1994	1485.0	5.0	1481.4	8.6
1995	1482.9	7.1	1482.1	7.9
1996	1484.6	5.4	1481.5	8.5
1997	1484.0	6.0	1481.1	8.9
1998	1482.4	7.6	1483.7	6.3
1999	1486.1	3.9	1483.2	6.8
2000	1483.6	6.4	1485.0	5.0
2001	1482.7	7.3	1482.2	7.8
2002	1483.8	6.2	1484.6	5.4
2003	1484.8	7.2	1483.3	6.7
2004	1484.2	5.8	1482.4	7.6
2005	1483.8	6.2	1482.5	7.5
2006*	1483.7	6.3	1485.0	5.0
2007*	1484.0	6.0	1483.0	7.0
2008*	1485.5	4.5	1482.5	7.5
2009*	1483.5	6.5	1483.0	7.0
2010	1487.7	2.3	1482.9	7.1
2011*	1485.2	4.8	1484.2	5.8
2012*	1484.9	5.1	1483.9	6.1
2013	1488.1	1.9	1483.8	6.2
2014	1486.6	3.4	1482.4	7.6
2015	1485.8	4.2	1485.4	4.6
2016	1488.8	1.2	1487.2	2.8
2017	1487.7	2.3	1488.6	1.4

* drought year

3.5.3 Superior Falls Project Operation

3.5.3.1 Current Operation

The Project currently operates in a run-of-river mode where discharge measured immediately downstream of the Project tailrace approximates the sum of inflows to the Project reservoir. This operation mode protects fish spawning in the Project impoundment, riparian vegetation above and below the Project, and recreation opportunities in the Project impoundment.

To ensure run-of-river operation, the Licensee maintains a reservoir water surface elevation at a minimum of 739.7 feet above mean sea level as measured immediately upstream from the project dam per FERC's March 31, 1997 Order. A minimum flow of 8 cfs is required to be released into the bypass reach of the Montreal River between the Saturday before Memorial Day to October 15 for enhancement of scenic resources. A minimum flow of 20 cfs is required to be released into the bypass reach from 8 am to 8 pm on weekends and holidays during the same timeframe.

The Project is operated in conjunction with the Saxon Falls Project located a short distance upstream. Two operators are assigned to oversee the daily operation and routine maintenance of both Projects. Eight-hour coverage is provided five days a week, Monday-Friday. An operator for the facility is on call 24 hours per day, seven days per week. The plant is manually operated with controls installed for automatic shutdown in case of operational emergencies. Whenever a plant shutdown occurs or if high or low water occurs, the continually staffed control center at the Licensee's Wissota Hydro Project is notified.

For emergency operation of the facility, an operator is available 24 hours a day and can also be supported by the Licensee's White River Hydro operator, local line crews, the Ashland Bay Front Plant maintenance staff, and personnel from the Xcel Energy's Hydro Maintenance Department in Chippewa Falls, Wisconsin.

3.5.3.2 Proposed Operation

Northern States Power Company is proposing to continue operating the Superior Falls Project in the same manner it is currently operated.

3.6 Other Project Information (18 CFR § 5.6(d)(2)(v))

3.6.1 Other Project Information - Saxon Falls Project

3.6.1.1 Saxon Falls Project Current License Requirements

The Project license includes a series of License Articles that specify actions the Licensee must take to remain in compliance with its license terms and conditions. FERC issued the Project license on December 22, 1989 and it went into effect on January 1, 1990 (FERC, 1989). The license conditions are summarized in **Table 3.6.1.1-1** and a copy of the existing license is located in **Appendix 3.6.1.1-1**.

Table 3.6.1.1-1: Saxon Falls Project Current License Conditions

License Article	Brief Description	Comments
Article 401	Requires Licensee to operate the project to minimize reservoir fluctuations by maintaining a minimum reservoir surface elevation of 997.0 feet from ice-out to June 1. The rest of the year reservoir surface elevations are required to be between 996.5 feet and 997.0 feet.	
Article 402	Requires Licensee to maintain a minimum flow of 5 cfs or inflow, whichever is less, into the bypass reach of the Montreal River between ice-out through October 31 each year to protect aquatic and aesthetic resources in the River.	
Article 403	If a drawdown of the reservoir below the elevations indicated in Article 401 for purposes such as maintenance or repair, the Licensee is required to limit the drawdown rate to a maximum of 1 foot per 24 hours for the first 2 feet the reservoir is drawn down and 0.5 feet per 24 hours thereafter.	
Article 404	Licensee is required to maintain upstream and downstream staff gages and a recording headwater gage in the Montreal River to monitor compliance with Articles 401 and 402. The upstream staff gages must be visible to the public and indicate specific full pond and low pond surface elevations. The downstream staff gage must indicate the elevation corresponding to a minimum flow of 5 cfs in the bypass reach. Records from the reporting gage must be maintained and available within 30 days upon request by the WDNR or MDNR.	
Article 405	Requires Licensee to consult with the SHPO prior to starting any land clearing or disturbing activities or operating the Project in a mode different than those authorized in the license. If any previously undiscovered historic or archaeological properties are identified during the course of project operations or construction, Licensee must stop work and consult with the SHPO and file a cultural resources management plan for Commission approval.	
Article 406	Requires Licensee to file a cultural resource monitoring plan within 1 year of the effective date of the license for Commission approval after consulting with Michigan and Wisconsin SHPO.	Plan Approved 2/15/1991
Article 407	Requires Licensee to construct a boat ramp, access road, and associated signs within 2 years of the effective date of the license and operate and maintain the facilities during the term of the license.	As Built Drawings submitted on 3/18/1991
Article 408	Standard Land Use Article	

3.6.1.2 Saxon Falls Project Compliance History

A review of the FERC e-library for the Project did not identify any notices of non-compliance during the term of the existing license.

3.6.1.3 Saxon Falls Project Summary of Project Generation and Flow Records

Generation and flow records for the last five years are summarized in **Table 3.6.1.3-1**. Dependable capacity from 2013 to 2017 was 52.6%.

Table 3.6.1.3-1: Summary of Saxon Falls Project Generation and Flow Records

Time Period	Annual Generation (MWh)	Monthly Average Generation (MWh)	Average Outflow* (cfs)
1/1/2013 to 12/31/2013	10,198	849.8	473
1/1/2014 to 12/31/2014	12,243	1,020.3	488
1/1/2015 to 12/31/2015	10,769	897.4	297
1/1/2016 to 12/31/2016	6,818	568.2	579
1/1/2017 to 12/31/2017	7,741	645.1	403

*Note: Average outflow as measured at Saxon USGS Gage No. 04029990; average outflow is adjusted according to drainage basin area at the Project dam.

3.6.1.4 Saxon Falls Project Current Net Investment

Project net investment will be provided in the DLA.

3.6.2 Other Facility Information – Gile Flowage

3.6.2.1 Gile Flowage Current License Requirements

While the Gile Flowage is used to supplement flows in the Montreal River for electric generation at the downstream Saxon Falls and Superior Falls Projects, it is not licensed by the FERC. The Wisconsin Public Service Commission issued an Order in 1937 authorizing construction of the Gile Flowage Dam to augment river flows during summer and winter low-flow periods at the downstream Saxon Falls and Superior Falls Projects. The 1937 Order set the maximum reservoir elevation at 1490.0 feet.

3.6.2.2 Gile Flowage Compliance History

There is no history of non-compliance.

3.6.2.3 Gile Flowage Summary of Project Generation and Flow Records

The Gile Flowage is a storage reservoir and does not generate any electricity. Flow records for the last five years are summarized in **Table 3.6.2.3-1**.

Table 3.6.2.3-1: Summary of Gile Flowage Generation and Flow Records

Time Period	Annual Generation (MWh)	Monthly Average Generation (MWh)	Average Outflow* (cfs)
1/1/2013 to 12/31/2013	NA	NA	136
1/1/2014 to 12/31/2014	NA	NA	140
1/1/2015 to 12/31/2015	NA	NA	85
1/1/2016 to 12/31/2016	NA	NA	166
1/1/2017 to 12/31/2017	NA	NA	115

*Note: Average outflow as measured at Gile USGS Gage No. 40299000; average outflow is adjusted according to drainage basin area at the Project dam.

3.6.2.4 Gile Flowage Current Net Investment

Project net investment will be provided in the DLA.

3.6.3 Other Project Information - Superior Falls Project

3.6.3.1 Superior Falls Project Current License Requirements

The Project license includes a series of License Articles that specify actions the Licensee must take to remain in compliance with its license terms and conditions. FERC issued the Project license on January 19, 1995 and it went into effect January 1, 1995 (FERC, 1995). The license conditions are summarized in **Table 3.6.3.1-1** and a copy of the existing license is in **Appendix 3.6.3.1-1**.

Table 3.6.3.1-1: Superior Falls Project Current License Conditions

License Article	Brief Description	Comments
Article 201	Requires Licensee to pay annual charges for 2,200 hp installed capacity.	
Article 202	FERC reserves the authority to require the Licensee to conduct studies, modify reservoir levels, or otherwise make reasonable provisions to mitigate or avoid cumulative effects for the upstream Saxon Falls Project or Giles reservoir.	
Article 203	Requires Licensee to set aside one half of the project surplus earnings in a project amortization reserve account.	
Article 401	Requires Licensee to file a plan to control erosion to the Commission at least 90 days prior to beginning any land disturbing or land-clearing activities.	
Article 402	Requires Licensee to operate the project in a run-of-river mode so flows measured immediately downstream of the project tailrace approximate the sum of inflows to the reservoir. To ensure run-of-river operation, the Licensee shall maintain a reservoir water surface elevation at a minimum of 739.7 feet above mean sea level as measured immediately upstream from the project dam. The Licensee shall not operate over full range on a daily basis for the purpose of power system load-following. The Licensee is also required to monitor and maintain records of headwater elevations. The Licensee is also required to file a plan for notifying the WDNR and MDNR of events when the reservoir elevation is outside of the specified range.	Plan approved 4/8/1998

Article 403	Requires Licensee to submit a drawdown plan for approval to the WDNR and MDNR at least 90 days prior to any nonemergency drawdown. Nonemergency drawdowns are limited to a reservoir drawdown rate of no more than 12 inches per 24 hours for the first 2 days, and 6 inches per 24 hours per day after that.	
Article 404	Requires the Licensee to release a minimum flow into the bypass reach for the enhancement of aesthetic resources. A minimum flow of 8 cfs must be released into the bypass reach from the Saturday before Memorial Day to October 15 of each year. A minimum flow of 20 cfs into the bypass reach is required between 8 am and 8 pm on weekends and holidays during the same timeframe.	
Article 405	Requires Licensee to submit a plan to continuously monitor aesthetic flow releases from the dam within 6 months of license issuance.	Plan Approved 6/21/2000
Article 406	FERC reserves authority to require the Licensee to construct, operate, and maintain fishways that may be prescribed by the Secretary of the Interior.	
Article 407	Requires Licensee to consult and cooperate with Michigan and Wisconsin State Historic Preservation Offices (SHPO) prior to commencement of any construction or development of any project works or other facilities to determine the need for cultural surveys or mitigation measures are necessary. Also requires the Licensee to conduct surveys of reservoir shorelines 5 years and 10 years after license issuance to search for visible traces of artifacts, objects, or remains of potential archaeological significance.	
Article 408	Requires Licensee to submit a recreation plan within 2 years of license issuance to construct and operate a trail to the Superior Falls Scenic overlook; a boat landing on the west side of the reservoir including 4 parking spaces, a turnaround area, and a concrete boat ramp; and a sign on MI Highway 505 indicating the location of the driveway and parking area near the powerhouse.	Plan Approved 07/01/1998
Article 409	Requires Licensee to monitor the project area for purple loosestrife (*Lithrum salicaria*) and Eurasian water milfoil (*Myriophyllum spicatum*). If identified, the Licensee must contact WDNR and MDNR and cooperate to eradicate the species when an effective eradication method is developed.	
Article 410	Requires Licensee to file a wildlife management plan with the Commission within 2 years of license issuance. The plan must include provisions for the construction and maintenance of 10 wood duck nesting boxes and additional mallard nesting boxes.	Plan Approved 5/11/1998
Article 411	Requires Licensee to file an endangered resources plan with the Commission within 1 year of license issuance.	Article 411 deleted per FERC Order on Rehearing dated 03/31/1997.
Article 412	Requires Licensee to earmark $2,400 annually (adjusted annually for inflation) to fund resource-based activities in the Montreal River Basin. Also requires the Licensee to submit annual resource enhancement status reports with the Commission.	Article 412 deleted per FERC Order on Rehearing dated 03/31/1997.
Article 413	Requires Licensee to file a plan to avoid or minimize the quality of the existing visual resources of the project area within 9 months of license issuance. Visual Resources Protection Plan report is filed every 6 years.	Plan Approved 01/21/1998
Article 414	Requires Licensee to sample and analyze each source of ash used to “cinder” the spillway gates annually. Results must be submitted to MDNR and WDNR.	
Article 415	Requires Licensee to file a plan with the Commission to monitor dissolved oxygen (DO) levels and temperature of the Montreal River downstream in the project tailrace area for the months of September, October, and November for at least 3 years.	Article Deleted 03/13/1998

Article 416	Standard Land Use Article	

3.6.3.2 Superior Falls Project Compliance History

A review of the FERC e-library for the Project did not identify any notices of non-compliance during the term of the existing license.

3.6.3.3 Superior Falls Project Summary of Project Generation and Flow Records

Generation and flow records for the last five years are summarized in **Table 3.6.3.3-1**. Dependable capacity from 2013 to 2017 was 56.5%.

Table 3.6.3.3-1: Summary of Superior Falls Project Generation and Flow Records

Time Period	Annual Generation (MWh)	Monthly Average Generation (MWh)	Average Outflow* (cfs)
1/1/2013 to 12/31/2013	7,820	651.7	477
1/1/2014 to 12/31/2014	10,283	856.9	492
1/1/2015 to 12/31/2015	9,514	792.8	299
1/1/2016 to 12/31/2016	13,819	1151.6	584
1/1/2017 to 12/31/2017	12,600	1,050.0	406

*Note: Average outflow as measured at Saxon USGS Gage No. 04029990; average outflow is adjusted according to drainage basin area at the Project dam.

3.6.3.4 Superior Falls Project Current Net Investment

Project net investment will be provided in the DLA.

3.6.4 References

- Federal Energy Regulatory Commission. 1989. Order Issuing Subsequent License P-2610 (Minor Project). Issued December 22, 1989.
- Federal Energy Regulatory Commission. 1995. Order Issuing New License P-2587 (Major Project). Issued January 19, 1995.
- Federal Energy Regulatory Commission. 1997. Order on Rehearing of Order Issuing License to Northern States Power Company for Superior Falls Project, P-2587. Issued Marcy 31, 1997.
- Federal Energy Regulatory Commission. 1998. Order Deleting Article 415, Project No. 2587. Issued March 13, 1998.
- Friends of the Gile Flowage. 2019. Brief History of the Gile Flowage. http://www.friendsofthegile.org/home/flowage-. Accessed September 12, 2019.
- Northern States Power Company. 2019. Matt Miller personal communication. October 3, 2019.
- Wisconsin Department of Natural Resources, 2019a. WDNR Lake Pages-Gile Flowage. https://dnr.wi.gov/lakes/lakepages/LakeDetail.aspx?wbic=2942300&page=facts. Accessed September 13, 2019.

4. Description of Existing Environment and Resource Impacts

This section summarizes the existing environment and resources related to the Saxon Falls Project, Gile Flowage, and Superior Falls Project.

4.1 General Description of the Project Area (18 CFR § 5.6(d)(3)(xiii))

The Montreal River originates near Pine Lake in east-central Iron County, Wisconsin and flows for approximately 53 miles while descending nearly 1,000 feet in elevation until it empties into Oronto Bay of Lake Superior. From its headwaters, the Montreal River flows approximately 18 miles northwesterly until it meets with the West Branch of the Montreal River and then continues westerly for an additional 35 miles. The Montreal River is the political boundary that separates Iron County, Wisconsin and Gogebic County, Michigan for roughly 40 miles (USGS, 2016). **Figure 4.1-1** shows where the Saxon Falls Project, Gile Flowage, and Superior Falls Project are located on the Montreal River and West Fork of the Montreal River. Most of the watershed is wooded or wild land, with an estimated 10% cleared for agricultural and urban development. The small size of the watershed and the steep gradient of the river and rocky nature of the terrain produce rapid changes in stream flow (Northern States Power Company, 1991).

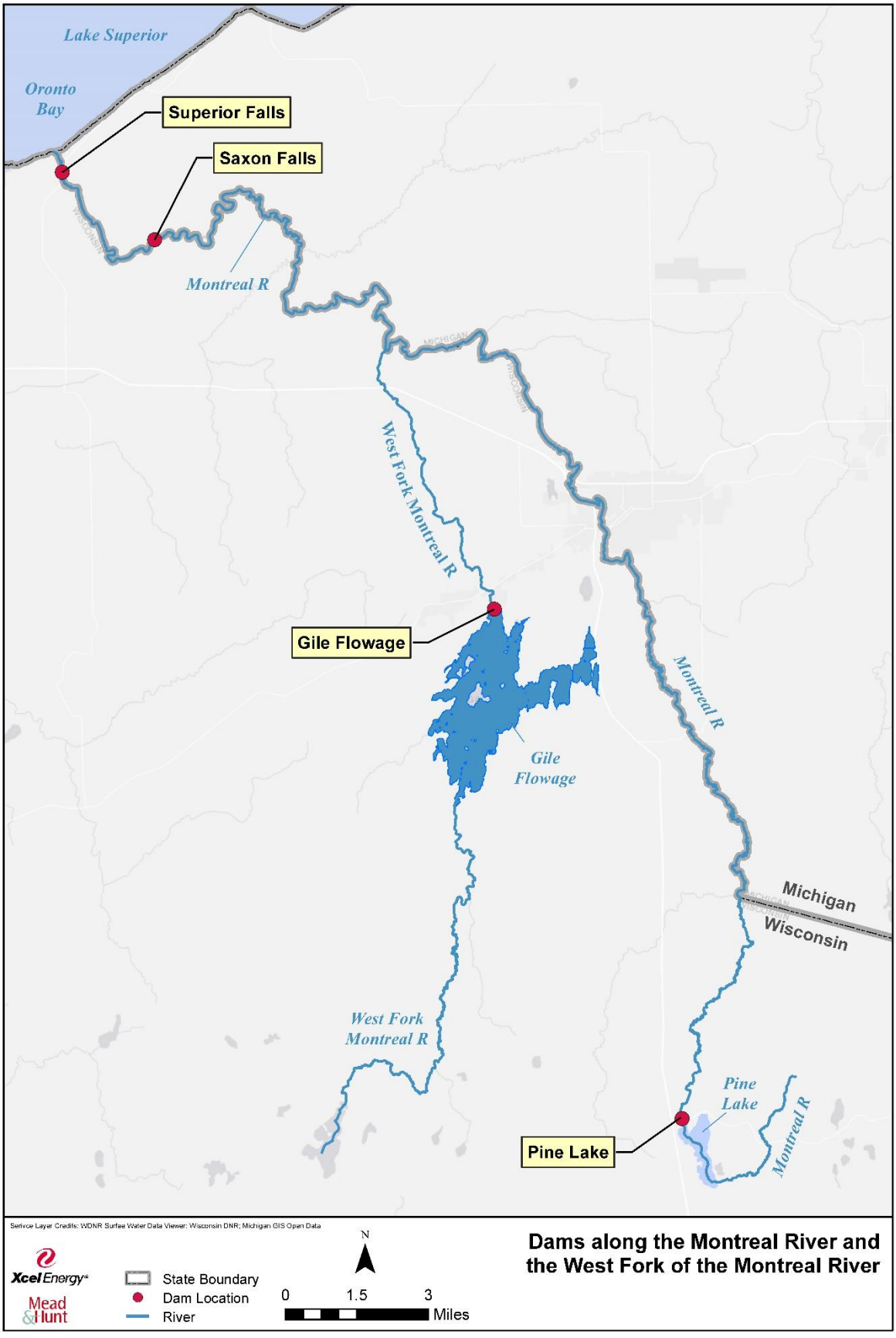
The Montreal River Watershed has a drainage area of approximately 264 square miles. The drainage area is 75 square miles upstream of the Gile Flowage, 262 square miles upstream of the Saxon Falls Project, and 264 square miles upstream of the Superior Falls Project (Northern States Power Company, 1988; Northern States Power Company, 1991).

There are two FERC-licensed hydroelectric projects and two state-regulated headwater storage reservoirs on the Montreal River; all are listed from upstream to downstream in **Table 4.1-1**. The FERC-regulated dams include the Saxon Falls and Superior Falls Projects. The state-regulated facilities do not generate power and are regulated by the State of Wisconsin.

Table 4.1-1: Hydroelectric Projects and Dams Located on the Montreal River

Dam Name	Location	River	FERC or State Regulated	FERC No.	Authorized Capacity
Pine Lake	Town of Oma, WI	Montreal River	State	N/A	N/A
Gile Flowage	Town of Pence, WI and Town of Carey, WI	Montreal River-West Branch	State	N/A	N/A
Saxon Falls	Town of Saxon, WI and Ironwood Township, MI	Montreal River	FERC	P-2610	1,500 kW
Superior Falls	Town of Saxon, WI and Ironwood Township, MI	Montreal River	FERC	P-2587	1,650 kW

Figure 4.1-1: Regulated Dams on the Montreal River and West Fork of the Montreal River



4.1.1 Saxon Falls Project

The Saxon Falls Project is located in northeastern Iron County, Wisconsin and northwestern Gogebic County, Michigan, approximately 11 miles northwest of the neighboring cities of Hurley, Wisconsin and Ironwood, Michigan and 25 miles east of the city of Ashland, Wisconsin. The Project's structural facilities, including the Saxon Falls Dam and powerhouse, are located in Section 21, Township 47 North, Range 01 East in Wisconsin and Section 24, Township 48 North, Range 49 West in Michigan. The Saxon Falls Dam impounds the Montreal River creating a 69-acre reservoir, which extends about 1.1 miles upstream of the Project dam. Municipalities within the current Project boundary include the town of Saxon, Wisconsin and Ironwood Township, Michigan.

4.1.2 Gile Flowage

The Gile Flowage is located in northeastern Iron County, Wisconsin, approximately 2.5 miles southwest of the neighboring cities of Hurley, Wisconsin and Ironwood, Michigan and 33 miles southeast of the city of Ashland, Wisconsin. The Gile Flowage Dam and structural facilities are located in Section 34, Township 46 North, Range 02 East. The dam impounds the West Fork of the Montreal River creating a 3,317-acre reservoir, which extends about 4.25 miles upstream. The Gile Flowage is located within the city of Montreal, town of Pence, and town of Carey.

4.1.3 Superior Falls Project

The Superior Falls Project is located in northeastern Iron County, Wisconsin and northwestern Gogebic County, Michigan, approximately 14 miles northwest of the neighboring cities of Hurley, Wisconsin and Ironwood, Michigan and 23 miles east of the city of Ashland, Wisconsin. The Project's structural facilities, including the Superior Falls Dam and powerhouse, are located in Section 7, Township 47 North, Range 01 East in Wisconsin and Section 15, Township 48 North, Range 49 West in Michigan. The Superior Falls Dam impounds the Montreal River creating a 16.9-acre reservoir, which extends about 1.2 miles upstream of the Project dam. Municipalities within the current Project boundary include the town of Saxon, Wisconsin and Ironwood Township, Michigan.

4.1.4 Major Land Uses

Based on the United States Geological Survey (USGS) National Land Cover Database (USGS, 2016), major land uses within the vicinity of the Saxon Falls and Superior Falls Projects include deciduous forest, evergreen forest, mixed forest, and wooded wetlands. Major land uses within the vicinity of the Gile Flowage include deciduous forest, wooded wetlands, mixed forest, emergent herbaceous wetlands, and a limited amount of low and medium intensity development on the north end of the reservoir, which is associated with the city of Montreal. Maps showing the major land uses in the vicinity of the Saxon Falls Project, Gile Flowage, and Superior Falls Project are shown in **Figure 4.1.4-1**, **Figure 4.1.4-2**, and **Figure 4.1.4-3**, respectively.

The Saxon Falls and Superior Falls Projects are located within the town of Saxon in Iron County, Wisconsin and Ironwood Township in Gogebic County, Michigan. Major land use in the town of Saxon consists of: 89.6% woodlands or other natural areas, 8% agriculture, 1.9% open space, 0.3% residential, and less than 0.1% each for parks and recreation, industrial, communications and utilities, government and institutional, and commercial (Town of Saxon, 2005).

The Gile Flowage is located within the town of Pence and town of Carey in Iron County, Wisconsin. Major land uses in the town of Pence consist of: 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, government and institutional, and commercial (Town of Pence, 2005). The town of Carey has similar land uses with 98.9% woodlands or other natural areas, 0.6% open space, 0.3% agriculture, and 0.1% residential (Town of Carey, 2012).

Figure 4.1.3-1: Major Land Uses in the Vicinity of the Saxon Falls Project Boundary

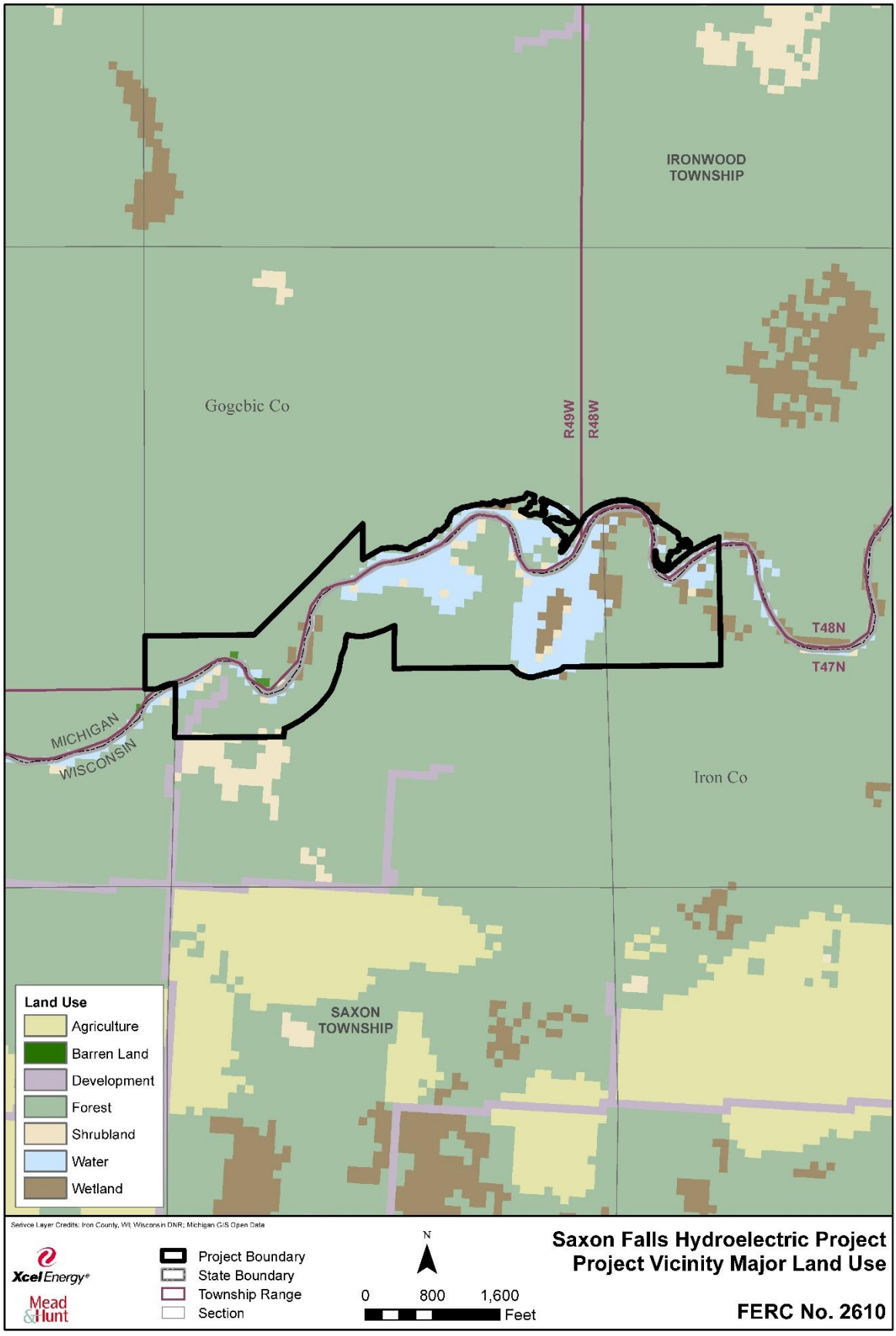


Figure 4.1.3-2: Major Land Uses in the Vicinity of the Gile Flowage

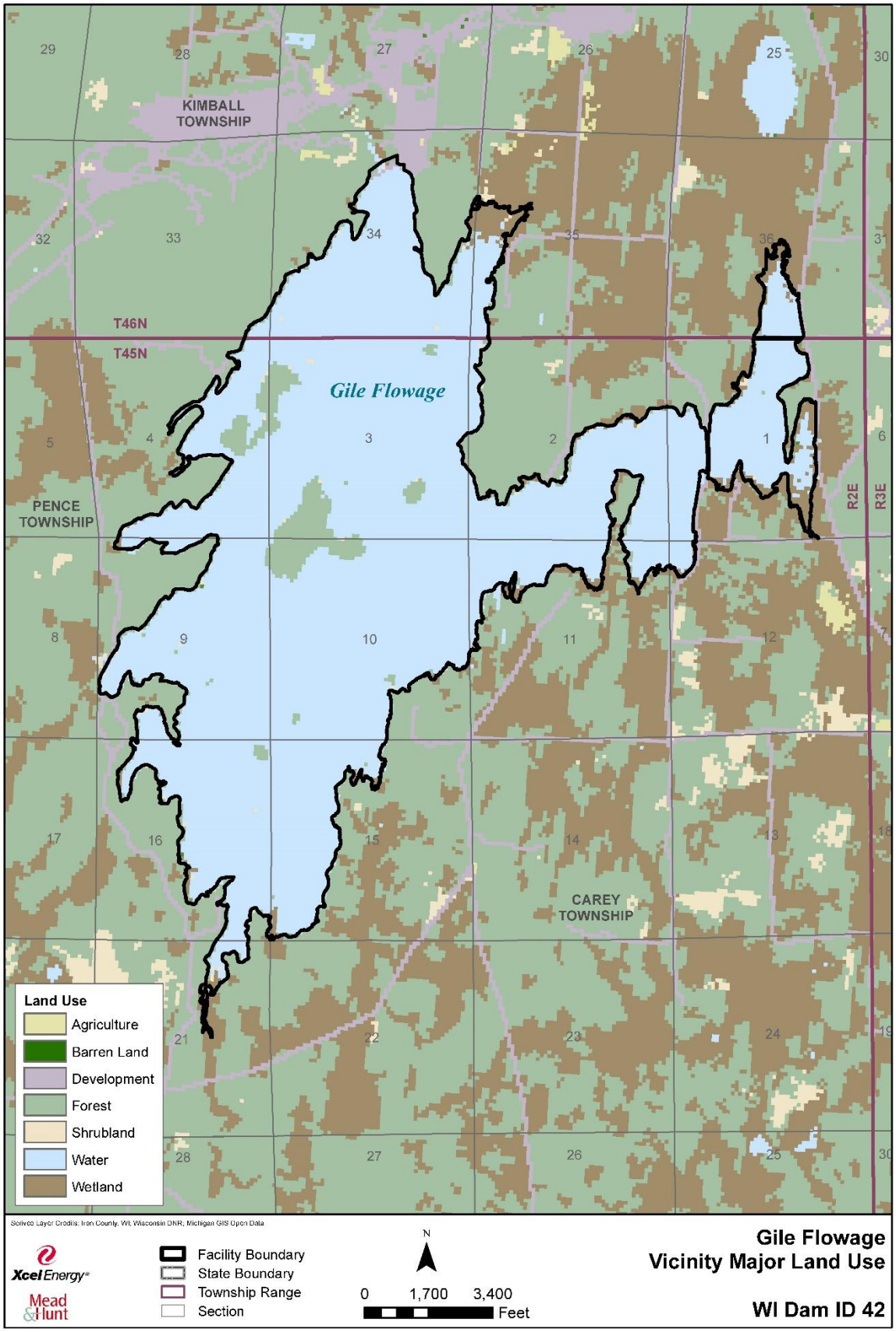
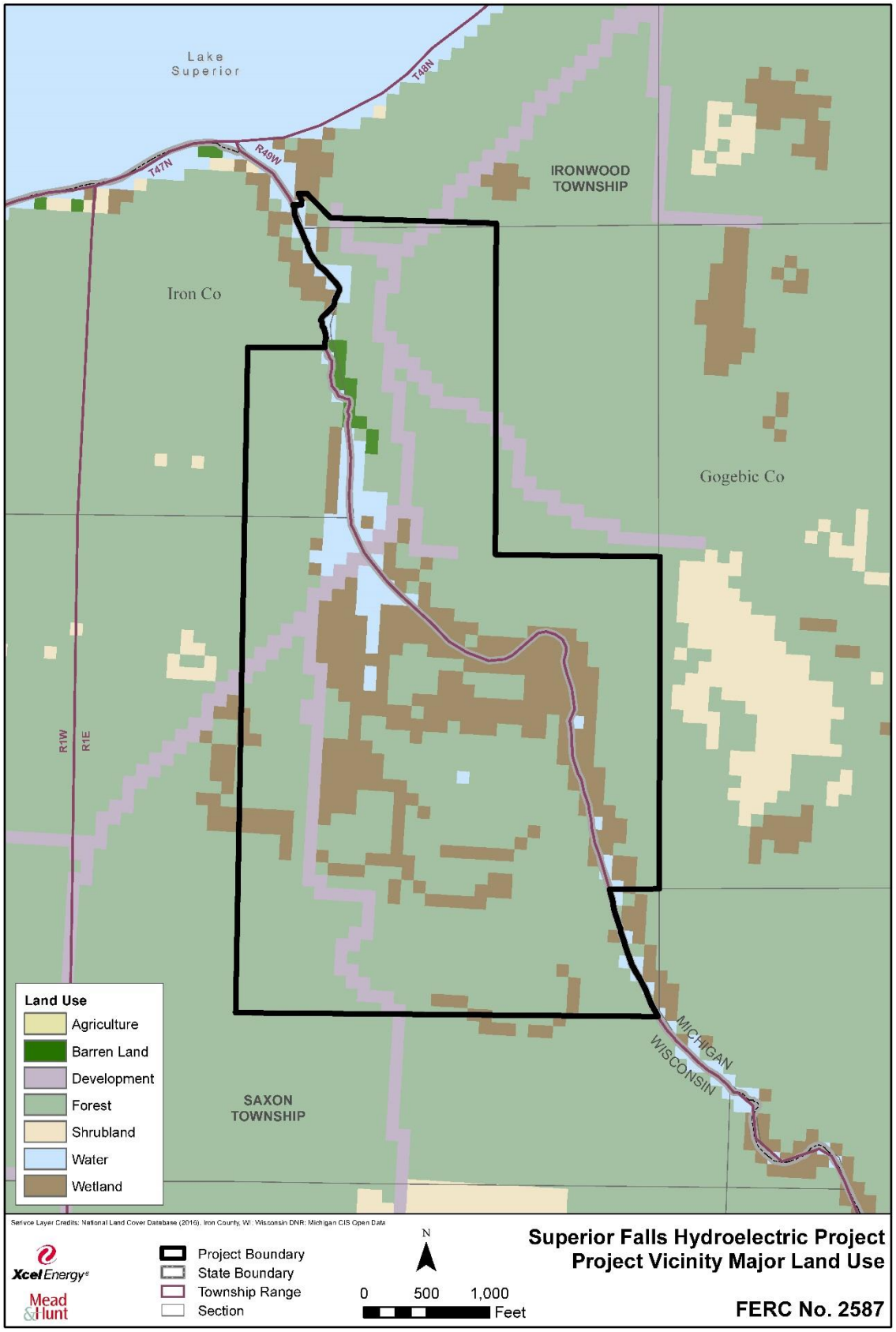


Figure 4.1.3-3: Major Land Uses in the Vicinity of the Superior Falls Project Boundary



4.1.5 Major Water Uses

Prior to European settlement, the Montreal River was not used as a transportation route due to the presence of waterfalls and steep canyons along the lower portion of the river. However, the Flambeau Trail, which began at the mouth of the Montreal River, was used as one of the few routes from the south shore of Lake Superior to the interior of northern Wisconsin. The Flambeau Trail was the only practical way to reach the interior and was used by travelers from prehistoric times into the 19th century (Northern States Power Company, 1988). Hydroelectric power was introduced to the Montreal River when the Saxon Falls Dam was completed in 1912 and the Superior Falls Dam in 1917 (Northern States Power Company, 2014a, Northern States Power Company, 2014b). The two hydroelectric projects provide a combined capacity of 3,250 kW of electricity to the local distribution system. The Gile Flowage Dam was completed in 1940 on the West Fork of the Montreal River and was built in the same location as a former lumber company dam originally constructed in 1885.

Aside from hydroelectric power and headwater storage, the Montreal River is also utilized for fish and wildlife habitat and recreational activities that include fishing, boating, whitewater rafting, canoeing, kayaking, hiking, sightseeing, and hunting.

4.1.6 Project Impoundments

4.1.6.1 Saxon Falls Project

The Saxon Falls Dam impounds the Montreal River approximately 4.3 miles upstream of its mouth. The resulting reservoir spans approximately 69.0 acres with a storage capacity of 550 acre-feet at maximum reservoir elevation of 997.0 as shown in the current Exhibit G maps.

4.1.6.2 Gile Flowage

The Gile Flowage Dam impounds the West Fork of the Montreal River approximately 17 miles upstream of the Saxon Falls Dam. The resulting reservoir spans approximately 3,317 acres with a useable storage capacity of 37,064 acre-feet with a 15-foot drawdown (Northern States Power Company, 2019).

4.1.6.3 Superior Falls Project

The Superior Falls Dam impounds the Montreal River approximately 0.4 miles upstream of its confluence with Lake Superior. The resulting reservoir spans approximately 16.9 acres with a storage capacity of about 80.9 acre-feet at maximum reservoir elevation of 740.0 feet, as shown in the current Exhibit G maps.

4.1.7 Climate

Iron County, Wisconsin and Gogebic County, Michigan are located within the continental climate region and experience some variation due to lake effects caused by Lake Superior. The continental climate is generally characterized by hot summers and cold winters (UW-M, 2003). This pattern is modified along the Lake Superior coast 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

overall monthly average temperatures range from 12°F in January to 66.5°F in July. The average annual precipitation is 36.11 inches, with about one half 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, 2019).

4.1.8 References

- Iron County. 2016. Iron County Outdoor Recreation Plan 2016-2020. Iron County and Northwest Regional Planning Commission. April 2016.
- Northern State Power Company. 1988. Application for a Minor Water Power Project Pursuant to Section 4(e) of the Federal Power Act for the Saxon Falls Hydro Project, FERC No. 2610. December 16, 1988.
- Northern States Power Company. 1991. Application for a License for a Minor Water Power Project, Superior Falls Hydroelectric Project, FERC Project No. 2587. December 17, 1991.
- Northern States Power Company. 2014a. Saxon Falls Hydroelectric Project FERC No. 2610. Supporting Technical Information Document. March 13, 2014.
- Northern States Power Company. 2014b. Superior Falls Hydroelectric Project FERC No. 2587. Supporting Technical Information Document. March 22, 2014.
- Northern States Power Company. 2019. Matt Miller, personal communication. October 3, 2019.
- Town of Carey. 2005. Town of Carey Comprehensive Plan. October 2005.
- Town of Pence. 2005. Town of Pence Comprehensive Plan. October 2005.
- US Climate Data. 2019. https://www.usclimatedata.com/climate/hurley/wisconsin/united-states/uswi0335. Accessed September 9, 2019.
- United States Geological Survey. 2016. National Hydrography Dataset (NHD). August 1, 2016.
- University of Wisconsin-Madison (UW-M), Atmospheric and Oceanic Studies. Climate of Wisconsin. Adapted from Climatography of the United States, No. 60, NOAA. March 25, 2003.
- Wisconsin Department of Natural Resources, 2019. WDNR Lake Pages-Gile Flowage. https://dnr.wi.gov/lakes/lakepages/LakeDetail.aspx?wbic=2942300&page=facts. Accessed September 13, 2019.

4.2 Geology and Soils (18 CFR § 5.6(d)(3)(ii))

4.2.1 Geology

4.2.1.1 Saxon Falls Project

The North Central Forest Ecological Landscape is characterized by end and ground moraines with some pitted outwash and bedrock-controlled areas. Kettle depressions and steep ridges are found in the northern portion of the North Central Forest (WDNR, 2015a). The topography surrounding the Saxon Falls Project varies up to 300 feet in elevation; the highest land surface elevation of about 1,180 feet descends to the Montreal River surface elevation of 880 feet downstream of the powerhouse.

The Saxon Falls Dam is located on the Middle Keweenawan Portage Lake Volcanic Group, which is composed of many basalt flows with a few sedimentary rock units of sandstone and shale deposited between the flow events. Geologic maps of the area place the contact between the Portage Lake Volcanic Group and the Upper Keweenawan Oronto Group less than a mile north of the dam. Although the thickness of the Volcanic Group is unknown, it is estimated at greater than 20,000 feet and the Saxon Falls dam rests on nearly its entire thickness (Northern States Power Company, 2014b).

Although no basalt is present at the dam, the geologic units are presumed to represent the interflow sedimentary units. These sedimentary units are moderately to highly metamorphosed due to their deposition between lava flow events and to the Late Keweenawan regional metamorphism that resulted from the emplacement of the Mellen Intrusive, located approximately five miles to the south. Mafic dikes visible at the dam were likely intruded at this time. The southern portion of the Keweenawan fault cuts through the Montreal River about three miles southeast of the dam. This fault is a northwest to southeast trending, nearly vertical, reverse dip-slip fault with the majority of displacement occurring during middle to late Keweenawan time. Displacement north of the dam in Gogebic County, Michigan is estimated at 10,000 feet. There is evidence that small movement took place within this fault system during the early Ordovician period. The faulting resulted in displacement and jointing of the rocks near the dam (Northern States Power Company, 2014b).

Glacial deposits are 50 to 100 feet thick in the area of the dam. Ground moraine of reddish-brown silty to sandy clay till containing gravel and cobbles is overlain by end moraine deposits of red sandy to clay till with stratified sand and gravel, which in turn is overlain by reddish-brown glacial lake clay. The red clay region has a very high rate of erosion and yields an overage of 500 tons per square mile per year of clay and silt sediment (Northern States Power Company, 2014b).

4.2.1.2 Gile Flowage

The Gile Flowage is located in the North Central Forest Ecological Landscape. The North Central Forest Ecological Landscape is characterized by end and ground moraines with some pitted outwash and bedrock-controlled areas. Kettle depressions and steep ridges are found in the northern portion of the North Central Forest (WDNR, 2015a). The topography surrounding Gile Flowage varies up to 280 feet with the highest land surface elevation of about 1,760 feet descending to the West Fork of the Montreal River surface elevation of 1,480 feet downstream of the Gile Flowage Dam (USGS, 2019).

The Gile Flowage area is part of the Gogebic Range and Trap Range, just north of the Northern Highlands Region. The ranges form two prominent ridges in Ashland and Iron Counties in Wisconsin and extend over the state border into Michigan near Ironwood. Both ridges are composed of relatively

steeply dipping rock layers (to the north) 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 and composed of interbedded iron-rich and silica-rich layers about 650 feet thick. The bedrock is Precambrian, approximately 1.9 billion years old. The northern ridge is the Trap Range and composed of younger volcanic rock that is approximately 1.1 billion-years-old and primarily basaltic lava flows. 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 as ground moraines and end moraines. The thickness of unconsolidated materials in the vicinity of the Gile Flowage is mapped at the transition between 0-50 feet deep and 50-100 feet deep (Ayres Associates, 2016).

4.2.1.3 Superior Falls Project

The Superior Falls Projects lies within the Superior Coastal Plain Ecological Landscape, which exhibits level plains that slope towards Lake Superior. These plains are dissected by deeply incised streams and rivers. Sandspits enclosing lagoons and wetlands are often well-developed at river mouths (WDNR, 2015b). The surrounding topography varies up to 300 feet in elevation, with the highest land surface of about 900 feet descending to the Lake Superior elevation of 603 feet (USGS, 2019).

The Superior Falls Dam is founded on the Middle Keweenawan Portage Lake Volcanic Group, which is composed of many basalt flows with a few sedimentary rock units of sandstone and shale deposited between flow events. Geologic maps of the area place the contact between the Portage Lake Volcanics and the Upper Keweenawan Oronto Group less than a mile north of the dam. Although the thickness of the Volcanic Group is unknown, it is estimated at greater than 20,000 feet and the Superior Falls dam rests on nearly its entire thickness (Northern States Power Company, 2014a).

Although no basalt is present at the dam, the geologic units are presumed to represent the interflow sedimentary units. These sedimentary units are moderately to highly metamorphosed due to their deposition between lava flow events and to the Late Keweenawan regional metamorphism that resulted from the emplacement of the Mellen Intrusive, located approximately five miles to the south. Mafic dikes visible at the dam were likely intruded at this time. The southern portion of the Keweenawan fault cuts through the Montreal River about four miles southeast of the dam. This fault is a northwest to southeast trending, nearly vertical, reverse dip-slip fault with the majority of displacement occurring during middle to late Keweenawan time. Displacement north of the dam in Gogebic County, Michigan is estimated at 10,000 feet. There is evidence that small movement took place within this fault system

during the early Ordovician period. The faulting resulted in displacement and jointing of the rocks near the dam (Northern States Power Company, 2014a).

The Superior Falls Dam was constructed in the Montreal River Canyon at the head of a series of rapids that lead to the Superior Falls waterfall. The bedrock is exposed in several locations at the Project site. Upstream of the dam, bedrock is visible along the banks of both shores. Downstream of the dam, bedrock is exposed across the base of the dam and downstream beyond the waterfall. Glacial drift is thin to absent at the dam. It thickens away from the Montreal River to a maximum of 100 feet of reddish-brown lake clay (Northern States Power Company, 1991).

Geologic maps of the area identify the bedrock at the project site as a Precambrian sedimentary unit sandstone composed of shale and conglomerate. The bedrock outcropping immediately above and below the dam is composed of shale. Bedding strikes east-northeast to west-southwest and an angle of approximately 35 degrees from the centerline of the dam. Due to the impermeable nature of shale, most of the porosity and permeability in the immediate vicinity of the dam is estimated to occur along joint and bedding planes (Northern States Power Company, 2014a).

4.2.2 Soils

4.2.2.1 Saxon Falls Project

There are 15 soil types found throughout the Saxon Falls Project vicinity, which are grouped into 13 major soil associations with distinct soil patterns, relief, and drainage factors (USDA-NRCS, 2019b). **Appendix 4.2.2.1** presents a custom soils report and map for the general Project vicinity.

Michigamme-Schweitzer-Peshekee rock outcrop complex, Gichigami-Oronto complex, and Fence soils are the most prevalent soil series found in the Project vicinity. The most commonly identified soil classifications in respective order of abundance are the Michigamme-Schweitzer-Peshekee-Rock outcrop complex soils with 55-75% slopes (369F), Gichigami-Oronto complex soils with 0-6% slopes (444B), and Fence very fine sandy loam soils with 0-6% slopes (625B). Soil characteristics are shown in **Table 4.2.2.1-1**.

Table 4.2.2.1-1: Prevalent Soil Characteristics in the Saxon Project Vicinity

Soil Series	Drainage Classification	Formation	Water Transmittal Capacity	Runoff Class
Michigamme-Scweitzer-Peshekee-Rock Outcrop	Well-drained	Hill, backslope, and sideslope	Very low to low	High
Gichigami-Oronto	Moderately well-drained to somewhat poorly drained	Till plain	Moderately high to high	Moderate
Fence	Moderately well-drained	Lake plain slopes	Moderately High	Moderate

4.2.2.2 Gile Flowage

There are 26 soil types found throughout the vicinity of the Gile Flowage, which are grouped into 21 major soil associations with distinct soil patterns, relief, and drainage factors (USDA-NRCS, 2019c). **Appendix 4.2.2.2-1** presents a custom soils report and map for the general vicinity.

Gogebic-Peshekee complex, Tula-Gogebic complex, and Gogebic silt loam soils and the most prevalent soils found in the Project vicinity. The most commonly identified soil classifications in respective order of abundance are the Gogebic-Peshekee complex with 6-18% slopes, very stony, very rocky soils (5429C); Tula-Gogebic complex stony soils with 0-6% slopes (5353B); and Gogebic silt loam soils with 6-18% slopes (5351C). Soil characteristics are shown in **Table 4.2.2.2-1**.

Table 4.2.2.2-1: Prevalent Soil Characteristics in the Gile Flowage Vicinity

Soil Series	Drainage Classification	Formation	Water Transmittal Capacity	Runoff Class
Gogebic-Peshekee	Moderately well-drained to well-drained	Hill and backslope	Very low to low	Medium to high
Tula-Gogebic	Moderately well-drained to somewhat poorly drained	Till plain, summit, and footslope	Very low to moderately low	Low to high
Gogebic Silt Loam	Moderately well-drained	Till plain, summit, backslope, and footslope	Very low to moderately low	High

4.2.2.3 Superior Falls Project

There are 10 soil types found throughout the Superior Falls Project vicinity, which are grouped into nine major soil associations with distinct soil patterns, relief, and drainage factors (USDA-NRCS, 2019a). **Appendix 4.2.2.3-1** presents a custom soils report and map for the general Project vicinity.

Moquah-Anheim complex, Flintsteel loam, and Rockland-Anheim complex soils are the most prevalent soil series found in the Project vicinity. The most commonly identified soil classifications in respective order of abundance are the Moquah-Anheim complex with 0-3% slopes frequently flooded (230B), Flintsteel loam with 1-8% slopes (280B), and Rockland-Anheim frequently flooded complex with 0-70% slopes (5285F). Soil characteristics are shown in **Table 4.2.2.3-1**.

Table 4.2.2.3-1: Prevalent Soil Characteristics in the Superior Falls Project Vicinity

Soil Series	Drainage Classification	Formation	Water Transmittal Capacity	Runoff Class
Moquah-Anheim	Moderately well-drained to poorly drained	Floodplain	Moderately high to high	Low to negligible
Flintsteel Loam	Moderately well-drained	Till plain	Very low to moderately low	High
Rockland-Anheim	Well-drained to poorly drained	Slump and floodplain	Moderately high to high	Very high to negligible

4.2.3 Impoundment Shoreline Conditions

4.2.3.1 Saxon Falls Project

A 1991 survey of the Saxon Falls Project reservoir indicated the shoreline banks varied from regular and steep to irregular and low banked. The shorelines are heavily vegetated with second growth forest up to the water's edge, which is heavily vegetated with aquatic plants. In 1991, observed bank erosion was intermittent and very minor throughout the flowage (BZ Engineering, 1991b). A survey of the shoreline in 1998 indicated the shorelines were stable, with well vegetated banks along the entire shoreline and no signs of erosion that warranted inspection by the archaeologist (Northern States Power Company, 1999). A survey of the shoreline in 2003 indicated the shoreline was essentially stable and well-vegetated with only slight erosion due to animal activity, particularly beaver, and high-water events at the upper end of the flowage (Northern States Power Company, 2004). A survey of the shoreline in 2008 indicated all of the sites identified in the 2003 survey exhibited some degree of healing through natural revegetation. Four new erosion sites were documented in the survey, but all were located within the river channel upstream of the Project boundary. No new erosion sites were noted within the Project boundary (Northern States Power Company, 2008). All lands within the Project boundary are owned by Northern States Power Company.

4.2.3.2 Gile Flowage

The Gile Flowage shoreline consists of approximately 26 miles of irregular shaped points and bays with numerous areas of exposed bedrock. Approximately 90% of the shoreline is in public or Northern States Power Company ownership and is maintained in a natural forested state, reducing the likelihood of erosion (Whitewater Associates, 2005).

In Wisconsin, comprehensive floodplain and shoreland zoning is a function of the county. Iron County enforces floodplain and shoreland zoning ordinances for navigable waters to maintain safe and healthful conditions; prevent and control water pollution; protect spawning grounds, fish, and aquatic life; control building sites, structure placement, and land uses; and preserve and restore vegetation and enhance natural scenic beauty (Iron County, 2019).

The combination of Northern State Power Company shoreline ownership, existing native riparian vegetation buffers, and local shoreland regulations, work together to provide adequate protection from wide-spread shoreline erosion and over development.

4.2.3.3 Superior Falls Project

A 1991 survey of the Superior Falls Project reservoir indicated the reservoir shoreline varies from regular and steep to irregular and low banked areas. The shorelines are heavily vegetated with second growth forest and the water's edge is heavily vegetated with aquatic plants. Bank erosion was noted along the upper portion of the impoundment in 1991, some of which was fairly extensive. Many abandoned river channels were also apparent. Water flow in the lower portion of the flowage includes several marshy areas and showed less erosion (BZ Engineering, 1991a). All lands within the Project boundary are owned by Northern States Power Company.

4.2.4 Erosion

The United States Department of Agriculture (USDA)-Natural Resource Conservation Service (NRCS) uses a computer software model called Revised Universal Soil Loss Equation Version 2 (RUSLE2) to estimate soil loss from erosion caused by rainfall on cropland. The following factors are reviewed in RUSLE2 to estimate soil erosion based upon erodibility.

4.2.4.1 Hydrologic Group

The Hydrologic Group for each soil is based upon runoff potential for saturated and bare soils and range from Group A through Group D, with Group A having the lowest runoff potential and Group D having the highest (USDA-NRCS, 2019c).

Saxon Falls Project

Michigamme-Schweitzer-Peshekee-Rock outcrop complex (369F) resides in Group C, Gichigami-Oronto complex (444B) resides in group B/D, and Fence very fine sandy loam (625B) resides in Group B/D.

Gile Flowage

Gogebic-Peshekee complex (5429C) resides in Group D, Tula-Gogebic (5353B) resides in Group C/D, and Gogebic silt loam (5351C) resides in Group D.

Superior Falls Project

Moquah-Anheim complex (230B) resides in Groups A and B, Flintsteel loam (280B) resides in Group C/D, and Rockland-Anheim frequently flooded complex (5285F) resides in Groups C and B/D.

4.2.4.2 T Factor

The T Factor is an estimate of the maximum average rate of soil erosion in tons per acre per year that can occur without affecting crop productivity over a sustained period (USDA-NRCS, 2019d). T Factor also relates to the soil's ability to revegetate once it is disturbed.

Saxon Falls Project

Michigamme-Schweitzer-Peshekee-Rock outcrop complex (369F) has a T Factor of 1-3 tons per acre, Gichigami-Oronto complex (444B) has a T Factor of 5 tons per acre, and Fence very fine sandy loam (625B) has a T Factor of 5 tons per acre.

Gile Flowage

Gogebic-Peshekee complex (5429C) has a T Factor of 1 to 4 tons per acre, Tula-Gogebic complex (5353B) has a T Factor of 4 tons per acre, and Gogebic silt loam (5351C) has a T Factor of 4 tons per acre.

Superior Falls Project

Moquah-Anheim complex (230B) has a T Factor of 5 tons per acre, Flintsteel loam (280B) has a T Factor of 3 tons per acre, and Rockland-Anheim frequently flooded complex (5285F) has a T Factor of 5 tons per acre.

4.2.4.3 Kf Factor

The Kf Factor gives an indication of how susceptible a soil surface is to erosion caused by water. The factors range from 0.02 to 0.69, with 0.69 having the highest susceptibility to erosion (USDA-NRCS, 2019d). Based upon the RUSLE2 information, the lands in the vicinity of the Superior Falls Project, Saxon Falls Project, and the Gile Flowage have Kf Factors in the moderate range because the soil particles are moderately susceptible to detachment and can produce moderate runoff.

Saxon Falls Project

Michigamme-Schweitzer-Peshekee-Rock outcrop complex (369F) has a Kf Factor of 0.35, Gichigami-Oronto complex (444B) has a Kf Factor of 0.28 to 0.32, and Fence very fine sandy loam (625B) has a Kf Factor of 0.49.

Gile Flowage

Gogebic-Peshekee complex (5429C), Tula-Gogebic complex (5353B), and Gogebic silt loam (5351C) do not have Kf Factors listed in the soil report since the soils are very rocky and do not contain the fine earth fragments (less than 2mm) the Kf Factor measures.

Superior Falls Project

Moquah-Anheim complex (230B) has a Kf Factor of 0.28 to 0.37, Flintsteel loam (280B) has a Kf Factor of 0.28, and Rockland-Anheim frequently flooded complex (5285F) has a Kf Factor for Anheim of 0.43 (no Kf Factor is assigned to Rockland since the soil is very rocky and does not contain the fine earth fragments (less than 2mm) the Kf Factor measures).

4.2.4.4 Percent Sand, Percent Silt, and Percent Clay

The USDA-NRCS also provides a representative value of the sand, silt, and clay composition in the dominant soils (USDA-NRCS, 2019d).

Saxon Falls Project

The majority of the Michigamme-Schweitzer-Peshekee-Rock outcrop complex (369F) is composed of 5% sand, 90% silt, and 5% clay or is a rock outcrop with no soil; Gichigami-Oronto complex (444B) is composed of 34% sand, 52% silt, and 14% clay; and Fence very fine sandy loam (625B) is composed of 54% sand, 41% silt, and 5% clay.

Gile Flowage

Gogebic-Peshekee complex (5429C) and Tula-Gogebic complex (5353B) are not broken down into the amounts of sand, silt, and clay because these soils are very rocky. Gogebic silt loam (5351C) is composed of 5% sand, 90% silt, and 5% clay.

Superior Falls Project

Moquah-Anheim complex (230B) is composed of 30-46% sand, 44-60% silt, and 9-10% clay; Flintsteel loam (280B) is composed of 5% sand, 90% silt, and 5% clay; and Rockland-Anheim frequently flooded complex (5285F) is composed of 36% sand, 54% silt, and 10% clay.

4.2.5 References

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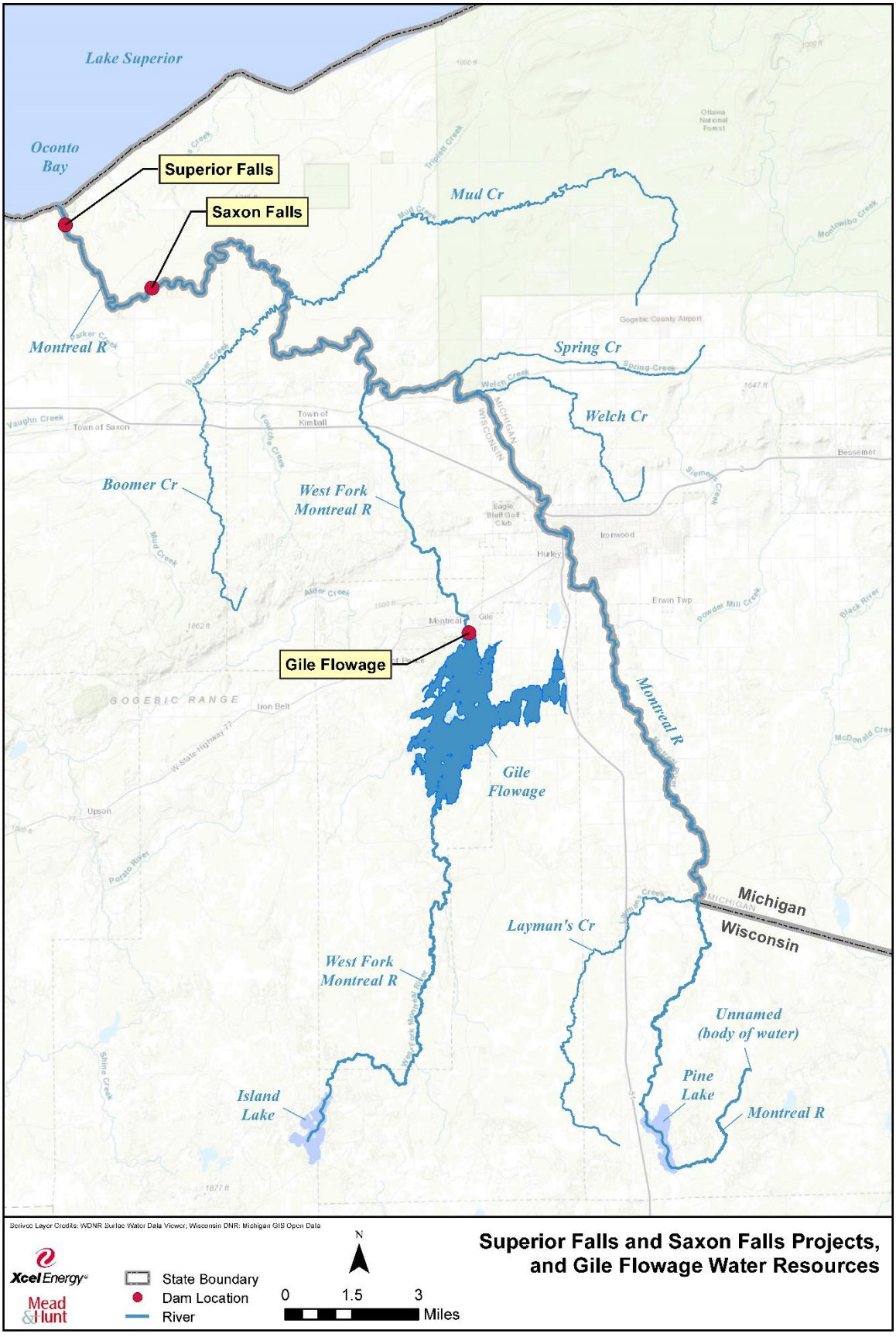
4.3 Water Resources (18 CFR § 5.6(d)(3)(iii))

The Montreal River is roughly 53.5 miles in length and originates from an unnamed body of water located approximately 1.8 miles upstream from where the River passes through a culvert under County Road G in Oma Township, Wisconsin. The Montreal River flows southwesterly for about 3.8 miles from the unnamed body of water until it enters Pine Lake at the southeast shoreline. The Montreal River then flows northerly for another 9.5 miles, at which point it begins to flow northwesterly for an additional 40.2 miles along the Wisconsin and Michigan border while passing through the Saxon Falls Project and Superior Falls Project, until it reaches Oronto Bay in Lake Superior. Primary tributaries include Boomer Creek and Layman's Creek in Wisconsin and Mud Creek, Spring Creek, and Welch Creek in Michigan, as shown in **Figure 4.3-1** on the following page (USGS, 2016).

The West Fork of the Montreal River is about 26.1 miles in length and originates from Island Lake in Pence Township, Wisconsin. The West Fork of the Montreal River flows north and east for 13.8 miles until it enters the southern end of Gile Flowage. From there, the West Fork of the Montreal River continues northeast for an additional 12.3 miles until it meets the Montreal River, at which point the Montreal River continues to flow another 17.7 miles before it reaches Oronto Bay.

Figure 4.3-1: Superior Falls and Saxon Falls Projects and Gile Flowage Water Resources



4.3.1 Drainage Area

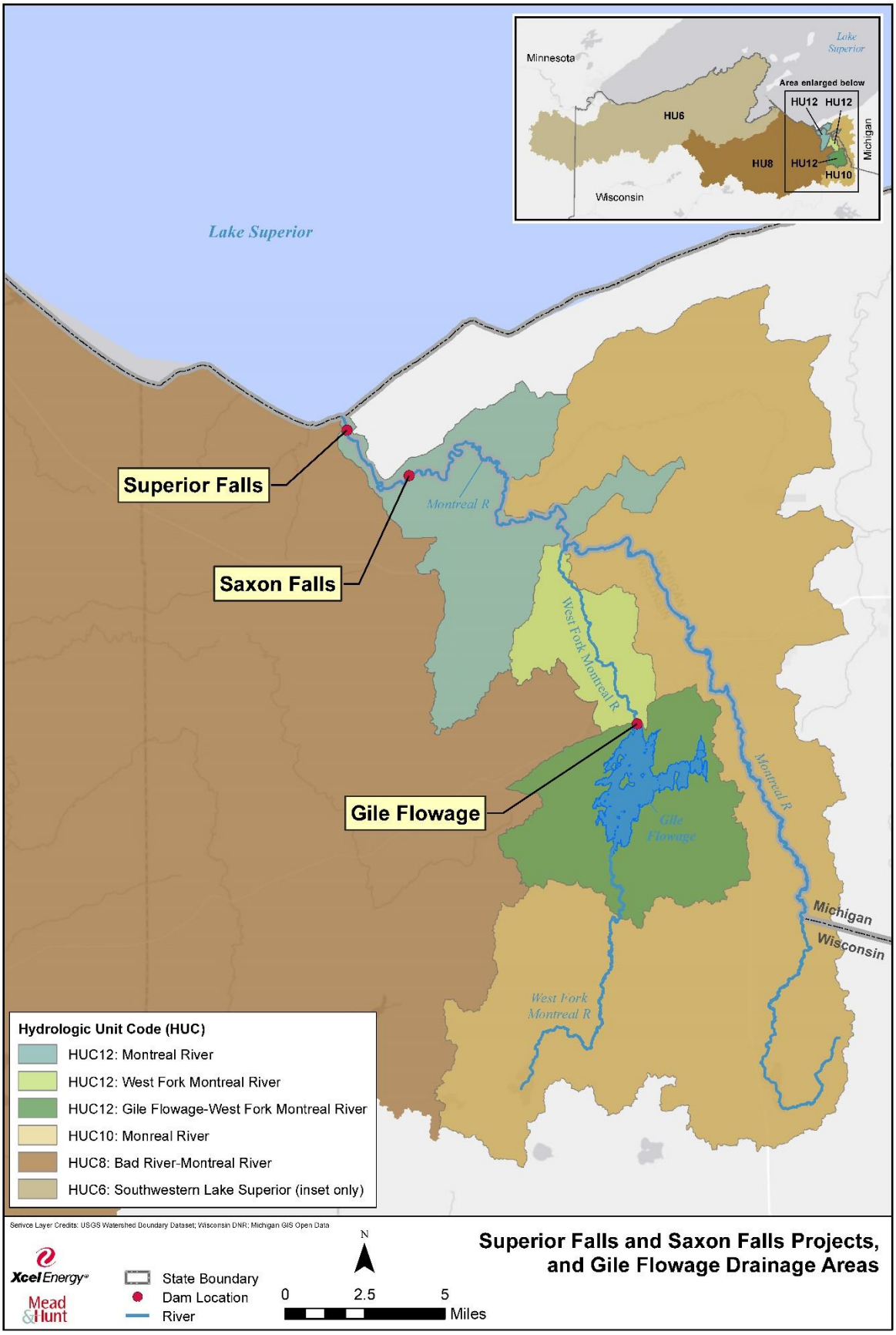
The Saxon Falls Project, Gile Flowage, and Superior Falls Project are located in the Bad-Montreal River Subbasin in northeast Wisconsin and northwest Michigan. The drainage area lies within portions of Iron County, Wisconsin and Gogebic County, Michigan. The Bad-Montreal Subbasin is further divided into watershed and subwatershed hierarchies. The Saxon Falls Project, Gile Flowage, and Superior Falls Project are located in the same watershed. The Saxon Falls Project and Superior Falls Project are located within the same subwatershed, while Gile Flowage is located in a different subwatershed, as shown in **Figure 4.3.1-1**. The National Watershed Boundary hierarchy is listed in **Table 4.3.1-1** (WDNR, 2019b).

Table 4.3.1-1: National Watershed Boundary Dataset Hydrologic Unit Designation

Hierarchy	WBDHU[1]	Project/Facility	Hydrologic Unit Name
Region	WBDHU2	All three	Great Lakes
Subregion	WBDHU4	All three	Western Lake Superior
Basin	WBDHU6	All three	Southwestern Lake Superior
Subbasin	WBDHU8	All three	Bad River - Montreal River
Watershed	WBDHU10	All three	Montreal River
Subwatershed	WBDHU12	Superior Falls Saxon Falls	Montreal River
		Gile Flowage	Gile Flowage-West Fork Montreal River

[1] National Watershed Boundary Dataset Hydrologic Unit (USGS-USDA-NRCS, 2013)

Figure 4.3.1-1: Superior Falls and Saxon Falls Projects and Gile Flowage Water Drainage Areas



4.3.2 Streamflow, Gage Data, and Flow Statistics

Monthly flow duration curves for the Saxon Falls Project, Gile Flowage, and Superior Falls Project were developed based on data recorded at USGS Gage No. 04029990, which is located at Saxon Falls powerhouse. The USGS gage data, provided below, was analyzed from January 1986 to December 2017.

4.3.2.1 Saxon Falls Project

USGS Gage No. 04029990 is located at the Saxon Falls Project. Daily discharge values are provided by Licensee to the USGS. The gage location has a drainage area of 262 square miles. The USGS gage data was analyzed from January 1986 to December 2017. Based on the adjusted data for the analyzed period of January 1986 to December 2017, the average annual calendar year flow at the Project is 310 cfs; the maximum annual calendar year flow was 579 cfs in 2016; and the minimum annual calendar year flow was 154 cfs in 1987.

The Saxon Falls Project monthly minimum, mean, and maximum flows are shown in **Table 4.3.2.1-1** and the monthly flow duration curves and exceedance table for the analyzed period is available in **Appendix 4.3.2.1-1**.

Table 4.3.2.1-1: Saxon Falls Project Monthly Minimum, Mean, and Maximum Flows (1986 to 2017)

Month	Monthly Minimum (cfs)	Monthly Mean (cfs)	Monthly Maximum (cfs)
January	60	157	430
February	55	169	1,700
March	64	394	4,100
April	85	952	8,840
May	60	551	8,520
June	40	285	3,510
July	40	273	9,880
August	25	162	1,170
September	17	148	1,450
October	30	212	1,920
November	53	228	2,880
December	48	188	1,500

*Note: Measured at Saxon USGS Gage No. 04029990.

4.3.2.2 Gile Flowage

The USGS Gage No. 04029990 is located downstream at the Saxon Falls Project. The gage location has a drainage area of 262 square miles adjusted for the drainage area of 75 square miles at the Gile Flowage dam. Based on the adjusted data for the analyzed period of January 1986 to December 2017, the average annual calendar year flow at Gile Flowage is 89 cfs; the maximum annual calendar year flow was 166 cfs in 2016; and the minimum annual calendar year flow was 44 cfs in 1987.

The Gile Flowage monthly minimum, mean, and maximum flows are depicted in **Table 4.3.2.2-1** and the monthly flow duration curves and exceedance table for the analyzed period is available in **Appendix 4.3.2.2-1**.

Table 4.3.2.2-1: Gile Flowage Monthly Minimum, Mean, and Maximum Flows (1986 to 2017)

Month	Monthly Minimum (cfs)	Monthly Mean (cfs)	Monthly Maximum (cfs)
January	17	45	123
February	16	49	487
March	18	113	1,174
April	24	272	2531
May	17	158	2,439
June	11	82	1,005
July	11	78	2,828
August	7	46	335
September	5	42	415
October	9	61	550
November	15	65	824
December	14	54	429

*Note: Measured at Saxon USGS Gage No. 04029990.

4.3.2.3 Superior Falls Project

The USGS Gage No. 04029990 is located approximately 2 miles upstream at Saxon Falls. The gage location has a drainage area of 262 square miles adjusted for the drainage area of 264 square miles at the Project dam. Based on the adjusted data for the analyzed period of January 1986 to December 2017, the average annual calendar year flow at the Project is 312 cfs; the maximum annual calendar year flow was 584 cfs in 2016; and the minimum annual calendar year flow was 156 cfs in 1987.

The Superior Falls Project monthly minimum, mean, and maximum flows are depicted in **Table 4.3.2.3-1** and the monthly flow duration curves and exceedance table for the analyzed period is available in **Appendix 4.3.2.3-1.**

Table 4.3.2.3-1: Superior Falls Project Monthly Minimum, Mean, and Maximum Flows (1986 to 2017)

Month	Monthly Minimum (cfs)	Monthly Mean (cfs)	Monthly Maximum (cfs)
January	60	158	433
February	55	171	1,731
March	64	397	4,131
April	86	959	8,907
May	60	555	8,585
June	40	287	3,537
July	40	275	9,955
August	25	163	1,179
September	17	149	1,461
October	30	214	1,935
November	53	229	2,902
December	48	190	1,511

*Note: Measured at Saxon USGS Gage No. 04029990.

4.3.3 Existing and Proposed Uses of Water

4.3.3.1 Existing Uses

Beginning in the early 1900's, the Montreal River provided water for hydroelectric power production, recreation, and fish and wildlife habitat. The primary uses of the Montreal River today remain the same.

Saxon Falls Project

There are currently no known surface water withdrawals or point source discharges within the Project boundary (WDNR, 2019a, WDNR 2019c).

Gile Flowage

There are no known surface water withdrawals from the Gile Flowage. One permitted point-source municipal discharge from the city of Montreal sewer treatment plant is located 0.8 miles downstream of the Gile Flowage Dam (WDNR, 2019a, WDNR 2019c).

Superior Falls Project

There are currently no known surface water withdrawals or point source discharges within the Project boundary (WDNR, 2019a, WDNR 2019c).

4.3.3.2 Proposed Uses

Both the Saxon Falls and Superior Falls Projects are operated in a run-of-river mode and do not store water for future releases. The non-licensed Gile Flowage is operated in order to supplement flows on the West Fork of the Montreal River during periods of low river flows. Northern States Power Company does not propose any changes to the current operation of any of the facilities.

4.3.4 Existing Instream Flow Uses

4.3.4.1 Saxon Falls Project

Article 402 of the current Saxon Falls Project license requires a minimum flow of 5 cfs or inflow, whichever is less, to be released between ice-out and October 31 into the bypass reach to maintain aesthetic flows and protect aquatic resources within the bypass reach. The Licensee does not propose any changes to the minimum flow.

4.3.4.2 Gile Flowage

The Gile Flowage is a non-licensed headwater storage reservoir. It has historically released a minimum flow of 10 cfs into the West Fork of the Montreal River (Friends of the Gile Flowage, 2019). Northern States Power Company does not propose any operational changes to the minimum flow.

4.3.4.3 Superior Falls Project

Article 404 of the current Superior Falls Project license requires minimum flows be released into the bypass reach to maintain aesthetics. A minimum flow of 8 cfs must be released from the Saturday before Memorial Day to October 15. A minimum flow of 20 cfs must be released between 8AM and 8PM on weekends and holidays during the same timeframe. The Licensee does not propose any operational changes to the minimum flow.

4.3.5 Existing Water Rights

The Licensee owns or has the rights necessary to operate the Saxon Falls Project, Gile Flowage and Superior Falls Project.

4.3.6 Reservoir Bathymetry

4.3.6.1 Saxon Falls Project

The Saxon Falls reservoir is approximately 69 acres at the maximum reservoir elevation of 997.0 feet. The reservoir is shallow, with much of the reservoir being less than six feet in depth (Northern States Power Company, 1988). The WDNR Lakes webpage for Saxon Falls lists the maximum depth of the reservoir as 12 feet (WDNR, 2019d). A literature search was not able to identify a bathymetric map for the reservoir.

4.3.6.2 Gile Flowage

The Gile Flowage encompasses approximately 3,317 acres and has a maximum depth of 25 feet. The reservoir has a usable storage capacity of 37,064 acre-feet with a 15-foot drawdown (Northern States Power Company, 2019). A bathymetric map of the area near the embankment is located in **Appendix 4.3.6.2-1**. Northern States Power Company does not have a bathymetric map of the entire reservoir.

4.3.6.3 Superior Falls Project

The Superior Falls reservoir is approximately 17 acres at the maximum reservoir elevation of 740.0 feet. Based on a 1991 survey, the reservoir has a maximum depth of 18 feet and the average depth is 4.8 feet with approximately 42% having a depth of less than three feet (Northern States Power Company, 1991). A bathymetric map of the Superior Falls reservoir is located in **Appendix 4.3.6.3-1.**

4.3.7 Water Quality

4.3.7.1 Wisconsin Regulations

The State of Wisconsin has established water quality standards with Wisconsin Administrative Code Chapter Natural Resources (NR) 102 in order 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 § 303(c) of the Clean Water Act

<u>River Water Quality Standards</u>

Wisconsin classifies the Montreal River from its mouth to the Saxon Falls Flowage as a warm water stream. The river upstream of the Saxon Falls Project is classified as a cold water stream. Under NR 102.03, the portion of the Montreal River flowing through the Saxon Falls and Superior Falls Projects is defined as a surface water and no variances are provided. This portion is categorized as a warm water sport fish community for fish and other aquatic life uses and for general recreational, public health and welfare, and fish consumption uses. The Wisconsin state standards for fish and aquatic life criteria classifications in the warm water sport fish category include the following requirements:

- pH shall be between 6.0 and 9.0.
- Dissolved oxygen (DO) shall not be lowered below 5 milligrams per liter (ug/l) at any time.
- Temperature shall not exceed 86ºF.
- Total phosphorus of less than 100 ug/l.

A recreational use classification requires the average fecal coliform count to not exceed a most probable number of 200 counts per 100 milliliters based on five or more samples per month.

NR 102.14 establishes taste and odor criteria standards for public health and welfare, which are outlined by specific substance. The full text of Chapter NR 102 Water Quality Standards is provided in **Appendix 4.3.7.1-1**.

NR 105.07 establishes wildlife use standards, which are outlined based upon specific substance concentrations. The full text of Chapter NR 105 Surface Water Quality Criteria for Toxic Substances is provided in **Appendix 4.3.7.1-2**.

Reservoir Water Quality Standards

Under NR 102.06, a waterbody is considered a reservoir if there is a dam that raises water depth more than two times to conditions prior to dam construction, and that has a mean water residence time of 14 days or more under summer mean flow conditions. Under this definition the Saxon Falls and Superior Falls reservoirs both impound flowing waters with a dam and are subject to the stream total phosphorous criterion of less than 100 micrograms per liter. The Gile Flowage has a water residence time exceeding 14 days and is considered an unstratified reservoir under NR 102.06, with a total phosphorous criterion of 40 ug/l.

4.3.7.2 Michigan Regulations

The State of Michigan's Part 4 Rules, Water Quality Standards (of Part 31, Water Resources Protection, of Act 451 of 1994) establishes water quality standards in the state. Michigan's Part 4 Water Quality Standards require all designated uses of the receiving water be protected. Designated uses are defined in Rule 323.1100 and include at a minimum: agriculture, navigation, industrial water supply, warmwater fishery, other indigenous aquatic life and wildlife, fish consumption, and partial body contact for recreation (EGLE, 2019). Additional designated uses (i.e. trout stream, public water supply) may be applied to specific waters. The entire Montreal River system is classified as a trout stream by the MDNR (MDNR, 2014). Water quality standards for pH, DO, and water temperature in the Montreal River are identified in **Table 4.3.7.2-1**. The full text of Michigan's Part 4 Water Quality Standards is provided in **Appendix 4.3.7.2-1**.

Table 4.3.7.2-1: Michigan Water Quality Standards for the Montreal River

Parameter	Standard					
pH	pH shall be maintained within the range of 6.5 to 9.0 in all surface waters of the state, except for those waters where the background pH lies outside the range of 6.5 to 9.0.					
Dissolved Oxygen	DO shall not be lowered below a minimum of 6 mg/l during the warm weather season. A minimum of 7 mg/l shall be maintained at the design flows during other seasonal periods.					
Water Temperature	Rivers, streams, and impoundments naturally capable of supporting cold-water fish shall not receive a heat load which would warm the receiving water at the edge of the mixing zone more than 2°F above the existing natural water temperature.					
	Rivers, streams, and impoundments naturally capable of supporting cold-water fish shall not receive a heat load which would warm the receiving water at the edge of the mixing zone to temperatures greater than the following monthly maximum temperatures:					
	January	38 °F	May	65 °F	September	63 °F
	February	38 °F	June	68 °F	October	56 °F
	March	43 °F	July	68 °F	November	48 °F
	April	54 °F	August	68 °F	December	40 °F

4.3.8 Water Quality Data

4.3.8.1 Historic Water Quality Data

Saxon Falls Project

The Environmental Analysis (EA) issued on October 13, 1989 indicated DO concentrations are high, seldom dropping below 8.5 mg/l and 87% saturation. Water temperature follows normal seasonal patterns of a cool water stream with a summer maximum of less than 80°F. Hardness, nitrogen, and phosphorous are low to moderate in concentration and pH is slightly alkaline. The only water quality concern identified in the EA was a historical contamination with fecal coliform bacteria (likely as a result of untreated waste from upstream cities), which appeared to be corrected at the time of license issuance (FERC 1989).

Superior Falls Project

The FERC license issued on January 1, 1995 indicated Project operations do not adversely affect water quality. The Project is compliant with state standards except temperature variance during some spring and summer months. The variance occurs upstream and downstream of the Project. The Project meets temperature standards during critical periods such as the fall spawning season. Due to the small size and shallowness of the Project reservoir, Northern States Power Company "…has no ability to modify its operations to enhance water quality conditions" (FERC, 1995). In order to further monitor water quality downstream of the Project, License Article 415 required Northern States Power Company to monitor DO levels and temperatures in the Project tailrace for the months of September to November for at least three years.

Water quality data from 1990-1991 indicated upstream and downstream DO and water temperatures remained within state standards throughout the duration of the fall spawning period. Downstream DO levels ranged from 7.8 to 12.8 milligrams per liter (mg/l) with an average of 9.9 mg/l. Since the Project

was shown to meet state water quality standards, FERC approved deletion of Article 415 its March 13, 1998 order (FERC, 1998).

4.3.8.2 Existing Wisconsin Water Monitoring Data

None of the waters associated with the Saxon Falls Project, Gile Flowage, or Superior Falls Project are designated as impaired waters (WDNR 2019a).

Saxon Falls Project Data

A search of the WDNR Surface Water Data Viewer did not identify water quality data within the Saxon Falls Project (WDNR, 2019a).

Gile Flowage Data

Two water quality monitoring stations were identified on the Gile Flowage. Monitoring Station 263041 is located within the reservoir about 0.75 miles upstream of the dam and has monitoring data from 1994, 1997, and 2000. Monitoring Station 10029743 is located at the intersection of West Branch Road and the West Fork of the Montreal River and has monitoring data from 2017. Data indicates the Gile Flowage meets Wisconsin's water quality standards for all monitoring events. Gile Flowage is located entirely within Wisconsin and is not subject to Michigan water quality standards. The pH, DO, and temperature data for each monitoring station is shown in **Table 4.3.8.2-1**. Water quality monitoring data for the Gile Flowage is located in **Appendix 4.3.8.2-1**.

Table 4.3.8.2-1: Wisconsin Gile Flowage Water Quality Monitoring Data

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

The Friends of the Gile Flowage (FOG) also conducted citizen lake monitoring of several sites on the Gile Flowage. Annual reports detailing citizen monitoring from 1993, 1997, 2012, 2015, 2017, 2018, and 2019 are in **Appendix 4.3.8.2-2**.

Superior Falls Project Data

A review of Wisconsin water quality monitoring data for the Montreal River identified two water monitoring stations within the Superior Falls Project boundary. Both stations are located within the Superior Falls reservoir. Monitoring Station 263001 is located at the intersection of the Montreal River and the Highway 122 bridge and has water monitoring data from 1988, 1989, 1990, 1997, 1998, 2008, and 2009. Monitoring Station 10022264 is located within the Superior Falls reservoir and has monitoring data from 2010. The pH, DO, and temperature data for both monitoring stations is shown in **Table 4.3.8.2-2**. The data indicates the Superior Falls reservoir meets Wisconsin's water quality standards for all monitoring events, meets Michigan's water quality standards for pH and DO for all monitoring events, and meets Michigan water quality standards for temperature for all but five monitoring events. Wisconsin water quality monitoring data for the Superior Falls Project is located in **Appendix 4.3.8.2-3**.

Table 4.3.8.2-2: Wisconsin Superior Falls Water Quality Monitoring Data

Monitoring Station	Date	pH	DO (mg/l)	Temp (°F)
263001	September 1, 1988	7.6	8.7	62.6
263001	September 29, 1988	7.5	9.7	53.6
263001	October 19,1988	7.3	10.2	44.4
263001	November 15, 1988	7.3	12.3	33.8
263001	December 6, 1988	7.0	12.4	32.0
263001	January 24, 1989	7.0	12.8	32.0
263001	March 22, 1989	7.0	12.4	32.0
263001	April 18,1989	6.8	13.4	33.8
263001	June 7, 1989	7.5	16.0	60.8
263001	September 14,1989	7.8	10.2	54.0
263001	October 11, 1989	7.7	10.2	42.8
263001	November 8, 1989	7.6	13.0	37.0
263001	March 22, 1990	7.2	13.8	33.4
263001	April 11, 1990	7.5	13.1	35.6
263001	June 27, 1990	7.7	8.4	69.8*
263001	August 1, 1990	7.6	9.1	66.4
263001	September 25,1997	8.0	10.4	57.2
263001	March 19,1998	7.3	13.4	32.0
263001	October 8, 2008	8.8	14.0	54.7
263001	November 4, 2008	8.5	NA	47.7
263001	December 10, 2008	NA	NA	32.0
263001	January 21, 2009	7.3	14.9	31.6
263001	February 11, 2009	7.3	15.5	31.6
263001	March 9, 2009	8.1	16.4	31.6
263001	April 14, 2009	7.8	14.5	44.1
263001	May 13, 2009	8.0	10.0	59.0
263001	June 6, 2009	7.7	11.0	54.3
263001	July 8, 2009	8.3	9.8	69.1*

263001	August 11, 2009	8.5	9.9	78.8*
263001	September 15, 2009	8.3	9.8	72.7*
10022264	July 22, 2010	NA	8.7	72.4*

* Monitoring event does not meet Michigan water quality temperature standards

4.3.8.3 Existing Michigan Water Monitoring Data

The 2016 Environmental Protection Agency (EPA) Water Quality Assessment report for the Montreal River indicates no impairments have been reported to the EPA for the river (USEPA, 2016). The State of Michigan maintains an interactive map-based system that allows users to view information for Michigan's surface waters. The system is called Michigan Surface Water Information System (MiSWIMS). According to MiSWIMS, the Montreal River attained water quality standards in a 2008 assessment of the waterway (MSWIMS, 2019b).

There is one MiSWIMS monitoring station within the vicinity of the Saxon Falls and Superior Falls Projects. Monitoring Station 270004-Montreal River at Lake Superior Road is located upstream of the Superior Falls Dam, within the Project reservoir. Monitoring results from the station begin in the late 1960s with the most recent monitoring data from 1991 as shown in **Table 4.3.8.3-1**. All samples met Michigan's water quality standards for pH and DO. Two samples were above the temperature standards for waters capable of supporting a cold-water fishery. Water quality data for Monitoring Station 270004 is found in **Appendix 4.3.8.3-1.**

Table 4.3.8.3-1: Michigan Superior Falls Water Quality Monitoring Data (EGLE, 2019b)

Monitoring Station	Date	pH	DO (mg/l)	Temp (°F)
270004	May 7, 1991	8.1	11.3	44.6
270004	June 11, 1991	7.2	7.5	69.8*
270004	July 23, 1991	8.2	7.4	68.9*
270004	August 20, 1991	8.1	9.0	64.4
270004	September 24, 1991	7.4	10.6	48.2
270004	October 22, 1991	8.0	11.5	42.6
270004	November 19, 1991	7.8	12.9	35.6

* Monitoring event does not meet Michigan water quality temperature standards

4.3.8.3 Future Water Quality Monitoring

Based upon historical monitoring data, sufficient information exists to evaluate water quality at the Saxon Falls Project, Gile Flowage, and Superior Falls Project. In addition, the Licensee is not proposing any changes to the current operation, or the addition of any new facilities, at any of the locations. As such, the existing water quality data is representative and continued operation at both Projects and the Gile Flowage is not expected to adversely impact water resources in the area.

4.3.9 References

- Federal Energy Regulatory Commission. 1989. Environmental Assessment Saxon Falls Hydroelectric Project (FERC Project No. 2610). October 13, 1989.
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4.4 Fish and Aquatic Resources (18 CFR § 5.6(d)(iv))

4.4.1 Fish and Aquatic Communities

Several specific fish and aquatic community related studies that are relevant to the Saxon Falls and Superior Falls Projects have been completed within the Montreal River and Gile Flowage. The WDNR Fish Mapping Application is a web application available to the public designed to provide precise geographic data on the distribution and relative abundance of Wisconsin fishes (WDNR, 2019a). The fish mapping application produces detailed maps and tables of occurrences and relative abundances of all fish species reported. The associated database is updated regularly and contains historic data from a variety of sources, as well as past and current surveys from the WDNR.

The WDNR Fish Mapping Application was used to identify fish species within the Montreal River that are representative of each Project. One data point was located within the Saxon Falls Project reservoir, one data point was located within the Superior Falls Project reservoir, and eight data points were located within the Gile Flowage.

4.4.1.1 Fisheries

Saxon Falls Project

Twelve species of fish were identified in the vicinity of the Saxon Falls Project based on data collected between 1979 and 1987. Of the 151 fish identified during that timeframe, the five most predominant species collected included (WDNR, 2019a):

- Pumpkinseed (*Lepomis gibbosus*) at 54 or 35.8% (most abundant fish)
- Yellow perch (*Perca flavescens*) at 40 or 26.5%
- Northern pike (*Esox luscius*) at 16 or 10.6%
- Walleye (*Sander vitreus*) at 12 or 7.9%
- Black crappie (*Pomoxis nigromaculatus*) at 11 or 7.3%

The species list is provided in **Table 4.4.1.1-1** and the data list is enclosed in **Appendix 4.4.1.1-1**.

Gile Flowage

Nineteen species of fish were identified in the Gile Flowage based on data collected between 1973 and 1994. Of the 11,049 fish collected during that timeframe, the five most predominant species included (WDNR, 2019a):

- Yellow perch (*Perca flavescens*) at 9,783 or 88.5% (most abundant fish)
- Walleye (*Sander vitreus*) at 706 or 6.4%
- Smallmouth bass (*Micropterus dolomieu*) at 173 or 1.6%
- Rock bass (*Ambloplites rupestris*) at 97 or 0.9%
- Northern pike (*Esox lucius*) at 73 or 0.7%

The species list is provided in **Table 4.4.1.1-1** and the data list is enclosed in **Appendix 4.4.1.1-2**.

Superior Falls Project

Six species of fish were identified in the vicinity of the Superior Falls Project based on data collected in 1987. Of the 120 fish collected, the five most predominant species collected included (WDNR, 2019a):

- White sucker (*Catostomus commersonii*) at 79 or 65.8% (most abundant fish)
- Pumpkinseed (*Lepomis gibbosus*) at 19 or 15.8%
- Yellow perch (*Perca flavescens*) at 16 or 13.3%
- Black bullhead (*Ameiurus melas*) at 4 or 3.3%
- Northern pike (*Esox lucius*) and rock bass (*Ambloplites rupestris*) at 1 each or 0.8%

The species list is provided in **Table 4.4.1.1-1** and the data list is enclosed in **Appendix 4.4.1.1-3**.

Table 4.4.1.1-1: Fish Species Identified in the WDNR Fish Mapping Application

Fish Species	Scientific Name	Superior Falls Project	Saxon Falls Project	Gile Flowage
Black bullhead	*Ameiurus melas*	X		X
Black crappie	*Pomoxis nigromaculatus*		X	X
Blacknose shiner	*Notropis heterolepis*			X
Bluegill	*Lepomis macrochirus*		X	X
Brook stickleback	*Culaea inconstans*	X		
Bullheads	*Ameiurus spp.*			X
Central mudminnow	*Umbra limi*			X
Common shiner	*Luxilus cornutus*		X	X
Crappies	*Pomoxis spp.*		X	X
Golden shiner	*Aplodinotus grunniens*			X
Iowa darter	*Etheostoma exile*			X
Johnny darter	*Etheostoma nigrum*			X
Muskellunge	*Esox masquinongy*		X	X
Northern pike	*Esox lucius*	X	X	X
Pumpkinseed	*Lepomis gibbosus*	X	X	
Rock bass	*Ambloplites rupestris*	X	X	X
Smallmouth bass	*Micropterus dolomieu*		X	X
Suckers spp.				X
Walleye	*Sander vitreus*		X	X
Western blacknose dace	*Rhinichthys obtusus*	X		
White sucker	*Catostomus commersonii*	X	X	X
Yellow perch	*Perca flavescens*	X	X	X

Additional Data

According to the WDNR Fish Stocking Database, the WDNR has been routinely stocking the Montreal River from 1972 through 2018. During that timeframe, a total of 12,073 brook trout (*Salvelinus fontinalis*) and 100,496 brown trout *(Salmo trutta*) have been stocked in the river (WDNR, 2019b). During this timeframe, the WDNR also stocked 44,545 smallmouth bass and 34,828 muskellunge (*Esox masquinongy*) in the Gile Flowage (WDNR, 2019b). Review of the Michigan Department of Natural Resources website did not identify any fish survey data, but it did reveal fish stocking data for the Montreal River. The MDNR stocked 19,745 brown trout in the Montreal River

between 1979 and 2018. The Wisconsin and Michigan fish stocking data are located in **Appendix 4.4.1.1-4** and **4.4.1.1-5** respectively.

4.4.1.2 Mussels

The WDNR maintains a database of mussel observations that can be searched by county and stream. A review of the database for Iron County identified two mussel species within the Montreal River, Cylindrical papershell (*Anodontoides ferussacianus*) and Eastern elliptio (*Elliptio complanata*) (WDNR, 2019c).

The Michigan Natural Features Inventory maintains a web application called the Michigan Mussels Web App to track the presence of mussels throughout the state. A review of the web application did not identify any mussel data for the Montreal River (Michigan Natural Features Inventory, 2019).

4.4.2 Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act does not apply because no mapped Essential Fish Habitat is identified in the vicinity of the Saxon Falls Project, Gile Flowage, or Superior Falls Project (NOAA, 2019).

4.4.3 Fish Entrainment and Mortality

4.4.3.1 Saxon Falls Project

The Saxon Falls Project contains a 15-foot-high by 20-foot-wide main trashrack with 1-inch clear spacing. A search of available literature did not identify any entrainment or mortality information regarding the Project.

4.4.3.2 Gile Flowage

The Gile Flowage is a storage reservoir and does not have a water intake, trashracks, or turbine. All water is passed downstream through the sluice and tainter gates.

4.4.3.3 Superior Falls Project

The Superior Falls Project contains a 15-foot-high by 23-foot-wide main trashrack with one-inch clear spacing. The estimated approach velocity at the intake is 0.6 feet per second (fps) at maximum flow through the turbines and less than 0.5 fps under normal conditions. These velocities are below the sustained and darting swim speeds of most fish (Northern States Power Company, 1991). The Final EA issued on January 19, 1995 indicated the narrow trash rack spacing precludes the passage of larger fish and allows mostly young-of-year fish to pass through. Young-of-year fish are more susceptible to entrainment but are less prone to mortality due to their small size. Natural mortality in the first year for most resident fish species is very high, therefore an additional small increment of mortality due to turbine passage at the early life stage should not significantly affect the overall fishery. FERC concluded that “entrainment mortality is not likely to be biologically significant; i.e., would not adversely affect fish populations either in the reservoir or down-stream in Lake Superior” (FERC, 1995).

4.4.4 References

- Federal Energy Regulatory Commission. 1989. Environmental Assessment Saxon Falls Hydroelectric Project (FERC Project No. 2610). October 13, 1989.
- Federal Energy Regulatory Commission. 1995. Final Environmental Assessment, Superior Falls Hydroelectric Project (FERC Project No 1587-Wisconsin/Michigan. January 19, 1995.
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- Wisconsin Department of Natural Resources. 2019c. Wisconsin Mussel Observations Database. http://wiatri.net/inventory/mussels/MusselWatersAll.cfm. Accessed September 11, 2019.

4.5 Wildlife and Botanical Resources (18 CFR § 5.6(d)(3)(v))

A map depicting the 16 ecological landscapes within Wisconsin is included in **Appendix 4.5-1**. Ecological landscapes in their natural state are primarily defined by the physical environment which includes climate, geology and landforms, and hydrology. The Superior Falls Project is located within the Superior Coastal Plain Ecological Landscape. The Saxon Falls Project and Gile Flowage are located within the North Central Forest Ecological Landscape.

4.5.1 Botanical Species

In the mid-1800's, the majority of the lands within the Superior Coastal Plain were covered by boreal forest. The lands within the North Central Hardwoods Ecological Landscape contained the most contiguous area of Hemlock-Yellow Birch-Sugar Maple-Pine Forest in Wisconsin (WDNR, 2015b). A map showing Wisconsin's land cover in the 1800s is included in **Appendix 4.5.1-1**.

4.5.1.1 Saxon Falls and Superior Falls Projects

Vegetation in the vicinity of the Saxon Falls and Superior Falls Projects is primarily hardwood forest with scattered conifers on north facing slopes and deeper drainageways. The main hardwood species include: sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), silver maple (*Acer saccharinum*), quaking aspen (*Populus tremuloides*), paper birch (*Betula papyrifera*), American basswood (*Tilia americana*), yellow birch (*Betula alleghaniensis*), green ash (Fraxinus pennsylvanica), and white ash (*Fraxinus americana*). Conifers present include: red pine (*Pinus resinosa*), eastern white pine (*Pinus strobus*), balsam fir (*Abies balsamea*), white spruce (*Picea glauca*), eastern hemlock (*Tsuga canadensis*), and red cedar (*Juniperus virginiana*) (Northern States Power Company, 1988; Northern States Power Company, 1991).

4.5.1.2 Gile Flowage

The shorelines upstream and downstream of the dam and the shoreline of the Gile Flowage are primarily undeveloped. A review of the vegetation types shown on the USGS "The National Map" indicates vegetation in the vicinity of the Gile Flowage consists of three main cover types, deciduous forest, mixed forest, and wooded wetlands (USGS, 2019). The main hardwood forest species in the North Central Ecological Landscape include sugar maple, basswood, red maple, green ash, and white ash. Mixed forest areas also include conifer species such as white pine, white spruce, balsam fir, and eastern hemlock. Wooded wetlands include northern white cedar (*Thuja occidentalis*), eastern white pine, black ash (*Fraxinus nigra*), and yellow birch (WDNR, 2015b).

4.5.2 Wildlife

4.5.2.1 Mammal Species

The mammal species likely to be found in the vicinity of the Saxon Falls Project, Gile Flowage, and Superior Falls Project are detailed in **Table 4.5.2.1-1** (Northern States Power Company, 1988; Northern States Power Company, 1991; WDNR 2015a; WDNR 2015b).

Table 4.5.2.1-1: Mammal Species in the Vicinity

Mammal Species	Scientific Name
Badger	*Taxidea taxus*
Big brown bat	*Eptesicus fuscus*
Black bear	*Ursus americanus*
Deer mouse	*Peromuscus manoculatus*
Coyote	*Canis latrans*
Eastern chipmunk	*Tamias striatus*
Fisher	*Martes pennanti*
Gray wolf	*Canis lupus*
Masked shrew	*Sorex cinereus*
Least chipmunk	*Eutamias minimus*
Little brown bat	*Myotis lucifugus*
Long-tailed weasel	*Mustela frenata*
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 septentionalis*
Raccoon	*Procyon lotor*
Redbacked vole	*Clethrionomys gapperi*
Red fox	*Vulpes fulva*
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*

4.5.2.2 Bird Species

The bird species likely to be found in the vicinity of the Saxon Falls Project, Gile Flowage, and Superior Falls Project are detailed in **Table 4.5.2.2-1** (Northern States Power Company 1988; Northern States Power Company, 1991; WDNR, 2015a; WDNR 2015b, Cornell E-bird, 2019).

Table 4.5.2.2-1: Bird Species in the Vicinity

Bird Species	Scientific Name
American bittern	*Botaurus lentiginosus*
American crow	*Corvus brachyrhynchos*
American goldfinch	*Spinus tristis*
American robin	*Turdus migratorius*
American woodcock	*Scolopax minor*
Bald eagle	*Haliaeetus leucocephalus*
Black and white warbler	*Mniotilta varia*
Blackburnian warbler	*Dendroica fusca*
Belted kingfisher	*Megaceryle alcyon*
Black-capped chickadee	*Poecile atricapillus*
Black tern	*Childonias niger*
Bluejay	*Cyanocitta cristata*
Boreal chickadee	*Parus hudsonicus*
Broad-winged hawk	*Buteo platypterus*
Chestnut-sided warbler	*Dendroica pensylvanica*
Common snipe	*Gallinago gallinago*
Downy woodpecker	*Picoides pubescens*
Eastern kingbird	*Tyrannus tyrannus*
Eastern wood pewee	*Contopus virens*
Field sparrow	*Spizella pusilla*
Great blue heron	*Ardea herodias*
Hairy woodpecker	*Leuconotopicus villosus*
Hermit Thrush	*Catharus guttatus*
House wren	*Troglodytes aedon*
Least flycatcher	*Empidonax minimus*
LeConte's sparrow	*Ammospiza leconteii*
Mallard	*Anas platyrhynchos*
Nashville warbler	*Vermivora ruficapilla*
Northern flicker	*Colaptes auratus*
Northern goshawk	*Accipiter gentilis*
Northern waterthrush	*Seirus aurocapillus*
Olive-sided flycatcher	*Contopus borealis*
Osprey	*Pandion haliaetus*
Ovenbird	*Seirus aurocapillus*
Pie-billed grebe	*Podilymbus podiceps*
Pileated woodpecker	*Dryocopus pileatus*
Red-breasted nuthatch	*Sitta canadensis*
Red-eyed vireo	*Vireo olivaceus*
Red-winged blackbird	*Agelaius phoeniceus*
Rose-breasted grosbeak	*Pheucticus ludovicianus*
Ruby crowned kinglet	*Regulus calendula*

Ruby throated hummingbird	*Archilochus colubris*
Ruffed grouse	*Bonasa umbellus*
Song sparrow	*Melospiza melodia*
Sora rail	*Porzana carolina*
Swainson's thrush	*Catharus ustulatus*
Swamp sparrow	*Melospiza georgiana*
Tree swallow	*Tachineta bicolor*
Veery	*Catharus fuscescens*
Warbling vireo	*Vireo gilvus*
White-throated sparrow	*Zonotrichia albicollis*
Wood duck	*Aix sponsa*
Yellow-bellied sapsucker	*Sphyrapicus varius*
Yellow-headed blackbird	*Xanthocephalus zanthocephalus*
Yellow-rumped warbler	*Dendroica coronata*

4.5.2.3 Reptile and Amphibian Species

Although no records of herpetological species surveys were found during literature review, based on the existing habitat within Iron County, Wisconsin and Gogebic County, Michigan and the geographical range, it is likely a variety of frogs, snakes, turtles, and salamanders exist in the area. Reptiles and amphibians likely to be found in the vicinity of the Saxon Falls Project, Gile Flowage, and Superior Falls Project are detailed in **Table 4.5.2.3-1** (Northern States Power Company, 1988; Northern States Power Company, 1991; WDNR, 2015a; WDNR, 2015b).

Table 4.5.2.3-1: Reptile and Amphibian Species Presumed in Vicinity

Reptiles and amphibians	Scientific Name
American toad	*Bufo americanus*
Eastern gartersnake	*Thamnophis sirtalis*
Eastern gray treefrog	*Hyla versicolor*
Fox snake	*Elaphe vulpina*
Leopard frog	*Rana pipiens*
Northern ring-necked snake	*Diadophis punctatus edwardsii*
Northern spring peeper	*Hyla crucifer*
Painted turtle	*Chrysemys picta*
Wood frog	*Rana sylvatica*
Wood turtle	*Glyptemys insculpta*

4.5.3 Invasive Species

In the state of Wisconsin, the invasive species rule makes it illegal to possess, transport, transfer, or introduce certain invasive species into the state without a permit (WDNR, 2019a), as outlined in Chapter NR 40 of the Wisconsin Administrative Code (NR 40). NR 40 requirements are often used as guidance at hydroelectric projects to determine which species should be considered invasive.

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.

4.5.3.1 Saxon Falls and Superior Falls Projects

A review of the WDNR Lakes and Aquatic Invasive Species (AIS) Mapping Tool did not identify any invasive species in the vicinity of the Superior Falls or Saxon Falls Projects.

4.5.3.2 Gile Flowage

The WDNR Lakes and AIS Mapping Tool identified three invasive invertebrate species in the Gile Flowage: the prohibited spiny water flea (*Bythotrephes cederstroemi*), first identified in 2003, the restricted Chinese mystery snail (*Cipangopaludina chinensis*), first identified in 2004, and the restricted banded mystery snail (*Viviparus georgianus*), first identified in 2011 (WDNR, 2019b; WDNR, 2019c). The WDNR developed a flier to assist in early detection of aquatic invasive species, as shown in **Figure 4.5.3.2-1a** and **Figure 4.5.3.2-1b** on the following pages.

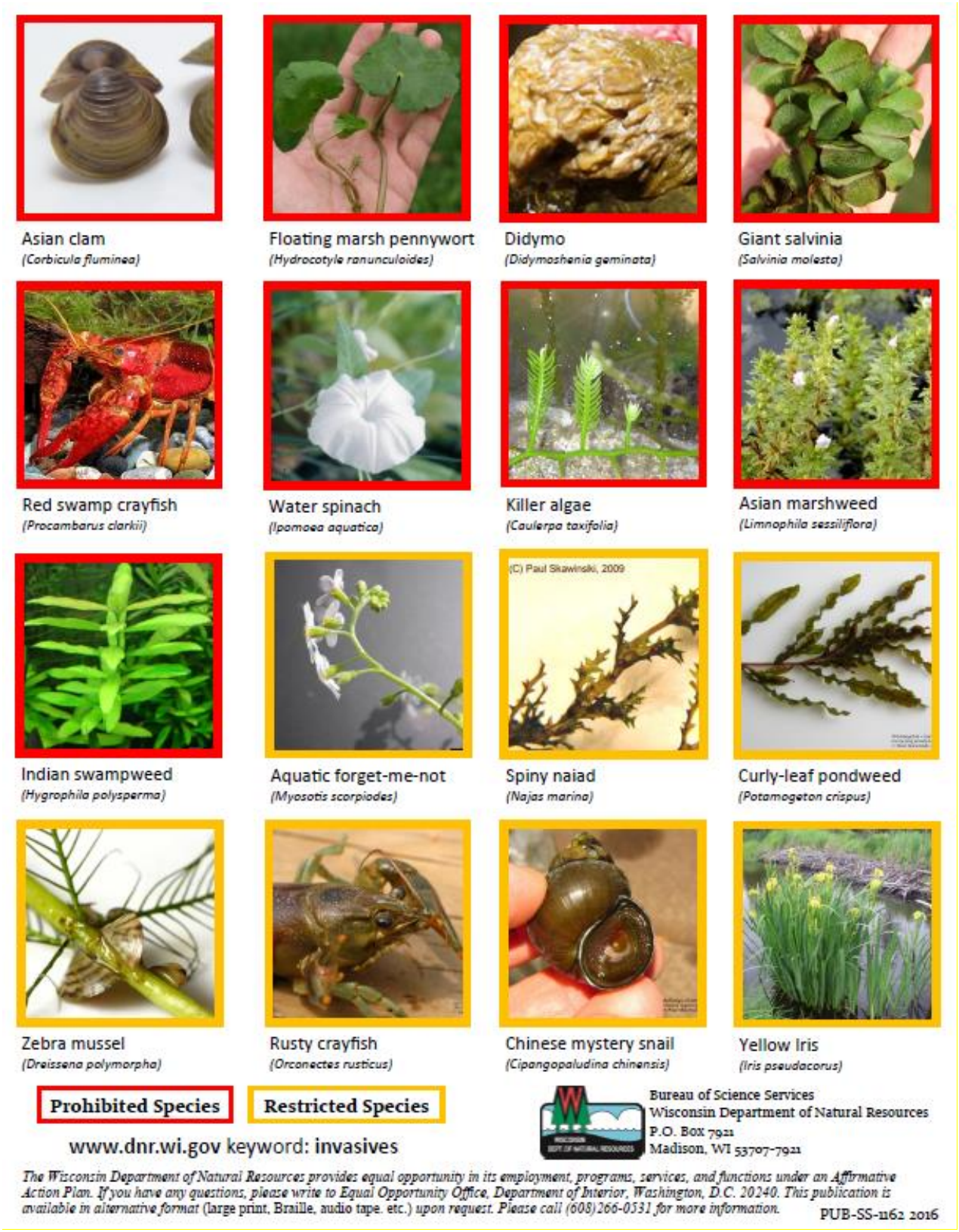
The Iron County Land and Water Conservation Department noted the spiny water flea was identified in the West Fork of the Montreal River downstream of the Gile Flowage dam for the first time in 2018 (LWCD, 2019).

4.5.4 References

- Cornell Ebird. 2019. Ebird Field Checklist, Iron County, Wisconsin, U.S. https://ebird.org/printableList?regionCode=US-WI-051&yr=all&m=, Accessed December 6, 2019.
- Iron County Land and Water Conservation Department (LWCD). 2019. Xcel Energy Gile Flowage Questionnaire.
- Northern State Power Company. 1988. Application for a Minor Water Power Project Pursuant to Section 4(e) of the Federal Power Act for the Saxon Falls Hydro Project, FERC No. 2610. December 16, 1988.
- Northern States Power Company. 1991. Application for a License for a Minor Water Power Project, Superior Falls Hydroelectric Project, FERC Project No. 2587. December 17, 1991.
- Wisconsin Department of Natural Resources. 2015a. The Ecological Landscapes of Wisconsin: an assessment of ecological resources and a guide to planning sustainable management. Chapter 21 Superior Coastal Plain Ecological Landscape. PUB-SS-1131J2014, Wisconsin Department of Natural Resources. 2015b. The Ecological Landscapes of Wisconsin: an assessment of ecological resources and a guide to planning sustainable management. Chapter 12 North Central Forest Ecological Landscape. PUB-SS-1131J2014, Madison.
- Wisconsin Department of Natural Resources Website. 2019a. https://dnr.wi.gov/topic/Invasives/classification.html. Accessed September 11, 2019.
- Wisconsin Department of Natural Resources. 2019b. WDNR Lakes and AIS Mapping Tool. https://dnrmaps.wi.gov/H5/?viewer=Lakes_AIS_Viewer. Accessed September 11, 2019.
- Wisconsin Department of Natural Resources Website. 2019c. Regulated Invasive Aquatic Invertebrates Except Crayfish. https://dnr.wi.gov/topic/Invasives/speciesNR40list.asp?filterBy=Category&filterVal=Aquatic%20Invertebrates%20Except%20Crayfish&addFilter=Classification. Accessed September 11, 2019.

Figure 4.5.3.2-1a: Selected Regulated Aquatic Invasive Species in Wisconsin (side one)

Figure 4.5.3.2-1b: Selected Regulated Aquatic Invasive Species in Wisconsin (side two)



4.6 Wetlands, Riparian and Littoral Habitat (18 CFR § 5.6(d)(3)(vi))

4.6.1 Riparian Habitat

Riparian habitat refers to reservoir margins where vegetation exists but is not regularly submerged. The riparian habitat in the vicinity of the Saxon Falls Project, Gile Flowage, and Superior Falls Project is relatively undeveloped except for formal recreation sites.

4.6.1.1 Saxon Falls Project and Gile Flowage

The riparian habitat at the Saxon Falls Project and Gile Flowage is typical North Central Forest Ecological Landscape Vegetation with a primary mixture of upland forest and forested wetlands. Typical upland forest cover types include a mix of sugar maple, ash (Fraxinus spp.), American basswood, quaking aspen, red maple, paper birch, eastern hemlock, and balsam fir. Typical forested wetland cover types consist of coniferous swamp species including northern white cedar, white pine, black ash, and yellow birch (WDNR, 2015b).

4.6.1.2 Superior Falls Project

The riparian habitat at the Superior Falls Project is typical Superior Coastal Plain Ecological Landscape vegetation with a primary mixture of upland forest and forested wetlands. Typical upland forest cover types include a mix of quaking aspen, paper birch, green ash, balsam fir, white spruce, and eastern white pine. Typical forested wetland cover types consist of coniferous swamp species including northern white cedar, eastern white pine and deciduous species including black ash, and yellow birch (WDNR, 2015a).

4.6.2 Wetlands Habitat

Wetland habitat includes terrestrial areas that are permanently, intermittently, or seasonally flooded. Wetlands help improve water quality and provide for wildlife habitat, nutrient cycling and storage, aesthetics, and recreation. In riverine systems such as the Saxon Falls, Gile Flowage, and Superior Falls reservoirs, wetland functions include flood water storage, filtration, sedimentation reduction, and wildlife habitat and corridors. The value of wetlands in the vicinity of the Saxon Falls Project, Gile Flowage, and Superior Falls Project includes flood peak mitigation, surface water quality enhancement, biodiversity preservation and enhancement, and recreational activities support and enhancement.

The Wisconsin Wetlands Inventory classifies wetlands according to vegetation, cover type, hydrology, human influence factors, and special wetland characteristics. According to this classification system, wetland vegetation is divided into seven major classes or cover types with several more precisely defined subclasses (WDNR, 2019).

Wetland boundaries are delineated based upon unique hydrologic, soil, and vegetational parameters. Wetlands displayed at both Projects are restricted to areas within and immediately adjacent to each Project reservoir. The Wisconsin Wetland Inventory identified two main classes of wetlands within the Saxon Falls Project, Gile Flowage, and Superior Falls Project. Outside of open water and riverine areas, the two main wetland classes within the boundaries of each Project and the Gile Flowage include freshwater forested/shrub wetlands and freshwater emergent wetlands. Figures displaying the

wetlands in the vicinity of the Saxon Falls Project, Gile Flowage, and Superior Falls Projects are included in **Appendix 4.6.2-1**.

In general, forested wetlands include bogs and forested floodplain complexes characterized by trees that are 20 feet or more in height including species such as tamarack *(Larix laricina),* northern white cedar, eastern white pine, and black ash. Shrub-carr wetlands are typically dominated by willow (S*alix spp*.) and dogwood (*Cornus spp*.) species. Emergent wetlands include species such as cattails (*Typha spp*.), sedges (*Carex spp*.), grasses, and rushes (WDNR, 2015a; WDNR 2015b).

4.6.3 Littoral Habitat

Littoral habitat is the transition between aquatic and terrestrial habitats and is prevalent along most reservoir margins. Within the Saxon Falls and Superior Falls project boundaries, littoral habitat is more prevalent within the main body of the reservoir, versus the more riverine areas. The littoral habitat of the Gile Flowage is more prevalent in the south half of the reservoir which includes tributary streams and wetlands.

4.6.4 References

- Wisconsin Department of Natural Resources. 2015a. The Ecological Landscapes of Wisconsin: an assessment of ecological resources and a guide to planning sustainable management. Chapter 21 Superior Coastal Plain Ecological Landscape. PUB-SS-1131J2014, Madison.
- Wisconsin Department of Natural Resources. 2015b. The Ecological Landscapes of Wisconsin: an assessment of ecological resources and a guide to planning sustainable management. Chapter 12 North Central Forest Ecological Landscape. PUB-SS-1131J2014, Madison Wisconsin Department of Natural Resources. 2019. WDNR Surface Water Data Viewer. https://dnrmaps.wi.gov/H5/?Viewer=SWDV. Accessed October 9, 2019.

4.7 Rare, Threatened and Endangered Species (18 CFR § 5.6(d)(3)(vii))

4.7.1 Overview

The United States Fish and Wildlife Service (USFWS) Information for Planning and Conservation (IPaC) website was accessed to develop an IPaC Resource Lists for the Saxon Falls Project, Gile Flowage, and Superior Falls Project. Also, an Endangered Resources Review was completed by the WDNR to identify potential threatened, endangered, and special concern species located at the Saxon Falls Project, Gile Flowage, and Superior Falls Project.

4.7.2 IPaC Resource Lists

The IPaC Resource Lists identified one federally endangered and two federally threatened species likely to occur within the vicinity of all three developments. They include the Canada lynx (*Lynx canadensis*), Gray wolf (*Canis lupus*) and northern long-eared bat (NLEB) (*Myotis septentriolnalis*). One additional threatened species, the red knot (*Calidris canutus rufa*), was identified at the Saxon Falls and Superior Falls Projects. IPaC Resource Lists for the Saxon Falls Project, Gile Flowage, and Superior Falls Project are included in **Appendix 4.7.2-1**, **Appendix 4.7.2-2**, and **Appendix 4.7.2-3** respectively.

4.7.2.1 Canada Lynx

The Canada lynx is a federally endangered mammal species that is 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 any of the three developments (USFWS, 2019a). The species may pass through any of the three developments.

4.7.2.2 Gray Wolf

The gray wolf is a federally threatened mammal species that lives in family groups or packs and is a habitat generalist that can have territories ranging from 20 to 120 square miles (WDNR, 2019a). Gray wolves are present throughout northern Wisconsin and the Upper Peninsula of Michigan and may pass through any of the three developments along the upland property.

The gray wolf was removed from the Michigan endangered species list in 2009 and the Wisconsin endangered species list in 2004 (MDNR, 2019; WDNR, 2019a). The USFWS evaluated the classification status of the gray wolf and has proposed to remove the species from the federal endangered species list due to recovery. On May 15, 2019, the proposed rule list was printed in the Federal Register. A final determination on whether to remove the species from the federal endangered species list must be made within one year of that date. If the species is removed from the list, management of the species will be returned to the states (USFWS, 2019b).

4.7.2.3 Northern Long-Eared Bat

The Northern long-eared bat (NLEB) is a State of Wisconsin, State of Michigan, and federally threatened mammal species. 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. Iron County, Wisconsin and Gogebic County, Michigan are within the NLEB range (USFWS, 2019c). However, according to a Natural Heritage Inventory (NHI) search, no element occurrences of hibernacula or maternity roost trees were identified within or adjacent to any of the three developments.

4.7.2.4 Red Knot

The red knot is a federally threatened and Wisconsin special concern bird species. It is an Arctic breeder that occurs uncommonly during migration along coastal sandy beaches in Wisconsin from mid-May to early June and from mid-July to early November. The species does not breed in Wisconsin (WDNR, 2019b).

4.7.3 Wisconsin Natural Heritage Inventory Review

Review of the Natural Heritage Inventory indicates 17 state-listed threatened or endangered species are likely to occur within the Saxon Falls Project, Gile Flowage, or Superior Falls Project vicinity. These species are shown in **Table 4.7.3-1** and described in the following paragraphs (WDNR 2019c; WDNR 2019d; and WDNR 2019e).

Table 4.7.3-1: Threatened and Endangered Species Likely to Occur in the Vicinity

Species	Scientific Name	Group	WI Status*	MI Status*	Federal Status**
Bald Eagle	*Haliaeetus leucocephalus*	Bird		SC	Eagle Act
LeConte's sparrow	*Ammospiza leconteii*	Bird	SC		
Red knot	*Calidris canutus rufa*	Bird	SC		THR
Little Brown Bat	*Myotis lucifugus*	Mammal	THR	SC	
Eastern Elliptio	*Elliptio complanata*	Mussel	SC	SC	
Wood turtle	*Gleptemys insculpta*	Reptile	THR	SC	
Braun's holly-fern	*Polystichum braunii complanata*	Plant	SC		
Broad-leaved twayblade	*Listera convallarioides*	Plant	THR		
Maidenhair spleenwort	*Asplenium trichomanes*	Plant	SC		

* State Status: END = Endangered, THR = Threatened, SC = Special Concern

** Federal Status: THR = Threatened, Eagle Act = Bald and Golden Eagle Protection Act

4.7.3.1 Bald Eagle

The NHI review indicates bald eagles are located along the Montreal River in the vicinity of the Saxon Falls Project, Gile Flowage, and Superior Falls Project (WDNR, 2019 c; WDNR, 2019d; WDNR, 2019e). As of August 9, 2007, the Bald Eagle population had recovered to the extent that it no longer required the protection of the federal Endangered Species Act. The Bald Eagle is protected by the Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, and Lacey Act (USFWS, 2007). The bald eagle is no longer listed as a threatened, endangered or special concern species in Wisconsin and is listed as a special concern species in Michigan.

4.7.3.2 LeConte's Sparrow

The LeConte's sparrow is a Wisconsin special concern bird species. The bird is an uncommon migrant to Wisconsin and is found nesting throughout the central and northern parts of the state. It prefers habitats with tall, dense, moist vegetation such as sedge meadows, wet hayfields, and prairies. Other breeding habitats include marshy meadows and open bogs. The recommended avoidance period for the species is May 20 to July 20 (WDNR, 2019f). According to the WDNR website, the LeConte's sparrow is known to occur in Iron County and additional counties, as shown in **Figure 4.7.3.2-1** to the left.

Figure 4.7.3.2-1: General Known Occurrence of the LeConte's Sparrow

4.7.3.3 Little Brown Bat

The little brown bat is a Wisconsin threatened mammal species. It is insectivorous and feeds on aquatic soft-bodied insects. The species is found roosting in warm microclimates provided by tree snags, bat houses, and buildings during the summer. It forages primarily over open water and along edge habitat. The bat hibernates in caves and mines from October through April. Mating occurs in the fall. Usually one pup is born in early June and matures after six weeks (WNDR, 2019g). According to the WDNR website, the little brown bat is known to occur in Iron County and additional counties, as shown in **Figure 4.7.3.3-1** to the left.

Figure 4.7.3.3-1: General Known Occurrence of the Little Brown Bat

4.7.3.4 Eastern Elliptio

The eastern elliptio is a Wisconsin special concern mussel that is confined to the Lake Superior drainage of the northwest part of Wisconsin. The mussel lives in streams, lakes, impoundments, and bays of Lake Superior. Known host fish for the mussel include killifish, sunfish, bass, crappie, and perch (WDNR 2019h). According to the WDNR webpage, the eastern elliptio is known to occur in Bayfield, Douglas and Iron Counties, as shown in **Figure 4.7.3.4-1** to the left.

Figure 4.7.3.4-1: General Known Occurrence of the Eastern Elliptio

4.7.3.5 Wood Turtle

The wood turtle is a Wisconsin threatened reptile that forages in open wet meadows or in shrub-carr habitats dominated by speckled alder. The turtle overwinters in streams and rivers in deep holes or undercut banks where there is enough water flow to prevent freezing. The turtle becomes active in spring as soon as the ice is gone and air temperatures reach around 50°F, which can occur as early as mid-March. They may remain active into late October. This semi-terrestrial species typically remains within 300 meters of rivers and streams. Wood turtles can breed at any time of year but breeding primarily occurs during the spring or fall. Nesting usually begins in late May in southern Wisconsin and early June in Northern Wisconsin and continues through June. The species nests in open or semi-open canopy areas containing gravel or sandy soils, typically within 61 meters of the water. Hatching occurs from mid-July through mid-September depending upon air temperatures. This species does not overwinter in nests, unlike other turtle species (WDNR, 2019i). According to the WDNR website, the wood turtle is known to occur in Iron County and additional counties, as shown in **Figure 4.7.3.5-1** to the left.

Figure 4.7.3.5-1: General Known Occurrence of the Wood Turtle

4.7.3.6 Braun's Holly-fern

Braun's holly-fern is a Wisconsin threatened plant that is found in rich hardwood or mixed hardwood-conifer forests near ravine bottoms. It is also found in areas of cold air drainage, on gentle to moderately steep rocky forested slopes, and at the bases of moist cliffs (WDNR, 2019j). According to the WDNR website, the Braun's holly-fern is known to occur in Iron County and additional counties, as shown in **Figure 4.7.3.6-1** to the left.

Figure 4.7.3.6-1: General Known Occurrence of Braun's Holly-fern

4.7.3.7 Broad-leaved Twayblade

Broad-leaved twayblade is a Wisconsin threatened plant that is 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 the species is from late June through late July (WDNR, 2019k). According to the WDNR website, broad leaved twayblade is known to occur in Ashland, Bayfield, and Iron Counties as shown in **Figure 4.7.3.7-1** to the left.

Figure 4.7.3.7-1: General Known Occurrence of Broad-leaved Twayblade

4.7.3.8 Maidenhair Spleenwort

Maidenhair spleenwort is a Wisconsin special concern plant that is found on cool, shaded cliffs primarily in hardwood forests on basal and related rocks. The species can be identified year-round (WDNR, 2019l). According to the WDNR website, the maidenhair spleenwort is known to occur in Iron County and additional counties, as shown in **Figure 4.7.3.8-1** to the left.

Figure 4.7.3.8-1: General Known Occurrence of Maidenhair Spleenwort

4.7.4 Summary

The Licensee is not proposing any new facilities or changes to the current operations for the Saxon Falls Project, Gile Flowage, and Superior Falls Project. As such, continued operation of each is not expected to adversely impact the rare, threatened, or endangered species in the area.

Maintenance activities at any facility or removal of trees within the boundary of either the Saxon Falls Project, Gile Flowage, and Superior Falls Project, will need to be completed in accordance with requirements outlined in the § 4(d) rule created for the NLEB, which is located in **Appendix 4.7.4-1**.

4.7.5 References

- Michigan Department of Natural Resources (MDNR). 2019. Wolf Biology and Identification. https://www.michigan.gov/dnr/0,4570,7-350-79135_79218_79619-292026--,00.html. Accessed September 9, 2019.
- U.S. Fish and Wildlife Service. 2007. Midwest Region. Fact Sheet: Natural History, Ecology, and History of Recovery, June 2007. https://www.fws.gov/midwest/eagle/recovery/biologue.html. Accessed July 1, 2019.
- U.S. Fish and Wildlife Service. 2019a. Canada Lynx Factsheet. https://www.fws.gov/mountain-prairie/es/species/mammals/lynx/CandaLynxFactSheet_091613.pdf Accessed September 9, 2019.
- U.S. Fish and Wildlife Service. 2019b. Conserving the Nature of America Gray Wolf (*Canis lupus*). https://www.fws.gov/home/wolfrecovery/. Accessed September 9, 2019.
- U.S. Fish and Wildlife Service Website. 2019c. Northern Long-eared Bat. https://www.fws.gov/midwest/Endangered/mammals/nleb/index.html. Accessed September 9, 2019.
- Wisconsin Department of Natural Resources. 2019a. Gray Wolf Factsheet. https://dnr.wi.gov/topic/wildlifehabitat/wolf/facts.html. Accessed September 9, 2019.
- Wisconsin Department of Natural Resources. 2019b. Rufa Red Knot. https://dnr.wi.gov/topic/EndangeredResources/Animals.asp?mode=detail&SpecCode=ABNNF11021. Accessed September 9, 2019.
- Wisconsin Department of Natural Resources. 2019c. Superior Falls Project Endangered Resource Review ERR Log #19-732. October 21, 2019.
- Wisconsin Department of Natural Resources. 2019d. Saxon Falls Project Endangered Resource Review ERR Log #19-733. October 25, 2019.
- Wisconsin Department of Natural Resources. 2019e. Gile Flowage Endangered Resource Review ERR Log #19-734. October 28, 2019.
- Wisconsin Department of Natural Resources. 2019f. LeConte's Sparrow. https://dnr.wi.gov/topic/EndangeredResources/Animals.asp?mode=detail&SpecCode=ABPBXA0040. Accessed October 28, 2019.
- Wisconsin Department of Natural Resources. 2019g. Little Brown Bat. https://dnr.wi.gov/topic/EndangeredResources/Animals.asp?mode=detail&SpecCode=AMACC01010. October 28, 2019.
- Wisconsin Department of Natural Resources. 2019h. Eastern Elliptio. https://dnr.wi.gov/topic/EndangeredResources/Animals.asp?mode=detail&SpecCode=IMBIV14470. Accessed October 21, 2019.
- Wisconsin Department of Natural Resources. 2019i. Wood Turtle. https://dnr.wi.gov/search/index.asp?q=wood%20turtle#gsc.tab=0&gsc.q=wood%20turtle&gsc.page=1. Accessed October 28, 2019.

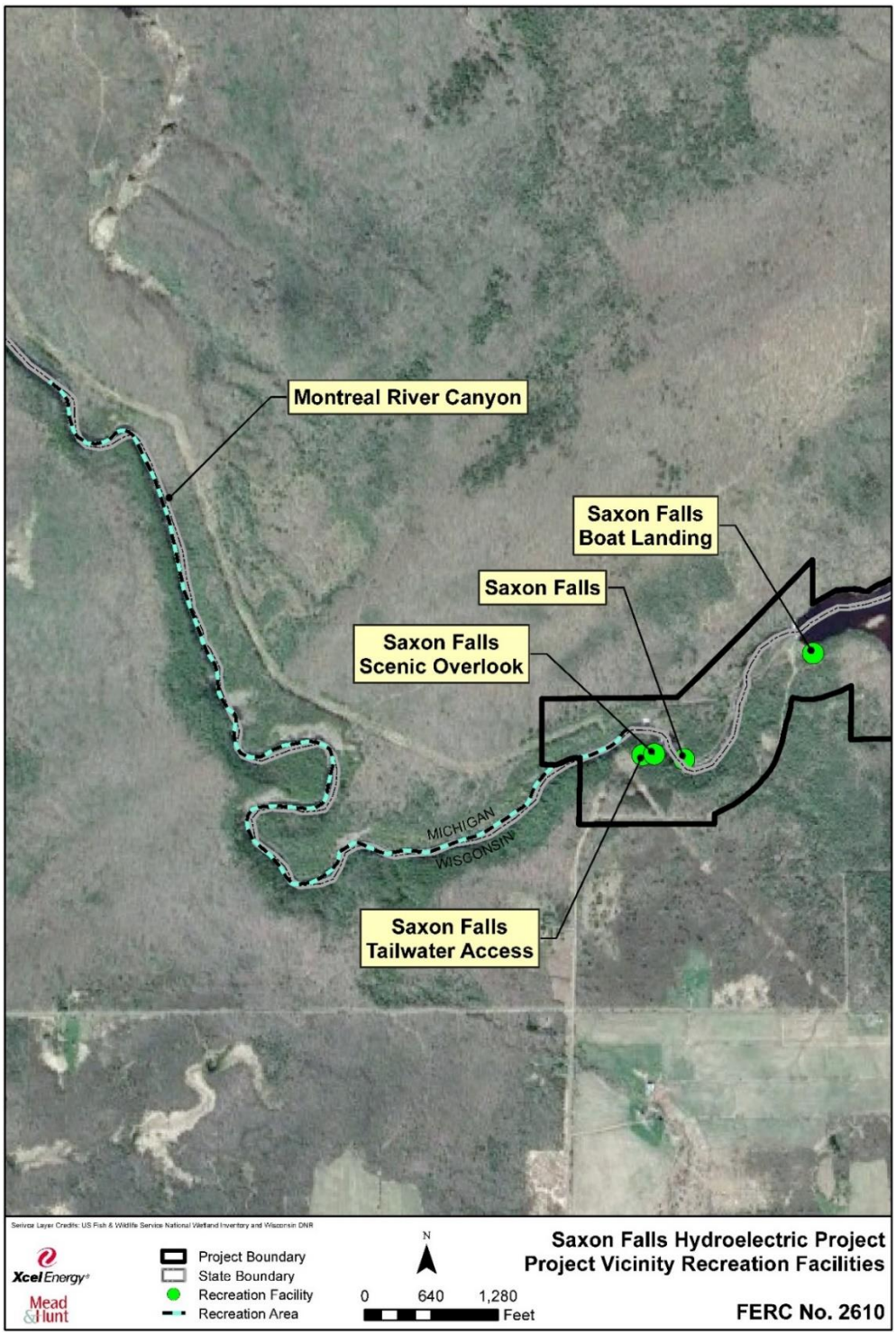
- Wisconsin Department of Natural Resources. 2019j. Braun's Holly-fern. https://dnr.wi.gov/topic/EndangeredResources/Plants.asp?mode=detail&SpecCode=PPDRY0R040. Accessed October 21, 2019.
- Wisconsin Department of Natural Resources. 2019k. Broad-leaved Twayblade. https://dnr.wi.gov/topic/EndangeredResources/Plants.asp?mode=detail&SpecCode=PMORC1N050. Accessed October 21, 2019.
- Wisconsin Department of Natural Resources. 2019 l. Maidenhair Spleenwort. https://dnr.wi.gov/topic/EndangeredResources/Plants.asp?mode=detail&SpecCode=PPASP021K0. Accessed October 28, 2019.

4.8 Recreation and Land Use (18 CFR § 5.6(d)(3)(viii))

4.8.1 Saxon Falls Project Existing Recreational Facilities and Opportunities

There are many opportunities for fishing, wildlife viewing, and water sports within the Saxon Falls Project vicinity. Existing recreation facilities are shown in **Figure 4.8.1-1** and described in the following paragraphs from upstream to downstream.

Figure 4.8.1-1: Saxon Falls Project Vicinity Recreation Facilities



4.8.1.1 Saxon Falls Boat Landing

The Saxon Falls Boat Landing is located on the left (Wisconsin) side of the Montreal River approximately 120 feet upstream of the Project Dam. The landing provides a gravel parking lot which can accommodate four cars and a ramp made of concrete planks. The landing serves as a take-out location for canoers and kayakers to bypass Saxon Falls, which is located within the bypass reach between the dam and the powerhouse, as well as an area to launch small boats onto the reservoir for recreational activities such as fishing and waterfowl hunting. The boat landing is shown in **Figure 4.8.1.1-1** and is owned and maintained by Northern States Power Company.

Figure 4.8.1.1-1: Saxon Falls Boat Landing

4.8.1.2 Saxon Falls Scenic Overlook

The Saxon Falls Scenic Overlook is accessed via a pathway from the parking area at the end of Saxon Falls Road. The pathway is located on the top of a high bank on the Wisconsin (south) side of the Montreal River. The high bank overlooks the waterfall. The parking area can accommodate four vehicles. The parking area, pathway, and scenic overlook are owned and maintained by Northern States Power Company.

Figure 4.8.1.2-1: Saxon Falls Scenic Overlook

4.8.1.3 Saxon Falls Tailwater Access

The Saxon Falls Tailwater Access is an informal recreation site that provides access to the tailwater area below the powerhouse for bank fishing and serves as a put-in below the powerhouse for canoers and kayakers wishing to access the Montreal River Canyon. A phone number is available to the public where boaters can check discharge from the Gile Flowage and Saxon Falls dam.

4.8.1.4 Montreal River Canyon

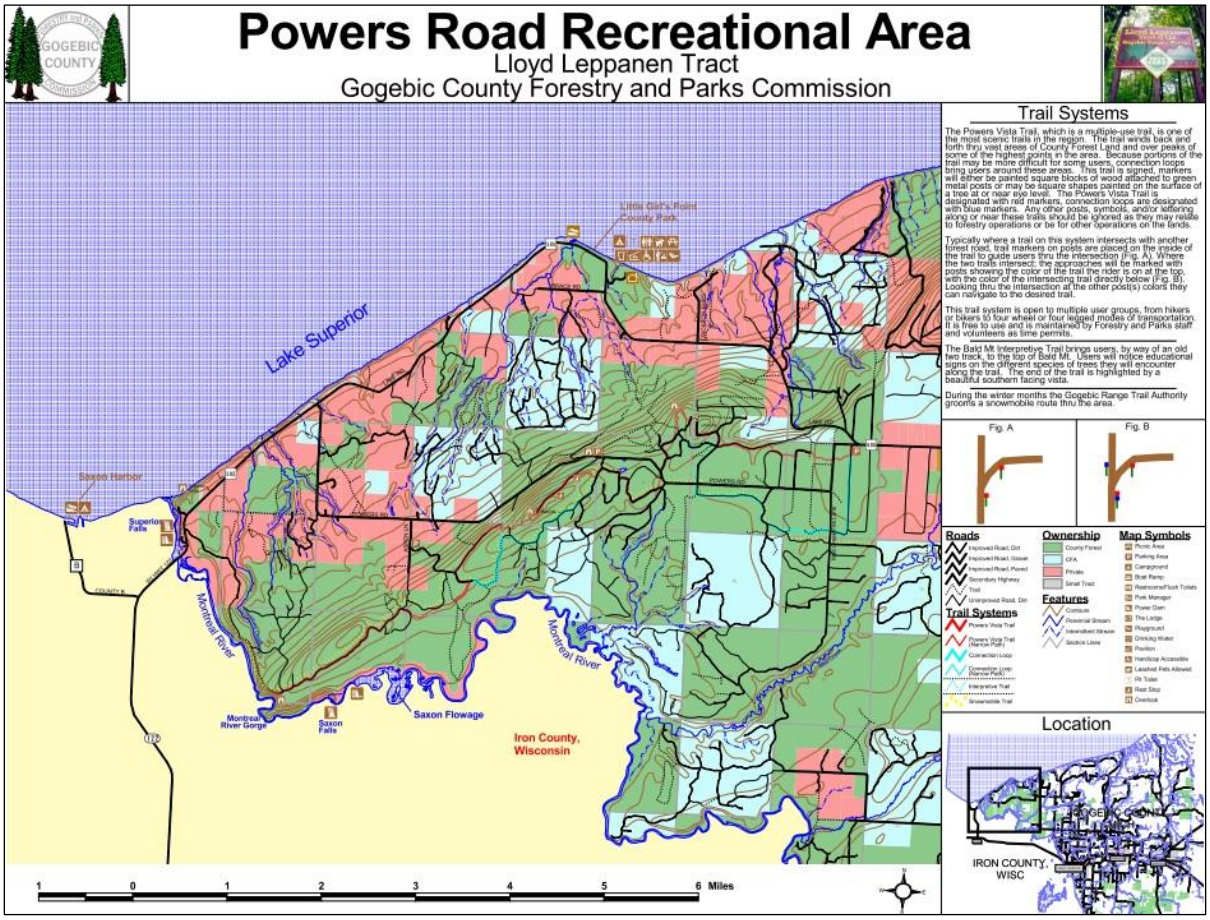
The Montreal River Canyon begins at Saxon Falls and extends approximately 2 miles downstream. The canyon is approximately 200 feet deep with vertical bedrock walls. Access to the canyon is limited, which helps preserve its unique wild and scenic qualities. Access can be achieved via the Montreal River at a kayak put-in location near the Saxon Falls powerhouse and a take-out location approximately 3 miles downstream at the Superior Falls take-out adjacent to the Wisconsin Highway 122 bridge (Northern States Power Company, 1988). The Montreal River canyon is held under a mixture of public and private ownership and has no recreational amenities.

4.8.1.5 Gogebic County Powers Road Recreation Area

The Gogebic County Park and Forestry Commission has over 50,000 acres of land under its jurisdiction that are generally available for recreational activities including hiking, biking, sightseeing, fishing, and hunting. The Powers Road Recreation area is located in northwestern Gogebic County and is adjacent to the Saxon Falls Project boundary on the Michigan side of the Montreal River. The

area provides a nearly 30-mile long trail network that was developed in cooperation with a local mountain biking group. This multi-use trail is open to non-motorized recreation, ATV's, off road vehicles and equestrians. There are also over five miles of walking trails for hunters (Gogebic County, 2018). The recreation area is maintained by the County. **Figure 4.8.1.5-1** shows the location of the Powers Road Recreation area.

Figure 4.8.1.5-1: Powers Road Recreation Area Map



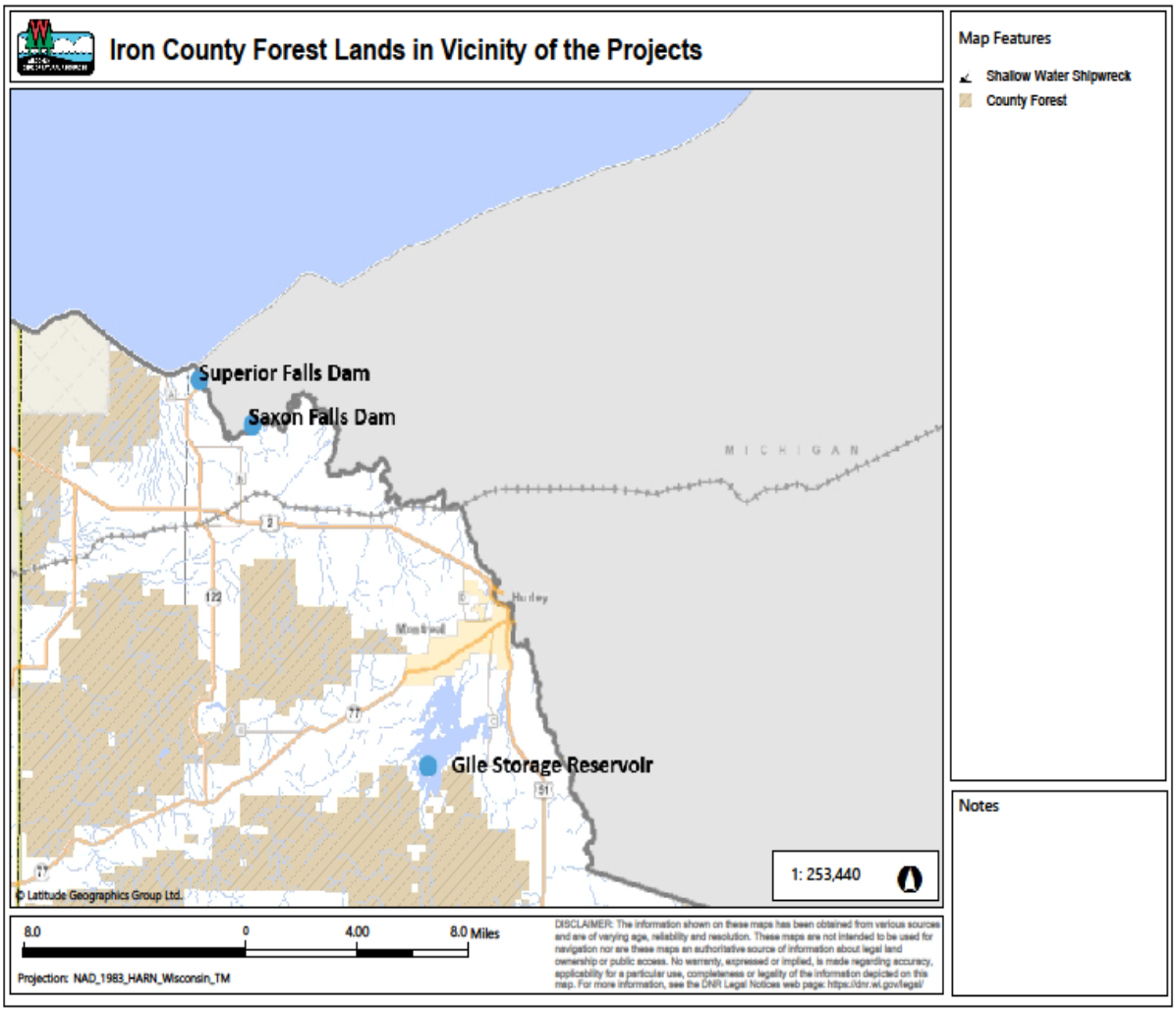
Gogebic County, 2018

4.8.1.6 Iron County Forest

The Iron County Forest encompasses over 174,000 acres. The forest is actively managed for timber production and provides numerous recreational opportunities including 118 miles of ATV trails and 304 miles of snowmobile trails (Iron County, 2016). Other recreational opportunities include cross-country skiing, snowshoeing, hiking, biking, site-seeing, hunting, fishing, and boating.

The Saxon Falls Project is located approximately 3 miles east of the nearest portion of the Iron County Forest as depicted in **Figure 4.8.1.6-1**. The Licensee does not own or maintain any portion of the Iron County Forest lands.

Figure 4.8.1.6-1: Iron County Forest Lands in the Vicinity of the Projects

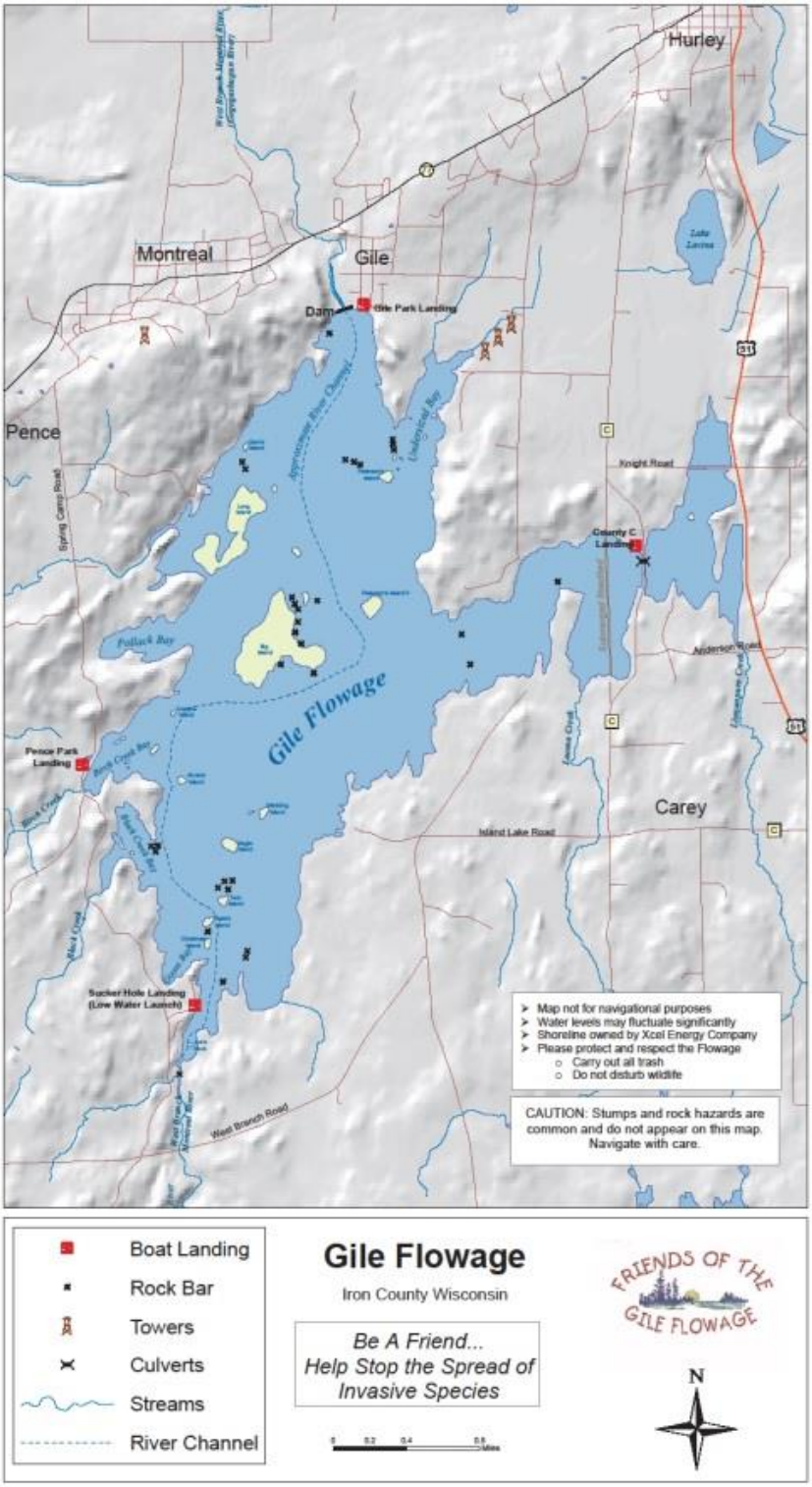


WDNR Public Lands Viewer, 2019

4.8.2 Gile Flowage Existing Recreational Facilities and Opportunities

There are many opportunities for fishing, wildlife viewing, and water sports within the vicinity of the Giles Flowage Reservoir. Existing recreation facilities are shown in **Figure 4.8.2-1** and described in the following paragraphs from upstream to downstream.

Figure 4.8.2-1: Gile Flowage Vicinity Recreation Facilities



4.8.2.1 Sucker Hole Landing

Sucker Hole Landing is located on the south end of the Gile Flowage near the mouth of the West Fork of the Montreal River. Sucker Hole Landing serves as a low water access point and provides a single-lane boat ramp composed of concrete planks with a gravel driveway and parking lot, as shown in **Figure 4.8.2.1-1**. The parking lot can accommodate up to four vehicles with trailers. A kiosk provides information about invasive species and fishing regulations. Sucker Hole Landing is owned and maintained by Iron County.

Figure 4.8.2.1-1: Sucker Hole Landing

4.8.2.2 Town of Pence Landing

The town of Pence landing is located along the west shoreline of the flowage about midway in the reservoir. The landing consists of a single lane concrete boat ramp with a gravel parking area along the shoulder of Spring Camp Road. The parking area can accommodate up to two vehicles with trailers. A kiosk provides information about invasive species and local fishing regulations. The landing is owned and maintained by the town of Pence and is shown in **Figure 4.8.2.2-1**.

Figure 4.8.2.2-1: Town of Pence Boat Landing

4.8.2.3 County C Landing

The County C Landing is located on west side of County Highway C on the east side of the reservoir, approximately 0.5 miles south of the intersection of County Highway C and Knight Road. The landing provides a two-lane boat ramp composed of concrete planks. The boat ramp plank includes a courtesy pier in between lanes. The landing also has a large gravel parking lot capable of holding 15-20 vehicles with trailers, as shown in **Figure 4.8.2.3-1**. The County C Landing is owned and maintained by Iron County.

Figure 4.8.2.3-1: County C Landing

Google Earth, earth.google.com/web/. Map showing Location of County C Landing. Image date May 4, 2015.

4.8.2.4 Gile Park Landing

The Gile Park Landing is located on the north end of the Gile Flowage at the east end of the Gile Dam. The landing provides a two-lane concrete boat ramp with a courtesy pier located between the lanes and a paved parking lot with space for up to eight vehicles with trailers and up to four vehicles without trailers. The park also includes a picnic area with tables, fireplace, drinking water, pavilion, restrooms, changing rooms, playground facilities, a swimming beach, and bank fishing (Iron County, 2016). The landing is owned and maintained by Iron County and is shown in **Figure 4.8.2.4-1**.

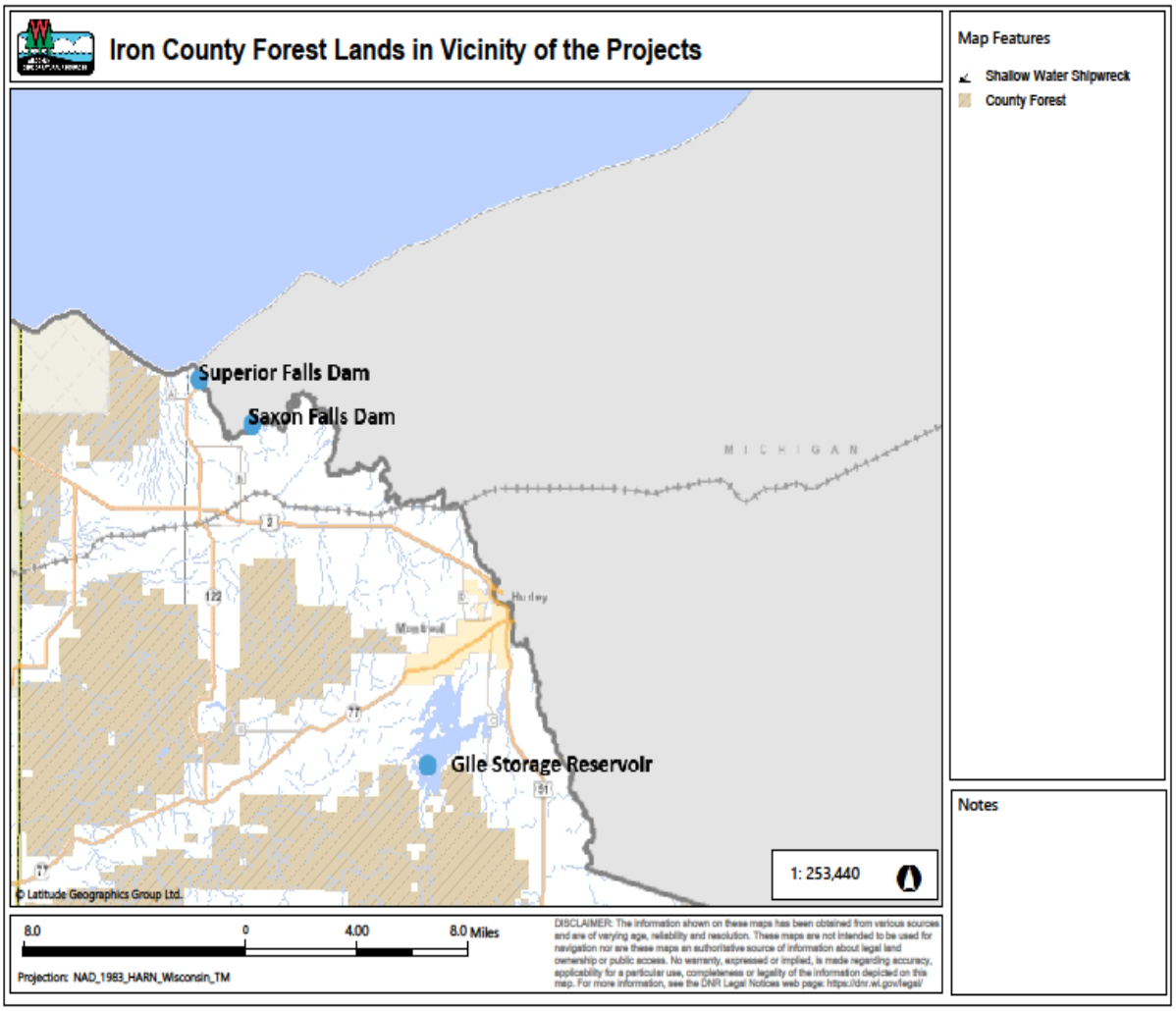
Figure 4.8.2.4-1: Gile Park Boat Landing

4.8.2.5 Iron County Forest

The Iron County Forest encompasses over 174,000 acres. The forest is actively managed for timber production. It provides numerous recreational opportunities including 118 miles of ATV trails and 304 miles of snowmobile trails (Iron County, 2016). Other recreational opportunities include cross-country skiing, snowshoeing, hiking, biking, site-seeing, hunting, fishing, and boating.

The south end of the Gile Flowage is adjacent to Iron County Forest lands as shown in **Figure 4.8.2.5-1**. The Licensee does not own or maintain any portion of the Iron County Forest lands.

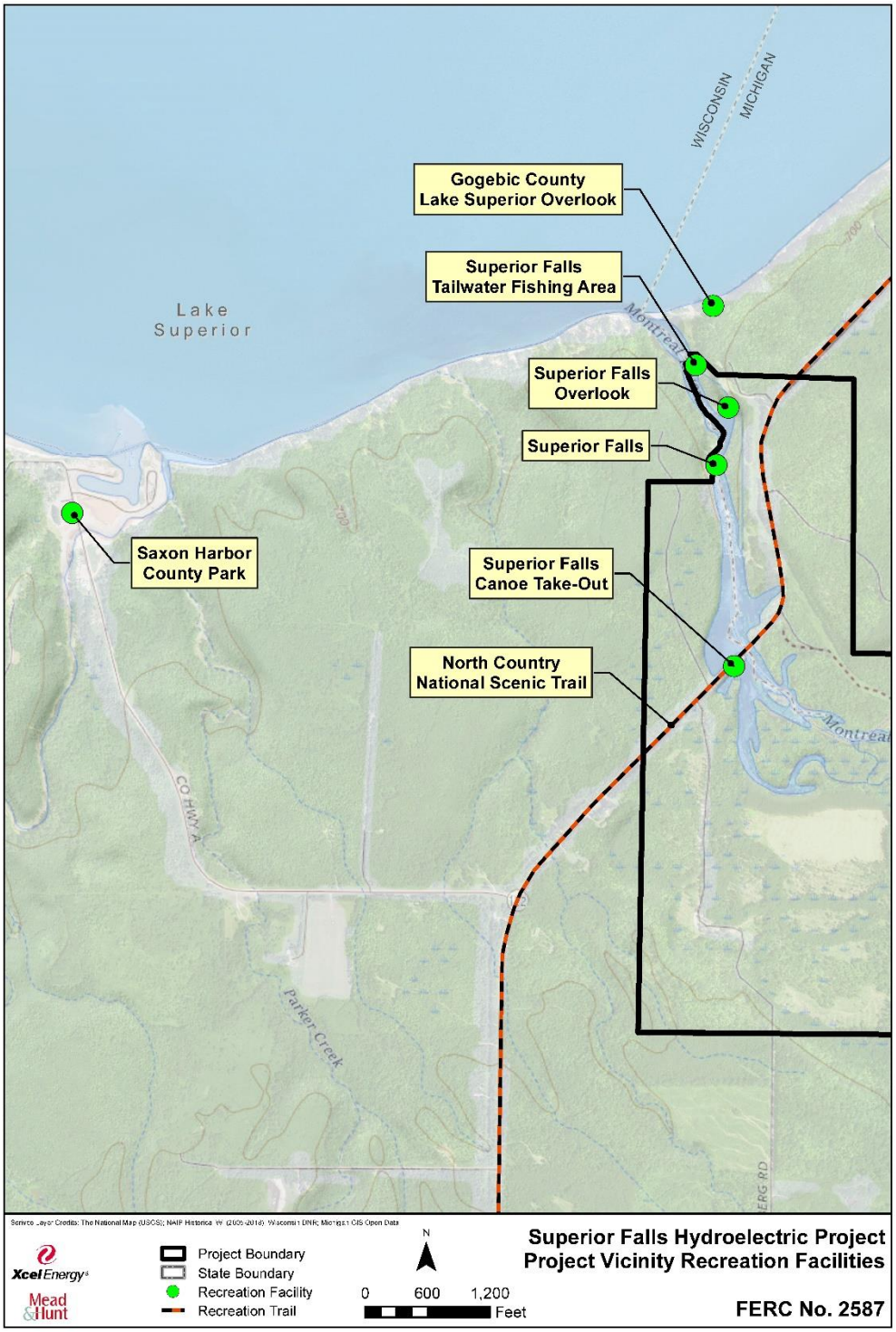
Figure 4.8.2.5-1: Iron County Forest Lands in the Vicinity of the Gile Flowage



4.8.3 Superior Falls Project Existing Recreational Facilities and Opportunities

There are many opportunities for fishing, wildlife viewing, and water sports within the Superior Falls Project vicinity. Existing recreation facilities are shown in **Figure 4.8.3-1** and described in the following paragraphs from upstream to downstream.

Figure 4.8.3-1: Superior Falls Project Vicinity Recreation Facilities



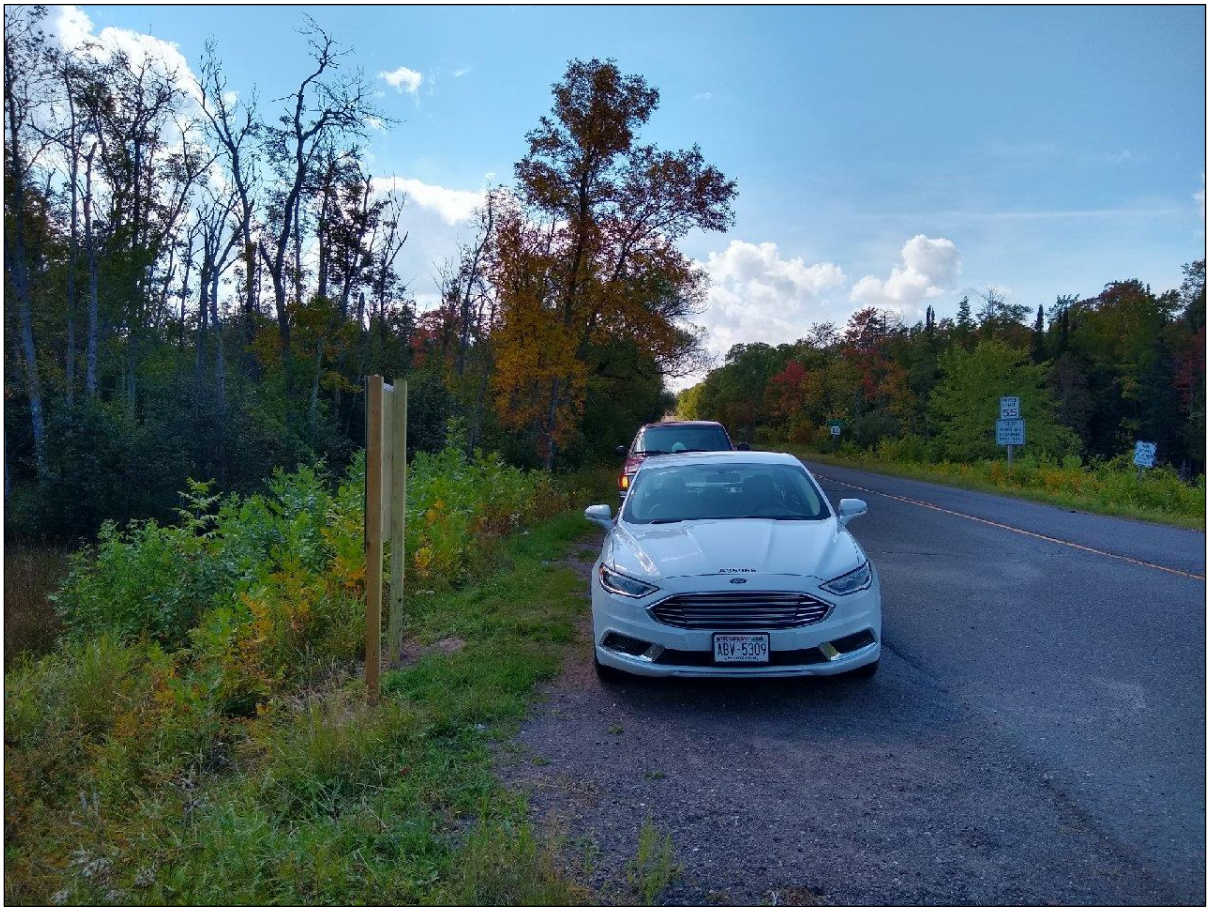
4.8.3.1 North Country National Scenic Trail

The North Country National Scenic Trail is a premier hiking and backpacking trail that travels for over 4,000 miles through seven northern states. It extends from Lake Sakakawea State Park in North Dakota to Crown Point, New York. It is one of only eight national scenic trails in the United States. It is also a designated Wisconsin state trail. In Wisconsin, the North County Trail extends 200 miles through Douglas, Bayfield, Ashland, and Iron counties (WDNR, 2019a). In the Superior Falls Project area, the trail runs along Wisconsin Highway 122/Michigan Highway 505 crossing over the Montreal River just upstream of the Superior Falls Dam. There are no off-road trail sections within the Superior Falls Project boundary. No signage identifying the trail was identified during a 2019 visit to the Project.

4.8.3.2 Superior Falls Canoe Take-out

The Superior Falls canoe take-out is maintained by the Licensee and is located adjacent to the Wisconsin Highway 122 bridge on the west side of the reservoir. Parking for two vehicles is available adjacent to the road. The access site also provides carry-in access for small boats and serves as the take-out area for boaters who traveled through the Montreal River Canyon upstream of the Project. The take-out parking area is shown in **Figure 4.8.3.2-1**.

Figure 4.8.3.2-1: Superior Falls Canoe Take-Out Parking Area



4.8.3.3 Superior Falls Scenic Overlook

The Superior Falls Scenic Overlook is a fenced area looking over the Superior Falls Waterfall on Northern States Power Company property. The area is maintained by the Licensee. Parking is available for up to ten cars on Project lands adjacent to the electric substation. Informational signage directing the public to the scenic overlook and tailrace fishing area is located adjacent to the parking area, as shown in **Figure 4.8.3.3-1**. A portable toilet is also provided at the site.

Figure 4.8.3.3-1: Superior Falls Scenic Overlook Informational Signage

4.8.3.4 Superior Falls Tailwater Fishing Area

A trail extends from the Superior Falls scenic overlook parking area down the hill to the powerhouse. This trail is maintained by the Licensee and provides access to both the tailwater fishing area below the powerhouse and the mouth of the Montreal River. The path to the tailwater fishing area is shown in **Figure 4.8.3.4-1**.

Figure 4.8.3.4-1: Superior Falls Path to Tailwater Fishing Area

4.8.3.5 Gogebic County Lake Superior Scenic Overlook.

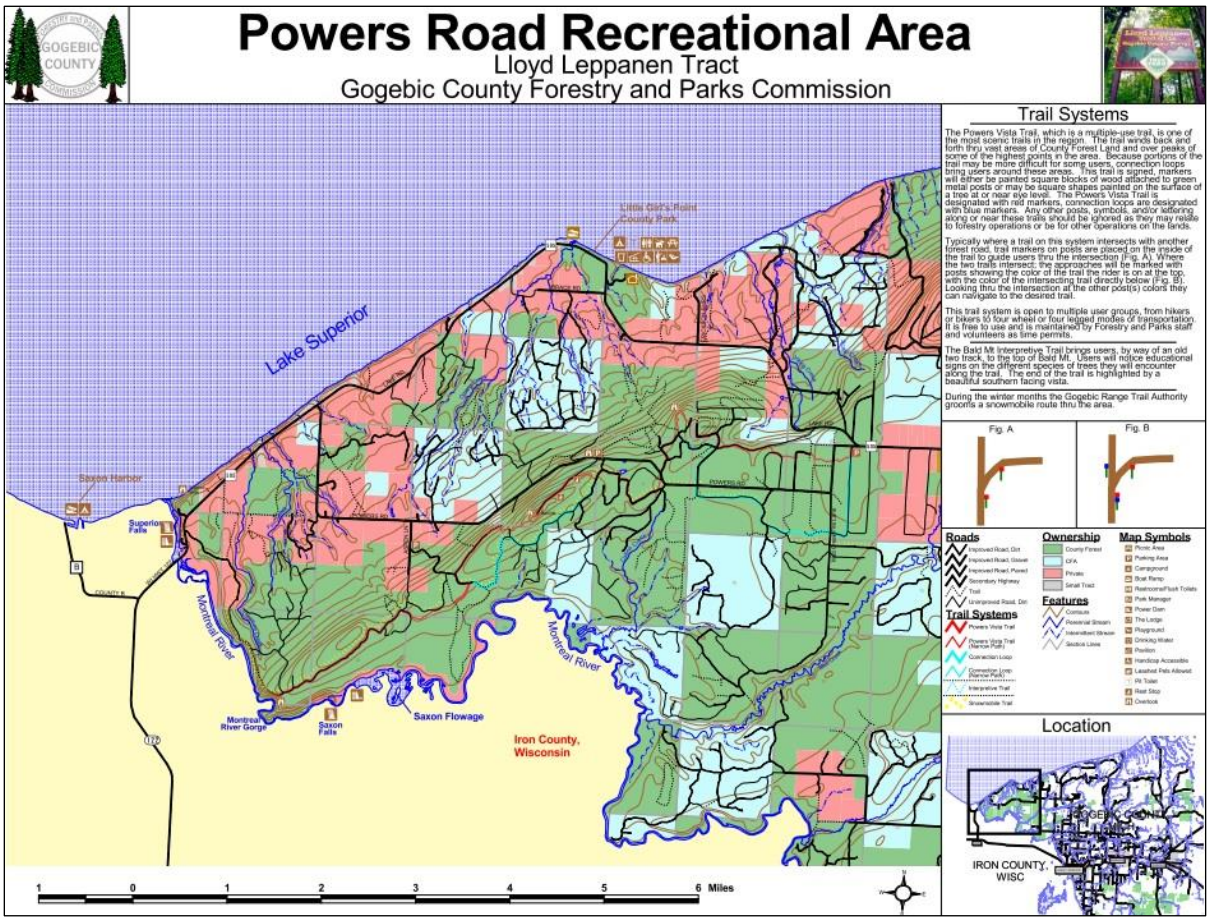
The Gogebic County Lake Superior Scenic Overlook is not located on Project lands and is not maintained by the Licensee. A gravel pathway extends from the parking area located on Gogebic County lands to a scenic overlook of Lake Superior. Benches are provided at the overlook, as shown in **Figure 4.8.3.5-1**.

Figure 4.8.3.5-1: Non-Project Gogebic County Lake Superior Scenic Overlook

4.8.3.6 Gogebic County Powers Road Recreation Area

The Gogebic County Park and Forestry Commission has over 50,000 acres of land under its jurisdiction that are generally available for recreational activities including hiking, biking, sightseeing, fishing, and hunting. The Powers Road Recreation area is located in northwestern Gogebic County, Michigan and is adjacent to the Superior Falls Project boundary on the Michigan side of the Montreal River. The area provides a nearly 30-mile long trail network that was developed in cooperation with a local mountain biking group. The trail allows multiple uses including non-motorized, all-terrain vehicle (ATV), off road vehicle, and equestrian use. There are also over five miles of walking trails for hunters (Gogebic County, 2018). The recreation area is maintained by the County. **Figure 4.8.3.6-1** shows the location of the Powers Road Recreation area. The Gogebic County Lake Superior Scenic Overlook is located on Gogebic County Park and Forestry Commission Property.

Figure 4.8.3.6-1: Powers Road Recreation Area Map



Gogebic County, 2018

4.8.3.7 Saxon Harbor County Park

Saxon Harbor County Park is not located within the Project boundary, nor is it owned or maintained by the Licensee. It is located approximately 1.25 miles west of the Superior Falls Project. The park features a marina, parking area, restrooms, shelters, picnic area, playground facilities and campground. The facility was completely renovated in 2019 following catastrophic flood damage in 2016, including repairing the marina area and relocating the campground (Iron County, 2019). **Figure 4.8.3.7-1** shows an aerial view of the non-project Saxon Harbor County Park.

Figure 4.8.3.7-1: Saxon Harbor County Park, Iron County

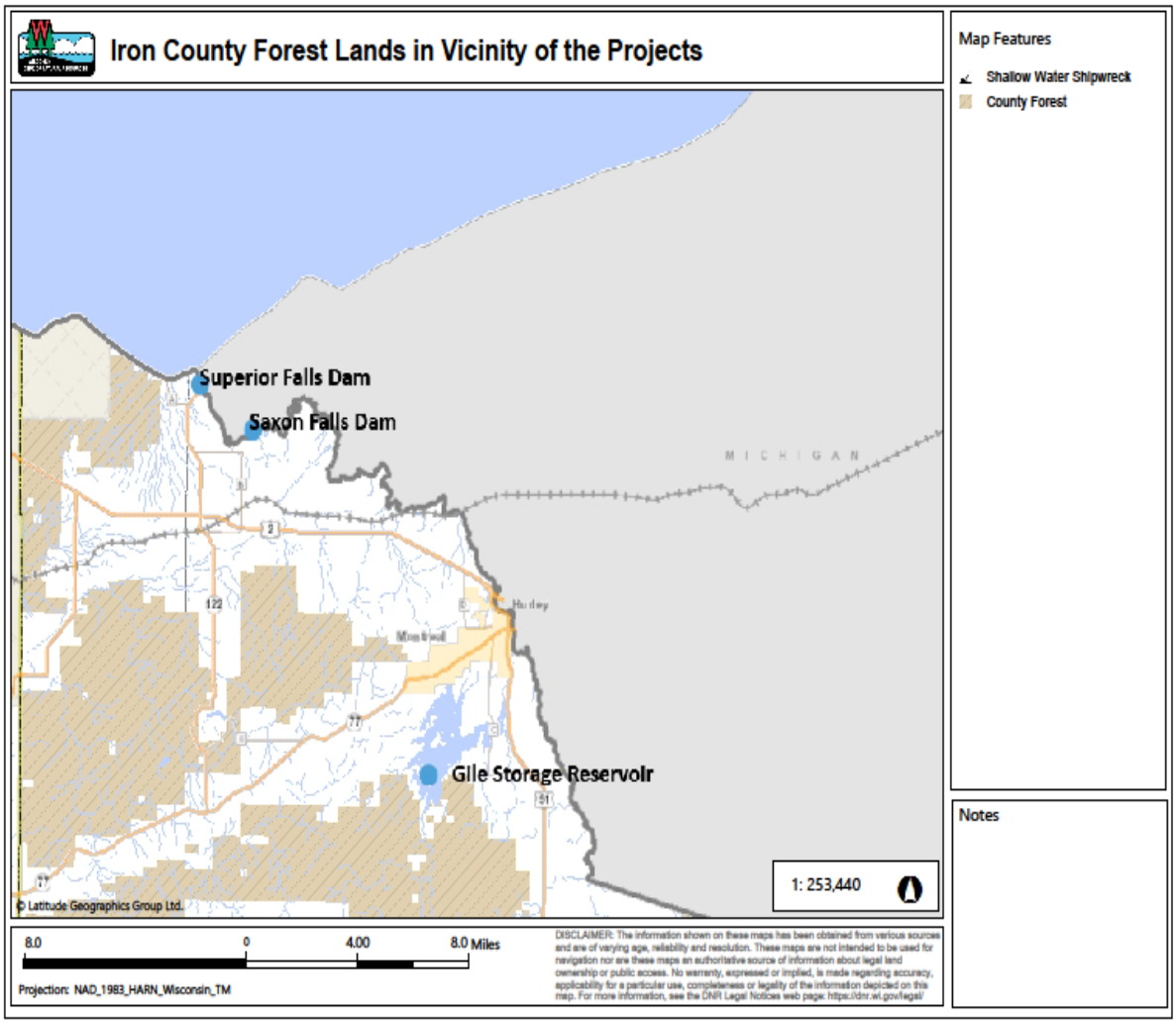
Google Earth, earth.google.com/web/. Map showing Location of Saxon Harbor County Park. Image date April 29, 2015.

4.8.3.8 Iron County Forest

The Iron County Forest encompasses over 174,000 acres. The forest is actively managed for timber production and provides numerous recreational opportunities including 118 miles of ATV trails and 304 miles of snowmobile trails (Iron County, 2016). Other recreational opportunities include cross-country skiing, snowshoeing, hiking, biking, site-seeing, hunting, fishing, and boating.

The Superior Falls Project is located approximately 1.5 miles east of the nearest portion of the Iron County as shown in **Figure 4.8.3.8-1**. The Licensee does not own or maintain any portion of the Iron County Forest lands.

Figure 4.8.3.8-1: Iron County Forest Lands in the Vicinity of the Projects



WDNR Public Lands Viewer, 2019

4.8.4 Recreational Needs Identified in Management Plans

4.8.4.1 State of Wisconsin

The 2019 to 2023 Statewide Comprehensive Outdoor Recreation Plan (SCORP) was released in March 2019. The SCORP identified a need to support nature-based recreation including trails and water and shore access for fishing and boating (WDNR, 2019a). The recreation amenities provided in the vicinity of the Saxon Falls Project, Gile Flowage, and Superior Falls Project help fulfill these goals. A copy of this SCORP is provided in **Appendix 4.8.4.1-1**.

4.8.4.2 State of Michigan

The 2018 to 2022 SCORP was released in August 2017. The SCORP identified needs which included raising awareness of recreational opportunities, improving recreational access, providing quality experiences, and enhancing health by increasing physical activity levels (MDNR, 2017a). The recreation amenities provided in the vicinity the Saxon Falls Project, Gile Flowage, and Superior Falls Project help fulfill these goals. A copy of this SCORP is provided in **Appendix 4.8.4.2-1**.

4.8.4.3 Iron County, Wisconsin

The Iron County Outdoor Recreation Plan 2016-2020 (2016-2020 Plan) puts a high priority on maintenance of existing facilities and increasing the promotion of recreation opportunities in the county. For facilities near the Saxon Falls Project, Gile Flowage, and Superior Falls Project, the plan specifies improvements to Saxon Harbor County Park and continued maintenance of existing ATV and snowmobile trails. Iron County also plans continued cooperation with the North Country Trail Association in expansion of certified portions of the national scenic trail. No other specific needs identified in the plan are located within the vicinity of the Saxon Falls Project, Gile Flowage, or Superior Falls Project. A copy of the 2016-2020 Plan is provided in **Appendix 4.8.4.3-1**.

4.8.4.4 Gogebic County, Michigan

Regional trail connectivity remains a high priority for Gogebic County. The Gogebic County 2018-2022 Recreation Plan (2018-2022 Plan) identifies improvements fortwo county-owned areas near the Saxon Falls and Superior Falls Projects. These include the Powers Road Recreation Area adjacent to the Saxon Falls Project and Little Girl's Point Park located 5 miles northeast of the Superior Falls Project. Planned improvements at the Powers Road Recreation Area include upgrading the trailhead with new gravel and making improvements to existing trails. Planned improvements at Little Girl's Point Park include installation of new restrooms with flush toilets. (Gogebic County, 2018). A copy of the 2018-2022 Plan is provided in **Appendix 4.8.4.4-1**.

4.8.5 Recreation Accessibility Under the Americans with Disabilities Act

Americans with Disabilities Act (ADA) needs are accommodated in several locations in the vicinity of the Saxon Falls Project, Gile Flowage, and Superior Falls Project. Saxon Harbor County Park and Gile Park Landing provide ADA accessible boat ramps, docks, restrooms, pathways, and picnic areas.

4.8.6 References

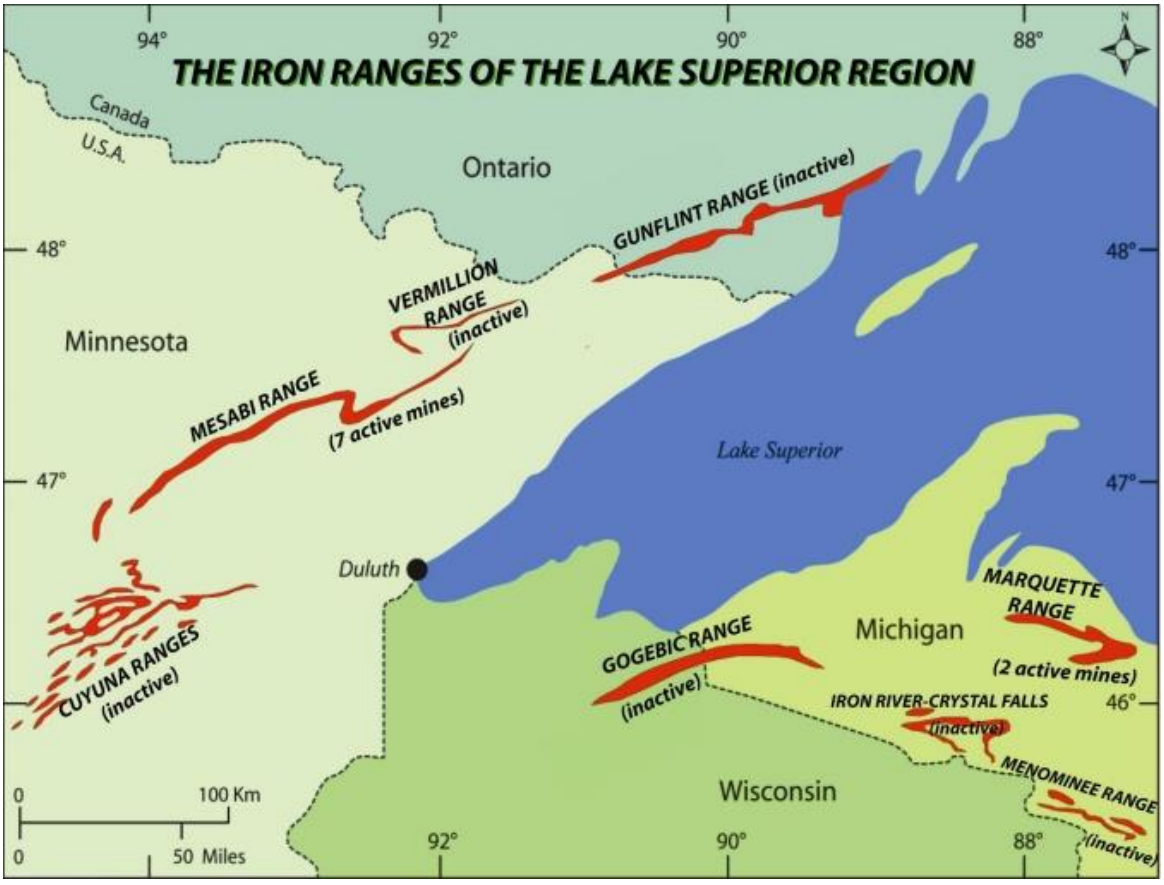
- Gogebic County. 2018. Gogebic County 2018-2022 Recreation Plan. Gogebic County and Western Upper Peninsula Planning and Development Region. January 3, 2018.
- Iron County. 2016. Iron County Outdoor Recreation Plan 2016-2020.Iron County and Northwest Regional Planning Commission. April 2016.

- Iron County.2019. Iron County Website. Saxon Harbor County Park. https://www.ironcountyforest.org/saxon-harbor.html. Accessed September 5, 2019.
- Michigan DNR. 2017. Michigan Statewide Comprehensive Outdoor Recreation Plan 2018-2022. August 31, 2017.
- Wisconsin Department of Natural Resources. 2019a. WDNR website. North Country Trail. https://dnr.wi.gov/topic/parks/name/northcountry/index.html. Accessed September 5, 2019.
- Wisconsin Department of Natural Resources. 2019b. Statewide Comprehensive Outdoor Recreation Plan (SCORP) 2019-2023.

4.9 Aesthetic Resources (18 CFR § 5.6(d)(3)(ix))

Iron County is 2,285 square miles and includes 758 square miles of surface waters; Gogebic County is 6,076 square miles and includes 1,102 square miles of surface waters (Worldatlas.com, 2019a; Worldatlas.com, 2019b). The topography of the area was created when glacial activity eroded the remnant mountain range known as the Penokee-Gogebic Range (**Figure 4.9-1)**. 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 at Lake Superior to 1863 feet in the Gogebic-Penokee Range (Town of Saxon, 2005). South of the range, glacial activity left behind a pitted outwash plain with heavily forested terrain and many lakes, potholes, and wetlands with generally low to moderate relief (Town of Pence, 2005).

Figure 4.9-1: General Location of the Penokee-Gogebic Range



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

4.9.1 Visual Character of Project Land and Waters

4.9.1.1 Saxon Falls Project

The view from the Saxon Falls Project Dam upstream is dominated by the reservoir, safety buoys, and undeveloped scenic wooded shoreline as shown in **Figure 4.9.1.1-1**.

Figure 4.9.1.1-1: View Upstream from the Saxon Falls Dam

Looking northwest from the boat landing provides a scenic view of the Saxon Falls Dam, as shown in Figure **4.9.1.1-2**. The Montreal River Canyon begins downstream of the powerhouse and extends for approximately 2 miles downstream of the Project. The Montreal River downstream of the Saxon Falls Project powerhouse can be seen in **Figure 4.9.1.1-3**. The Saxon Falls Waterfall is located in the bypass reach of the Montreal River between the dam and powerhouse and is shown in **Figure 4.9.1.1-4**.

Figure 4.9.1.1-2: View of the Saxon Falls Dam

Figure 4.9.1.1-3: Montreal River Downstream of the Saxon Falls Powerhouse

Figure 4.9.1.1-4: Saxon Falls Waterfall

4.9.1.2 Gile Flowage

The Gile Flowage Dam creates a 3,317-acre reservoir with several large islands. A view upstream of the dam shows the wooded, undeveloped shorelines typical of the reservoir (**Figure 4.9.1.2-1**).

Figure 4.9.1.2-1: Gile Flowage Upstream of Dam

The Gile Flowage dam as viewed from the Gile Park Landing is shown in **Figure 4.9.1.2-2**. The Gile Flowage Dam discharges to the West Fork of the Montreal River. **Figure 4.9.1.2-3** shows the West Fork of the Montreal River downstream of the dam.

Figure 4.9.1.2-2: View of Gile Flowage Dam

Figure 4.9.1.2-3: West Fork Montreal River Downstream of Gile Flowage Dam

4.9.1.3 Superior Falls Project

The view from the Superior Falls Project Dam upstream is dominated by the reservoir, safety buoys, log boom, and scenic, undeveloped, wooded shoreline, as shown in **Figure 4.9.1.3-1**.

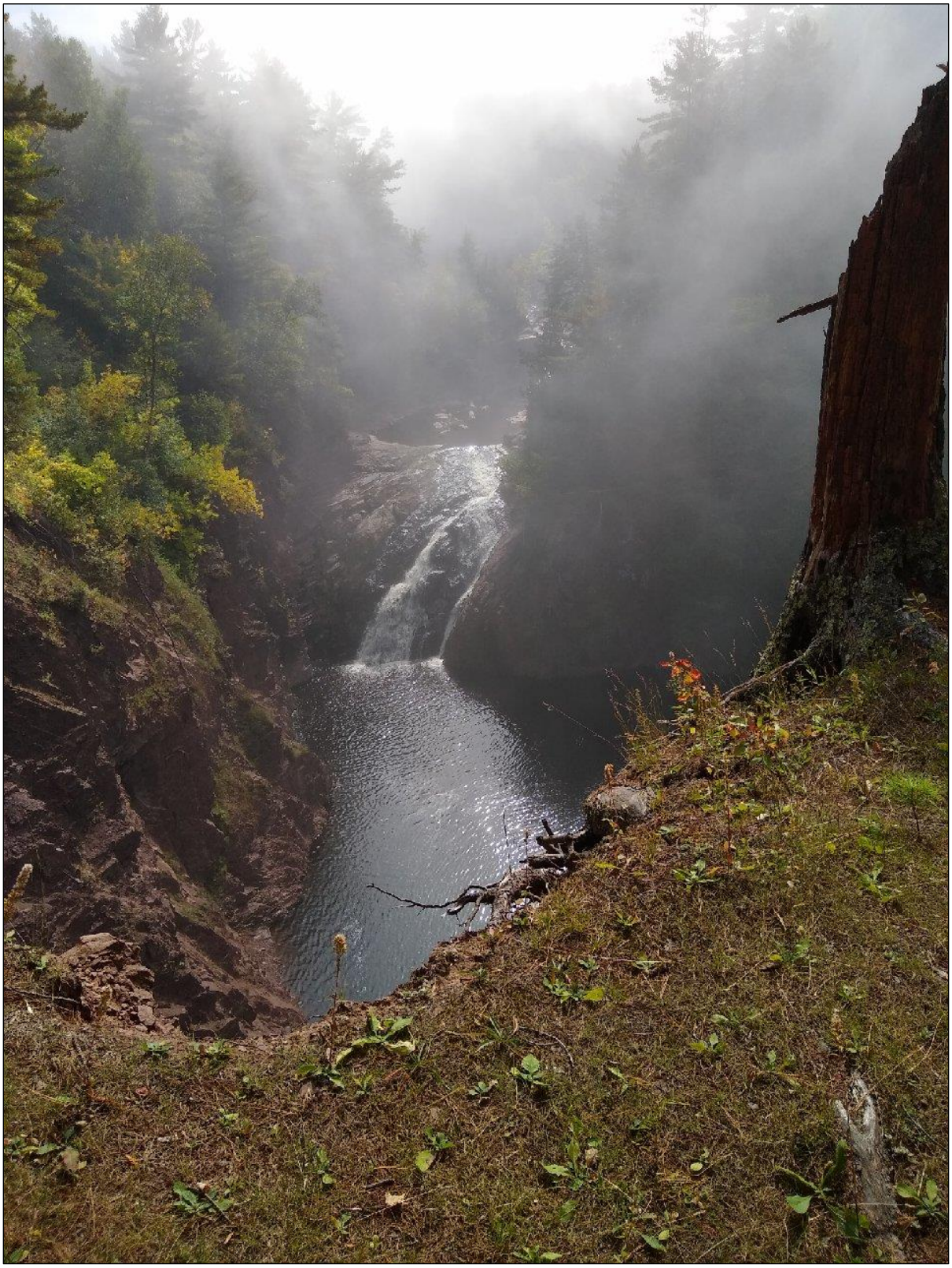
Figure 4.9.1.3-1: View Upstream of the Superior Falls Dam

The Superior Falls Waterfall is located in the bypass reach of the Montreal River between the dam and powerhouse. The bypass reach downstream of the dam is shown in **Figure 4.9.1.3-2**. The powerhouse discharges about halfway between the waterfall and Lake Superior. The Montreal River downstream of the Superior Falls powerhouse is shown in **Figure 4.9.1.3- 3**. The Superior Falls scenic observation area provides an aesthetic view of the waterfall, as shown in **Figure 4.9.1.3-4**.

Figure 4.9.1.3-2: View of the Bypass Reach Downstream of the Superior Falls Dam

Figure 4.9.1.3-3: Montreal River Downstream of Superior Falls Powerhouse

Figure 4.9.1.3-4: View of Superior Falls Waterfall from Observation Area



4.9.2 Nearby Scenic Attractions

4.9.2.1 Gile Flowage

The largest scenic attraction in the area is the Gile Flowage. This 3,317-acre reservoir with its rocky shores and bedrock islands is one of the last undeveloped large water bodies in Wisconsin. Most of the shoreline is ancient exposed bedrock and the reservoir is dotted with bedrock islands similar to the Boundary Waters and Quetico canoe-country region of northern Minnesota (Friends of the Gile Flowage, 2019). **Figure 4.9.2.1-1** shows one of the islands on the Gile Flowage.

Figure 4.9.2.1-1: Island in the Gile Flowage

4.9.2.2 Potato River Falls

Several waterfalls, in addition to Saxon Falls and Superior Falls, are located within Iron County. Potato River Falls is the largest and is located on the Potato River near Gurney, Wisconsin. The falls are accessible from a town park with hiking trails, picnic area, and several primitive campsites. The Potato River Falls consist of an upper falls and lower falls with a total height of 90 feet. (Iron County Economic Development, 2019). The waterfall is shown in **Figure 4.9.2.2-1**.

Figure 4.9.2.2-1: Potato River Waterfall

4.9.2.3 Interstate Falls

Interstate Falls is located on the Montreal River approximately 0.6 miles northwest of Hurley, Wisconsin and is accessible via a 0.3-mile-long hiking path from the parking area. Interstate Falls is 18 feet high and is shown in Figure 4.9.2.3-1 (Iron County Economic Development, 2019).

Figure 4.9.2.3-1: Interstate Falls

4.9.2.4 Kimball Falls

Kimball Falls is located on the West Fork of the Montreal River in the area of Hurley, Wisconsin. The 10-foot high waterfall, shown in **Figure 4.9.2.4-1**, is accessible via Kimball Town Park, which provides picnic tables, a pavilion, restrooms, and playground equipment (Iron County Economic Development, 2019).

Figure 4.9.2.4-1: Kimball Falls and Kimball Town Park

Google Earth, earth.google.com/web/. Map showing Location of Kimball Town Park. Image date May 4, 2015.

4.9.3 References

- Friends of the Gile Flowage. 2019. Brief History of the Gile Flowage. http://www.friendsofthegile.org/home/flowage. Accessed September 12, 2019.
- Iron County Economic Development. 2019. Waterfalls/Points of Interest/Parks & Campgrounds. https://ironcountywi.com/waterfalls/. Accessed October 10, 2019.
- Worldatlas.com, 2019a. Iron County Wisconsin. https://www.worldatlas.com/na/us/wi/c-iron-county-wisconsin.html. Accessed October 9, 2019.
- Worldatlas.com, 2019b. Gogebic County Michigan. https://www.worldatlas.com/na/us/mi/c-gogebic-county-michigan.html. Accessed October 9, 2019.

4.10 Historical and Cultural Resources (18 CFR § 5.6(d)(3)(x))

The Wisconsin Historical Society - Division of Historic Preservation Office (SHPO) maintains a Wisconsin Historic Preservation Database (WHPD) that includes information on the locations of historic buildings, historic sites, and archaeological sites in the National Register of Historic Places (NRHP). An area of potential effect was established to identify historic and archaeological resources within both current Project license boundaries (Northern States Power Company, 1988; Northern States Power Company 1991). There is also an existing Cultural Resources Monitoring Plan for the Saxon Falls Project.

4.10.1 Historic/Architectural Resources

Northern States Power Company conducted a thorough literature search of the WHPD database to identify known historic and archaeological resources within the boundaries of the Saxon Falls Project, Gile Flowage, and Superior Falls Project.

4.10.1.1 Saxon Falls Project

The Saxon Falls Hydroelectric Project was completed in 1912 by the Bessemer Railway and Light Company. The plant and dam were purchased in 1922 by the Lake Superior District Power Company, the predecessor to Northern States Power Company. The dam was reconstructed in 1940 to its present configuration (Northern States Power Company, 2014).

A review of the Wisconsin Architecture and History Inventory located one structure within the Project boundary, site number 227618 (SHPO, 2019). The site is the Saxon Falls Hydroelectric Dam, which is over 50 years old and is part of the proposed Saxon Falls Hydroelectric Dam Historic District. The Project was evaluated for NRHP and determined ineligible.

4.10.1.2 Gile Flowage

The Gile Flowage Dam was authorized by the Wisconsin Public Service Commission in 1937. The dam was built at the site of the former Montreal River Log Company Dam dating back to the late 1800's. Lake Superior District Power Company, which was later acquired by Northern States Power Company, was the initial owner. The dam was completed in 1940 and the reservoir began filling in 1941 with the spring snowmelt (Friends of the Gile, 2019).

A review of the Wisconsin Architecture and History Inventory did not locate any structures within the immediate vicinity of the Gile Flowage (SHPO, 2019).

4.10.1.3 Superior Falls Project

The Superior Falls Hydroelectric facility was completed in 1917. The crest elevation of the dam was raised in 1935. A major spillway renovation was completed in 1999 and included refurbishing two existing steel tainter gates, removing three existing wood tainter gates, and replacing them with a larger steel tainter gate and an overflow spillway.

A review of the Wisconsin Architecture and History Inventory located one structure within the Project boundary, site number 26872 (SHPO, 2019). The site is the Superior Falls Hydroelectric Plant, which was evaluated in 1989 and determined ineligible for inclusion in the NRHP. No further evaluation of the site is planned as part of the relicensing process.

4.10.2 Archaeological Resources

The Wisconsin Historic Preservation Database includes information on previously surveyed areas and the locations of any known archaeological sites within the Saxon Falls Project, Gile Flowage, and Superior Falls Project.

4.10.2.1 Saxon Falls Project

A WHPD database search for previously surveyed areas and archaeological sites within the Saxon Falls Project boundary identified three surveys which are summarized in **Table 4.10.2.1-1. The surveys** did not reveal any previously unidentified archaeological sites (SHPO, 2019).

Table 4.10.2.1-1: Previous Archaeological Surveys within the Saxon Falls Project Boundary

SHPO Project #	Report Author	Type of Survey	Results
87-1257	Allen Van Dyke	2012 Shoreline erosion monitoring of Saxon Falls Flowage and Phase I survey of Saxon Falls Driveway Project	No cultural material or features identified
87-1957	Allen Van Dyke	1991 Erosion monitoring of Saxon Falls Project shoreline	No previously known or new sites discovered
16-1204	Allison Lange-Mueller and Matthew Terry	2015 Shovel testing, probing, walk over/ visual inspection for timber harvest	No new sites identified

4.10.2.2 Gile Flowage

A review of the WHPD database did not identify any historic structures, past archaeological surveys, or previously unidentified archaeological sites in the vicinity of the Gile Flowage boundary (SHPO, 2019).

4.10.2.3 Superior Falls Project

A WHPD database search for previously surveyed areas and archaeological sites within the Superior Falls Project boundary identified three individual surveys under two project numbers, which are summarized in **Table 4.10.2.3-1,** and three previously identified archaeological sites, which are summarized in **Table 4.10.2.3-2** (SHPO, 2019).

Table 4.10.2.1-1: Previous Archaeological Surveys within the Superior Falls Project Boundary

SHPO Project #	Report Author	Type of Survey	Results
89-0308	Allen Van Dyke	1991 Survey of Project shoreline	No sites identified
	Allen Van Dyke	1999 Survey of Project exposed reservoir bed during construction related drawdown	No cultural material identified
16-1204	Allison Lange-Mueller and Matthew Terry	2015 Shovel testing, probing, walk over/ visual inspection for timber harvest	3 previously unreported archaeological sites identified

Table 4.10.2.1-2: Previously Identified Archaeological Sites within the Superior Falls Project Boundary

State Site #	Report Author	Site Type	Year
IR-0046	Allison Lange-Mueller, Matthew Terry	Foundation/depression, HCM concentration	2016
IR-0047	Allison Lange-Mueller, Matthew Terry	Foundation/depression, HCM concentration	2016
IR-0048	Allison Lange-Mueller, Matthew Terry	Foundation/depression	2016

4.10.3 Tribal Cultural Resources (18 CFR § 5.6(d)(3)(xii))

Native Americans occupied the area now known as Wisconsin for thousands of years. The federal government currently recognizes 11 tribes in Wisconsin and has established Native American Reservations (tribal lands) for each of these tribes (Loew, 2001). The tribes include the Forest County Potawatomi, Ho-Chunk Nation, Menominee Indian Tribe of Wisconsin, Oneida Nation of Wisconsin, Stockbridge-Munsee Band of Mohican Indians, and six Ojibwe (Chippewa) tribes. The Ojibwe tribes include the Bad River Band of Lake Superior Chippewa, Lac Courte Oreilles Band of Lake Superior Chippewa, Lac du Flambeau Band of Lake Superior Chippewa, Red Cliff Band of Lake Superior Chippewa, St. Croix Band of Chippewa Indians of Wisconsin, and Sokaogon Chippewa (Mole Lake) Community (WDPI, 2019).

4.10.3.1 Forest County Potawatomi

The Potawatomi arrived in Wisconsin in the mid-17th century from Canada and the western United States. In the early 1800s, the government took away Potawatomi land rights. In 1913, the Forest County Potawatomi bought back approximately 12,000 acres located in northern Wisconsin (Loew, 2001).

4.10.3.2 Ho-Chunk Nation

The Ho-Chunk people, who were driven from Wisconsin to the west, have gradually returned to reclaim their ancestral lands. No treaty lands have been reserved, so present Ho-Chunk lands are tribal lands that have been re-purchased. Today, 4,700 members of the Wisconsin Ho-Chunk hold title to 2,000 acres of land in Wisconsin (Loew, 2001).

4.10.3.3 Menominee Indian Tribe of Wisconsin

The Menominee people are believed to have occupied Wisconsin for more than 5,000 years. As Europeans arrived, the Menominee lost most of their lands, but maintained a significant presence in the state. Menominee County was created from part of Shawano County in 1959 in anticipation of the Menominee Indian Reservation termination in 1961. Reservation status was restored in 1973. Today, most land within Menominee County is designated as tribal trust lands by the U.S. Bureau of Indian Affairs; non-tribal regulations generally do not apply. The Menominee also holds a small amount of land within the town of Red Springs, Shawano County (Loew, 2001).

4.10.3.4 Oneida Nation of Wisconsin

The Oneida people were part of the New York Iroquois League prior to the Revolutionary War. In 1822, the Oneida purchased land in a territory that would later become the state of Wisconsin. Much of these lands were taken away by the 1900s, but 1,270 acres were repurchased in 1937 (Loew, 2001).

4.10.3.5 Stockbridge-Munsee Band of Mohican Indians

The Stockbridge-Munsee are a blend of Mohican Tribes from Massachusetts and Delaware who moved west, settling near Lake Winnebago. In 1856, they obtained their present treaty lands from neighboring Menominee Native Americans. Tribal fee lands are owned by the Stockbridge-Munsee and remain subject to non-tribal regulations. As such, lands held in fee title are subject to County zoning and subdivision regulation. The Stockbridge-Munsee population was estimated at 1,527 in 2000, which represents a nearly 163% increase from 1990 (Loew, 2001).

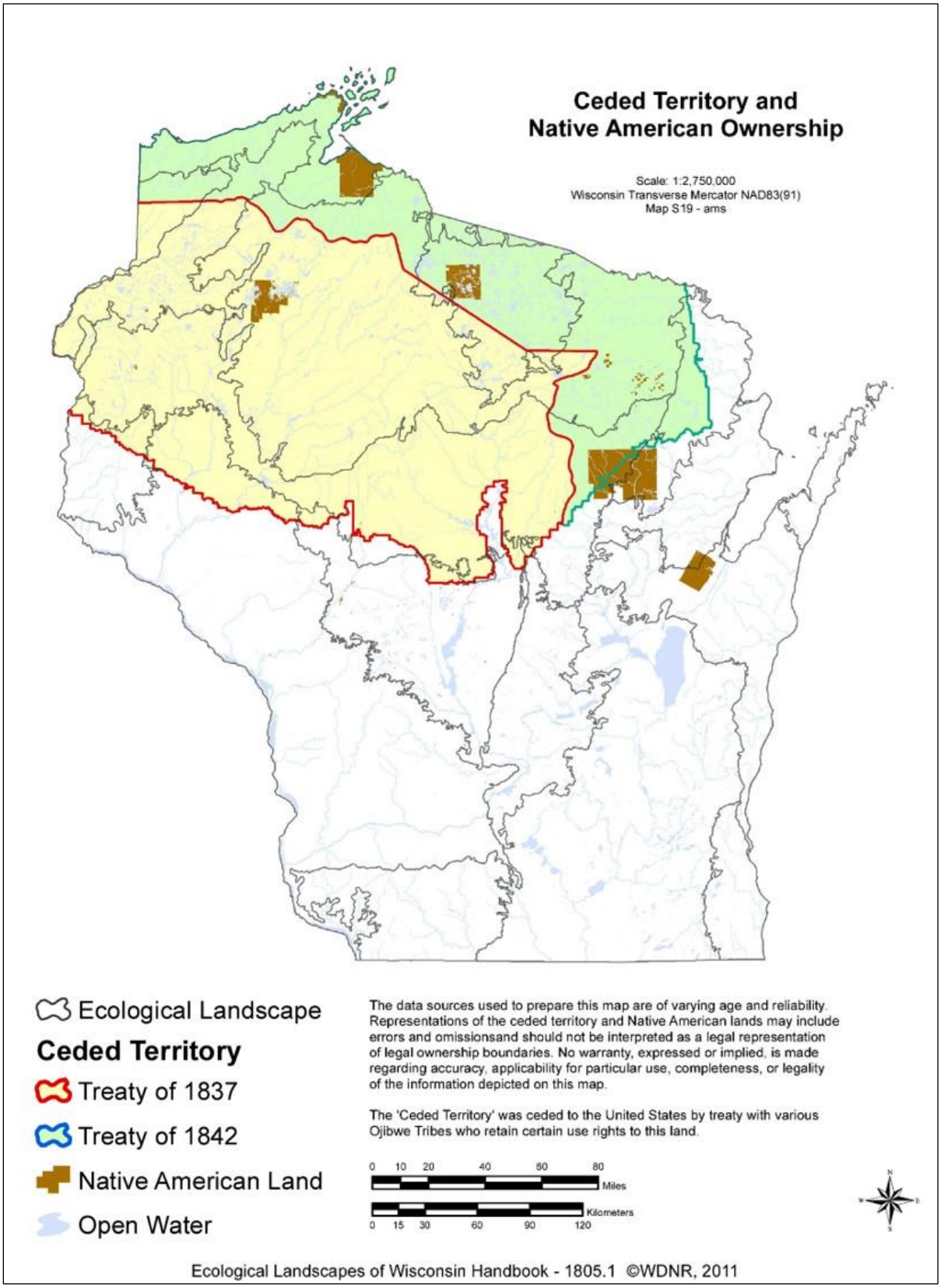
4.10.3.6 Ojibwe (Chippewa) Tribes

The Ojibwe (Chippewa) originated from the Great Lakes and moved east to areas near the Atlantic Ocean. The Ojibwe returned to the Great Lakes Region over 1,000 years ago and settled within fertile wild rice beds, with a resting stop of Madeline Island, Wisconsin. The Ojibwe had a close relationship with the French, but efforts to convert the Ojibwe people to Christianity divided their belief systems into various bands of Ojibwe who established themselves in other locations.

As the pursuit of furs for trade progressed inland, conflicts with other Tribes, including the Dakotas, culminated with a Treaty assembled by the U.S. Government in 1825. The Treaty forced the Ojibwe to cede their territory to the U.S. under negotiations in 1837 and 1842. The Ojibwe ceded territories are shown in **Figure 4.10.3.6-1**. The Saxon Falls Project, Gile Flowage, and Superior Falls Project are located within the territory ceded in 1842.

The Ojibwe retained their right to hunt, fish, and gather on ceded lands in Wisconsin. In 1850, the U.S. began to relocate the Ojibwe to Minnesota territory. Through negotiations, an 1854 treaty established the Bad River Band, Lac Courte Oreilles Band, Lac du Flambeau Band, and Red Cliff Band Reservations. Reservation lands were not established for the St. Croix Band or the Sokaogon (Mole Lake) Community in the 1854 Treaty (Loew, 2001).

Figure 4.10.3.6-1: Ojibwe Ceded Territories of 1837 and 1842



4.10.3.7 Tribal Representatives Consulted with Questionnaires

A questionnaire was sent to tribal representatives in June 2019 asking for any known information or known potential impacts of the Superior Falls or Saxon Falls Project operations. A second questionnaire was sent in September 2019 asking for any known information or potential impacts of the Gile Flowage operations. The tribal representatives who were sent questionnaires are listed in **Table 4.10.3.7-1**.

Ms. Amy Burnette, Leech Lake Band of Ojibwe, responded to the Saxon Falls and Superior Falls questionnaire indicating the Leech Lake Bank of Ojibwe does not have any known recorded sites of religious or cultural importance in the Saxon Falls or Superior Falls area, but they reserved the right to reenter the consultation process.

Ms. Sherry White, Stockbridge Munsee Tribe, responded to the Saxon Falls and Superior Falls questionnaire indicating they did not intend to participate in the relicensing process, and they did not have concerns regarding the use of the traditional licensing process. A discussion of all questionnaire responses is included in Section 6.

Table 4.10.3.7-1: Tribal Representatives Consulted Through Questionnaires

Name	Organization
Ms. Edith Leoso	Bad River Band of Lake Superior Chippewa
Mr. Clinton Parish	Bay Mills Indian Community of Michigan
Mr. Marcus Ammesmaki	Fond du Lac Band of Lake Superior Chippewa
Mr. Michael LaRonge	Forest County Potawatomi Community of Wisconsin
Mr. Michael Blackwolf	Fort Belknap Indian Community
Ms. Mary Ann Gagnon	Grand Portage Band of Chippewa Indians
Mr. Earl Meshigaud	Hannahville Potawatomi Indian Community
Mr. William Quackenbush	Ho-chunk Nation Executive Offices
Cultural Preservation Office	Iowa Tribe of Oklahoma
Mr. Chris Swarz	Keweenaw Bay Indian Community
Mr. Brian Bisonette	Lac Courte Oreilles Band of Lake Superior Chippewa Indians of Wisconsin
Ms. Melinda Young	Lac du Flambeau Band of Lake Superior Chippewa Indians
Mr. James Williams	Lac Vieux Desert Band of Lake Superior Chippewa Indians of Michigan
Ms. Amy Burnette	Leech Lake Band of Minnesota
Mr. David Grignon	Menominee Indian Tribe of Wisconsin
Ms. Diane Hunter	Miami Tribe of Oklahoma
Ms. Natalie Weyaus	Mille Lacs Band of Ojibwe
Ms. Corina Williams	Oneida Nation of Wisconsin
Mr. Warren Wahweotten, Jr.	Prairie Band Potawatomi Nation
Mr. Ryan Howell	Prairie Island Indian Community
Mr. Larry Balber	Red Cliff Band of Lake Superior Chippewa Indians

Mr. Marvin Defoe*	Red Cliff Band of Lake Superior Chippewa Indians
Mr. Gary Bahr	Sac and Fox Nation of Missouri in Kansas and Nebraska
Mr. Jonathan Buffalo	Sac and Fox of the Mississippi in Iowa
Ms. Sandra Massey	Sac and Fox Nation of Oklahoma
Mr. Chris MeGeshick	Sokaogon Chippewa Community/Mole Lake Band of Lake Superior Chippewa
Mr. Adam VanZile	Sokaogon Chippewa Community/Mole Lake Band of Lake Superior Chippewa
Mr. Cecil E. Pavlat, Sr.	Sault Ste. Marie Tribe of Chippewa Indians
Mr. Lewis Taylor	St. Croix Chippewa Indians of Wisconsin
Ms. Wanda McFaggen	St. Croix Chippewa Indians of Wisconsin
Ms. Bonnie Hartley	Stockbridge-Munsee Community Band of Mohican Indians
Ms. Sherry White	Stockbridge-Munsee Community of Wisconsin
Ms. Cayla Olson	White Earth Band of the Minnesota Chippewa

* New contact for Red Cliff Band - Gile Flowage Questionnaire Only

4.10.3.8 Tribal Representatives Consulted via FERC Letter

On October 9, 2018, the FERC sent two separate letters to the tribal representatives outlined in **Table 4.10.3.8-1**. The first letter was to invite them to participate in the relicensing process for the Superior Falls Project and the second letter was to invite them to participate in the relicensing process for the Saxon Falls Project (FERC, 2018b; FERC, 2018a).

On October 18, 2018, the Lac du Flambeau Band of Lake Superior Indians sent a letter to the FERC requesting a consultation meeting regarding the Superior Falls Project (Lac du Flambeau Band of Lake Superior Indians, 2018).

On November 8, 2018 the Miami Tribe of Oklahoma sent an email to the FERC accepting the invitation to participate in the relicensing process for the Saxon Falls Project (Miami Tribe of Oklahoma, 2018).

On November 9, 2018 the Keweenaw Bay Indian Community of Michigan sent a letter to the FERC accepting the invitation to participate in the relicensing process for the Saxon Falls Project (Keweenaw Bay Indian Community of Michigan, 2018).

On December 10, 2018, the FERC followed up the consultation letter with a telephone call to each Tribe and on January 30, 2019, followed up by email to determine if any Tribes would be interested in participating in consultation for the Saxon Falls Project.

On February 4, 2019, the Mille Lacs Band of Ojibwe emailed the FERC indicating the Tribe was not interested in the Saxon Falls Project area (FERC, 2019).

On February 11, 2019, the Keweenaw Bay Indian Community responded by email expressing an interest in holding a consultation meeting for both Projects. On February 15, 2019, the FERC followed up by telephone and on February 25, 2019, followed up by email to coordinate a consultation meeting (FERC, 2019).

Table 4.10.4-2: Tribal Representatives Invited by the FERC to Participate

Name	Organization
Ms. Edith Leoso	Bad River Band of the Lake Superior Tribe of Chippewa Indians
Mr. Michael Wiggins	Bad River Band of the Lake Superior Tribe of Chippewa Indians
Ms. Karen Driver	Fond du Lac Band of Minnesota Chippewa Tribe
Mr. Marcus Ammesmake	Fond du Lace Band of Minnesota Chippewa Tribe
Mr. Mark L. Azure	Fort Belknap Indian Community
Mr. Michael Blackwolf	Fort Belknap Indian Community
Kevin DuPuis	Grand Potage Band of Chippewa Indians
Mary Ann Gagnon	Grand Portage Band of Chippewa Indians
Mr. Gary Loosfoot	Keweenaw Bay Indian Community of Michigan
Mr. Warren C. Swartz, Sr.	Keweenaw Bay Indian Community of Michigan
Mr. Henry Butch St. Germain	Lac du Flambeau Band of Lake Superior Indians
Ms. Melinda Young	Lac du Flambeau Band of Lake Superior Chippewa
Ms. Giiwegiizhigookway Martin	Lac Vieux Desert Band of Lake Superior Chippewa Indians of Michigan
Mr. James Williams	Lac Vieux Desert Band of Lake Superior Chippewa Indians of Michigan
Ms. Amy Brunette	Leech Lake Band of Minnesota Chippewa Tribe
Ms. Carri Jones	Leech Lake Band of Minnesota Chippewa Tribe
Ms. Joan Delabreau	Menominee Indian Tribe of Wisconsin
Mr. David Grignon	Menominee Indian Tribe of Wisconsin
Ms. Diane Hunter	Miami Tribe of Oklahoma
Mr. Douglas Lankford	Miami Tribe of Oklahoma
Ms. Melanie Benjamin	Mille Lacs Band of Ojibwe
Ms. Natalie Weyaus	Mille Lacs Band of Ojibwe
Mr. Norman Deschampe	Minnesota Chippewa Tribe
Mr. Brian Bainbridge	Red Cliff Band of Lake Superior Chippewa Indians
Mr. Larry Balber	Red Cliff Band of Lake Superior Chippewa Indians
Mr. Chris MecGeshick	Sokaogon Chippewa Community of Wisconsin
Mr. Lewis Taylor	St. Croix Chippewa Indians of Wisconsin
Ms. Cayla Olson	White Earth Band of the Minnesota Chippewa Tribe
Ms. Erma Vizenor	White Earth Band of the Minnesota Chippewa Tribe

4.10.4 Programmatic Agreement

Standard archaeological and cultural resource concerns for Licensees to address during the FERC relicensing process are outlined in the pre-licensing procedure section of the *Programmatic Agreement among the Federal Energy Regulatory Commission; the Advisory Council on Historic Preservation (ACHP); 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,* executed in December 1993 (ACHP, 1993). The Programmatic Agreement also assigns Licensees the responsibility to ensure historic properties are considered in the continued operation and maintenance of hydroelectric facilities during the term of their federal licenses.

Based upon the information available herein and the requirements outlined in the Programmatic Agreement, if future operation continues to follow the requirements outlined in the Programmatic Agreement, it is unlikely the continued operation of either Project will have an adverse effect upon historic resources.

4.10.5 References

- Advisory Council on Historic Preservation (ACHP). 1993. Programmatic Agreement among the Federal Energy Regulatory Commission; the 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, executed in December 1993.
- Federal Energy Regulatory Commission. 2018a. Consultation with Tribes for the Superior Falls hydroelectric Project No. 2587. October 9, 2010.
- Federal Energy Regulatory Commission. 2018b. Consultation with Tribes for the Saxon Falls Hydroelectric Project No. 2610. October 9, 2018.
- Federal Energy Regulatory Commission. 2019. Telephone Memo: Consultation with Tribes for the Saxon Falls Hydroelectric Project No. 2610. February 25, 2019.
- Friends of the Gile Flowage. 2019. Brief History of the Gile Flowage. http://www.friendsofthegile.org/home/flowage-. Accessed September 12, 2019.
- Keweenaw Bay Indian Community of Michigan. 2018. Letter responding to the FERC Consultation with the Tribes for the Saxon Falls Hydroelectric Project N0. 2610. November 9, 2018.
- Lac du Flambeau Band of Chippewa Indians. 2108. Letter responding to the FERC consultation with the Tribes for the Superior Falls Project under P-2587. October 18, 2019.
- Loew, Patty. 2001. Indian Nations of Wisconsin-Histories Endurance and Renewal.
- Miami Tribe of Oklahoma. 2018. Comments from Miami Tribe of Oklahoma under P-2160 Saxon Falls Hydroelectric Project. November 8, 2018.
- Northern States Power Company, 2014. Saxon Falls Hydroelectric Project, FERC No 2610 Supporting Technical Information Document. March 13, 2014.
- Wisconsin Department of Public Instruction (WDPI). 2019. Tribal Nations of Wisconsin. https://dpi.wi.gov/amind/tribalnationswi. Accessed September 17, 2019.
- Wisconsin Historical Society - State Historic Preservation Office. Wisconsin Historic Preservation Database. Accessed September 17, 2019.

4.11 Socio-economic Resources (18 CFR § 5.6(d)(3)(xi))

This section outlines historical population patterns and employment information for the city of Hurley, Wisconsin; city of Ironwood, Michigan; Iron County, Wisconsin; and Gogebic County, Michigan.

4.11.1 Population and Housing Patterns

The 2010 populations for the city of Hurley, WI, city of Ironwood, MI, Iron County, WI and Gogebic County, MI were 1,547; 5,387; 5,916; and 16,427, respectively. The population density in Iron County is 7.8 people per square mile with a housing unit density of 7.9 housing units per square mile. The population density in Gogebic County is 14.9 people per square mile with a housing unit density of 9.8 housing units per square mile (US Census Bureau American Factfinder, 2010).

The population of the city of Hurley and the city of Ironwood declined from 2000 and 2010. From the 1970's through 2000, the population of Iron County was fairly stable and then began declining in 2010. The population of Gogebic County has shown a consistent population decline since the 1970s. Historical population information and population forecasts can be found in **Table 4.11.1-1** and **Table 4.11.1-2**, respectively (US Census Bureau American Factfinder, 2010; Population.US, 2019; Worldpopulationreview.com, 2019).

Table 4.11.1-1: Historical Population Data

Municipality	1970	1980	1990	2000*	2010*	Population Change 2000-2010
City of Hurley, WI	N/A	N/A	N/A	1,818	1,547	(-14.9%)
City of Ironwood, MI	N/A	N/A	N/A	6,293	5,387	(-14.4%)
Iron County, WI	6,533	6,733	6,153	6,861	5,916	(-13.8%)
Gogebic County, MI	20,676	19,686	18,052	17,730	16,427	(-7.3%)

Source: *US Census Bureau; Population.US, 2019; worldpopulationreivew.com, 2019

Table 4.11.1-2: Population Forecast Data

Year	2010-Census	2020	2030	2040
City of Hurley, WI	1,547	1,505*	1,464*	1,424*
City of Ironwood, MI	5,387	4,563**	4,390**	4,188**
Iron County, WI	5,916	5,756*	5,601*	5,450*
Gogebic County, MI	16,427	13,914	13,384	12,758

Source: U.S. Census Bureau, WDOA 2013, and MBLMISI, 2019

* Calculated using WDOA growth estimate; ** Calculated using MBLMISI Growth Estimates

The Wisconsin Department of Administration projects an 8% population decrease in Iron County from 5,916 to 5,450 between 2010 to 2040. When using the same population growth rate for the city of Hurley, the projected population decrease is anticipated to drop from 1,547 to 1,424 (WDOA, 2013).

The Michigan Bureau of Labor Market Information and Strategic Initiatives (MBLMISI) projects a population decrease of 22% between 2010 and 2040 for Gogebic County, which will result in the

population decreasing from 16,427 to 12,758. When using the same population growth rate for the city of Ironwood, the projected population decrease anticipated to drop from 5,916 to 4,188 (MBLMISI, 2019).

4.11.2 Economic Patterns

The city of Ironwood's employment trend follows the same trend as Iron and Gogebic Counties. No data was available for the city of Hurley. Employment sectors, from largest to smallest, for the city of Ironwood, Iron County, and Gogebic County are educational services, health care, social assistance, and manufacturing. These sectors have historically been the largest employers in the area.

Employment status based on industry sector, estimated number of jobs, and percentage of jobs is summarized in **Table 4.11.2-1**, **Table 4.11.2-2**, and **Table 4.11.2-3** for the city of Ironwood, Iron County, and Gogebic County, respectively.

Table 4.11.2.1-1: Employment Status, City of Ironwood, Michigan

Industry Sector	Estimated # of Jobs	% Jobs
Civilian employed population 16 years and over	2,234	-
Agriculture, forestry, fishing, hunting, and mining	112	5%
Construction	110	5%
Manufacturing	391	18%
Wholesale trade	48	2%
Retail trade	325	15%
Transportation, warehousing, and utilities	52	2%
Information	22	1%
Finance and insurance, real estate, rental, and leasing	76	3%
Professional, scientific, and management; administrative; and waste management services	101	5%
Educational services, health care, and social assistance	410	18%
Arts, entertainment, recreation, accommodation, and food services	364	16%
Other services, except public administration	79	4%
Public administration	144	6%

Source: U.S. Census Bureau, 2017 American Community Survey

Table 4.11.2.1-2: Employment Status, Iron County, Wisconsin

Industry Sector	Estimated # of Jobs	% Jobs
Civilian employed population 16 years and over	2,536	-
Agriculture, forestry, fishing, hunting, and mining	98	4%
Construction	187	7%
Manufacturing	333	13%
Wholesale trade	67	3%
Retail trade	234	9%
Transportation, warehousing, and utilities	100	4%
Information	49	2%
Finance and insurance, real estate, rental, and leasing	119	5%
Professional, scientific, and management; administrative; and waste management services	159	6%
Educational services, health care, and social assistance	578	23%
Arts, entertainment, recreation, accommodation, and food services	308	12%
Other services, except public administration	123	5%
Public administration	181	7%

Source: U.S. Census Bureau, 2017 American Community Survey

Table 4.11.2.1-3: Employment Status, Gogebic County, Michigan

Industry Sector	Estimated # of Jobs	% Jobs
Civilian employed population 16 years and over	5,968	-
Agriculture, forestry, fishing, hunting, and mining	280	5%
Construction	374	5%
Manufacturing	920	15%
Wholesale trade	112	2%
Retail trade	667	11%
Transportation, warehousing, and utilities	211	4%
Information	57	1%
Finance and insurance, real estate, rental, and leasing	195	3%
Professional, scientific, and management; administrative; and waste management services	304	5%
Educational services, health care, and social assistance	1,342	22%
Arts, entertainment, recreation, accommodation, and food services	792	13%
Other services, except public administration	253	4%
Public administration	461	8%

Source: U.S. Census Bureau, 2017 American Community Survey; *Does not add to 100% due to rounding

The city of Ironwood, Iron County, and Gogebic County all have a strong economic base in the educational services, health care, and social assistance sectors, followed by the manufacturing sector and the arts, entertainment, recreation, accommodation, and food services sector. The city of Ironwood and Gogebic County have seen a slight increase in the number of jobs in the manufacturing sector and the arts, entertainment recreation, accommodation, and food services sector; and a decrease in the number of jobs in the education services, health care, and social assistance sector. Iron County has seen a decrease in the number of jobs in all these sectors (US Census Bureau American Factfinder, 2017).

Northern States Power Company is not proposing any new facilities or changes to the current operation of either the Saxon Falls Project, Gile Flowage, and Superior Falls Project. As such, continued operation of each is not expected to adversely impact the socioeconomic resources in the area.

4.11.3 References

- Michigan Bureau of Labor Market Information and Strategic Initiatives. 2019. Population Projections. https://milmi.org/DataSearch/POPPROJ. Accessed September 4, 2019.
- Population.us. 2019.Population of Gogebic County. https://population.us/county/mi/gogebic-county/. Accessed September 4, 2019.
- Wisconsin Department of Administration (WDOA) Demographic Services Center. 2013. Wisconsin's Future Population Projections for the State, Its Counties and Municipalities, 2010 to 2040.
- Worldpopulationreview.com.2019. Iron County Wisconsin Population 2019. http://worldpopulationreview.com/us-counties/wi/iron-county-population/. Accessed September 4, 2019.
- US Census Bureau, American Factfinder. 2000. Profile of General Demographic Characteristics: 2000 Census 2000 Summary File 1. https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=CF. Accessed September 3, 2019.
- US Census Bureau, American Factfinder. 2010. General Population and Housing Characteristics: 2010 Demographic Profile Data 010 Demographic Profile Data https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=. Accessed September 3, 2019.
- U.S. Census Bureau, American Factfinder. 2017. American Community Survey-Selected Economic Characteristics. https://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml. Accessed September 3, 2019.

5. Preliminary Issues and Studies List (18 CFR § 5.6(d)(4))

The PAD must include a list of issues pertaining to the identified resources outlined in Section 4, potential studies, or information gathering requirements associated with the identified issues, relevant qualified federal and state or Tribal comprehensive waterway plans, and relevant resource management plans.

5.1 Known or Potential Negative Impacts to the Identified Resources

For the purposes of this relicensing process, potential negative impacts are new impacts to the resources that are documented to occur, believed to be occurring, or believed will occur because of the continued operation of each Project through a successful relicensing.

5.1.1 Geology and Soils

5.1.1.1 Saxon Falls Project

EGLE identified bank erosion as a potential issue in their response to the Saxon Falls Project questionnaire. The entire shoreline of the Saxon Fall Project is located on lands owned by the Licensee. The shorelines are managed in a natural condition. Shoreline surveys are routinely conducted to identify shoreline erosion at the Saxon Falls Project. The 2003 inspection identified six erosion sites encompassing a total of 75 linear feet of shoreline (Xcel Energy, 2004). A follow up survey in 2008 indicated that all six of the previously identified sites were healing and showed signs of natural revegetation. The 2008 survey identified four new erosion sites encompassing 45 linear feet of shoreline, which were all located upstream of the Project boundary (Xcel Energy, 2008). There is no evidence that erosion is a current concern at the Project.

In addition, Iron County, Wisconsin and Gogebic County, Michigan have existing regulations that limit ground disturbance in shoreline areas. The requirements outlined in the regulations will help reduce the potential for future shoreline erosion in the Project boundary.

5.1.1.2 Gile Flowage

EGLE, the Friends of the Gile, and the MDNR identified bank/shoreline erosion as a potential issue in their response to the Gile Flowage questionnaire. Approximately 90% of the Gile Flowage shoreline is owned by Northern States Power Company or local governments. Of that 90%, that portion of the shoreline not located within existing public recreational facilities are maintained in a natural state where development is not permitted.

In addition, Iron County, Wisconsin has existing shoreline regulations that limit ground disturbance in shoreline areas. The requirements outlined in the regulations will help reduce the potential for future shoreline erosion on the Gile Flowage.

5.1.1.3 Superior Falls Project

EGLE identified bank erosion as a potential issue in their response to the Superior Falls Project questionnaire. The entire shoreline of the Superior Falls Project is located on lands owned by the Licensee. The shorelines are maintained in a natural condition. There is no current information that erosion is a current concern at the Project.

In addition, Iron County, Wisconsin and Gogebic County, Michigan have existing regulations that limit ground disturbance in shoreline areas. The requirements outlined in the regulations will reduce the potential for future shoreline erosion in the Project boundary.

5.1.2 Water Resources

5.1.2.1 Saxon Falls Project

Water resources issues identified from responses to the Saxon Falls Project questionnaire include:

- EGLE identified DO and temperature concerns as potential water resource issues.
- MDNR identified run-of-river compliance and the adequacy of minimum flows for aquatic habitat as potential water resource issues.
- River Alliance of Wisconsin (RAW) identified minimum flow adequacy for aquatic habitat as a potential water resource issue.

There are no planned changes to operations, reservoir levels, or minimum flows that would cause adverse impacts to water resources at the Saxon Falls Project.

5.1.2.2 Gile Flowage

Water resources issues identified from responses to the Gile Flowage questionnaire include:

- EGLE identified DO and temperature concerns as potential water resource issues.
- MDNR identified drawdown timing, rate, frequency, and downstream flows as potential water resource issues.
- RAW identified minimum flow adequacy for aquatic habitat as a potential water resource issue.

There are no planned changes to operations, reservoir levels, or minimum flows that would cause adverse impacts to water resources at Gile Flowage.

5.1.2.3 Superior Falls Project

Water resources issues identified from responses to the Superior Falls Project questionnaire include:

- EGLE identified DO and temperature concerns as potential water resource issues.
- MDNR identified run-of-river compliance and the adequacy of minimum flows for aquatic habitat as potential water resource issues.
- RAW identified minimum flow adequacy for aquatic habitat as a potential water resource issue.

There are no planned changes to operations, reservoir levels, or minimum flows that would cause adverse impacts to water resources at the Superior Falls Project.

5.1.3 Fish and Aquatic Resources

5.1.3.1 Saxon Falls Project

Fish and aquatic resource issues identified from responses to the Saxon Falls Project questionnaire include:

- EGLE identified Polychlorinated biphenyl (PCB) in fish and sediments as a potential fish and aquatic resource issue.
- MDNR identified run-of-river compliance, adequacy of minimum flows, continuous gaging needs to verify headwater elevations and downstream flows, and fish entrainment and mortality as potential fish and aquatic resource issues.
- RAW identified the adequacy of minimum flows for fish and aquatic life, the need for mussel information, and fish entrainment and mortality as potential fish and aquatic resource issues.

There are no planned changes to operations, reservoir levels, or minimum flows that would cause adverse impacts to water resources.

5.1.3.2 Gile Flowage

Fish and aquatic resource issues identified from responses to the Gile Flowage questionnaire include:

- EGLE identified PCBs in fish and sediments as a potential fish and aquatic resource issue.
- Iron County and Friends of the Gile identified the presence of the spiny water flea within the Gile Flowage and the downstream West Fork of the Montreal River as a potential fish and aquatic resource issue.
- MDNR identified drawdown timing, rate, frequency, and downstream flows as potential fish and aquatic resource issues.
- RAW identified the adequacy of minimum flows for fish and aquatic life and the need for mussel information as potential fish and aquatic resource issues.

There are no planned changes to operations, water levels, or flows that would cause new impacts to water resources.

5.1.3.3 Superior Falls Project

Fish and aquatic resource issues identified from responses to the Superior Falls Project questionnaire include:

- EGLE identified PCBs in fish and sediments as a potential fish and aquatic resource issue.
- MDNR identified run-of-river compliance, adequacy of minimum flows, continuous gaging needs to verify headwater elevations and downstream flows, and fish entrainment and mortality as potential fish and aquatic resource issues.
- RAW identified the adequacy of minimum flows for fish and aquatic life, the need for mussel information, and fish entrainment and mortality as potential fish and aquatic resource issues.

There are no planned changes to operations, reservoir levels, or minimum flows that would cause adverse impacts to fish and aquatic resources.

5.1.4 Terrestrial Wildlife and Botanical Resources

5.1.4.1 Saxon Falls Project

No terrestrial wildlife or botanical resources issues were identified through the Saxon Falls Project questionnaire. There is no proposed construction that would impact terrestrial wildlife or botanical resources.

5.1.4.2 Gile Flowage

No terrestrial wildlife or botanical resources issues were identified through the Gile Flowage questionnaire. There is no proposed construction that would impact terrestrial wildlife or botanical resources.

5.1.4.3 Superior Falls Project

No terrestrial wildlife or botanical resources issues were identified through the Superior Falls Project questionnaire. There is no proposed construction that would impact terrestrial wildlife or botanical resources.

5.1.5 Wetlands, Riparian, and Littoral Habitat

5.1.5.1 Saxon Falls Project

RAW identified the need to retain all existing wetlands within the Saxon Falls Project boundary as a potential concern. There are no planned changes to operation, reservoir levels, or minimum flows that would cause adverse impacts wetlands, riparian, and littoral habitat.

5.1.5.2 Gile Flowage

Iron County and the Friends of the Gile identified the presence of the spiny water flea within the Gile Flowage and in the West Fork of the Montreal River as a potential littoral habitat issue. There are no planned changes to operation, reservoir levels, or minimum flows that would cause adverse impacts wetlands, riparian, and littoral habitat.

5.1.5.3 Superior Falls Project

RAW identified the need to retain all existing wetlands within the Superior Falls Project boundary as a potential issue in its questionnaire response. There are no planned changes to operation, reservoir levels, or minimum flows that would cause adverse impacts wetlands, riparian, and littoral habitat.

5.1.6 Critical Habitat and Threatened and Endangered Species

5.1.6.1 Saxon Falls Project

Several state-listed and federal-listed species were identified in the Saxon Falls Project vicinity. The Licensee will need to consult with the USFWS, MDNR, and WDNR to determine potential impacts to threatened and endangered species from Project operation. No specific issues were identified through the questionnaire.

5.1.6.2 Gile Flowage

Several state-listed and federal-listed species were identified in the vicinity of the Gile Flowage. The Licensee will need to consult with the USFWS and WDNR to determine potential impacts to

threatened and endangered species from Project operation. No specific issues were identified through the questionnaire.

5.1.6.3 Superior Falls Project

Several state-listed and federal-listed species were identified in the Superior Falls Project vicinity. The Licensee will need to consult with the USFWS, MDNR, and WDNR to determine potential impacts to threatened and endangered species from Project operation. No specific issues were identified through the questionnaire.

5.1.7 Recreation and Land Use

5.1.7.1 Saxon Falls Project

Recreation and land use resource issues identified from responses to the Saxon Falls Project questionnaire include:

- MDNR identified the need to inventory and assess recreation facilities and use, the need for real time flow gages to benefit paddlers, and the need to assess land use practices for resource protection as potential recreation and land use issues.
- NPS identified the need to inventory and assess recreation facilities and use, as well as recreation flow releases as potential recreation and land use issues.
- RAW identified the need to keep all existing lands within the Project boundary, the need to assess recreation facilities and use, and the potential for recreation flow releases as potential recreation and land use issues.

The Licensee is proposing to formalize the existing Saxon Falls Scenic Overlook on the Wisconsin side of the Montreal River as a formal recreation site to provide a safe location to observe the Saxon Falls waterfall. Form 80 surveys (**Appendix 5.1.7.1-1**) indicate existing facilities are utilized significantly below capacity. No new recreation facilities or improvements are being proposed.

5.1.7.2 Gile Flowage

Recreation and land use resource issues identified from responses to the Gile Flowage questionnaire include:

- Friends of the Gile identified increased public use and the need to maintain the shoreline buffer zone as potential recreation and land use issues.
- MDNR identified the need to inventory and assess recreation facilities and use, the need for real time flow gages to benefit paddlers, and the need to assess land use practices for resource protection as potential recreation and land use issues.
- NPS identified the need to inventory and assess recreation facilities and use, as wells as the potential for recreation flow releases as potential recreation and land use issues.
- RAW identified the need to keep all existing lands within the Gile Flowage boundary, the need to assess recreation facilities and use, and the potential for recreation flow releases as potential recreation and land use issues.

Recreation within the vicinity of the Gile Flowage is dominated by Iron County and town of Pence parks, which are regularly monitored and maintained by county and town staff. Since the sites are

regularly monitored for recreational use and there is no information indicating a need to increase capacity, the Licensee is not proposing any recreational improvements.

5.1.7.3 Superior Falls Project

Recreation and land use resource issues identified from responses to the Superior Falls Project questionnaire responses include:

- MDNR identified the need to inventory and assess recreation facilities and use, the need for real time flow gages to benefit paddlers, and the need to assess land use practices for resource protection as potential recreation and land use issues.
- The National Park Service (NPS) identified the need to inventory and assess recreation facilities and use, as well as recreation flow releases as potential recreation and land use issues.
- RAW identified the need to keep all existing lands within the Project boundary, the need to assess recreation facilities and use, and the potential for recreation flow releases as potential recreation and land use issues.

The most-recent Form 80 surveys (see **Appendix 5.1.7.3-1**) indicate that utilization of existing facilities is significantly below capacity. No new recreation facilities are being proposed since there is sufficient access to the Project.

5.1.8 Aesthetic Resources

5.1.8.1 Saxon Falls Project

MDNR identified the need to evaluate the impact of minimum flows and land use practice on aesthetics at the Saxon Falls Project. The licensee maintains the shoreline in a natural condition and releases flows into the bypass reach in order to maintain aesthetics. There are no proposed operational, reservoir level, minimum flow, or land use changes that would impact aesthetic resources.

5.1.8.2 Gile Flowage

Aesthetic resource issues identified from responses to the Gile Flowage questionnaire include:

- Friends of the Gile identified loss of “wilderness character” as a potential aesthetic resource issue.
- MDNR identified the need to evaluate land use practice impacts on aesthetics as a potential aesthetic resource issue.

Northern States Power Company maintains the Gile Flowage shoreline in a natural condition and releases a continuous minimum flow to the West Fork of the Montreal River to maintain aesthetics. There are no proposed operational, reservoir level, minimum flow, or land use changes that would cause adverse impacts to aesthetic resources.

5.1.8.3 Superior Falls Project

MDNR identified the need to evaluate the impact of minimum flows and land use practices on aesthetics at the Superior Falls Project. The licensee maintains shorelines in a natural condition and releases flows into the bypass reach in order to maintain aesthetics. There are no proposed operational, reservoir level, minimum flow, or land use changes that would adversely impact aesthetic resources.

5.1.9 Cultural and Tribal Resources

5.1.9.1 Saxon Falls Project

The Saxon Falls Hydroelectric Dam is over 50 years old and was determined ineligible for the NRHP in 1998.

5.1.9.2 Gile flowage

The Gile Flowage dam is over 50 years old and its NRHP eligibility has not been evaluated.

5.1.9.3 Superior Falls Project

The Superior Falls Project, which is over 50 years old, was evaluated in 1989 and determined ineligible for inclusion in the NRHP.

5.1.10 Socio-Economic Resources

5.1.10.1 Saxon Falls Project

No socio-economic resource issues were identified through the questionnaire.

5.1.10.2 Gile Flowage

Friends of the Gile identified the increased recreational use of the Gile Flowage bringing new economic development and tourism opportunities as a potential socio-economic resource issue. Northern States Power Company is not proposing any changes to the operations, reservoir levels or minimum flows, that would cause adverse impacts to socio-economic resources.

5.1.10.3 Superior Falls Project

No socio-economic resource issues were identified through the questionnaire.

5.1.11 References

- Xcel Energy. 2004. Five-Year Reservoir Shoreline Surveys for Eroding Archaeological Sites. January 9, 2004.
- Xcel Energy, 2008. Results of 2008 Erosion Survey of Saxon Falls Flowage (FERC Project # 2610). November 13, 2008.

5.2 Potential Studies or Information Gathering

This section identifies potential studies or information gathering that may be needed to analyze the preliminary resource issues identified in Section 5.1. In accordance with 18 CFR § 16.8(b)(5), within 60 days of the Joint Agency Meeting, each interested resource agency, Indian tribe, and member of the public must provide any and all study requests to the Licensee, as described in Section 2.1.

All study requests must comply with the following criteria:

- Identify its determination of necessary studies to be performed or the information to be provided by the potential applicant.
- Identify the basis for its determination.
- Discuss its understanding of resource issues and its goals and objectives for these resources.
- Explain why each recommended study methodology is more appropriate than any other available methodology alternatives, including those identified by the potential applicant.
- Document each recommended study methodology is a generally accepted practice.
- Explain how the requested studies and information will be useful to the agency, Indian tribe, or member of the public in furthering its resource goals and objectives that are affected by the proposed project.

The following Sections identify potential studies and information gathering that may be needed to analyze the resource issues identified in Section 5.1.

5.2.1 Geology and Soils

5.2.1.1 Saxon Falls Project

The Licensee is not proposing any studies specific to geologic or soil resources. In Section 5.2.9, the Licensee is proposing a shoreline survey of the reservoir within the Saxon Falls Project boundary to search for previously unidentified archaeological sites along currently eroding shoreline areas. As a result, currently eroding shoreline areas will be identified as part of that study.

5.2.1.2 Gile Flowage

The Licensee is not proposing any studies specific to geologic or soil resources. In Section 5.2.9, the Licensee is proposing a shoreline survey of the Gile Flowage to search for previously unidentified archaeological sites along currently eroding shoreline areas. As a result, currently eroding shoreline areas will be identified as part of that study.

5.2.1.3 Superior Falls Project

The Licensee is not proposing any studies specific to geologic or soil resources. In Section 5.2.9, the Licensee is proposing a shoreline survey of the reservoir within the Superior Falls Project boundary to search for previously unidentified archaeological sites along currently eroding shoreline areas. As a result, currently eroding shoreline areas will be identified as part of that study.

5.2.2 Water Resources

5.2.2.1 Saxon Falls Project

The Licensee is not proposing any studies specific to water resources.

5.2.2.2 Gile Flowage

The Licensee is not proposing any studies specific to water resources.

5.2.2.3 Superior Falls Project

The Licensee is not proposing any studies specific to water resources

5.2.3 Fish and Aquatic Resources

5.2.3.1 Saxon Falls Project

The Licensee is not proposing any studies specific to fish and aquatic resources.

5.2.3.2 Gile Flowage

The Licensee is not proposing any studies specific to fish and aquatic resources.

5.2.3.3 Superior Falls Project

The Licensee is not proposing any studies specific to fish and aquatic resources.

5.2.4 Terrestrial Wildlife and Botanical Resources

5.2.4.1 Saxon Falls Project

The Licensee is not proposing any studies specific to terrestrial wildlife and botanical resources.

5.2.4.2 Gile Flowage

The Licensee is not proposing any studies specific to terrestrial wildlife and botanical resources.

5.2.4.3 Superior Falls Project

The Licensee is not proposing any studies specific to terrestrial wildlife and botanical resources.

5.2.5 Wetlands, Riparian, and Littoral Habitat

5.2.5.1 Saxon Falls Project

The Licensee is not proposing any studies specific to wetlands, riparian, and littoral habitat.

5.2.5.2 Gile Flowage

The Licensee is not proposing any studies specific to wetlands, riparian, and littoral habitat.

5.2.5.3 Superior Falls Project

The Licensee is not proposing any studies specific to wetlands, riparian, and littoral habitat.

5.2.6 Critical Habitat and Threatened and Endangered Species

5.2.6.1 Saxon Falls Project

Should the consultation process outlined in Section 5.1.6 not identify any adverse effects from Saxon Falls Project operations, more specifically to either critical habitat or threatened or endangered species, the Licensee will not propose any studies. However, maintenance activities involving work on any Project structure or removal of trees within the Project boundary could impact unknown critical habitat for the NLEB or the species themselves. Instead of completing a study to determine their presence or absence, the Licensee proposes to implement the requirements outlined in the § 4(d) rule for the protected bat species throughout the term of the license to assure the NLEB is not adversely impacted by Project operations. These requirements, in addition to consulting with the USFWS prior to removing any bats that are not posing an immediate threat to project structures, shall provide for the necessary protection of the NLEB.

5.2.6.2 Gile Flowage

Should the consultation process outlined in Section 5.1.6 not identify any adverse effects from operations at Gile Flowage, more specifically to either critical habitat or threatened or endangered species, the Licensee will not propose any studies. However, maintenance activities involving work on any Project structure or removal of trees within the Project boundary could impact unknown critical habitat for the NLEB or the species themselves. Instead of completing a study to determine their presence or absence, the Licensee proposes to implement the requirements outlined in the § 4(d) rule for the protected bat species throughout the term of the license to assure the NLEB is not adversely impacted by facility operations. These requirements, in addition to consulting with the USFWS prior to removing any bats that are not posing an immediate threat to project structures, shall provide for the necessary protection of the NLEB.

5.2.6.3 Superior Falls Project

Should the consultation process outlined in Section 5.1.6 not identify any adverse effects from Superior Falls Project operations, more specifically to either critical habitat or threatened or endangered species, the Licensee will not propose any studies. However, maintenance activities involving work on any Project structure or removal of trees within the Project boundary could impact any unknown critical habitat for the NLEB or the species themselves. Instead of completing a study to determine their presence or absence, the Licensee proposes to implement the requirements outlined in the § 4(d) rule for the protected bat species throughout the term of the license to assure the NLEB is not adversely impacted by Project operations. These requirements, in addition to consulting with the USFWS prior to removing any bats that are not posing an immediate threat to project structures, shall provide for the necessary protection of the NLEB.

5.2.7 Recreation and Land Use

5.2.7.1 Saxon Falls Project

Form 80 surveys completed by the Licensee showed that all monitored recreation facilities were utilized significantly below their capacity (**Appendix 5.1.7.1-1**). Since the sites are regularly monitored for recreational use and are used below their capacity, the Licensee is not proposing any studies specific to recreation or land use.

5.2.7.2 Gile Flowage

Recreation within the vicinity of the Gile Flowage is dominated by Iron County and town of Pence parks, which are regularly monitored by county and town staff. Since the sites are regularly monitored for recreational use and there is no information indicating that there is a need to increase their capacity, the Licensee is not proposing any studies specific to recreation or land use.

5.2.7.3 Superior Falls Project

Form 80 surveys completed by the Licensee showed that all monitored recreation facilities were utilized significantly below their capacity (**Appendix 5.1.7.3-1**). Since the sites are regularly monitored for recreational use and are used below their capacity, the Licensee is not proposing any studies specific to recreation or land use.

5.2.8 Aesthetic Resources

5.2.8.1 Saxon Falls Project

The Licensee is not proposing any studies specific to aesthetic resources.

5.2.8.2 Gile Flowage

The Licensee is not proposing any studies specific to aesthetic resources.

5.2.8.3 Superior Falls Project

There is an existing Visual Resources Protection Plan. Therefore, the Licensee is not proposing any studies specific to aesthetic resources.

5.2.9 Historical and Cultural Resources

5.2.9.1 Saxon Falls Project

The Saxon Falls Project Hydroelectric Dam is over 50 years old and is part of the Proposed Saxon Falls Hydroelectric Dam Historic District. The Project was evaluated in 1988 and determined ineligible for inclusion in the NRHP. A shoreline survey will be completed by a qualified archaeologist according to the requirements of the Programmatic Agreement[9].

5.2.9.2 Gile Flowage

The Licensee is not proposing any studies specific to historic and cultural resources.

5.2.9.3 Superior Falls Project

The Superior Falls Project site was evaluated in 1989 and determined ineligible for inclusion in the NRHP. No further evaluation of the site is planned as part of the relicensing process. A shoreline survey will be completed by a qualified archaeologist according to the requirements of the Programmatic Agreement.

[9] Standard concerns for Licensees to address during the relicensing process are outlined in the pre-licensing procedure section of the Programmatic Agreement among the Federal Energy Regulatory Commission; the 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, executed in December 1993.

5.2.10 Socio-Economic Resources

5.2.10.1 Saxon Falls Project

The Licensee is not proposing any studies specific to socio-economic resources.

5.2.10.2 Gile Flowage

The Licensee is not proposing any studies specific to socio-economic resources.

5.2.10.3 Superior Falls Project

The Licensee is not proposing any studies specific to socio-economic resources.

5.2.11 Tribal Resources

5.2.11.1 Saxon Falls Project

Northern States Power Company will continue to provide process documentation to tribal stakeholders and address, as necessary, any concerns they may have. The Licensee is not proposing any studies related to tribal resources.

5.2.11.2 Gile Flowage

Northern States Power Company will continue to provide process documentation to tribal stakeholders and address, as necessary, any concerns they may have. The Licensee is not proposing any studies related to tribal resources.

5.2.11.3 Superior Falls Project

Northern States Power Company will continue to provide process documentation to tribal stakeholders and address, as necessary, any concerns they may have. The Licensee is not proposing any studies related to tribal resources.

5.3 Mitigation Enhancement

5.3.1 Saxon Falls Project

The Licensee is proposing the following mitigation and enhancement measures at the Project:

- Continue to operate the Project in a run-of-river mode so that flows measured immediately downstream of the tailrace approximate the sum of inflows to the reservoir the project.
- Continue to maintain a minimum flow of 5 cfs, or inflow, whichever is less, into the bypass reach of the Montreal River between ice-out through October 31 each year to protect aquatic and aesthetic resources in the River.
- Continue to operate the Project to minimize reservoir fluctuations by maintaining a minimum reservoir surface elevation of 997.0 from ice-out to June 1 and maintaining reservoir surface elevations between 996.5 feet and 997.0 feet the rest of the year.
- If a drawdown of the reservoir is needed, the Licensee will continue to limit the drawdown rate to a maximum of 1 foot per 24 hours for the first 2 feet the reservoir is drawn down and 0.5 feet per 24 hours thereafter.
- The Licensee is proposing to formalize the existing Saxon Falls Scenic Overlook as a FERC-approved recreation site on the Wisconsin side of the Montreal River to provide a safe location for the public to observe the Saxon Falls Waterfall.

The Saxon Falls Project has operated since 1912. The existing information available for the Project does not identify any significant concerns or adverse effects upon the resources from the current Project operation. Additionally, no changes to Project operation are proposed. As a result, the Licensee does not propose any additional protection, mitigation, or enhancement measures for the purposes of this relicensing process.

5.3.2 Gile Flowage

The Licensee is proposing the following mitigation and enhancement measures at the Gile Flowage:

- Continue to maintain a minimum flow of 10 cfs, or inflow, whichever is less, into the West Fork of the Montreal River to protect aquatic resources.
- Continue to maintain reservoir elevation of the Gile Flowage between a minimum elevation of 1475.0 feet and a maximum elevation of 1490.0 feet.

The Gile Flowage Dam has operated since 1940. The existing information available does not identify any significant concerns or adverse effects upon the resources from the current operation. Additionally, no changes to the existing operation are proposed. As a result, the Licensee does not propose any additional protection, mitigation, or enhancement measures for the purposes of this relicensing process.

5.3.3 Superior Falls Project

The Licensee is proposing the following mitigation and enhancement measures at the Project:

- Continue to operate the Project in a run-of-river mode so that flows measured immediately downstream of the tailrace approximate the sum of inflows to the Project reservoir.
- Continue to operate the Project to minimize reservoir fluctuations by maintaining a minimum reservoir elevation of 739.7 feet.
- Continue to maintain a minimum flow of 8 cfs into the bypass reach from the Saturday before Memorial Day to October 15 and a minimum flow of 20 cfs between 8 am and 8 pm on weekends and holidays during the same timeframe to protect aquatic and aesthetic resources in the river.
- If a drawdown of the reservoir is needed, the Licensee will continue to limit the drawdown rate to a maximum of 1 foot per 24 hours for the first 2 feet the reservoir is drawn down and 0.5 feet per 24 hours thereafter.

The Superior Falls Project has operated since 1917. The existing information available for the Project does not identify any significant concerns or adverse effects upon the resources from the current Project operation. Additionally, no changes to Project operation are proposed. As a result, the Licensee does not propose any additional protection, mitigation, or enhancement measures for the purposes of this relicensing process.

5.4 Federal, State, or Tribal Comprehensive Waterway Plans

Section 10(a)(2) of the Federal Power Act requires the FERC to consider the extent to which a project is consistent with existing federal or state comprehensive plans, as defined in § 2.19 under Part 2 of Chapter 1, Title 18, Code of Federal Regulations. According to FERC Order No. 481-A, issued on April 27, 1998 which revised Order No. 481, issued on October 26, 1997, the FERC will provide comprehensive

plan status to any federal or state plan that is a comprehensive study of one or more beneficial uses of a waterway(s), specifies standards, data and methodology used, and is filed with the FERC Secretary.

A current listing of FERC-approved comprehensive plans that may be applicable to relicensing the Saxon Falls and Superior Falls Projects is presented below. If an updated version of a plan is available, the updated plan is listed (FERC, 2019).

- Michigan Department of Environmental Quality. Non-indigenous aquatic nuisance species, State management plan: A strategy to control their spread in Michigan. 1996.
- Michigan Department of Natural Resources, Statewide Comprehensive Outdoor Recreation Plan (SCORP) for 2018 to 2022. 2017.
- National Park Service, The Nationwide Rivers Inventory. U.S. Department of the Interior. 1993.
- U.S. Fish & Wildlife Service, Canadian Wildlife Service. North American Waterfowl Management Plan. 2012.
- U.S. Fish & Wildlife Service, Upper Mississippi River & Great Lakes Region joint venture implementation plan: A component of the North American waterfowl management plan. 1998.
- U.S. Fish & Wildlife Service, Fisheries USA: The Recreational Fisheries Policy of the U.S. Fish & Wildlife Service. No date.
- Wisconsin Coastal Management Program. Montreal River Canyon: a management plan. Saxon, Wisconsin. No date.
- Wisconsin Department of Natural Resources, Lake Superior Basin area wide water quality management plan. 1979.
- Wisconsin Department of Natural Resources, Statewide Comprehensive Outdoor Recreation Plan (SCORP) for 2019-2023. 2019.
- Wisconsin Department of Natural Resources, Wisconsin Water Quality Assessment Report to Congress. 2018.
- Wisconsin Department of Natural Resources, Wisconsin's Biodiversity as a Management Issue. 1995.
- Wisconsin Department of Natural Resources, Wisconsin's forestry best management practices for water quality. 1995.

5.5 Relevant Resource Management Plans

In addition to the plans listed in Section 5.4, other resource management plans have been developed by other entities to provide guidance with managing specific resources. The plans listed below are believed to be relevant to the Projects.

- Gogebic County. Gogebic County 2018-2022 Recreation Plan. 2018.
- Iron County. Iron County Comprehensive Plan. 2005
- Iron County. Iron County Outdoor Recreation Plan 2016-2020. 2016.
- Town of Carey. Town of Carey Comprehensive Plan. 2005.
- Town of Pence. Town of Pence Comprehensive Plan. 2005.
- Town of Saxon. Town of Saxon Comprehensive Plan. 2005.
- Wisconsin Department of Natural Resources, Wisconsin’s Wildlife Action Plan (2015-2025). 2016.

5.6 References

- Federal Energy Regulatory Commission. May 2019. List of Comprehensive Plans.

6. Consultation in preparation of the PAD (18 CFR § 5.6(d)(5))

Northern States Power Company began consultation in preparation of the PAD by developing a questionnaire with a fact sheet and providing it to pertinent stakeholders included on the FERC Mailing List and Service List for the Saxon Falls Project and Superior Falls Project and any other entities thought to be potential stakeholders. The information was sent via postal mail service on February 22, 2019. A second questionnaire requesting information regarding the Gile Flowage was sent on September 20, 2019. A copy of the questionnaires, fact sheets, and stakeholder lists is enclosed in **Appendix 6-1.**

Northern States Power Company received several written responses to the questionnaires. A summary of the comments is provided below. The information contained in the responses is incorporated into the PAD as appropriate. Responses are also included in **Appendix 6-1**.

- Charter Township of Ironwood, MI responded to the Saxon Falls and Superior Falls questionnaire indicating they did not know if they would participate in the relicensing process at this time, did not have any pertinent information, and did not have concerns with the use of the TLP.

- The Environmental Protection Agency provided information sources and indicated they would participate in the relicensing process.

- The EGLE responded to the Gile Flowage questionnaire indicating they intend to participate in the relicensing process, had pertinent information available, and had concerns with the use of the TLP. In a follow-up email, EGLE indicated they support use of the TLP. EGLE indicated they had information regarding water resources; fish and aquatic resources; wildlife and botanical resources; wetlands, riparian, and littoral habitat; recreation, and land use. EGLE identified DO, temperature, and PCBs in fish as water quality concerns.

  EGLE recommended the following studies for both Projects:
  - DO and water temperature monitoring
  - Fish sampling
  - Sediment sampling

- Friends of the Gile Flowage responded to the Gile Flowage questionnaire indicating they had pertinent information available and supported use of the TLP. Friends of the Gile Flowage recommended development of a comprehensive plan for the Gile Flowage and its watershed.

- Gogebic County Forestry and Parks Commission responded to the Saxon Falls and Superior Falls questionnaire indicating they did not intend to participate in the relicensing process, did not have any pertinent information, and did not have any concerns with use of the TLP.

- Iron County responded to the Superior Falls and Saxon Falls questionnaire indicating they did not intend to participate in the relicensing process, did not have any pertinent information, and did not have concerns with the use of the TLP.

- Iron County responded to the Gile Flowage questionnaire indicating they had information regarding invasive species and water resources, provided contact information, supported use of the TLP, and would participate in the relicensing process.

- The Leech Lake Band of Ojibwe responded to the Superior Falls and Saxon Falls questionnaires with a letter stating that there are no known recorded sites of religious or cultural significance to the Tribe in the Saxon Falls or Superior Falls Project areas. They requested that if any human remains are encountered, all work should cease and the County Sheriff's Office and Office of State Archaeologist should be notified. The Tribe also reserved the right to re-enter the consultation process at any time.

- MDNR responded to both questionnaires indicating they intend to participate in the relicensing process, had pertinent information available, and conditionally supported use of the TLP. If the TLP is used, MDNR wants reassurance that scoping meetings are appropriately timed and that the Licensee is committed to open communication and acting as a partner in fisheries and aquatic resource protection and mitigation. MDNR identified several issues relating to fish and aquatic resources, aesthetic resources, recreation, and land use.

  MDNR recommended the following studies for both Projects:
  - Work with USGS to install gages.
  - Collect aquatic organism data including fish community inventory of pond and riverine areas to include threatened or endangered species.
  - Evaluate potential for organism stranding, stress, and mortality associated with reservoir fluctuations.
  - Evaluate fish entrainment and mortality as part of a two-phase study.
    - Phase 1 - reconnaissance to determine gross extent of facility entrainment and fish mortality.
    - Phase 2 - if necessary, an intensive study to determine facility entrainment and fish mortality.
  - Conduct wildlife inventory in riverine and pond areas to include threatened or endangered species.
  - Conduct inventory of recreational facilities that includes written descriptions, maps, photos, and diagrams for MDNR review.
  - Conduct assessment of current recreational use and regional trends to identify appropriate options and alternatives for recreation amenities.
  - Evaluate current and proposed minimum flows in bypass reaches for aesthetic recreation, water quality, and aquatic habitat.
  - Provide Project hydrology information including daily fluctuation in tailwater, bypass channels, and reservoir for previous year, normal year, and high and low water years.
  - If changes in Project operations are proposed, an Instream Flow Incremental Methodology study may be required.

- NPS responded to both questionnaires indicating they intend to participate in the relicensing process, provided information sources regarding recreation, and provided additional stakeholder contact information for American Whitewater. NPS expressed they had concerns with use of the TLP due to the need for good communication, coordination, and action to promote positive engagement among all of the parties. NPS identified issues related to recreation including barriers to access, the need for recreational flow releases, access area, signage, and trail enhancements.

NPS recommended the following studies for both Projects:

- Recreation facilities condition assessment.
- Instream flow for recreation evaluation.

- RAW responded to both questionnaires indicating they intend to participate in the relicensing process, did not have any pertinent information, and did not have any concerns with the use of the TLP. They identified several issues pertaining to water, recreation, fish, and wildlife resources.

  RAW recommended the following potential studies for both Projects:
  - Potential instream flow studies.
  - Study of drawdown impacts on fish and wildlife habitat and plant communities.
  - Recreational flow release study/aesthetic flow study.
  - Update fishery community information.
  - Update mussel community information.
  - Federal/state threatened and endangered species evaluation.
  - Wetland delineation study.
  - Recreational use survey.
  - Evaluate turbine mortality and fish entrainment.
  - Prepare a recreation plan and upgrade recreation facilities where necessary.

- The Stockbridge Munsee Tribe responded to the Saxon Falls and Superior Falls questionnaire indicating they did not intend to participate in the relicensing process, did not have any pertinent information, and did not have any concerns with the use of the TLP.

- The town of Carey responded to the Gile Questionnaire indicating that they intended to participate in the relicensing process and provided information sources regarding recreational and land use. They did not support or oppose use of the TLP.

- WDNR did not respond to either questionnaire.

7. Public Utilities Regulatory Policies Act

The Licensee is not seeking benefits under the Public Utilities Regulatory Policies Act for the Superior Falls Project or Saxon Falls Project.