Preliminary Application Document

Hayward Project

FERC Project No. 2417

Namekagon River, Sawyer County, WI

Trego Project

FERC Project No. 2711

Namekagon River, Washburn County, WI

Submitted by
Northern States Power Company-Wisconsin
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List of Abbreviations

ACHP	Advisory Council on Historic Preservation
AHI	Wisconsin Architecture and History Inventory
Applicant	Northern States Power Company-Wisconsin d/b/a Xcel Energy
CEII	Critical Energy Infrastructure Information
CFR	Code of Federal Regulations
cfs	Cubic feet per second
CNNF	Chequamegon Nicolet National Forest
Commission	Federal Energy Regulatory Commission
CRMP	Cultural Resource Management Plan
Dam	Hayward dam or Trego dam, dependent on section heading
DLA	Draft License Application
DO	Dissolved oxygen
EA	Environmental Assessment
EIS	Environmental Impact Statement
°F	Temperature in degrees Fahrenheit
FERC	Federal Energy Regulatory Commission
FLA	Final License Application
ft/sec	feet per second
GIS	Geographic Information System
GLEC	Great Lakes Environmental Center
Hayward Project	Hayward Hydroelectric Project
hp	Horsepower
HRMP	Historic Resource Management Plan
IPaC	Information for Planning and Consultation
JAM	Joint Agency Meeting
kV	Kilovolts
kVA	Kilovolt-amperes
kW	Kilowatts
Licensee	Northern States Power Company-Wisconsin d/b/a Xcel Energy
mg/L	milligrams per liter
MWh	Megawatts per Hour
NEPA	National Environmental Policy Act
NGVD	National Geodetic Vertical Datum of 1929
NHI	National Heritage Inventory
NLEB	Northern long-eared bat
No.	Number
NOAA	National Oceanic Atmospheric Association
NOI	Notice of Intent
Nos.	Numbers
NPS	National Park Service
NPSMP	National Park Service General Management Plan - Upper St. Croix and Namekagon Rivers
NR	Natural Resources
NR 40	Chapter NR 40 of the Wisconsin Administrative Code
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
NPSMP	General Management Plan for the Upper St. Croix and Namekagon Rivers
NSPW	Northern States Power Company-Wisconsin d/b/a Xcel Energy
ORW	Outstanding Resource Water
PAD	Preliminary Application Document
PDF	Portable Document Format
Project	Either Hayward Project or Trego Project, dependent on section heading

Projects	Hayward Hydroelectric Project and Trego Hydroelectric Project
rpm	Revolutions per minute
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
Trego Project	Trego Hydroelectric Project
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
v	Volt
WDNR	Wisconsin Department of Natural Resources
WDPI	Wisconsin Department of Public Instruction
WHPD	Wisconsin Historic Preservation Database

1. Introduction

Northern States Power Company-Wisconsin, d/b/a Xcel Energy (NSPW, Licensee, or Applicant), is currently licensed by the Federal Energy Regulatory Commission (FERC or Commission) to operate the Hayward Hydroelectric Project (Hayward Project) and the Trego Hydroelectric Project (Trego Project), collectively (Projects) or individually (Project).

The Hayward Project (FERC Project No. 2417) is located on the Namekagon River in Sawyer County, Wisconsin. The Hayward Project license was issued on September 1, 1995 for a period of 30 years and 3 months with an expiration date of November 30, 2025 (FERC, 1995; FERC, 1996)[1].

The Trego Project (FERC Project No. 2711) is located on the Namekagon River in Washburn County, Wisconsin. The Trego Project license was issued on June 2, 1994 for a term of 31 years and 6 months with an effective date of June 1, 1994 and an expiration date of November 30, 2025 (FERC, 1994).

The Projects are located within approximately 30 river miles of each other on the Namekagon River. For the purposes of this Preliminary Application Document (PAD), the Licensee is providing information regarding both Projects to assist with evaluating their environmental impacts. The locations of both Projects are shown in **Figure 1-1**.

NSPW must submit license applications for both Projects to the Commission no later than November 30, 2023 to ensure that new licenses are issued prior to the expiration of the current licenses. A similar relicensing schedule will be implemented for both Projects in order to consolidate efforts of the Licensee, Commission, resource agencies, and other stakeholders.

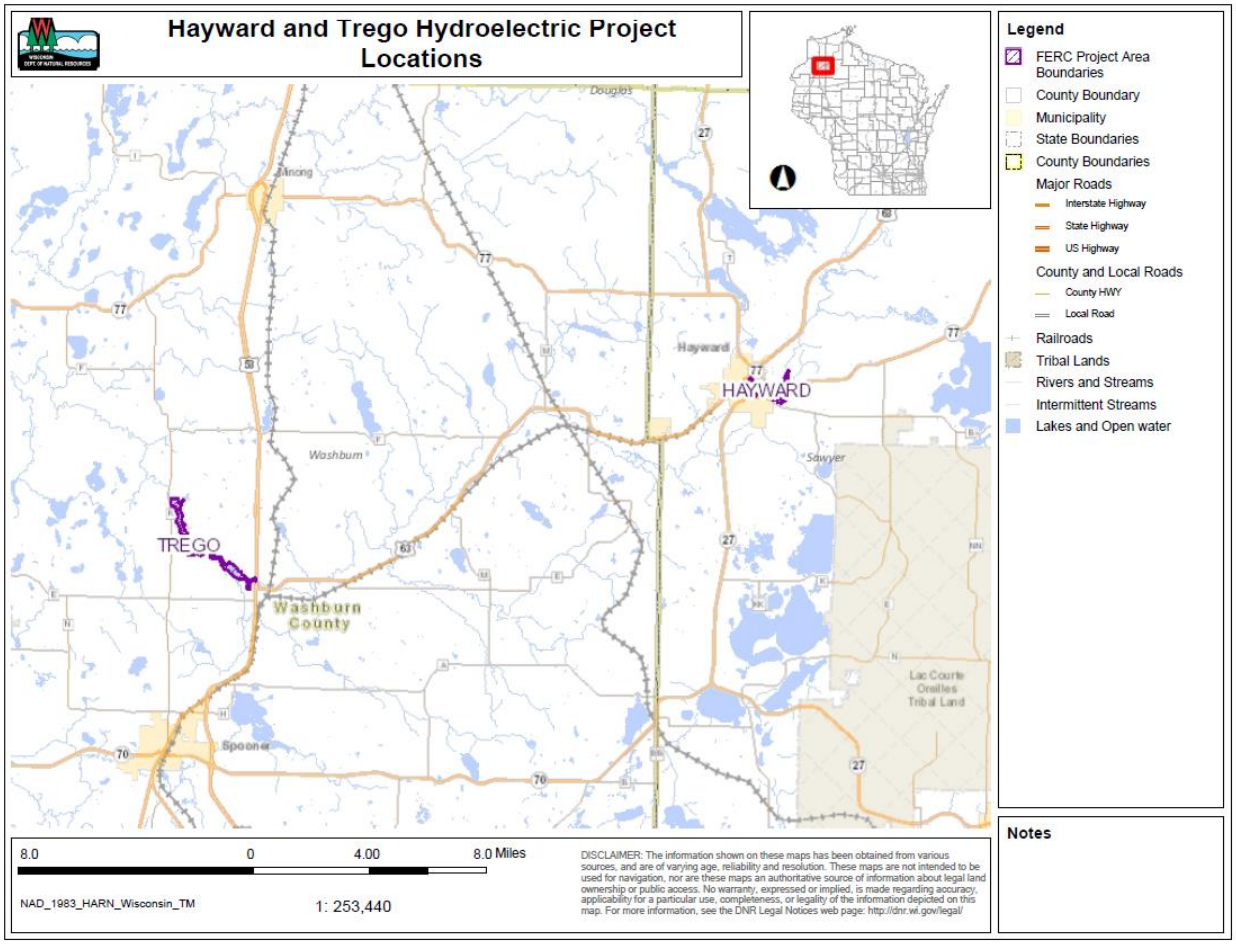
Applying for a new license requires the Licensee to first prepare a Notice of Intent (NOI) and PAD pursuant to 18 Code of Federal Regulations (CFR) Part 5 (CFR, 2016). As such, a separate NOI will be prepared for each Project while one PAD will be developed for both Projects. The PAD includes the required information consistent with 18 CFR § 5.6 for both Projects.

The FERC requires a Licensee to use the Integrated Licensing Process unless they grant approval to use an alternative process at the request of the Licensee. 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) will be included with each NOI as well as the PAD.

A separate license application will be filed for each Project along with corresponding public notices. The public notices will be published in a local newspaper providing interested persons and agencies an opportunity to present any concerns they may have; and a subsequent license will be obtained for each Project.

[1] The Order Issuing Subsequent License for the Hayward Project listed the expiration date as December 31, 2025. The September 25, 1995 Order on Rehearing amended the Project license to expire concurrently with the Trego Project on November 30, 2025.

Figure 1-1: Hayward Project and Trego Hydroelectric Project Locations



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

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

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

1.3 References

- Federal Energy Regulatory Commission. (1994). Order Issuing Subsequent License P-2711 (Minor Project). Issued June 2, 1994.
- Federal Energy Regulatory Commission. (1995). Order Issuing Subsequent License P-2417 (Minor Project). Issued September 1, 1995.
- Federal Energy Regulatory Commission. (1996). Order on Rehearing P-2714, Issued May 1, 1996.
- 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 subsequent licenses from the FERC which will allow for the continued operation and maintenance of the Projects. Concurrent with the filing of this PAD, NSPW 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 each NOI and the PAD, NSPW filed a request with the FERC seeking approval to utilize the TLP for each Project. The requests to use the TLP were filed as related submittals under 18 CFR § 5.3. NSPW's justification to utilize the TLP for each Project is included in the request.

Initial activities under the plan and schedule, shown in **Figure 2.1-1** and **Table 2.1-1**, include filing each NOI and the PAD, as well as requests to use the TLP, by November 27, 2020[2]. Based upon this tentative filing date, comments regarding the proposed use of the TLP must be filed with the FERC no later than December 28, 2020. It is anticipated the FERC will approve the Licensee's request to use the TLP for both Projects by January 26, 2021, at which time Stage 1 of the formal three-stage consultation process would begin.

In accordance with the above-referenced plan and schedule, NSPW will issue a Notice for a Joint Agency Meeting (JAM) within 30 days of receiving approval from the FERC to use the TLP. The JAM will include resource agencies, Indian tribes and any other stakeholders interested in the relicensing process. NSPW anticipates holding one JAM for both Projects. Based upon the anticipated approval date to use the TLP of January 26, 2021, the JAM will be held no later than March 27, 2021. Following this schedule, stakeholder comments on the PAD would be due by May 26, 2021.

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 consultation with resource agencies regarding study requests. Coordination with the resource agencies for the development of study plans is expected to occur prior to the implementation of the studies.

NSPW will submit one Draft License Application (DLA) for each Project. Preparation of the DLAs will begin by November 7, 2022 and will be filed by June 30, 2023. Stakeholder review of the DLAs is expected to occur between June 30, 2023 and September 28, 2023 (90 days).

Preparation of the Final License Application (FLA) is expected to begin by September 29, 2023 and be filed with the FERC no later than November 30, 2023. Once the FLA is filed, Stage 3 consultation would begin.

Based on the November 30, 2023 FLA filing date, it is anticipated the following will occur between November 30, 2023 and November 30, 2025:

- Review of the FLA by the FERC
- Issuance of the FERC FLA acceptance letter
- Submittal of stakeholder comments, terms, and conditions
- Scoping under the National Environmental Policy Act (NEPA)

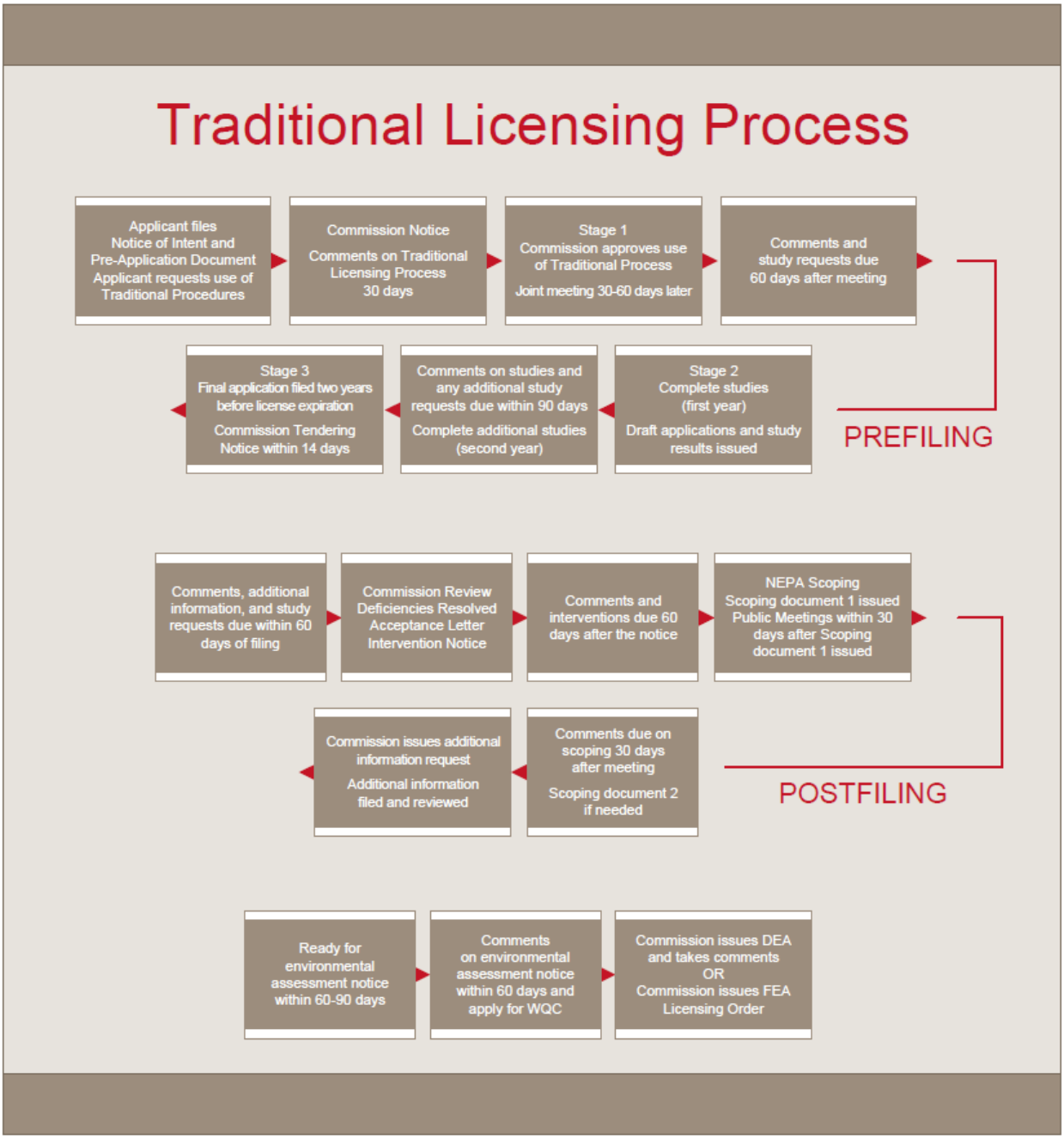
[2] NSPW intends to file each NOI, the PAD, and request to use the TLP three days earlier than the required date.

- 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 November 30, 2025.

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

Figure 2.1-1: FERC Traditional Licensing Process 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 NOIs, PAD, and TLP Requests	5 years before license expiration date	11/27/2020
Stakeholders provide comments regarding TLP	30 days after request	12/28/2020
FERC approval of TLP	60 days after request	01/26/2021
Stage 1 Consultation		
Licensee conducts JAM and site visits with potential stakeholders	30 to 60 days after TLP approval	03/27/2021
Stakeholders submit comments on PAD/Study Requests	Comments and study requests due 60 days after JAM	05/26/2021
Stage 2 Consultation		
Licensee's Study, Year 1	Begins after receipt of study requests	2021
Licensee's Study, Year 2, if necessary	Begins after completion of Study Year 1	2022
Licensee submits DLA to FERC and relicensing participants for comment	Begins after completion of Study Year 2 (soft deadline)	06/30/2023
Stakeholders and FERC provide comments on DLA	Within 90-days after receipt of DLA	09/28/2023
Licensee Files FLA	At least 2 years prior to license expiration	11/30/2023
Stage 3 Consultation		
FERC review of FLA	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 FLA filing and no 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	11/30/2025

* 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 described below in Section 2.2.3, has been developed to include major document submissions, 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. Anyone can search for filings by Project by using P-2417 for information regarding the Hayward Project or P-2711 for information regarding the Trego 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. 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 stakeholder's unique schedule; however, every effort will be made to schedule meetings to accommodate the majority of stakeholders. NSPW 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 each NOI and TLP request, as well as this PAD, will be available for public viewing at the public libraries listed below.

- Sherman and Ruth Weiss Community Library – 10788 State Hwy. 77, Hayward, Wisconsin
- Spooner Memorial Library – 421 High Street, Spooner, Wisconsin

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 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 or privileged information can be found by following the instructions contained at: https://www.ferc.gov/enforcement-legal/ceii.

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 number. 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), 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 Hayward Project

The Hayward Project is located on the Namekagon River in the City of Hayward, Wisconsin approximately 33 miles downstream of Lake Namekagon. The Project is located 50 miles southwest of the City of Ashland and 85 miles north of the City of Eau Claire.

3.1.2 Trego Project

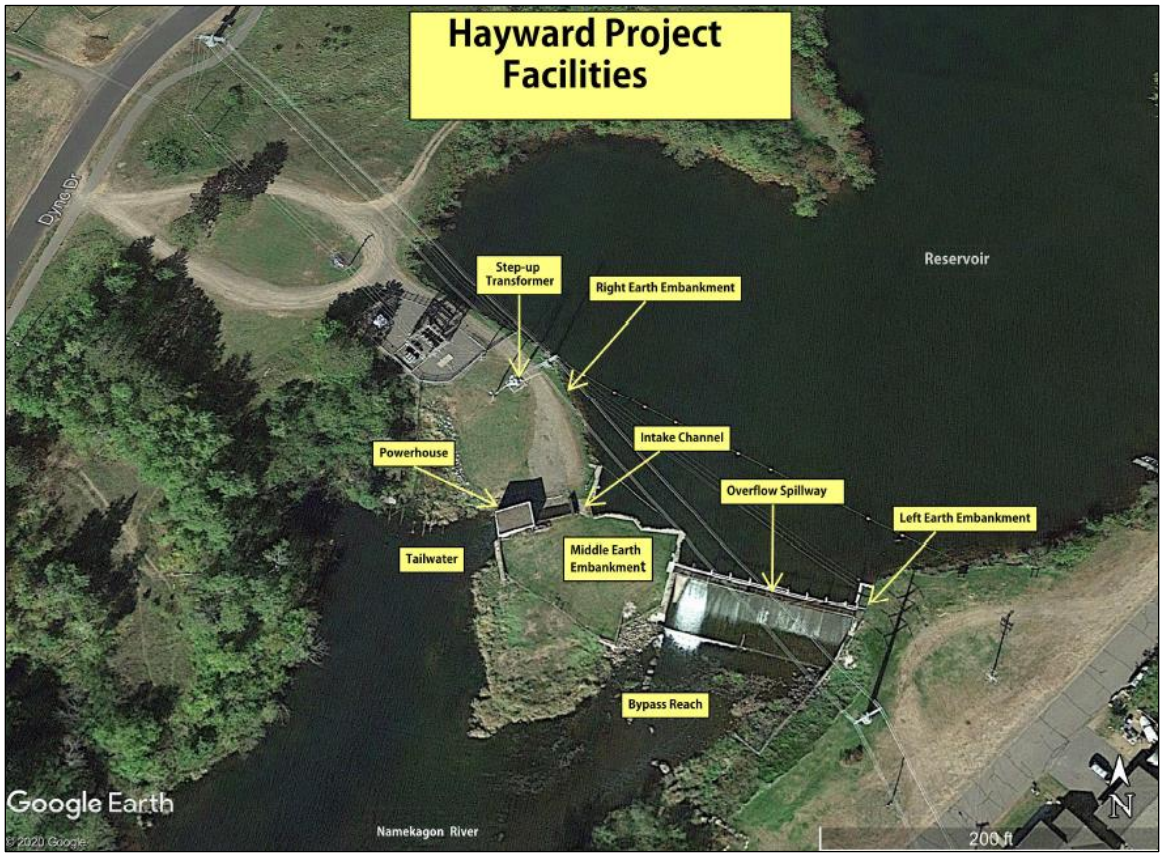
The Trego Project is located in the Town of Trego, Washburn County, Wisconsin on the Namekagon River approximately 30 miles upstream of its confluence with the St. Croix River. The Project is located approximately 8 miles north of the City of Spooner and 81 miles north of the City of Eau Claire.

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

3.2.1 Hayward Current Facilities

Existing Project structures include a dam, concrete intake channel, and powerhouse as depicted in **Figure 3.2.1-1**. A description of each structure, as well as the tailrace, transmission equipment, reservoir (impoundment)[3], and appurtenant equipment is provided in the following paragraphs (NSPW, 2010)[4].

Figure 3.2.1-1: Hayward Project Facilities



[3] The terms reservoir and impoundment are used interchangeably throughout the document.
[4] Unless otherwise cited, all facility description attributes are from the Supporting Technical Information Document dated June 2010.

3.2.1.1 Hayward Dam

The Hayward Dam is 424 feet long, 18 feet high, and consists of the following four sections: right earth embankment, middle earth embankment, overflow spillway, and left earth embankment[5].

Right Earth Embankment Section

The right earth embankment section has a crest elevation of 1,188.5 feet 1929 National Geodetic Vertical Datum (NGVD)[6] and a top width of approximately 30 feet. The embankment extends from the right bank to the powerhouse and is approximately 200 feet long. There is a gravel access road located along the crest of the embankment. Along the upstream slope, a concrete training wall extends approximately 23 feet upstream and to the right of the intake channel. The wall is approximately 18 to 24 inches thick at the top. There is a gravity-type concrete retaining wall on the downstream side of the right earth embankment adjacent to the powerhouse. This wall is approximately 90 feet long with two separate sections: a 27-foot long section adjacent to the powerhouse, and a 63-foot long section. The 63-foot long section is offset approximately 5 feet upstream from the right end of the 27-foot long section and extends to the right. The retaining walls are approximately 8 feet high and 11 inches thick at the top.

Middle Earth Embankment Section

The middle earth embankment section has a crest elevation of 1,188.5 feet and a top width of approximately 30 feet. The embankment extends approximately 80 feet from the powerhouse to the right abutment of the overflow spillway section. The ground extends above the downstream water level to form a small island between the powerhouse intake and tailrace on the right side and the overflow spillway and main river channel on the left side. On the upstream side of the embankment, a steel sheet pile wall extends from the intake channel to the overflow spillway. The top elevation of the sheet pile wall is approximately 188.3 feet.

On the downstream side of the embankment, a concrete gravity-type retaining wall extends approximately 30 feet from the left side of the powerhouse. The wall is 15 feet high and 11 inches thick at the top. The remaining downstream side of the embankment located between the retaining wall and the overflow spillway has a slope of approximately 4:1.

Overflow Spillway Section

The overflow spillway section is approximately 120 feet long and is founded on rock-filled timber cribbing. Beginning upstream, the spillway includes a sloping or near horizontal upstream apron, crest section with piers, steel and timber operator's bridge, timber stoplogs, sloped rollway, horizontal apron, and downstream sheet pile cutoff wall. The crest elevation is approximately 1,183.4 feet and the downstream end of the spillway is at an elevation of approximately 1,173.7 feet.

The spillway section has 8 stoplog bays and 2 bays with slide gates separated by concrete spillway piers that are nominally 16 inches wide. The overflow spillway bays are numbered consecutively beginning at the right bay. Stoplog bays are approximately 4.5 feet high and 10 feet long. The width of the bays is variable and shown in **Table 3.2.1.1-1**. The upstream noses of the spillway pier slope in the upstream direction and downward approximately 15-degrees from vertical. Slots follow the

[5] Directions of right and left, when describing facilities is given looking downstream.
[6] All elevations in this document related to the Hayward Project are listed in the 1929 National Geodetic Vertical Datum (NGVD).

upstream pier noses and are formed into the pier approximately 4 feet downstream from the upstream noses. Timber stoplogs are used in the slots for controlling reservoir level.

Table 3.2.1.1-1 Hayward Overflow Spillway Bay Widths

Bay	Width (feet)	Bay	Width (feet)
1	9.55	6	11.60
2	11.50	7	11.50
3	11.50	8	11.55
4	11.70	9	11.35
5	11.30	10	6.10

An operator's bridge is supported on the top of the spillway piers and consists of grating that extends the length of the overflow spillway. The bridge is supported by three steel beams that span between the spillway piers. A handrail consisting of steel angles is located on the downstream side of the bridge.

The upstream concrete apron extends approximately 34 feet from the upstream edge of the spillway piers. The apron slopes slightly downward approximately 20 feet from the piers and then extends horizontally to the piers. A mixture of sand and bentonite material was placed over the apron in locations where holes have historically been seen. The downstream apron is a concrete slab located over rock-filled timber cribbing with thicknesses varying from 1 to 3 feet. The voids in the timber cribbing beneath the apron are grouted.

A steel sheet pile cutoff wall is located at the downstream end of the spillway. The tops of the sheets are embedded into the concrete spillway apron at an elevation of approximately 1,173.2 feet. The sheets are approximately 20 feet long. A gravel filter is located under the apron upstream of the sheet pile wall with slot drains in the sheeting. The normal tailwater elevation is at 1,171.4 feet downstream of the overflow spillway (NSPW, 1991).

Left Earth Embankment Section

The left earth embankment extends from the left abutment of the overflow spillway to the left bank. The embankment is vegetated with grass and weeds. The left spillway abutment serves as both a retaining wall for the left earth embankment and a training wall for spillway flows. The concrete wall is approximately 85 feet long and extends from the upstream end of the upstream apron to approximately 20 feet beyond the downstream end of the spillway apron. The wall is a cantilever-type retaining wall approximately one foot thick with a base slab approximately two feet wide and one foot thick. The height of the wall varies from approximately 4 feet adjacent to the crest to approximately 10 feet at the downstream end of the spillway apron. The top of the sheet pile wall is anchored into the base of the concrete retaining wall with a concrete cap and anchor bolts and is tied with steel rods to a steel sheet pile deadman buried in the left earth embankment. A drain discharges through the left spillway abutment wall from the left earth embankment.

3.2.1.2 Hayward Intake Channel

The intake channel consists of the concrete intake structure, trash rack, steel bulkhead, access bridge, and channel. The top of the side walls elevation is approximately 1,188.8 feet. The intake channel structure sill elevation is approximately 1,176.1 feet. The channel width varies linearly from approximately 13 feet on the upstream side of the access bridge to approximately 8 feet on the downstream side of the bridge and remains 8 feet wide to the powerhouse. Stoplog slots are located at the upstream end of the intake channel and are built into the concrete channel side walls. Downstream of the stoplog slots is a steel trash rack mounted near-vertical across the intake with 1.5 inch spacing between bars. An 8-foot wide concrete access bridge spans the intake channel downstream of the trash rack. A head gate slot and vertical steel bulkhead are located downstream of the bridge. The head gate does not have a hoist and is operated using a boom truck or other similar mobile equipment. Metal grating covers the top of the intake channel from the access bridge to the powerhouse.

3.2.1.3 Hayward Powerhouse

The powerhouse structure is approximately 18 feet wide (right to left) and 24 feet long (upstream to downstream). The powerhouse has a concrete substructure and a brick masonry wall superstructure which extends 27.5 feet from the generator floor to the roof. The concrete substructure walls are approximately 1.5 feet thick. The top of the concrete substructure is at an elevation of 1,191.5 feet and the elevation of the draft tube invert is 1,164.7 feet. The elevation of the top of the generator floor is approximately 1,190.3 feet. The draft tube is approximately 6.3 feet high.

Turbine

The powerhouse contains one S. Morgan Smith vertical Francis turbine rated at 280 horsepower (hp) at a speed of 180 revolutions per minute (rpm). The runner diameter is 60 inches with a peripheral velocity of 47 feet per second (ft/sec). The turbine has a minimum hydraulic capacity of 120 cubic feet per second (cfs) and a maximum hydraulic capacity of 178 cfs at a net head of 17 feet (NSPW, 1991).

Generator

The Project uses one Northwestern Electric Equipment Company 2300-volt (v), 180 rpm, 0.8 power factor alternating current generator with an original nameplate capacity of 168 kilowatts (kW) at 80% power factor.

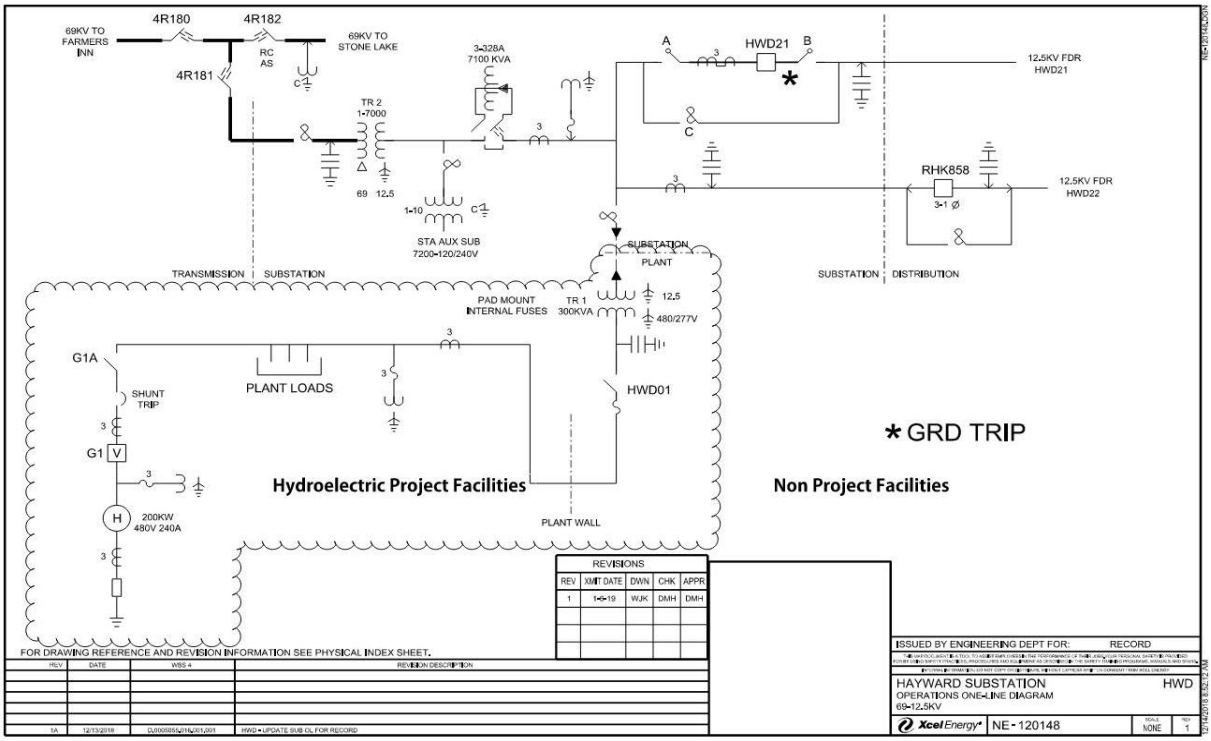
3.2.1.4 Hayward Tailrace

Water is released from the powerhouse into the tailrace, which is approximately 125 feet wide and 150 feet long, before reaching the Namekagon River. Normal tailwater elevation at the powerhouse is 1,170.8 feet (NSPW, 1991).

3.2.1.5 Hayward Transmission Equipment

There is an approximately 150-foot long generator lead extending from the powerhouse to a step-up transformer located just outside of a non-project substation. Equipment required to transmit the electrical generation to the non-project distribution system contains a step-up transformer. The 300-kilovolt ampere (kVA) transformer steps up the voltage that connects to the non-project distribution system from 0.48 to 12.5 kilovolts (kV) (NSPW, 1991). A diagram of principal electrical circuits associated with the Project is included in **Figure 3.2.1.5-1**.

Figure 3.2.1.5-1: Hayward Project One-Line Diagram of Principal Electrical Circuits



3.2.1.6 Hayward Reservoir

The reservoir, Lake Hayward, encompasses approximately 244.2 acres with a storage capacity of about 1,221-acre feet at maximum reservoir elevation of 1,187.5 feet[7] (Mead & Hunt, 2020). The reservoir has a maximum depth of 17 feet and an estimated average depth of 5 feet. The substrate consists of 60% sand, 8% gravel, and 32% muck (WDNR, 2020).

3.2.1.7 Hayward Appurtenant Equipment

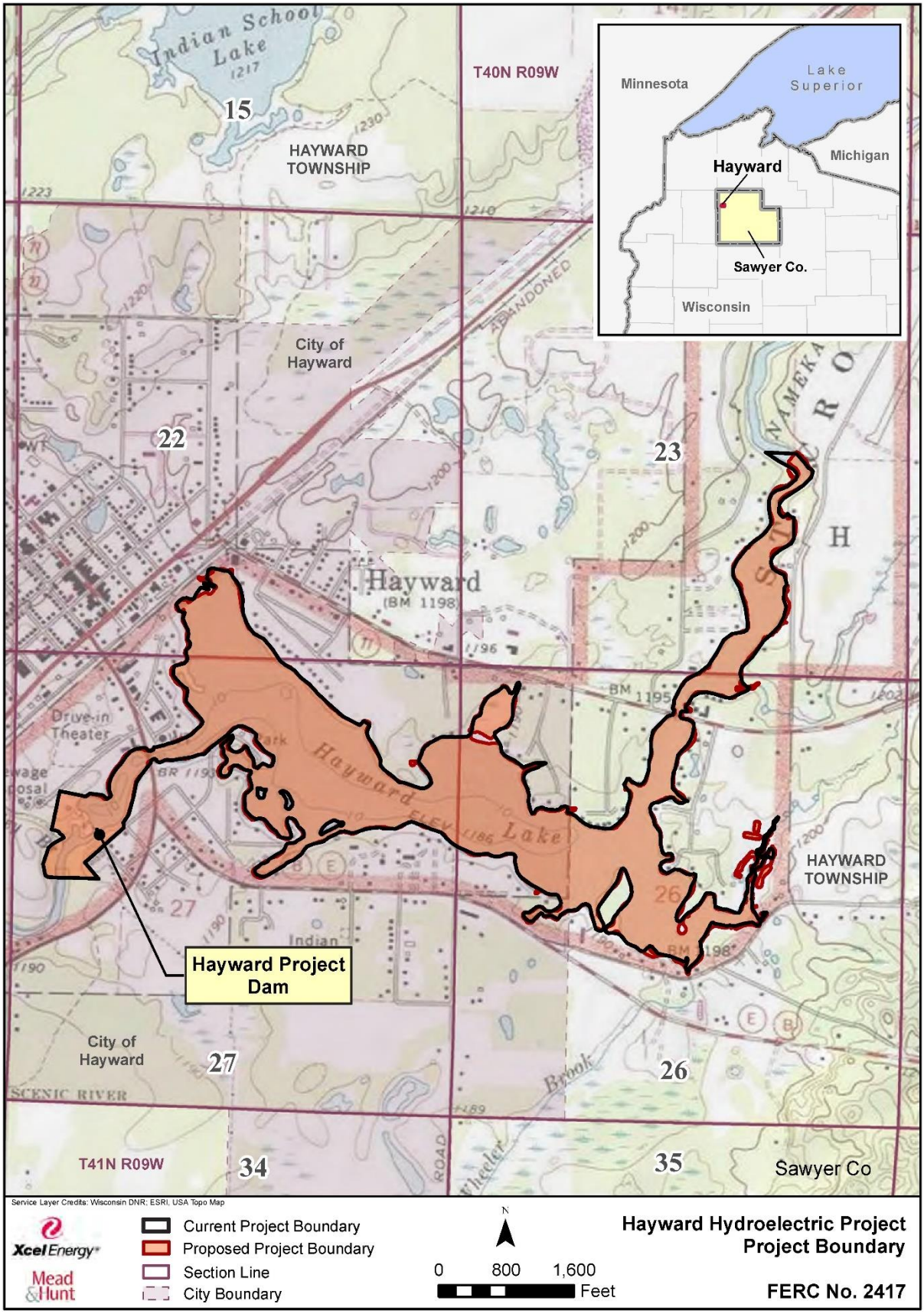
Appurtenant equipment includes, but is not limited to, bearing lubrication systems, generator ventilation systems, switchboards, additional gate hoist equipment, switchgear, protective devices, and metering devices.

3.2.2 Hayward Project Boundary

The current FERC license was issued September 1, 1995 and established the Project boundary to include a total area of 255.9 acres. This area includes the 244.2-acre reservoir, 9.6 acres of upland around the dam, and 2.1 acres of water downstream of the dam including the tailwater, bypassed reach, and the Namekagon River downstream extent of the Project boundary (Mead & Hunt, 2020). Project lands include the dam, powerhouse, and canoe portage. The current and proposed Project boundaries are depicted in **Figure 3.2.2-1** on the following page and in the existing Exhibit G included as **Appendix 3.2.2-1**. The Licensee is proposing to increase the acreage within the Project boundary an additional 2.8 acres. The increase includes a portion of the reservoir currently occupied by the Project, but not currently included in the Project boundary (Mead & Hunt, 2020).

[7] Reservoir acreage derived by digitizing existing Exhibit G map and calculating the reservoir area using geographic information system (GIS). Water storage capacity was calculated by multiplying the GIS-derived reservoir surface area by the average reservoir depth of 5 feet.

Figure 3.2.2-1: Hayward Project Boundary



3.2.3 Hayward Proposed Facilities

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

3.2.4 References

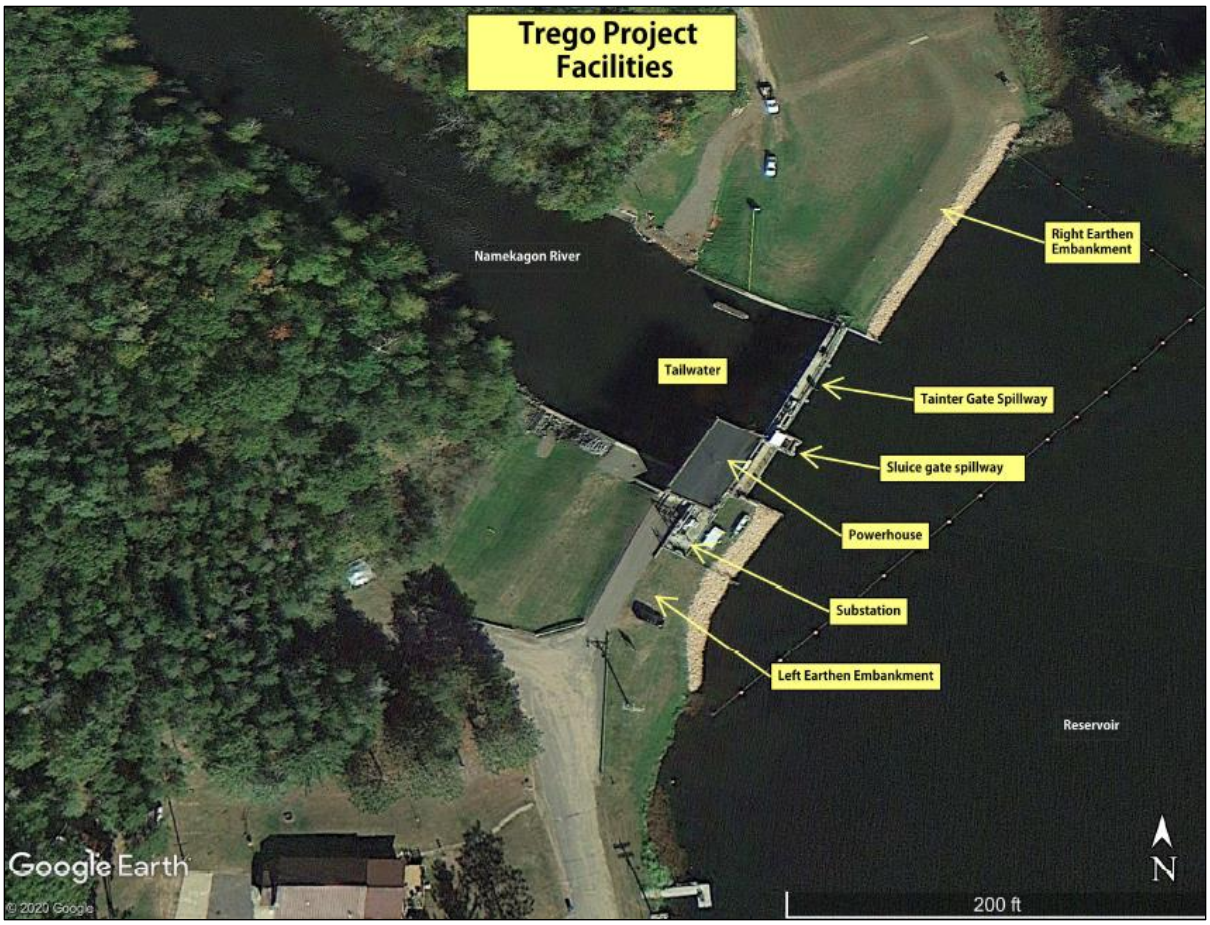
- Mead & Hunt. (2020). Geographic Information System-derived current Project boundary, proposed Project boundary, and associated reservoir acreages. September 11, 2020.
- Northern State Power Company-Wisconsin. (1991). Application for a Subsequent License for a Minor Water Power Project. Hayward Hydroelectric Project, FERC Project No. 2417. December 1991.
- Northern States Power Company-Wisconsin. (2010). Hayward Hydroelectric Project, FERC No 2417, Supporting Technical Information Document. June 2010.
- Wisconsin Department of Natural Resources. (2020). WDNR Lakes Pages-Hayward Lake. https://dnr.wi.gov/lakes/lakepages/LakeDetail.aspx?wbic=2725500&page=facts. Accessed August 5, 2020.

3.3 Trego Project Facilities (18 CFR § 5.6(d)(2)(iii))

3.3.1 Trego Current Facilities

From right to left looking downstream, the Project structures include a right earthen embankment, tainter gate spillway, sluice gate spillway, powerhouse, substation, and left earthen embankment. The current Project facilities are shown in **Figure 3.3.1-1**. 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 (NSPW, 2016)[8]. Exhibit F drawings will be provided in the draft license application (DLA).

Figure 3.3.1-1: Trego Project Facilities



3.3.1.1 Trego Dam

The Trego Dam is 641.5 feet long, 45.0 feet high, and consists of the following five sections: right earth embankment, Tainter gate spillway, sluice gate, powerhouse, and left earth embankment.

Right Earth Embankment Section

The right earth embankment section has a length of 380 feet and a maximum height of 30 feet with a top elevation of 1,040 feet 1929 National Geodetic Vertical Datum (NGVD)[9]. The top width is 12 feet with a 2:1 slope on the downstream side and a 3:1 slope on the upstream side. The embankment is constructed of sandy fill material with a reinforced concrete core wall with a top elevation of 1,036 feet that extends 200

[8] Unless otherwise cited, all Trego Project facility description attributes are from the Supporting Technical Information Document dated November 2016.

[9] All elevation in this document related to the Trego Project are listed in the 1929 National Geodetic Vertical Datum (NGVD).

feet from the concrete spillway. A steel sheet pile cutoff wall extends through the foundation sediments to the hardpan layer below the portion of the core wall closest to the spillway. Beyond the sheet pile cutoff, the core wall is founded on sand and gravel (NSPW, 1991).

Tainter Gate Spillway Section

The Tainter gate spillway section is an Ambursen dam spillway that is 86 feet long, 112 feet wide (upstream foundation wall to downstream end of stilling basin), and 27 feet high. The section contains three steel Tainter gates that are each 25.5-feet wide by 10-feet high separated by concrete piers. The gate sill elevation is 1,026 feet and top of gate elevation is 1,035.2 feet when closed. A sloping 28-foot long concrete apron with end sill basin is located downstream of the spillway (NSPW, 1991).

Sluice Gate Spillway Section

The sluice gate spillway section separates the concrete spillway section from the water passage section of the powerhouse. The section is an Ambursen dam spillway that contains one 6-foot wide by 8-foot high vertical bottom hinge Obermeyer sluice gate with a capacity of 320 cfs at elevation 1,187.5 feet. The gate is heated for winter operation. In cross-section, the section extends about 99 feet from its upstream foundation wall to the end of its downstream apron, which includes 73 feet for the sluice gate spillway and 26 feet for the apron. The sill crest is at elevation 1,028.0 feet and is 29 feet above the sluiceway foundation elevation of 999.0 feet. The top of the downstream trash sluice apron is at elevation 998.5 feet (NSPW, 1991).

Powerhouse Section

The powerhouse section is located between the sluice gate spillway section and the left earth embankment section. The powerhouse is 59.5 feet long by 30.2 feet wide and is 74 feet high above the foundation (NSPW, 1991).

Left Earth Embankment Section

The left earth embankment section has a length of 110 feet and a maximum height of 25 feet with a top elevation of 1,040 feet. The embankment has a 12-foot wide top with a 2:1 slope on the downstream side and a 3:1 slope on the upstream side. It is constructed of sandy fill material with a reinforced concrete core wall with a top elevation of 1,036.0 feet that extends 95 feet from the powerhouse. A steel sheet pile cutoff wall extends through the foundation sediments to the hardpan layer below the portion of the core wall closest to the spillway. Beyond the sheet pile cutoff, the core wall is founded on sand and gravel (NSPW, 1991).

3.3.1.2 Trego Powerhouse

Powerhouse Substructure and Intake

The powerhouse substructure contains two integral water intakes, each consisting of vertically separated intake and discharge flumes. One intake is 21 feet wide and the other is 13.5 feet wide. The intake flume sills are located at elevation 1,016.0 feet, while the trash rack sills are 2 feet lower, at elevation 1,014.0 feet. There are separate 17.8-foot high trash racks with 1.5 inch clear spacing for each intake. The powerhouse substructure extends approximately 99 feet from the upstream foundation wall to the downstream end of the tailrace apron. Approximately 58 feet of this distance is the powerhouse substructure and 41 feet is the concrete tailrace apron (NSPW, 1991).

The top of the powerhouse substructure (generator room floor) is located at elevation 1,037.0 feet and rises 42 feet above the foundation. The discharge flume sills and foundation are located at elevation 995.0 feet. The top of the tailrace apron slopes upward from elevation 995.0 feet to elevation 998.5 feet, the same elevation as the top of the stilling basin and sluiceway aprons. The southwest wall of the water passage section of the powerhouse substructure extends both upstream and downstream as a buttressed retaining wall for the left earth embankment section of the dam (NSPW, 1991).

A 16.5-foot long partial extension of the upper portions of the powerhouse substructure extends southwestward and into the left earth embankment. The extension increases the overall length of the affected portion of the substructure to 59.5 feet. This partial extension is 30 feet higher than the foundation for the water passage section of the substructure. The top of the extension is elevation 1,037.0 feet. The southwest wall of this extension is supported by driven bearing piles. This extension provides an approximate 15-foot by 27-foot basement area for the powerhouse and contains a boiler room for the heating system, storage room, and restroom (NSPW, 1991).

Powerhouse Superstructure

The powerhouse superstructure is a 59.5-foot long by 30.2-foot wide by 32-foot high, single story, steel, and brick masonry structure. It is located on the substructure and rises a total of 74 feet above its foundation (NSPW, 1991).

The powerhouse is founded on hardpan located approximately 8 feet below the river bottom. This hardpan layer is approximately 15 feet thick. Sand and gravel underlie the hardpan. Steel sheet piling is driven 13 feet into the hardpan along the entire length of the powerhouse and from 2 to 13 feet beneath the core walls extending beyond each end of the powerhouse (NSPW, 1991).

Turbines

The powerhouse contains two vertical Francis-type turbines manufactured by the J. Leffel Company.

Unit 1 has a 56-inch runner and rated capacity of 1,095 hp when operating at a constant speed of 164 rpm. It has a minimum hydraulic capacity of 140 cfs and maximum hydraulic capacity of 385 cfs.

Unit 2 has a 47.5-inch runner and rated capacity of 785 hp when operating at a constant speed of 180 rpm. It has a minimum hydraulic capacity of 100 cfs and maximum hydraulic capacity of 278 cfs.

Generators

The Project uses two generator units with a total capacity of 1,200 kW, both are installed on curbs above the generator floor.

Unit 1 consists of an 875 KVA, 700 kW at 80% power factor, 2,400 v, 60 cycle, 164 rpm alternator and a direct connected 20 kW, 124 v exciter. The unit is controlled by an oil pressure governor (NSPW, 1991).

Unit 2 consists of a 625 KVA, 500 kW at 80% power factor, 2,400 v, 60 cycle, 180 rpm alternator and a direct connected 16 kW, 125 v exciter. The unit is controlled by an oil pressure governor (NSPW, 1991).

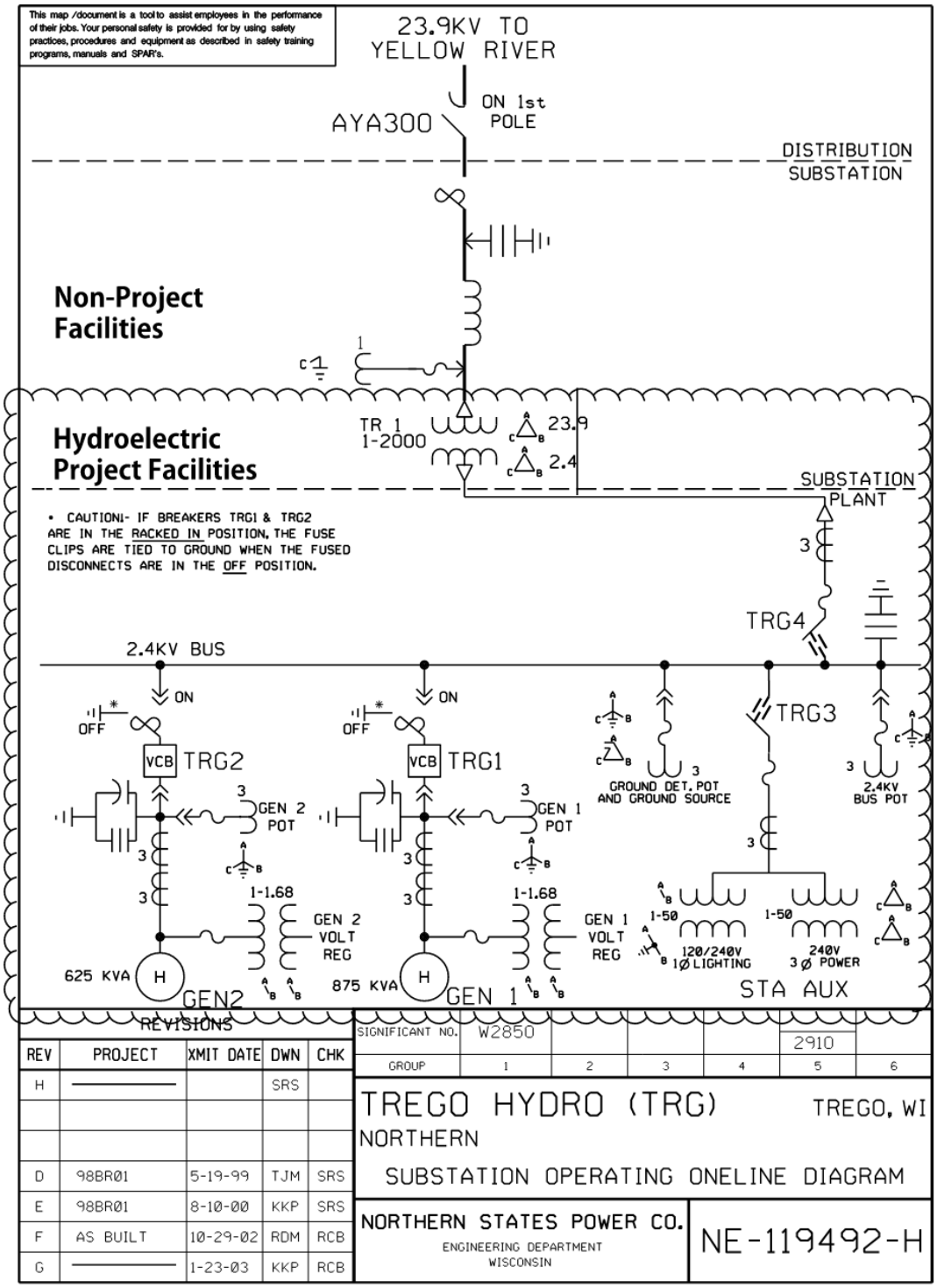
3.3.1.3 Trego Tailrace

The tailrace is approximately 125 feet wide and extends downstream from the dam for approximately 160 feet. Both the powerhouse and spillway discharge directly to the Namekagon River.

3.3.1.4 Trego Transmission Equipment

There is an approximately 40-foot long, 2.4 kV generator lead extending from the powerhouse to a non-project distribution substation. Equipment required to transmit the electrical generation to the non-project distribution system contains one 3-phase, 2,000 kVA transformer. The transformer steps up the voltage that connects to the non-project distribution system from 2.4 to 23.9 kV. A diagram of the principal electrical circuits associated with the Project is included in **Figure 3.3.1.4-1**.

Figure 3.3.1.4-1: Trego Project One-line Diagram of Principal Electrical Circuits



3.3.1.5 Trego Reservoir

The reservoir (Trego Lake) encompasses approximately 462.5 acres with a storage capacity of 4,625 acre-feet at reservoir elevation of 1,035.0 feet[10] (Mead & Hunt, 2020). It has a maximum depth of 35 feet near the dam and an average depth of 10 feet. The substrate consists of 95% sand and 5% muck (WDNR, 2020).

[10] Reservoir acreage derived by digitizing existing Exhibit G map and calculating the reservoir area using GIS. Water storage capacity was calculated by multiplying the GIS-derived reservoir surface area by the average reservoir depth of 10 feet.

3.3.1.6 Trego Appurtenant Equipment

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

3.3.2 Trego Project Boundary

The current FERC license was issued January 19, 1995 and established the Project boundary to include a total of 485.0 acres. This area includes the 462.5 acre reservoir, 21.8 acres of Licensee-owned upland adjacent to the dam, and 0.7 acres of water including the tailrace area and Namekagon River to the downstream extent of the Project boundary (Mead & Hunt, 2020). Project lands include the dam, powerhouse, substation, south tailwater access area, north tailwater access area, and canoe portage. The current and proposed Project boundaries are depicted in **Figure 3.3.2-1** on the following page and the existing Exhibit G map is enclosed in **Appendix 3.3.2-1**.

As part of the development of this document, the License completed a review of the current Project boundary with the most-accurate data available. The current Project boundary was likely developed using USGS topographic paper maps that displayed 10- or 20-foot contour intervals. LiDAR elevation data, with a vertical accuracy of 0.4 to 0.58 feet, was used in the review and remapping of the Project boundary for this document.[11]

The use of LiDAR data to review the current Project boundary identified that the upper extent of the existing Project boundary contains a portion of free-flowing Namekagon River that is not impounded at the maximum operating elevation of 1,035.2 feet and therefore is not necessary for project operations. Therefore, in developing the proposed Project boundary for this document, the unimpounded or free-flowing upstream reach has been removed from the proposed Project boundary. This results in an overall decrease of acreage within the Project boundary of 29.1 (submerged) acres.

3.3.3 Trego Proposed Facilities

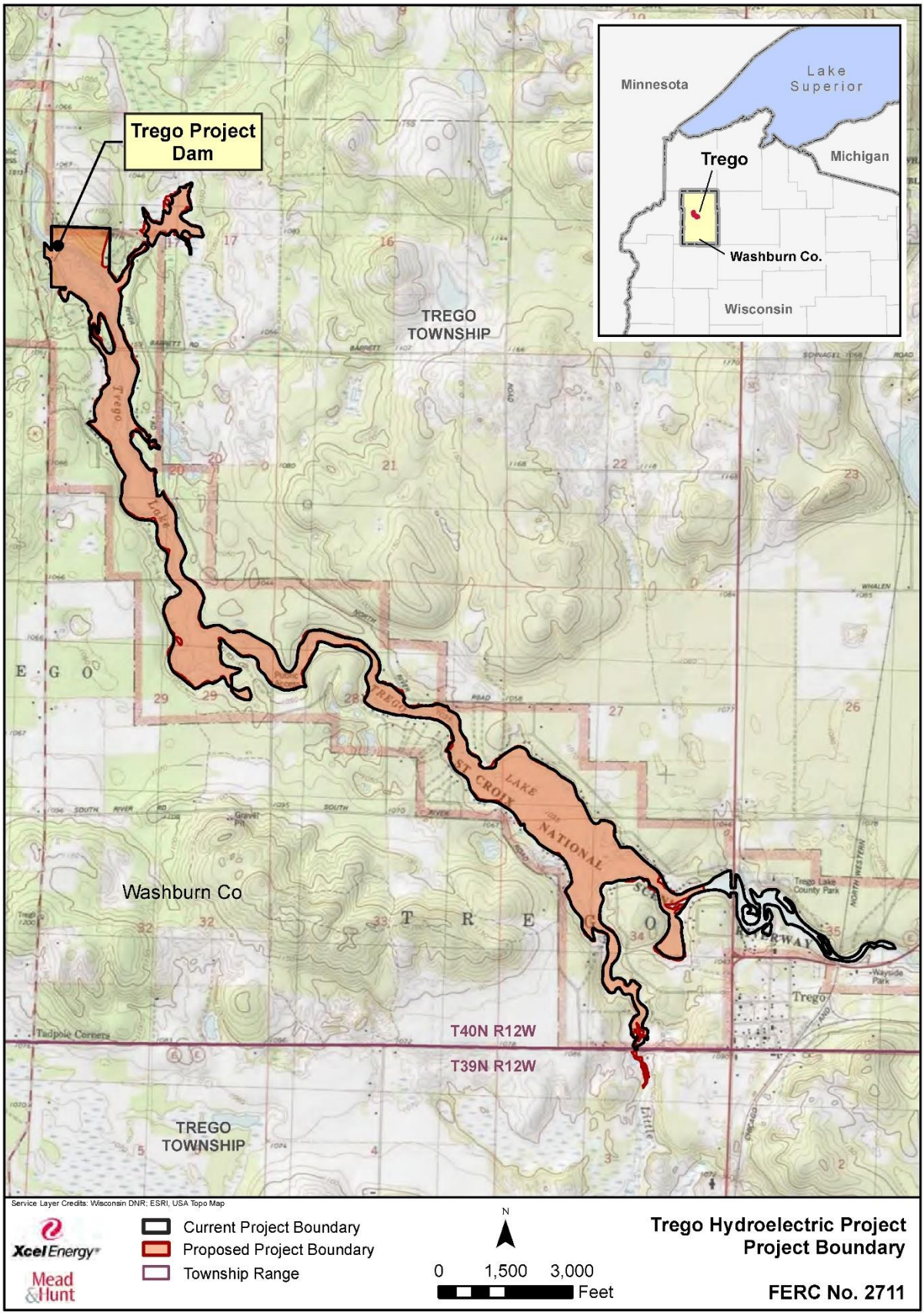
No new facilities are proposed as part of this relicensing effort.

3.3.4 References

- Mead & Hunt. (2020). Geographic Information System-derived current Project boundary, proposed Project boundary, and associated reservoir acreages. September 11, 2020.
- Northern States Power Company-Wisconsin. (1991). Application for a Subsequent License for a Minor Water Power Project. Trego Hydroelectric Project, FERC Project No. 2711. March 1991.
- Northern States Power Company-Wisconsin. (2016). Trego Hydroelectric Project, FERC No 2711. Supporting Technical Information Document. November 2016.
- Wisconsin Department of Natural Resources. (2020). WDNR Lakes Pages-Trego lake. https://dnr.wi.gov/lakes/lakepages/LakeDetail.aspx?wbic=2712000&page=facts. Accessed August 7, 2020.

[11] LiDAR data is available for Washburn County (April 2016) from the WisconsinView Data Portal via the State Cartographer's Office Website (https://www.sco.wisc.edu/data/elevationlidar/).

Figure 3.3.2-1: Trego Project Boundary



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

3.4.1 Hayward Project Operation

3.4.1.1 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 to the Project reservoir. This mode protects water quality, aquatic habitat, and other aquatic resources in the Namekagon River.

Under normal operating conditions, the Licensee is required to maintain the reservoir at a target elevation of 1,187.4 feet but can fluctuate around the target elevation such that the reservoir is maintained between 1,187.0 feet (minimum) and 1,187.5 feet (maximum). A minimum flow of 8 cfs or inflow to the reservoir, whichever is less, is required to be released into the bypassed reach, for the protection of fish and wildlife resources and water quality (FERC, 1995).

One operator is assigned to oversee the daily operation and routine maintenance of both the Hayward and Trego Projects. Eight-hour coverage is provided five days a week, Monday through Friday. The operator is also on call 24 hours per day, seven days a week for after-hours coverage. The plant is manually operated with controls installed for automatic shutdown in case of operational emergencies. Whenever a plant shutdown occurs or high or low headwater levels are detected, staff at the Licensee's Wissota Hydroelectric Project control center are automatically notified. The control center is staffed 24 hours a day, year-round. Reservoir elevations are continuously monitored electronically and confirmed with staff gages on the overflow spillway and powerhouse intake. Tailwater is monitored manually via a staff gage downstream of the powerhouse.

During normal operations, the generating unit and spillway stoplogs are manually operated to maintain a steady reservoir elevation. Flows in excess of the 8 cfs minimum flow are primarily passed through the powerhouse. Flows in excess of the Project's hydraulic capacity are passed through the overflow spillway. For emergency operation, an operator is available 24 hours a day and is also supported by backup operators dispatched from St. Croix Falls, Wisconsin within 90 minutes (NSPW, 2010).

3.4.1.2 Proposed Operation

NSPW proposes to continue operating the Hayward Project in the same manner it is currently operated.

3.4.2 Trego Project Operation

3.4.2.1 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 mode protects water quality, aquatic habitat, and other aquatic resources in the Namekagon River.

Under normal operating conditions, the Licensee maintains the Project reservoir at a target elevation of 1034.9 feet, with fluctuations limited to +/- 0.3 feet around the target elevation). Run-of-river operations may be temporarily modified if required by operating emergencies beyond the control of the Licensee and for short periods upon mutual agreement between the Licensee, WDNR, National Park Service (NPS), and USFWS. If flow is modified, the Licensee must notify the Commission as soon as possible, but no later than 10 days after the incident (FERC, 1994).

One operator is assigned to oversee the daily operation and routine maintenance of both the Hayward and Trego Projects. Eight-hour coverage is provided five days a week, Monday through Friday. The operator is also on call 24 hours per day, seven days per week for after-hours coverage. Headwater and tailwater elevations are continuously monitored electronically and manually confirmed with staff gages mounted on the Project headworks and tailwater. Headwater and tailwater levels are also transmitted to NSPW's Wissota Hydroelectric Project for remote monitoring, which occurs 24 hours a day, year-round.

The powerhouse is normally operated automatically with both generators operated to maintain a near constant full-pond elevation. A minimum flow of 230 cfs is maintained through one turbine unless stream flow is less than that amount, at which point all stream flow is passed. If either generator stops at any time, a back-up system assures downstream flows are maintained. The back-up system is battery-operated and automatically opens the sluice gate to allow approximately 250 cfs of water to bypass the powerhouse. For emergency operation, an operator is available 24 hours a day and is also supported by backup operators dispatched from St. Croix Falls, Wisconsin (NSPW, 2016).

3.4.2.2 Proposed Operation

NSPW proposes to continue operating the Trego Project in the same manner it is currently operated.

3.4.3 References

- Federal Energy Regulatory Commission. (1994). Order Issuing Subsequent License P-2711 (Minor Project). Issued June 2, 1994.
- Federal Energy Regulatory Commission. (1995). Order Issuing Subsequent License P-2417 (Minor Project). Issued September 1, 1995.
- Northern States Power Company-Wisconsin. (2010). Hayward Hydroelectric Project, FERC No 2417. Supporting Technical Information Document. June 2010.
- Northern States Power Company-Wisconsin. (2016). Trego Hydroelectric Project, FERC No 2711. Supporting Technical Information Document. November 2016.

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

3.5.1 Other Project Information - Hayward Project

3.5.1.1 Hayward Project Current License Requirements

The Project license includes a series of articles that specify actions the Licensee must take to remain in compliance with the license terms and conditions. FERC issued the Project license on September 1, 1995 (FERC, 1995). The license term was adjusted to coincide with the November 30, 2025 expiration of the Trego Project per FERC Order issued on May 1, 1996 (FERC, 1996). The license conditions are summarized below in **Table 3.5.1.1-1** and a copy of the existing license and FERC's May 1, 1996 Order are included in **Appendix 3.5.1.1-1**.

Table 3.5.1.1-1: Hayward Project Current License Conditions

License Article	Brief Description	Comments
Article 201	Requires Licensee to pay the U.S. an annual charge based on the authorized installed capacity of 224 horsepower.	
Article 202	Requires Licensee to file approved exhibit drawings and aperture cards within 45 days of license issuance.	
Article 203	Requires Licensee to remove dead trees and properly dispose of all waste material resulting from the maintenance, operation, or alteration of Project works.	Article deleted by Order on Rehearing issued May 1, 1996
Article 301	Requires Licensee to file Exhibits F and G showing as-built Project facilities within 90 days of completion of construction.	
Article 401	Requires Licensee to file a plan with the Commission to monitor the fly-ash cinders used during the "cindering" process for sealing the stoplogs after replacement within 180 days of license issuance. The purpose of the plan is to ensure that the fly-ash cinders used do not introduce significant contaminants to the Namekagon River.	Order deleting Article 401 issued March 6, 1998
Article 402	Requires Licensee to operate the Project in a run-of-river mode for the protection of water quality, aquatic habitat, and other aquatic resource values in the Namekagon River. Flows as measured immediately downstream of the Project tailrace must approximate the sum of inflows to the Project impoundment. The Licensee must also maintain the elevation of the Project impoundment at a target elevation of 1,187.4 feet with a fluctuation around the target elevation such that the impoundment is maintained between 1,187.0 feet and 1,187.5 feet under normal operating conditions.	
Article 403	Requires Licensee to file a plan to monitor compliance with the run-of-river mode of operation and any flow requirements required by Articles 402, 404, and 405 within 180 days of license issuance.	Order modifying and approving Plan issued May 7, 1997
Article 404	Requires Licensee to file a plan with the Commission to minimize extended periods without flow releases downstream from the Project within 180 days of license issuance.	Order modifying and approving Plan issued May 7, 1997
Article 405	Requires Licensee to release a minimum flow of 8 cfs into the bypassed reach of the Namekagon River or inflow to the Project impoundment, whichever is less, for the protection of fish and wildlife resources and water quality in the bypassed reach of the Namekagon River.	
Article 406	Requires Licensee to file a plan to enhance the aquatic habitat in the bypassed reach and enhance the canoe portage within 180 days of license issuance.	Order approving plan issued February 24, 1997

License Article	Brief Description	Comments
Article 407	Requires Licensee to file a plan to protect fish in Hayward Lake from entrainment through the Project within 180 days of license issuance.	Order modifying and approving plan issued April 10, 1997
Article 408	Commission reserved authority to require fishways as may be prescribed by Secretary of the Interior, pursuant to Section 18 of the FPA.	
Article 409	Requires licensee to file a plan to manage Licensee-owned Project lands for wildlife habitat within 1 year of license issuance.	Plan requirement eliminated by Order on Rehearing issued May 1, 1996
Article 410	Requires Licensee to file a plan to monitor purple loosestrife within 6 months of license issuance.	Order approving plan issued July 16, 1997
Article 411	Requires Licensee to file a drawdown management plan for the control of nuisance aquatic weed growth on Hayward Lake within 6 months of license issuance.	Order modifying and approving plan issued May 6, 1998
Article 412	Requires Licensee to protect potential perch and nest trees for the bald eagle on the Licensee-owned Project lands to protect bald eagles.	
Article 413	Requires Licensee to implement provisions of “Programmatic Agreement among the Federal Energy Regulatory Commission, The Advisory Council on Historic Preservation, The Wisconsin State Historic Preservation Officer, and the 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” and the provisions of its approved cultural resources management plan.	FERC approved plan via letter issued April 4, 1997
Article 414	Requires Licensee to monitor recreational use to determine whether recreation facilities are meeting recreation needs and file a report to the Commission every 6 years during the term of the license.	
Article 416	Standard Land Use Article that allows the Licensee to grant permission for certain types of use and occupancy of Project lands and waters and covey interests in Project lands and waters for certain types of use and occupancy without prior Commission approval.	
Article 502	Requires Licensee to reimburse upstream licensees, permittees, or the United States if the Project was directly benefitted by construction work on a storage reservoir or other headwater improvement.	

3.5.1.2 Hayward 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.

3.5.1.3 Hayward Project Summary of Project Generation and Flow Records

Generation and flow records for the last seven years are summarized in **Table 3.5.1.3-1**. Dependable capacity from 2010 through 2019 was 0.2 MW.

Table 3.5.1.3-1: Summary of Hayward Project Generation and Flow Records

Time Period	Annual Generation (MWh)	Monthly Average Generation (MWh)	Average Outflow* (cfs)
1/1/2012 to 12/31/2012	1,407	117.3	170
1/1/2013 to 12/31/2013	1,246	103.8	267
1/1/2014 to 12/31/2014	1,331	110.9	303
1/1/2015 to 12/31/2015	1,313	109.4	205
1/1/2016 to 12/31/2016	1,293	107.8	343
1/1/2017 to 12/31/2017	925**	77.1	273
1/1/2018 to 12/31/2018	0**	0	293

Note: * Average outflow as measured at Leonards, WI United States Geological Survey (USGS) Gage No. 05331833 and adjusted according to drainage basin area at the Project dam.
** No generation from October 2017 to December 2018.

3.5.1.4 Hayward Project Current Net Investment

Project net investment will be provided in the DLA.

3.5.2 Other Project Information - Trego Project

3.5.2.1 Trego Project Current License Requirements

The Project license includes a series of articles that specify actions the Licensee must take to remain in compliance with its license terms and conditions. FERC issued the Project license on June 2, 1994, which went into effect on June 1, 1994 (FERC, 1994). The license conditions are summarized below in **Table 3.5.2.1-1.** A copy of the current license is included **Appendix 3.5.2.1-1**.

Table 3.5.2.1-1: Trego Project Current License Conditions

License Article	Brief Description	Comments
Article 201	Requires Licensee to pay annual charges for 1,880 hp installed capacity.	
Article 202	FERC reserves the authority to require the Licensee to conduct studies, make financial provisions, or otherwise make reasonable provisions for decommissioning the Project.	
Article 401	Requires Licensee to operate the Project in a run-of-river mode so streamflow as measured immediately downstream of the Project tailrace approximates the sum of inflows to the Trego impoundment. Under normal operating conditions, the Licensee is required to maintain the	

License Article	Brief Description	Comments
	elevation at a target elevation of 1039.4 feet, with fluctuations limited to 0.3 feet around the target elevation, between elevations 1034.6 feet and 1035.2 feet.	
Article 402	Requires Licensee to operate and maintain existing headwater and tailwater streamflow monitoring equipment and staff gages to monitor compliance with run-of-river mode of operation as stipulated by Article 401.	
Article 403	Requires Licensee to provide $5,000 for sturgeon restoration and $500 for a study to assess the potential for restoring the gilt darter to the WDNR within 6 months of license issuance. If the survey identifies suitable habitat for the gilt darter, the Licensee is required to provide up to $2,000 to the WDNR for restoration efforts.	Donation to WDNR: Original donation of $5,500 paid November 14, 1994 Final donation of $1,200 paid August 22, 1997
Article 404	FERC reserved authority to require the Licensee to construct, operate, and maintain fishways that may be prescribed by the Secretary of the Interior, pursuant to Section 18 of the FPA.	
Article 405	Requires Licensee to submit a drawdown plan to the Commission including a needs analysis and a drawdown implementation plan if a need is identified. Needs analysis was required to be filed within 6 months of license issuance. Implementation plan was required to be filed within 6 months of identifying the need for a drawdown.	Drawdown needs analysis approved in order issued October 31, 1995 Implementation plan need reviewed every 6 years
Article 406	Requires Licensee to implement the provisions of the “Programmatic Agreement among FERC, ADHP, and Wisconsin SHPO for the Management of Historic Properties Affected by the Trego Hydroelectric Project” executed on June 16, 1992 and the approved cultural resources management plan.	CRMP approved via FERC order issued December 27, 2007
Article 407	Requires Licensee to: 1) Provide signs indicating the parking area for walk-in fishing off North River Road, 2) provide trash receptacles and portable toilets at the existing portage trail from Memorial Day to Labor Day each year, and 3) periodically cut emergent aquatic vegetation that is upstream canoe take-out area.	
Article 408	Requires Licensee to monitor recreation use at the Project to determine whether existing recreation facilities are meeting recreation needs beginning within 6 years of license issuance and every 6 years thereafter. The report must discuss annual recreation use figures, adequacy of Licensee’s recreation facilities to meet recreation demand, a description of methodology used, whether there is need for additional facilities, and documentation of consultation with the resource agencies.	Recreation Reports filed in 1997, 2003, 2009, and 2015
Article 409	Standard Land Use Article that allows the Licensee to grant permission for certain types of use and occupancy of project lands and waters and covey interests in project lands and waters for certain types of use and occupancy without prior Commission approval.	

3.5.2.2 Trego 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 current license.

3.5.2.3 Trego Project Summary of Project Generation and Flow Records

Generation and flow records for the last seven years are summarized in **Table 3.5.2.3-1**. Dependable capacity from 2010 to 2019 was 700 kW.

Table 3.5.2.3-1: Summary of Trego Project Generation and Flow Records

Time Period	Annual Generation (MWh)	Monthly Average Generation (MWh)	Average Outflow* (cfs)
1/1/2015 to 12/31/2015	8,520	710.0	469
1/1/2016 to 12/31/2016	9,904	825.3	555
1/1/2017 to 12/31/2017	9,975	831.3	558
1/1/2018 to 12/31/2018	9,389	782.4	536
1/1/2019 to 12/31/2019	9,838	819.8	579

*Note: Average outflow as measured at Trego Dam by NSPW.

3.5.2.4 Trego Project Current Net Investment

Project net investment will be provided in the DLA.

3.5.3 References

- Federal Energy Regulatory Commission. (1994). Order Issuing License P-2711. Issued June 2, 1994.
- Federal Energy Regulatory Commission. (1995). Order Issuing Subsequent License P-2417 (Minor Project). Issued September 1, 1995.
- Federal Energy Regulatory Commission. (1996). Order on Rehearing of Order Issuing License to Northern States Power Company for Hayward Project, P-2417. Issued May 1, 1996.

4. Description of Existing Environment and Resource Impacts

This section summarizes the existing environment and resources related to the Hayward and Trego Projects.

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

The Namekagon River is a small river that originates from Namekagon Lake in southern Bayfield County, Wisconsin. The river flows approximately 100 miles through Bayfield, Sawyer, Washburn, and Burnett Counties before its confluence with the St. Croix River. It is the largest tributary to the St. Croix River and has a rather uniform gradient of 6 to 8 feet per mile (NSPW, 1991a; NSPW, 1991b). From Lake Namekagon, the river flows approximately 33 miles southwest to the Hayward Project and continues flowing southwesterly for another 37 miles to the Trego Project. At the Trego Project, the river begins flowing northwesterly for its final 30 miles before entering the St. Croix River (USGS, 2016).

The entire mainstem of the Namekagon River is included in the Wild and Scenic Rivers System as part of the St. Croix National Scenic Riverway, which was established as a result of the enactment by Congress of the Wild and Scenic Rivers Act in 1968 (NSPW, 1991a; NSPW,1991b).

The Upper Namekagon River Watershed has a drainage area of approximately 488 square miles. The drainage area extends 206 square miles upstream of the Hayward Dam and 488 square miles upstream of the Trego Dam (NSPW, 1991a; NSPW, 1991b). The Upper Namekagon River Watershed, which includes the Hayward Project, is dominated by forests and wetlands (WDNR, 2020a). The Trego Lake-Middle Namekagon River Watershed, which encompasses the Trego Project, is dominated by forests, wetlands, and grasslands (WDNR, 2020b).

The NPS developed the General Management Plan for the Upper St. Croix and Namekagon Rivers (NPSMP) in 1998 to guide future development and management of federally owned lands within the riverway. The lands near Lake Hayward were designated as Urban Recreation Areas, where buildings, structures, or other signs of civilization dominate the landscape, yet natural elements remain. Most development consists of commercial, residential, and community facilities, with few or no NPS facilities. On non-federal lands, NPS encourages tribal, state, county, municipal, and private landowners within the riverway boundary to manage their lands in a manner consistent with the NPS designations. Lands adjacent to Lake Trego were designated as Developed Recreation Areas where high density, clustered, and sensitively placed planned developments that blend with the Northwoods ecosystem are permitted. This classification can accommodate a moderate to high level of recreation or development (NPS, 1998).

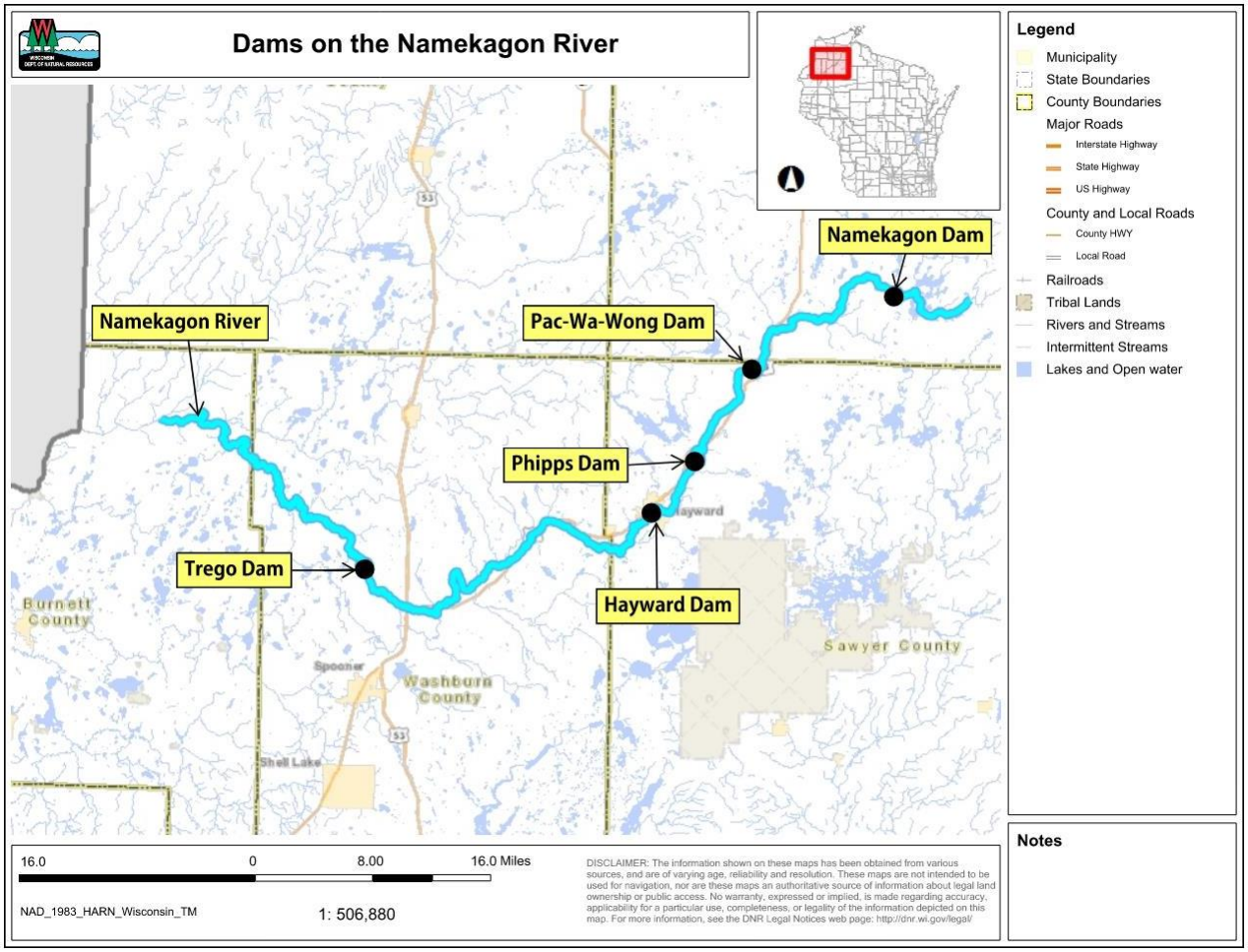
In Wisconsin, development is vested with the counties and municipalities. As such, the City of Hayward and Sawyer County shoreland and floodplain zoning regulations apply to development within the Hayward Project while Washburn County shoreland and floodplain zoning regulations apply to the Trego Project.

There are two FERC-licensed hydroelectric projects and three state-regulated dams on the Namekagon River; all are listed from upstream to downstream in **Table 4.1-1** and are shown in **Figure 4.1-1**. The FERC-regulated dams include the Hayward and Trego 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 Namekagon River

Dam Name	Owner	County	National Dam Inventory No.	FERC or State Regulated	FERC No.	Authorized Capacity
Namekagon	Town of Namekagon	Bayfield	WI-00623	State	N/A	N/A
Pac-Wa-Wong	US Department of the Interior	Sawyer	WI-10489	State	N/A	N/A
Phipps	US Department of the Interior	Sawyer	WI-10488	State	NA	NA
Hayward	NSPW	Sawyer	WI-00795	FERC	P-2417	168 kW
Trego	NSPW	Washburn	WI-00812	FERC	P-2711	1,200 kW

Figure 4.1-1: Dams on the Namekagon River



4.1.1 Hayward Project

The Hayward Project is located in northwestern Sawyer County, Wisconsin, approximately 50 miles southwest of the City of Ashland and 85 miles north of the City of Eau Claire, Wisconsin. The Project's structural facilities, including the dam and powerhouse, are located in Section 27, Township 41 North, Range 9 West. The dam impounds the Namekagon River creating a 244.2-acre reservoir (Lake Hayward), which extends about 2.25 miles upstream of the t dam (Mead & Hunt, 2020; NSPW, 1991a). Municipalities within the current Project boundary include the City of Hayward and Town of Hayward.

4.1.2 Trego Project

The Trego Project is located in west central Washburn County, Wisconsin, approximately 8 miles north of the City of Spooner and 81 miles north of the City of Eau Claire, Wisconsin. The Project's structural facilities, including the dam and powerhouse, are located in Section 17, Township 40 North, Range 12 West. The dam impounds the Namekagon River creating a 462.5-acre reservoir (Trego Lake), which extends about 6 miles upstream of the dam (Mead & Hunt, 2020; NSPW, 1991b). Municipalities within the current Project boundary include the Town of Trego.

4.1.3 Major Land Uses

WDNR developed a detailed land cover database for the State of Wisconsin called Wiscland 2 (WDNR, 2016). Based on Wiscland 2 data, major land uses within the existing Hayward Project boundary include 76.8% open water, 12.2% coniferous forest, 5.0% wetland, and 6.0% developed land. Major land uses within the existing Trego Project boundary include 69.9% open water, 13.3% coniferous forest, 10.0% wetland, 4.5% deciduous forest, 1.6% developed land, and 0.7% mixed forest. Maps showing the major land uses in the vicinity of the Hayward Project and Trego Project are included in **Figure 4.1.3-1 and Figure 4.1.3-2**, respectively.

The Hayward Project is located within the City of Hayward and Town of Hayward in Sawyer County, Wisconsin. Major land uses in the City of Hayward consist of 52.7% residential, 45.2% commercial, and 2.1% manufacturing (City of Hayward, 2010). Major land uses in the Town of Hayward consist of 49.8% agricultural, 16.5% woodland, 11.0% open space, 8.0% residential, 6.4% water bodies and wetlands, 4.8% transportation, 2.8% commercial and industrial, and 0.6% vacant (Town of Hayward, 2009).

The Trego Project is located within the Town of Trego in Washburn County, Wisconsin. Major land uses within Washburn County consist of 46.0% forestry, 32.2% agricultural, 9.5% residential recreational, 6.8% agricultural recreational, 2.2% resource conservation, 2.2% residential, 0.5% commercial and industrial, and 0.6% other (Washburn County, 2004).

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

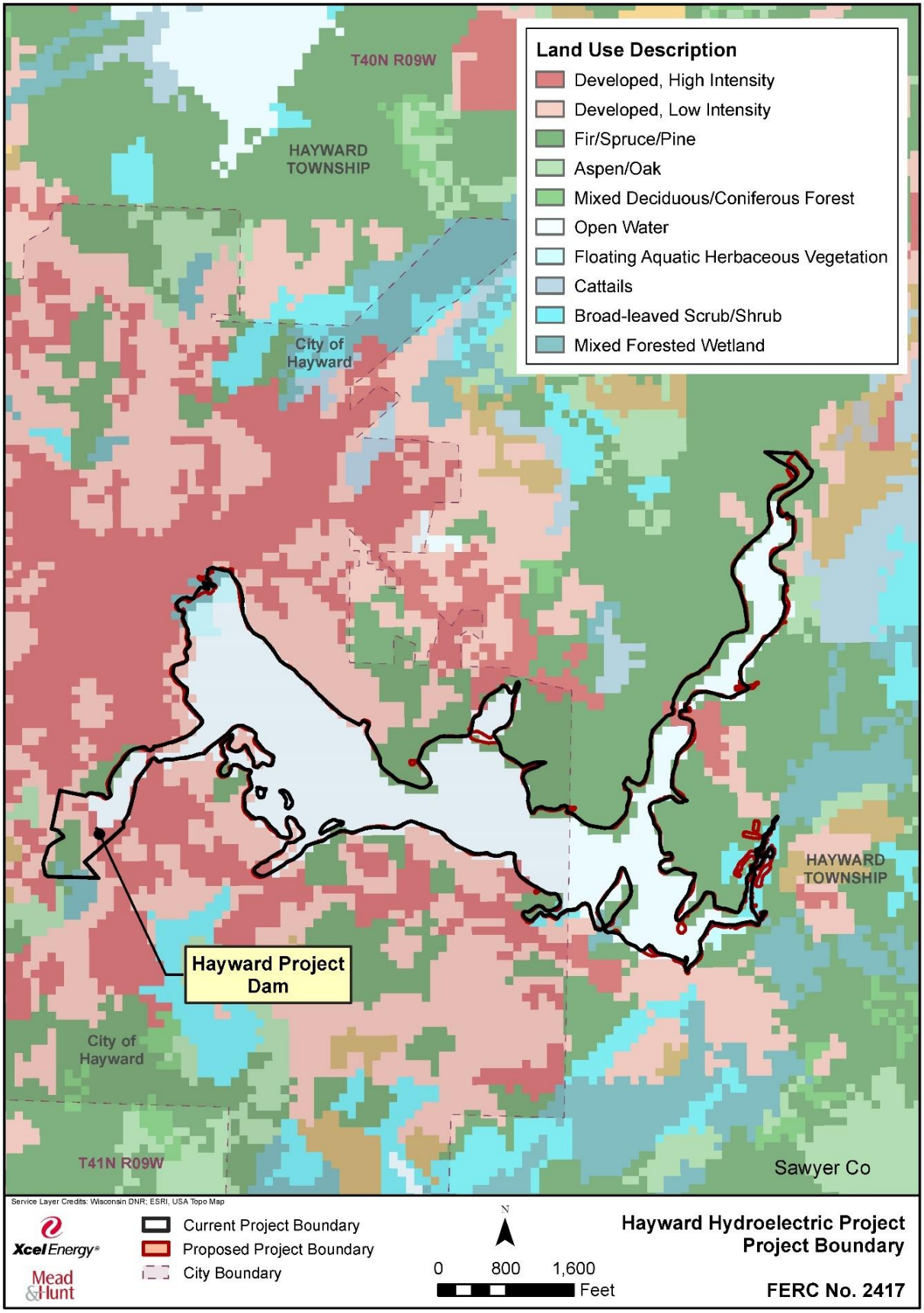
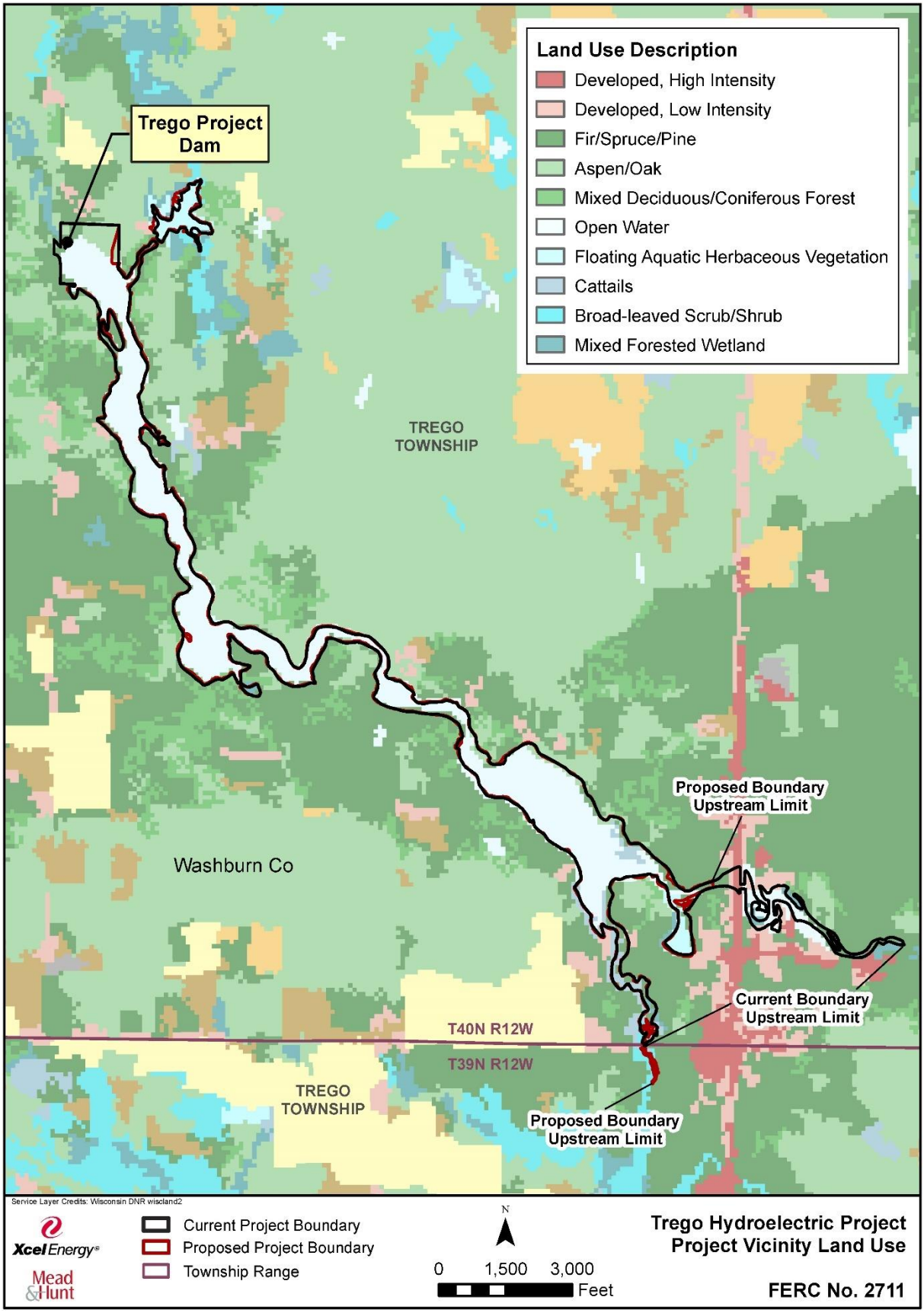


Figure 4.1.3-2: Major Land Uses in the Vicinity of the Trego Project Boundary



4.1.4 Major Water Uses

Historically, the Namekagon River was used heavily as a transportation route between the St. Croix and Chippewa Rivers for native Americans, explorers, missionaries, and fur traders. The Namekagon River was integral for transportation of logs to the St. Croix River during the 1800's timber boom (Namekagonriver.org, 2020).

The Hayward Project was first constructed in the late 1800's. The original dam was built of logs and was used to power a saw mill. The original dam washed out in 1907 and was reconstructed with earth dams and a timber crib spillway. The spillway was surfaced with reinforced concrete in 1918 and the powerhouse was rebuilt in 1928. The Project has been used to generate hydroelectric power since the dam was rebuilt.

The Trego Project was originally constructed between 1926 and 1927. The Project has been operated continuously to produce hydroelectric power with no major changes in design or construction since its original construction.

Aside from hydroelectric power generation, the Namekagon River also provides fish and wildlife habitat and recreational activities that include: fishing, boating, whitewater rafting, canoeing, kayaking, hiking, sightseeing, and hunting.

4.1.5 Project Reservoirs

4.1.5.1 Hayward Project

The Hayward Dam impounds the Namekagon River approximately 33 miles downstream of its origin at Lake Namekagon. The resulting reservoir spans approximately 244.2 acres with a storage capacity of 1,221 acre-feet at maximum reservoir elevation of 1,187.5 feet, as shown in the current Exhibit G maps (Mead & Hunt, 2020).

4.1.5.2 Trego Project

The Trego Dam impounds the Namekagon River approximately 30 miles upstream of its confluence with the St. Croix River. The resulting reservoir spans approximately 462.5 acres with a storage capacity of about 4,625 acre-feet at a reservoir elevation of 1,035.0 feet, as shown in the current Exhibit G maps (Mead & Hunt, 2020).

4.1.6 Climate

Both Projects are located in the Northwest Sands Ecological Landscape in Sawyer and Washburn Counties, Wisconsin. This ecological landscape has a continental climate with cold winters and warm summers, similar to other northern ecological landscapes. The northern ecological landscapes in Wisconsin generally tend to have shorter growing seasons, cooler summers, colder winters, and less precipitation than the ecological landscapes located farther south (WDNR, 2015).

4.1.6.1 Hayward Project

Climate information for the Hayward Project is based on data collected in the City of Hayward. The average monthly minimum temperatures range from -1 degrees Fahrenheit (°F) in January to 55°F in July. The average monthly maximum temperatures range from 23°F in January to 82°F in July. The overall monthly average temperatures range from 11°F in January to 68.5°F in July. The average

annual precipitation is 31.67 inches, with approximately 62% of the precipitation falling during the growing season from May through September. The area receives an average of 59 inches of snow each year (US Climate Data, 2020a).

4.1.6.2 Trego Project

Climate information for the Trego Project is based on data collected in the City of Spooner, located approximately 8 miles south of the Project. The average monthly minimum temperatures range from 1°F in January to 58°F in July. The average monthly maximum temperatures range from 21°F in January to 80°F in July. The overall monthly average temperatures range from 11°F in January to 69°F in July. The average annual precipitation is 31 inches, with approximately 63% of the precipitation falling during the growing season from May through September. The area receives an average of 51 inches of snow each year (US Climate Data, 2020b).

4.1.7 References

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

4.2.1 Geology

Both the Hayward and Trego Projects lie within the Northwest Sands Ecological Landscape, which is the most extensive and continuous glacial outwash system in northern Wisconsin. It has two major geomorphic components which include a large outwash plain pitted with depressions (kettle lakes) and a former spillway of Glacial Lake Duluth and its associated terraces. The spillway is now a river valley occupied by the St. Croix River and Bois Brule River and their tributaries (WDNR, 2015).

4.2.1.1 Hayward Project

The topography surrounding the Hayward Project varies in elevation by approximately 100 feet. The highest land surface elevation of about 1,270 feet descends to the Namekagon River surface elevation of approximately 1,171 feet downstream of the powerhouse (USGS, 2020; NSPW, 2010).

Surficial geology near the Hayward Project is primarily composed of glacial sediment. Geologic maps of the area indicate the underlying bedrock is Cambrian sandstone. Available soil boring records from the Wisconsin Geological and Natural History Survey indicate a 60 to130-foot thick layer of sand and gravel, underlain by sandstone bedrock (NSPW, 2010).

4.2.1.2 Trego Project

The topography surrounding the Trego Project varies in elevation by approximately 196 feet. The highest land surface elevation of about 1,200 feet descends to the Namekagon River surface elevation of approximately 1,004 feet downstream of the powerhouse (USGS, 2020; NSPW, 2016).

Basin topography near the Trego Project is primarily glacial in origin, ranging from flat outwash plains to knob and kettle end moraine. Bedrock is Cambrian sandstone with limited areas of Precambrian crystalline igneous and metamorphic rocks or lava flows (mostly basalt). Bedrock is covered with stratified sands and gravels that vary in thickness from about 50 to 150 feet (NSPW, 2016). Soils at the Project consist mostly of sand and gravel with a thin layer of topsoil. A 15 to 20-foot thick layer of hardpan divides the sand and gravel into upper and lower layers. The foundations and footings of the spillway and powerhouse structures were constructed to terminate in the hardpan layer (NSPW, 1991b).

4.2.2 Soils

4.2.2.1 Hayward Project

There are five soil types throughout the vicinity of the Hayward Project, which are grouped into four major soil associations with distinct soil patterns, relief, and drainage factors (USDA-NRCS, 2020a). **Appendix 4.2.2.1-1** presents a custom soils report and map for the general Project vicinity.

Lenroot loamy sand, Mahtomedi loamy sand, and Seelyeville and Markey 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 Lenroot loamy sand with 0 to 3% slopes (771A), Mahtomedi loamy sand with 0 to 6% slopes (383B), and Seelyeville and Markey soils with 0 to 1% slopes (407A). Soil characteristics are shown in **Table 4.2.2.1-1**.

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

Soil Series	Drainage Classification	Formation	Water Transmittal Capacity	Runoff Class
Lenroot	Moderately well-drained	Outwash plains and stream terraces	High to Very High	Low
Mahtomedi	Excessively drained	Outwash plains and stream terraces	High to Very High	Very Low
Seelyeville and Markey	Very poorly drained	Drainageways and depressions	Very High to High	Negligible

4.2.2.2 Trego Project

There are 16 soil types found throughout the vicinity of the Trego Project, which are grouped into 8 major soil associations with distinct soil patterns, relief, and drainage factors (USDA-NRCS, 2020b). **Appendix 4.2.2.2-1** presents a custom soils report and map for the general vicinity.

Menahga sand, Mahtomedi loamy sand, and Graycalm-Menahga complex soils are the most prevalent soils found in the Project vicinity. The most commonly identified soil classifications in respective order of abundance are the Menahga sand with 6-12% slopes (100C), Mahtomedi loamy sand with 0-6% slopes (383B), Graycalm-Menahga complex with 6-12% slopes (439B). Soil characteristics are shown in **Table 4.2.2.2-1**.

Table 4.2.2.2-1: Prevalent Soil Characteristics in the Trego Project Vicinity

Soil Series	Drainage Classification	Formation	Water Transmittal Capacity	Runoff Class
Menahga Sand	Excessively drained	Outwash plains	High to Very High	Very low
Mahtomedi Loamy Sand	Excessively drained	Outwash plains and stream terraces	High to Very high	Very low
Graycalm-Menahga Complex	Excessively drained to somewhat excessively drained	Outwash plains	High to Very high	Low

4.2.3 Reservoir Shoreline Conditions

In Wisconsin, comprehensive floodplain and shoreland zoning is a function of the county. Sawyer County and Washburn County enforce floodplain and shoreland zoning ordinances for navigable waters in the vicinity of the Hayward and Trego Projects, respectively. Zoning is in place 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; preserve and restore vegetation; and enhance natural scenic beauty (Sawyer County, 2017; Washburn County, 2016).

4.2.3.1 Hayward Project

Lake Hayward is a shallow, narrow body of water that has an approximate 0.3-mile maximum width. The Project is operated in a run-of-river mode with near stable water levels. These factors minimize the likelihood of active bank erosion from wind or wave action. Most of the shoreline around the Project reservoir is heavily developed with permanent or seasonal residential properties. The shoreline is gently sloping and generally only 2 to 3 feet above the water surface (NSPW, 1991a). The Lake Hayward shoreline was surveyed for archaeological evidence in 1998 and 2003. The surveys concluded the reservoir shoreline was very stable and well vegetated with little or no erosion (AVD, 1998; AVD, 2003).

The combination of NSPW shoreline ownership, minimization of reservoir fluctuation, existing native riparian vegetation buffers, local shoreland regulations, and Upper St. Croix and Namekagon River Management Plan provide adequate protection from wide-spread shoreline erosion and over development in the vicinity of the Hayward Project.

4.2.3.2 Trego Project

Trego Lake is a narrow body of water with a maximum width of 0.35-miles. The Project is operated in a run-of-river mode with near stable water levels (NSPW, 1991b). These factors minimize the likelihood of active bank erosion from wind or wave action. The shoreline surrounding Trego Lake is steeply sloped and rises 5 to 35 feet above the water surface (USGS, 2020). Approximately 30% of the shoreline is developed as permanent or seasonal residential properties. NSPW owns the shoreline area in the immediate vicinity of the dam. The Trego Lake shoreline was surveyed for archaeological evidence in 1998 and 2003. The surveys concluded the reservoir shoreline was very stable and well vegetated with little or no erosion (AVD, 1998; AVD, 2003).

The combination of NSPW shoreline ownership, minimization of reservoir fluctuation, existing native riparian vegetation buffers, local shoreland regulations, and NPSMP provide adequate protection from wide-spread shoreline erosion and over development in the vicinity of the Trego Project.

4.2.4 Erosion

The United States Department of Agriculture-Natural Resource Conservation Service (USDA-NRCS) uses a computer software model called Revised Universal Soil Loss Equation Version 2 (RUSLE2) to estimate soil loss from erosion caused by rainfall and its associated flow over the land. Components that are reviewed in RUSLE2 to estimate soil erosion based upon erodibility include the Hydrologic Soil Group, T Factor, and Kf Factor. The USDA-NRCS definition for each component is described in the following paragraphs (USDA, 2001). The USDA-NRCS also provides a representative value in a percentage of sand, silt, and clay in dominant soils (USDA-NRCS, 2020c).

The Hydrologic Soil Group is based upon runoff potential for saturated soils and bare soils. The runoff potential is classified as Group A through Group D, with Group A having the lowest runoff potential and Group D having the highest (USDA-NRCS, 2020c).

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. T Factor values range from 1 ton per acre per year for the most fragile soils that are typically unable to revegetate once eroded to 5 tons

per acre per year for soils that can sustain more erosion and revegetate more successfully once disturbed (USDA-NRCS, 2020c).

The Kf Factor indexes how susceptible a soil surface is to erosion by water. Factors range from 0.02 to 0.64, with 0.02 being the least erodible and 0.64 being the most erodible soils (USDA-NRCS, 2020c). Based upon RUSLE2 information, the lands in the vicinity of the Hayward Project and Trego Project have Kf Factors in the low range because the soils exhibit low runoff susceptibility.

The RUSLE2 components for the most prevalent soil series found in the vicinity of the Hayward Project and Trego Project are presented in **Table 4.2.4-1** and **Table 4.2.4-2** below.

Table 4.2.4-1: Hayward Project Prevalent Soils RUSLE2 Components

Soil	Hydrologic Soil Group	T Factor	Kf Factor	Percent Sand	Percent Silt	Percent Clay
Lenroot loamy sand	Group A	5 tons	0.1	80.5%	17.0%	2.5%
Mahtomedi loamy sand	Group A	5 tons	0.1	82.5%	9.0%	8.5%
Seelyeville and Markey soils	Group B/D	1 ton	N/A*	N/A**	N/A**	N/A**

*Soil is typically located in drainageways and depressions that have negligible erosion.

**Soil is composed of organic material.

Table 4.2.4-2: Trego Project Prevalent Soils RUSLE2 Components

Soil	Hydrologic Soil Group	T Factor	Kf Factor	Percent Sand	Percent Silt	Percent Clay
Menhaga sand	Group A	5 tons	0.02	64.6%	1.4%	45.0%
Mahtomedi loamy sand	Group A	5 tons	0.1	82.5%	9.0%	8.5%
Graycalm-Menhaga complex	Group A	5 tons	0.02 - 0.2	78.0 - 95.0%	1.0 - 16.0%	4.0 - 6.0%

4.2.5 References

- AVD Archaeological Services, Inc. (1998). Archaeological Monitoring at Chippewa Walls (FERC 2440), Trego (FERC 2711), Hayward (FERC 2417), Big Falls (FERC 2390), and Thornapple (FERC 2475) Flowages, Lake Holcombe (FERC 1982) and Lake Wissota (FERC 2567) Hydroelectric Projects. October 2, 1998.
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4.3 Water Resources (18 CFR § 5.6(d)(3)(iii))

The Namekagon River originates from Namekagon Lake in southern Bayfield County, Wisconsin and flows approximately 100 miles through Bayfield, Sawyer, Washburn, and Burnett Counties before its confluence with the St. Croix River (NSPW, 1991a; NSPW, 1991b). Tributaries in the vicinity of the Hayward Project reservoir include Hatchery Creek, Mosquito Brook, Smith Lake Creek, and Wheeler Brook, as shown in **Figure 4.3-1**. Tributaries in the vicinity of the Trego Project reservoir include Bean Brook, Little Mackay Creek, Potato Creek, and Whalen Creek, as shown in **Figure 4.3-2** (USGS, 2016).

Figure 4.3-1: Hayward Project Water Resources

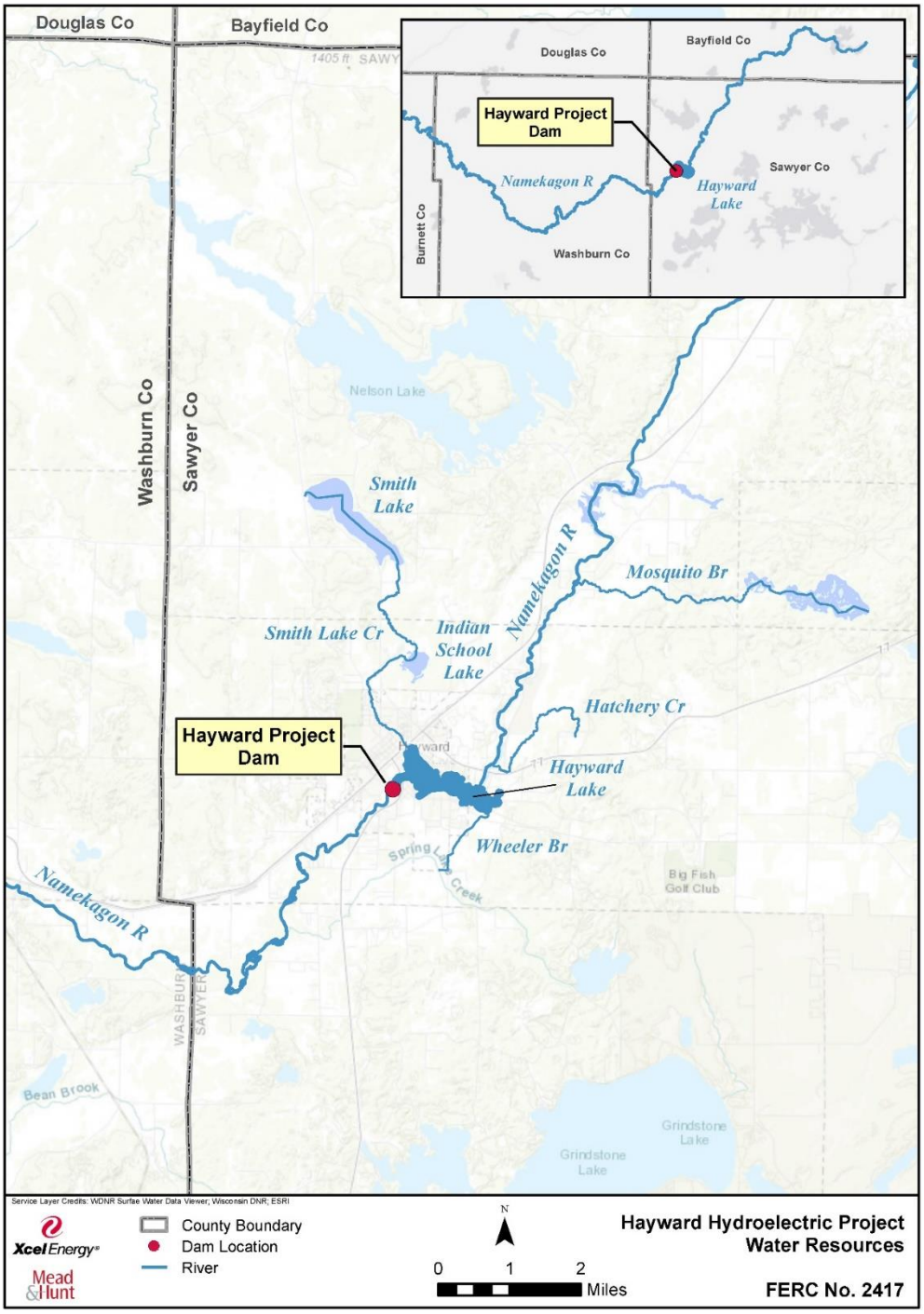
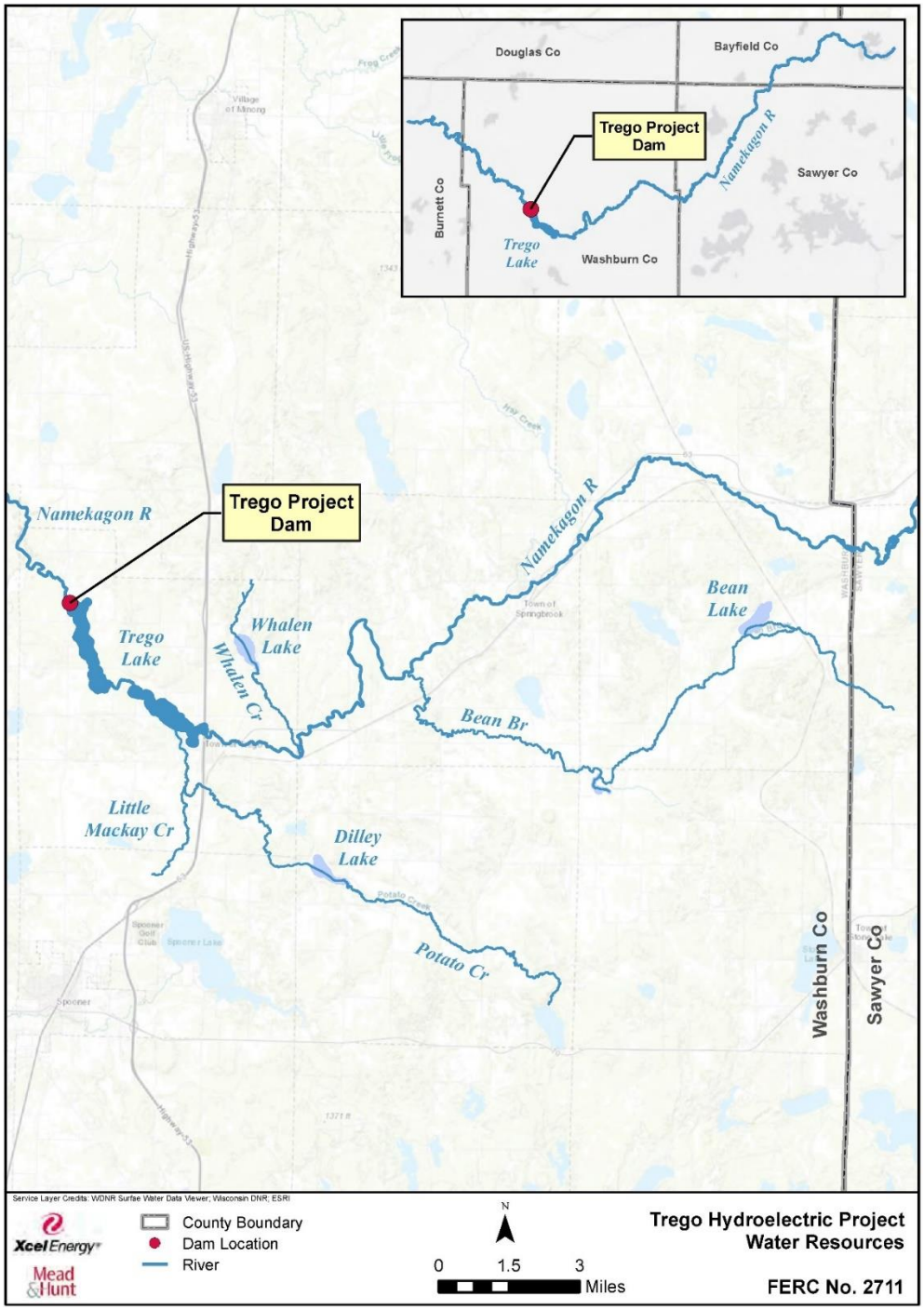


Figure 4.3-2: Trego Project Water Resources



4.3.1 Drainage Area

The drainage area for the Hayward and Trego Projects is located in the Namekagon River subbasin within portions of Bayfield, Burnett, Douglas, Sawyer, and Washburn Counties in northwest Wisconsin. The Namekagon River subbasin is further divided into watershed and subwatershed hierarchies. The National Watershed Boundary hierarchy is listed in **Table 4.3.1-1** on the following page. The watersheds and subwatersheds where the Hayward Project and Trego Project are located are shown in **Figure 4.3.1-1** and **Figure 4.3.1-2**, respectively (USGS-USDA-NRCS, 2013).

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

Hierarchy	WBDHU[1]	Project/Facility	Hydrologic Unit Name
Region	WBDHU2	Both	Upper Mississippi
Subregion	WBDHU4	Both	Saint Croix
Basin	WBDHU6	Both	Saint Croix
Subbasin	WBDHU8	Both	Namekagon
Watershed	WBDHU10	Hayward	Upper Namekagon River
			Trego Lake-Namekagon River
		Trego	Trego Lake-Namekagon River
			Namekagon River
Subwatershed	WBDHU12	Hayward	Hayward Lake-Namekagon River
			Spring Lake Creek-Namekagon River
		Trego	Christensen Creek-Namekagon River
			Little Mackay Creek
			Trego Lake-Namekagon River

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

Figure 4.3.1-1: Hayward Project Water Drainage Areas

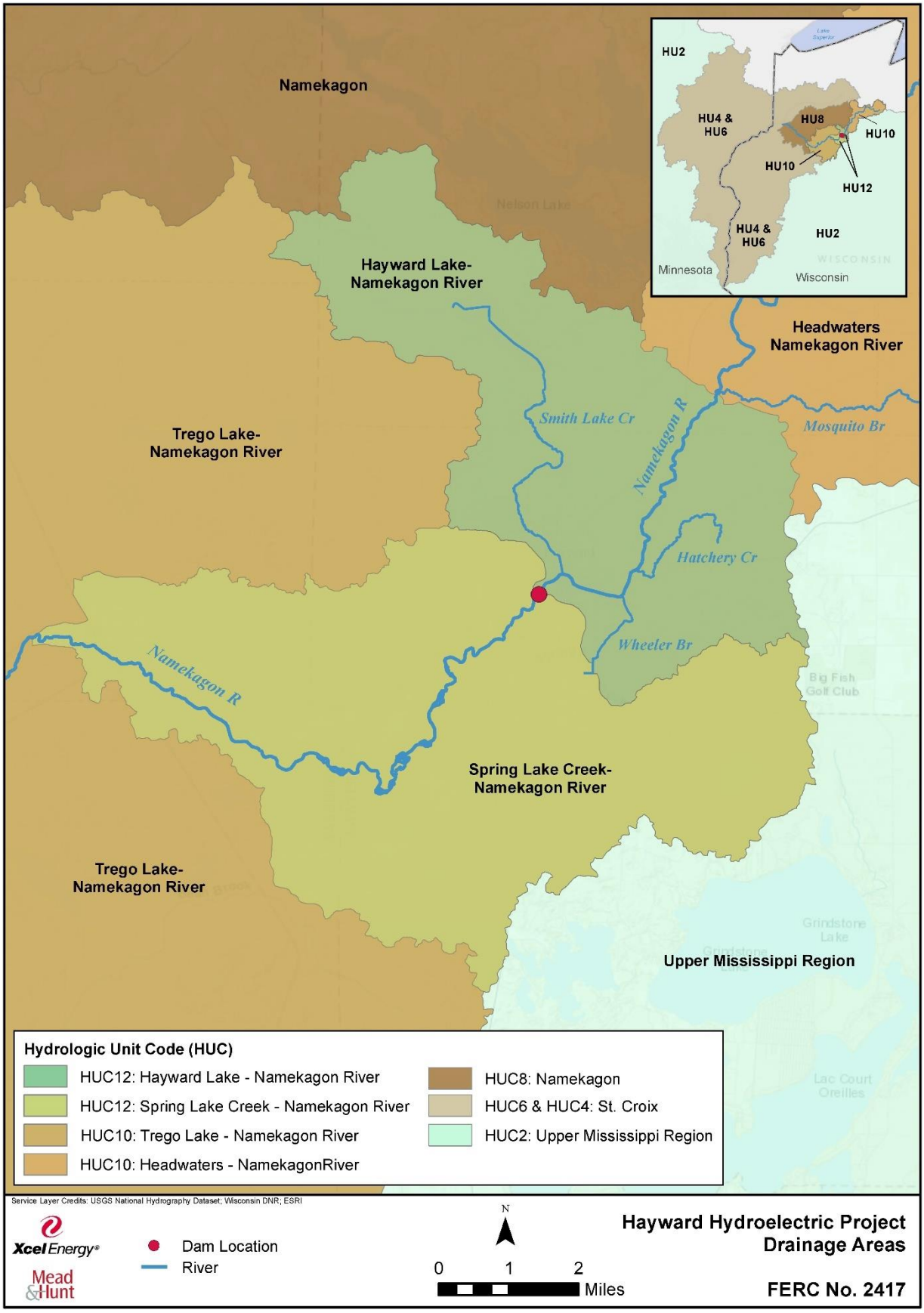
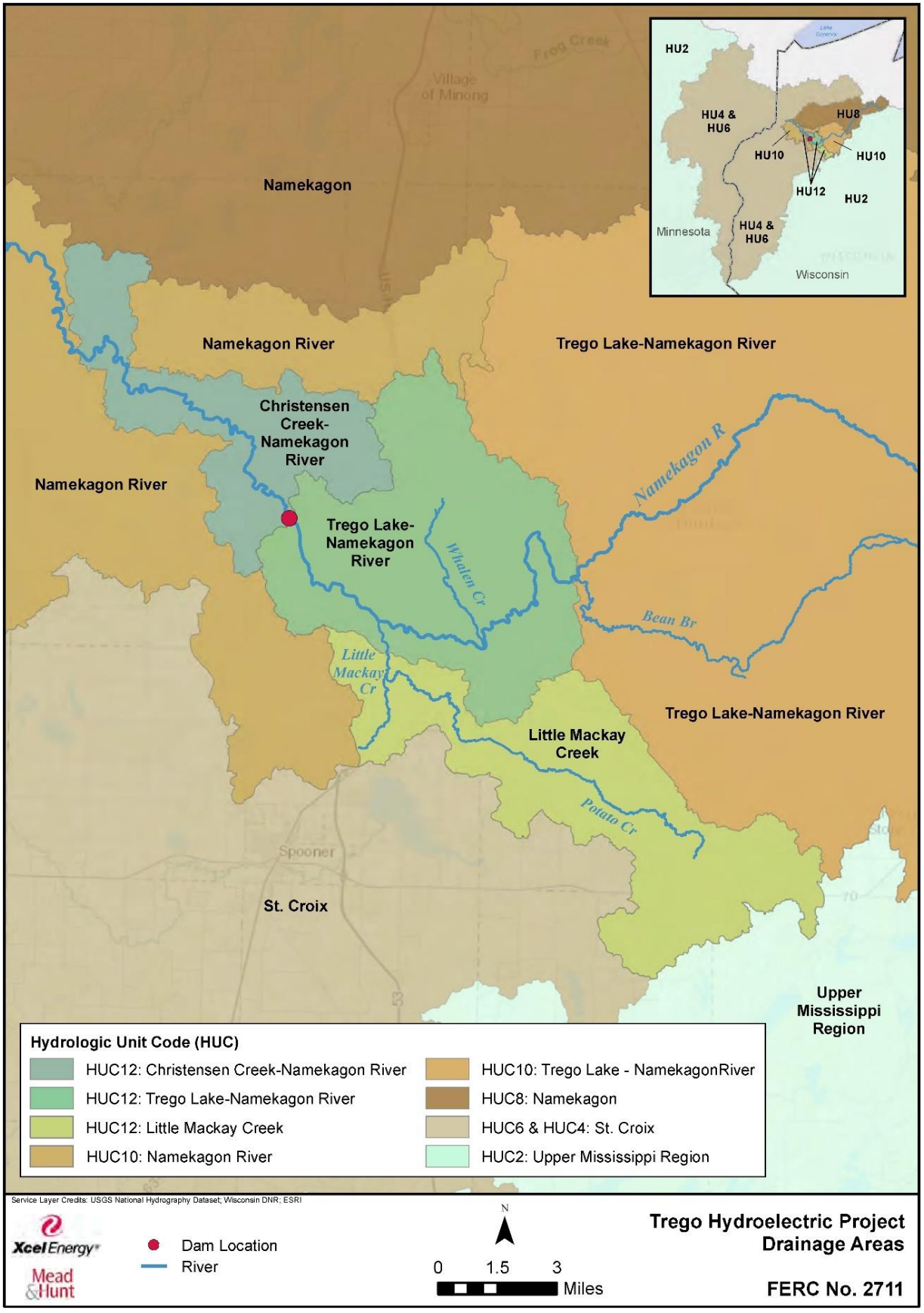


Figure 4.3.1-2: Trego Project Water Drainage Areas



4.3.2 Streamflow, Gage Data, and Flow Statistics

Monthly flow duration curves for the Hayward Project were developed based on data recorded at USGS Gage No. 05331833, which is located at Leonards, Wisconsin. Monthly flow duration curves for the Trego Project were developed based on discharge information collected by the Licensee. While there is a USGS gage in the vicinity of the Trego Project, it does not record daily flow data needed to develop flow duration curves and the USGS gage at Leonards is not located close enough to provide statistically accurate flow information.

4.3.2.1 Hayward Project

USGS Gage No. 05331833 is located at approximately 17 miles upstream of the Hayward Project and has a drainage area of 126 square miles, adjusted for the drainage area of 206 square miles at the Hayward Project dam. The USGS gage data was analyzed from March 1996 to September 2001 and May 2005 to December 2019. Based on the adjusted data for the analyzed period, the average annual calendar year flow at the Project is 220 cfs, the maximum annual calendar year flow was 343 cfs in 2016, and the minimum annual calendar year flow was 128 cfs in 2009.

The Hayward 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 included in **Appendix 4.3.2.1-1**.

Table 4.3.2.1-1: Hayward Project Monthly Minimum, Mean, and Maximum Flows

Month*	Monthly Minimum (cfs)	Monthly Mean (cfs)	Monthly Maximum (cfs)
January	109	161	266
February	86	157	461
March	97	201	749
April	105	335	1,399
May	97	337	1,153
June	93	264	1,609
July	65	219	3,123
August	55	181	675
September	57	182	616
October	78	213	884
November	94	210	592
December	96	180	371

*Measured at Leonards USGS Gage No. 05331833 (1996-2001, 2005-2019).

4.3.2.2 Trego Project

Flow information from the Trego Project was collected for the period of January 2015 to December 2019. There is a drainage area of 488 square miles at the Trego Project. Based on the data for the analyzed period, the average annual calendar year flow at Trego Project was 540 cfs, the maximum annual average calendar year flow was 579 cfs in 2019, and the minimum annual average calendar year flow was 469 cfs in 2015.

The Trego Project 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 in **Appendix 4.3.2.2-1**.

Table 4.3.2.2-1: Trego Project Monthly Minimum, Mean, and Maximum Flows

Month*	Monthly Minimum (cfs)	Monthly Mean (cfs)	Monthly Maximum (cfs)
January	321	444	586
February	349	426	672
March	357	522	691
April	441	582	684
May	430	575	678
June	326	573	682
July	323	544	724
August	319	504	693
September	370	563	736
October	361	605	738
November	385	599	745
December	348	531	753

*Measured at Trego Hydroelectric Project (2015-2019).

4.3.3 Existing and Proposed Uses of Water

4.3.3.1 Existing Uses

The Namekagon River has historically provided water for hydroelectric power production, recreation, and fish and wildlife habitat; these uses continue today.

There are currently no known surface water withdrawals or point source discharges within the Hayward or Trego Project boundary (WDNR, 2020a, WDNR 2020b).

4.3.3.2 Proposed Uses

Both the Hayward Project and Trego Project are operated in a run-of-river mode and do not store water for future releases. NSPW does not propose any changes to the current operation of the facilities.

4.3.4 Existing Instream Flow Uses

4.3.4.1 Hayward Project

Article 405 of the current Hayward Project license requires a minimum flow of 8 cfs or inflow, whichever is less, to be released into the bypassed reach of Namekagon River for the protection of fish and wildlife resources and water quality. The Licensee does not propose any operational changes regarding minimum flows.

4.3.4.2 Trego Project

No minimum flows are required under the Trego Project license. In order to operate in a run-of-river mode, all discharge from the Project powerhouse and spillway is released to the Namekagon River directly downstream of the dam. There is no bypassed reach at the Project. The Licensee does not propose any operational changes regarding minimum flows.

4.3.5 Existing Water Rights

The Licensee owns or has the rights necessary to operate both the Hayward Project and Trego Project.

4.3.6 Reservoir Bathymetry

4.3.6.1 Hayward Project

Hayward Lake is approximately 244.2 acres at the maximum reservoir elevation of 1,187.5 feet (Mead & Hunt, 2020). The WDNR Lakes webpage for Hayward Lake lists the average depth as 5 feet and the maximum depth as 17 feet (WDNR, 2020c). A bathymetric map of Hayward Lake is located in **Appendix 4.3.6.1-1**.

4.3.6.2 Trego Project

Trego Lake is approximately 462.5 acres at elevation 1,035.0 feet (Mead & Hunt, 2020). The WDNR Lakes webpage for Trego Lake lists the average depth of the reservoir as 10 feet and the maximum depth as 35 feet (WDNR, 2020d). A bathymetric map of Trego Lake is located in **Appendix 4.3.6.2-1.**

4.3.7 Water Quality

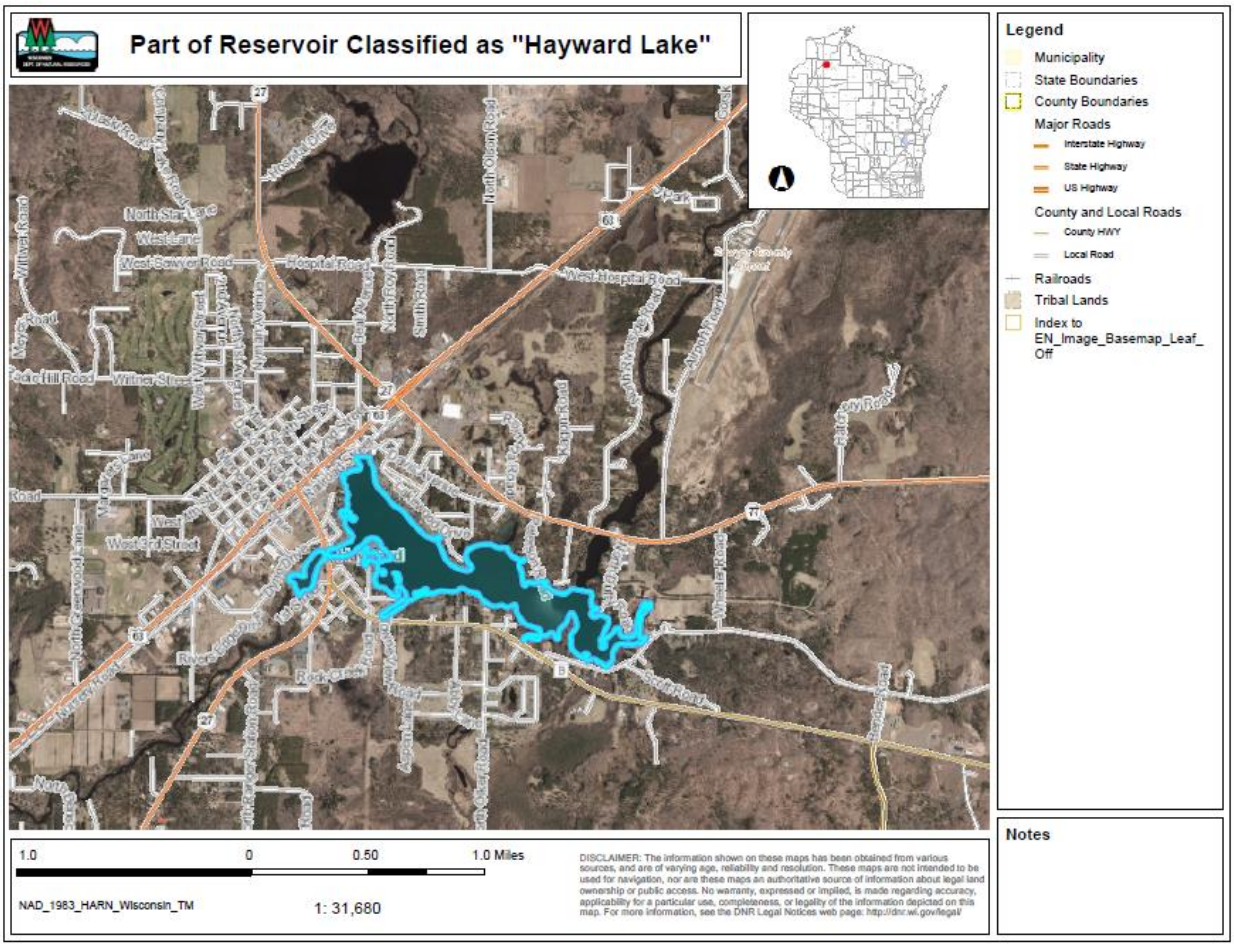
The State of Wisconsin has established water quality standards with Wisconsin Administrative Code Chapter Natural Resources (NR) 102 in order to protect, maintain, and enhance surface waters for a variety of designated uses. The standards set limits for each designated use described below for which water quality cannot be artificially lowered unless a variance has been provided. NR 102 standards are consistent with § 303(c) of the Clean Water Act.

4.3.7.1 River Water Quality Standards

The State of Wisconsin classifies the entire Namekagon River, including both Project impoundments, as Outstanding Resource Waters (ORW). Waters designated as ORW are surface waters that provide outstanding recreational opportunities, support valuable fisheries and wildlife habitat, have good water quality, and are not significantly impacted by human activities (WDNR, 2020e).

The State of Wisconsin considers Hayward Lake as only that portion of the impoundment outlined in blue as shown in **Figure 4.3.7.1-1**. The upper reaches of the impoundment outside of the area classified as Hayward Lake is considered part of the Namekagon River in regard to water quality standards.

Figure 4.3.7.1-1 Part of Reservoir Classified as "Hayward Lake"



The Namekagon River upstream of Hayward Lake is classified as a cold-water, class II trout stream whereas the river from the Hayward Dam downstream to Trego Lake is considered a warm-water stream. All waters within both Project boundaries have designated uses for fish and aquatic life, general recreation, public health and welfare, and fish consumption. The State of Wisconsin standards for each designated use are described below.

Fish and Aquatic Life Standards

Criteria requirements:

- pH shall be between 6.0 and 9.0 for all surface waters,
- Surface water dissolved oxygen (DO) shall not be lowered below 5 milligrams per liter (mg/L) at any time,
- DO in classified trout streams shall not be lowered to less than 6 mg/L at any time, nor be lowered to less than 7 mg/L during the spawning season, and
- Total phosphorus of less than 75 micrograms per liter (0.075 mg/L).

Temperature Standards

Waters within the Project boundaries are subject to two different temperature standards. The Namekagon River upstream of Hayward Lake is subject to "Cold Waters" temperature standards, while Hayward Lake and Trego Lake are subject to the "Inland Lake/Impoundment" temperature standards. **Table 4.3.7.1-1** shows maximum temperatures allowed each month for the specific water classifications.

Table 4.3.7.1-1: Maximum Temperatures for Specified Water Classifications

Month	Maximum Acute Temperatures (ºF)	
	Cold Waters	Inland Lakes/ Impoundments
January	68	77
February	68	78
March	69	78
April	70	80
May	72	82
June	72	86
July	73	87
August	73	87
September	72	85
October	70	81
November	69	78
December	69	77

Source: NR102, see Appendix 4.3.7.1-1.

Recreational Use Standards

A recreational use classification requires the geometric mean of bacterial counts of E. coli (*Escherichia coli)* to be below 126 counts per 100 ml based on a rolling 90-day period during the recreation season.

Public Health and Welfare Standards

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**.

Fish Consumption Standards

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**.

4.3.7.2 Reservoir Water Quality Standards

Under NR 102.06, a waterbody is classified as a reservoir by the State of Wisconsin if there is a dam that raises water depth more than two times compared 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, both the Hayward and Trego reservoirs are classified as "impounded flowing waters" but not a "reservoir" since the water does not have a residence time exceeding 14 days at either Project. Therefore, the Hayward and Trego reservoirs are subject to the stream total phosphorous criterion of less than 75 micrograms per liter rather than the more restrictive "reservoir" criterion.

4.3.8 Water Quality Data

4.3.8.1 Historic Water Quality Data

Hayward Project

The FERC License issued on September 1, 1995, indicated that water quality monitoring studies conducted between 1989 and 1990 showed that water quality in Hayward Lake and the Namekagon River was very good. DO concentrations averaged 8.9 mg/L, maximum water temperature recorded was 80.6ºF, total phosphorous averaged 0.024 mg/L, total alkalinity averaged 71.6 mg/L, and total dissolved solids averaged 88.0 mg/L (FERC, 1995). Two water quality concerns were identified in the EA. The first concern was the presence of elevated levels of oil, grease and trace metals (arsenic, chromium, mercury, and lead). These elevated levels were attributed to either point source discharges within the city of Hayward or indirect discharge of contaminants from a leaking underground storage tank in close proximity to the reservoir (FERC, 1995). The second concern was the use of fly-ash/cinders to seal stoplogs and its potential to introduce contaminants to the river. Licensee continues to use bottom-ash cinders to seal stoplogs at the Hayward Project via a *Conditional Grant of Exemption for the Use of Bottom Ash Cinders as a Dam Sealant* issued by the WDNR in 2007. The Conditional Grant of Exemption was extended for 10-years by the WDNR in 2018.

Trego Project

NSPW conducted water quality monitoring upstream and downstream from the Trego Dam in 1989 in conjunction with the previous relicensing effort. State water quality standards were met for all parameters except for a single non-attainment of the DO standard (5.0 mg/L) during August, which was recorded in the deepest part of the reservoir and coincidental with summer stratification. No DO deficiencies were recorded downstream in the Project tailrace (NSPW, 1991b).

4.3.8.2 Existing Water Monitoring Data

Hayward Project

None of the waters associated with the Hayward Project are designated as impaired waters (WDNR 2020f). A review of water quality information identified current data for three water quality monitoring stations within and one outside the Project boundary. Station 1000056697 is located in the Project reservoir and has invasive species monitoring data from 2005 to 2017. Station 10019085 is located at the City Boat Landing and has invasive species monitoring data from 2006 to 2015. Station 583131 is located in a deep hole near the Hayward City Beach and has monitoring data from 1999 to 2014. Station 10022184 is located on the Namekagon River approximately 0.6 miles upstream of the Project boundary and has monitoring data from 2007 and 2008.

A review of the data from these stations shows the pH ranging from 7.0 to 8.5 (7.6 average), total phosphorous ranging from 0.011 to 0.039 mg/L (0.023 mg/L average) and DO ranging from 5.0 to 13.5 mg/L (10.1 mg/L average). Water quality monitoring data for the Hayward Project is located in **Appendix 4.3.8.2-1**.

Trego Project

The State of Wisconsin listed Trego Lake as an impaired water in 2018 due to excessive algal growth from chlorophyll-a levels exceeding the listing threshold for recreation use (WDNR, 2020f).

A review of Wisconsin water quality monitoring data identified four water monitoring stations within the existing Trego Project boundary; all within the reservoir. Station 663162 is located in deep water near the dam and has water quality monitoring data from 2006 to 2014 and 2016 to 2020. Station 663176 is located at the Town of Trego Landing and has monitoring data from 2019. Station 10034498 is located within the reservoir near the inlet of Little Mackay Creek and has water quality monitoring data from 2005 to 2006, 2008 to 2014, and 2016 to 2020. Station 10022021 is located just upstream of the U.S. Highway 53 bridge and has water quality data from 2007 and 2008.

A review of the water quality monitoring data from these sites shows the pH ranging from 6.9 to 8.14 (7.6 average), total phosphorous ranging from 0.006 to 0.069 mg/L (0.028 mg/L average), and DO ranging from 7.9 to 14.3 mg/L (11.2mg/L average). Water quality monitoring data for the Trego Project is located in **Appendix 4.3.8.2-2**.

4.3.8.3 Future Water Quality Monitoring

Based upon historical monitoring data, sufficient information exists to evaluate water quality at both the Hayward and Trego Projects. Additionally, the Licensee is not proposing any changes to the current operation or the addition of any new facilities at either location. As such, the existing water quality data is representative of existing conditions and continued operation at both Projects is not expected to adversely impact water resources in the area.

4.3.9 References

- Federal Energy Regulatory Commission. (1995). Order Issuing Subsequent License P-2417 (Minor Project). Issued September 1, 1995.
- Mead & Hunt. (2020). Geographic Information System-derived current Project boundary, proposed Project boundary, and associated reservoir acreages. September 11, 2020.
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- Northern States Power Company-Wisconsin. (1991b). Application for a Subsequent License for a Minor Water Power Project. Trego Hydroelectric Project, FERC Project No. 2711. March 1991.
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- Wisconsin Department of Natural Resources. (2020d). WDNR Lakes Pages-Trego lake. https://dnr.wi.gov/lakes/lakepages/LakeDetail.aspx?wbic=2712000&page=facts. Accessed August 7, 2020.
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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 have been completed within the Namekagon River and are relevant to the Hayward and Trego Projects. The WDNR provided fish monitoring and stocking data for Hayward Lake on July 29, 2020 and for Trego Lake on July 30, 2020, in response to NSPW's request for information regarding each Project. On August 10, 2020, the WDNR provided mussel and wildlife information for both Projects. All associated information can be found in Section 6.

4.4.1.1 Fisheries

A list of the fish species provided by the WDNR is included in **Table 4.4.1.1-1** and the five most prominent species collected at each Project are described in the following paragraphs.

Hayward Project

Thirty-one species of fish were identified in the vicinity of the Hayward Project based on data provided by the WDNR and collected between 1965 and 2014; the data list is enclosed in **Appendix 4.4.1.1-1**. Of the 8,641 fish identified, the five most predominant species collected included (WDNR, 2020a):

- Bluegill (*Lepomis macrochirus*) at 3,499 or 40.5% (most abundant fish)
- Pumpkinseed (*Lepomis gibbosus*) at 1,493 or 17.3%
- Black crappie (*Pomoxis nigromaculatus*) at 1,263 or 14.6%
- Northern pike (*Esox luscius*) at 953 or 11.0%
- Yellow perch (*Perca flavescens*) at 508 or 5.9%

Trego Project

WDNR data was provided for three locations within the Trego Project, which included Trego Lake (Project reservoir), Namekagon River upstream of Trego Lake, and Namekagon River downstream of Trego Lake.

Trego Lake

Twenty-nine species of fish were identified within Trego Lake based on WDNR data collected between 2003 and 2019; the data list is enclosed in **Appendix 4.4.1.1-2**. Of the 2,041 fish identified, the five most predominant species collected included (WDNR, 2020b):

- Bluegill at 660 or 32.3% (most abundant fish)
- Black crappie at 260 or 12.7%
- Lake sturgeon (*Acipenser fulvescens)* at 205 or 10.0%
- Walleye (*Sander vitreus*) at 180 or 8.8%
- Smallmouth bass (*Micropterus dolomieu*) at 156 or 7.6%

Namekagon River Upstream of Trego Lake

Twenty-eight species of fish were identified in the Namekagon River immediately upstream of Trego Lake based on WDNR survey data collected between 2003 and 2019; the data lists are enclosed in **Appendix 4.4.1.1-3**. Of the 2,193 fish identified, the five most predominant species collected included (WDNR, 2020b):

- Hornyhead chub (*Nocomis biguttatus)* at 244 or 11.1% (most abundant fish)
- Shorthead redhorse (*Moxostoma macrolepidotum*) at 219 or 10.0%

- Common shiner (*Luxilus cornutus)* at 207 or 9.4%
- Blackside darter (*Percina maculata)* at 183 or 8.3%
- Greater redhorse (*Moxostoma valenciennesi*) at 182 each or 8.3%

Namekagon River Downstream of Trego Lake

Six species of fish were identified in the Namekagon immediately downstream of Trego Lake based on WDNR survey data collected between 2003 and 2019; the data lists are enclosed in **Appendix 4.4.1.1-4**. Of the 2,399 fish identified, the five most predominant species collected included (WDNR, 2020b):

- Shorthead redhorse at 629 or 26.2% (most abundant fish)
- Northern hogsucker (*Hypentelium nigricans*) at 498 or 20.8%
- Golden redhorse (*Moxostoma erythrurum)* at 428 or 17.8%
- River redhorse (*Moxostoma carinatum)* at 266 or 11.1%
- Common shiner at 126 or 5.3%

Table 4.4.1.1-1: Fish Species Identified in Previous Fishery Surveys

Fish Species	Scientific Name	Hayward Project	Trego Project
Black bullhead	*Ameiurus melas*	X	X
Black crappie	*Pomoxis nigromaculatus*	X	X
Blacknose dace	*Rhinichthys atratulus*	X	
Blacknose shiner	*Notropis heterolepis*	X	
Blackside darter	*Percina maculata*	X	X
Bluegill	*Lepomis macrochirus*	X	X
Bluntnose minnow	*Pimephales notatus*	X	X
Bowfin	*Amia calva*		X
Brown bullhead	*Ameiurus nebulosus*	X	X
Brown trout	*Salmo trutta*	X	X
Brook trout	*Salvelinus fontinalis*	X	
Burbot	*Lota lota*	X	X
Common logperch	*Percina caprodes*	X	X
Central mudminnow	*Umbra limi*		X
Central stoneroller	*Campostoma anomalum*	X	
Channel catfish	*Ictalurus punctatus*		X
Chestnut lamprey	*Icthyomyzon castaneus*	X	X
Common shiner	*Luxilus cornutus*	X	X
Creek chub	*Semotilus atromaculatus*		X
Fathead minnow	*Pimephales promelas*		X
Gilt darter	*Percina evides*		X
Golden redhorse	*Moxostoma erythrurum*	X	X
Golden shiner	*Notemigonus crysoleucas*		X
Greater redhorse	*Moxostoma valenciennesi*		X
Hornyhead chub	*Nocomis biguttatus*	X	X
Johnny darter	*Etheostoma nigrum*	X	X
Lake sturgeon	*Acipenser fulvescens*		X
Largemouth bass	*Micropterus salmoides*	X	X
Largescale stoneroller	*Campostoma oligolepis*		X
Longnose dace	*Rhinichthys cataractae*	X	X
Madtom	*Noturus spp.*		X

Mimic Shiner	*Notropus volucellus*		X
Mottled sculpin	*Cottus bairdi*	X	
Muskellunge	*Esox masquinongy*	X	X
Northern hogsucker	*Hypentelium nigricans*	X	X
Northern pike	*Esox lucius*	X	X
Pugnose shiner	*Notrpis angogenus*	X	
Pumpkinseed	*Lepomis gibbosus*	X	X
Rainbow trout	*Onchohynchus mykiss*	X	
River Redhorse	*Moxostoma carinatum*		X
Rock bass	*Ambloplites rupestris*	X	X
Shorthead redhorse	*Moxostoma macrolepidotum*	X	X
Silver redhorse	*Moxostoma anisurum*		X
Smallmouth bass	*Micropterus dolomieu*	X	X
Spottail shiner	*Notropis hudsonius*		X
Tiger muskie (northern pike/muskie cross)	*Esox masquinongy X luscius*	X	
Walleye	*Sander vitreus*	X	X
White sucker	*Catostomus commersonii*	X	X
Yellow bullhead	*Ameiurus natalis*	X	X
Yellow perch	*Perca flavescens*	X	X

Fish Stocking Data

The WDNR has routinely stocked fish in both Hayward Lake and Trego Lake. The fish stocking data for the Hayward Lake and Trego Lake are located in **Appendix 4.4.1.1-5** and **4.4.1.1-6**, respectively. From 1979 through 2019, a total of 250 panfish; 5,362 muskellunge (*Esox masquinongy*); and 122,356 walleyes were stocked in Hayward Lake. From 1972 through 2018, a total of 3,319 bluegills; 7,000 crappies; 19,632 lake sturgeon; 58,523 northern pike (*Esox lucius*); 2,030 unspecified panfish; and 2,225,889 walleyes were stocked in Trego Lake (WDNR, 2020a; WDNR, 2020b).

4.4.1.2 Mussels

According to the mussel information provided by the WDNR, there are no federal or state threatened, endangered, or special concern mussel species known to occur in either reservoir. However, listed species may occur downstream from either dam or further upstream from the reservoirs (WDNR, 2020c). **Table 4.4.1.2-1** provides a list of native mussel species that have been identified in the Namekagon River in Sawyer and Washburn Counties.

Table 4.4.1.2-1: Namekagon River Native Mussels Identified within Sawyer and Washburn Counties

Mussel Species	Scientific Name	Sawyer County	Washburn County	State Status
Black Sandshell	*Ligumia recta*	X	X	
Creek Heelsplitter	*Lasmigona compressa*	X		
Creeper	*Stophitus undulatus*	X	X	
Cylindrical papershell	*Anodontoides ferussacianus*	X	X	
Deertoe	*Truncilla truncate*		X	
Elktoe	*Alasmidonta marginata*	X	X	Special Concern
Fatmucket	*Lampsilis siliquoidea*	X	X	
Fluted-shell	*Lasmigona costata*	X	X	

Fragile papershell	*Leptodea fragilis*		X	
Giant floater	*Pyganodon grandis*	X	X	
Hickorynut	*Obovaria olivaria*		X	
Mapleleaf	*Quadrula quadrula*		X	Special Concern
Mucket	*Actinonaias ligamentina*	X	X	
Paper pondshell	*Utterbackia imbecillis*		X	
Pimpleback	*Quadrula pustulosa*		X	
Pink heelsplitter	*Potamilus alatus*		X	
Plain pocketbook	*Lampsilis cardium*	X	X	
Purple wartyback	*Cyclonaias tuberculata*		X	Endangered
Round pigtoe	*Pleurobema sintoxia*	X	X	
Salamander mussel	*Simsonaias ambigua*		X	Threatened
Spike	*Eliptio dilatata*	X	X	
Threeridge	*Amblema plicata*		X	
Wabash Pigtoe	*Fusconaia flava*	X	X	

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 Hayward or Trego Projects (NOAA, 2020).

4.4.3 Fish Entrainment and Mortality

4.4.3.1 Hayward Project

The Hayward Project contains a 10.5-foot high by 12.8-foot wide main trash rack with 1.5-inch clear spacing between the bars and an intake velocity of 1.5 ft/sec at full gate. During the previous relicensing, the WDNR and USFWS speculated that turbine entrainment was a factor limiting the number of young-of-year walleye in Hayward Lake. Article 407 required the Licensee to develop a cooperative fish protection plan in consultation with the WDNR in response to this concern. The plan included deployment of a barrier net in front of the Project's intake structure, conducting effectiveness studies, preparing a final report, and developing a plan for continuing or discontinuing the tested management strategies, including an evaluation of periodic reservoir drawdowns as a resource management tool (FERC, 1997).

Licensee filed a final report with the FERC on February 28, 2012 that included a recommendation from WDNR to terminate the study and the deployment of the barrier net. The WDNR further acknowledged that Hayward Lake did not provide good walleye habitat, and even in the absence of fish entrainment, the original goal of 3 walleye per/acre would not be possible to achieve. The WDNR also concluded there was no compelling resource-based reason to plan for drawdowns (FERC, 2012).

4.4.3.2 Trego Project

The Trego Project contains two separate trash racks, Unit 1 has a 21-foot wide by 17.8-foot high trash rack with 1.5 inch clear spacing between bars. The estimated approach velocity for this unit is 0.87 ft/sec at full gate. Unit 2 has a 13.5-foot wide by 17.8-foot high trash rack with 1.5 inch clear spacing between bars. The estimated approach velocity for this unit is 0.98 ft/sec at full gate (NSPW, 1991b).

4.4.4 References

- Federal Energy Regulatory Commission. (1997). Order Modifying and Approving Integrated Cooperative Fish Protection Plan (FERC No. 2417). April 10, 1997.
- Federal Energy Regulatory Commission. (2012). Fish Barrier Effectiveness Study Final Report (FERC No. 2417). April 6, 2012.
- National Oceanic and Atmospheric Administration. (2020). Essential Fish Habitat Mapper: https://www.habitat.noaa.gov/protection/efh/efhmapper/. Accessed July 27, 2020.
- Wisconsin Department of Natural Resources. (2020a). WDNR Questionnaire Response with Hayward Fish Survey and Stocking Data. July 29, 2020.
- Wisconsin Department of Natural Resources. (2020b). WDNR Questionnaire Response with Trego Fish Survey and Stocking Data. July 30, 2020.
- Wisconsin Department of Natural Resources. (2020c). WDNR Questionnaire Response with Mussel Data. August 4, 2020.

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. Both the Hayward Project and Trego Project are located within the Northwest Sands Ecological Landscape.

4.5.1 Botanical Species

In the mid-1800s, the majority of the lands within the Northwest Sands were covered by boreal forest. Today, the lands within the Northwest Sands Ecological Landscape are mostly covered with barrens and dry forests of jack pine (*Pinus banksiana*) and oak (*Quercus spp*.). Other common tree species included red pine (*Pinus resinosa*), white pine (*Pinus strobus*), tamarack (*Larix laricina*), aspen (*Populus spp*.) and paper birch (*Betula papyrifera*) (WDNR, 2015). A map showing Wisconsin's land cover in the 1800s is included in **Appendix 4.5.1-1**.

4.5.1.1 Hayward and Trego Projects

The main hardwood species include: red maple (*Acer rubrum*), silver maple (*Acer sacharinum*), quaking aspen (*Populus tremuloides*), big tooth aspen (*Populus grandidentata*), paper birch (*Betula papyrifera*), green ash (*Fraxinus pennsylvanica*), black ash (*Fraxinus nigra*), black willow (*Salix nigra*), cottonwood (*Populus deltoides*), and oak species. The main conifer species include red pine, white pine, jack pine, balsam fir (*Avies balsamea*), and black spruce *(Picea mariana*) (NSPW, 1991a; NSPW, 1991b, WDNR, 2016). Cover types identified in Wiscland 2 land cover data within the existing Hayward and Trego Project boundaries are shown in **Table 4.5.1.1-1** and **Table 4.5.1.1-2**, respectively.

Table 4.5.1.1-1: Cover Types within Existing Hayward Project Boundary

General Cover Type Description	Percent Land Cover	Detailed Cover Type Description*	Percent Land Cover
Open Water	76.77%	Open Water	76.77%
Coniferous Forest	12.18%	Fir/Spruce	4.92%
		Jack Pine	1.04%
		Red Pine	2.42%
		White Pine	3.80%
Wetland	5.02%	Floating Aquatic Herbaceous	1.99%
		Other Broad-leaved Deciduous Scrub/Shrub	1.30%
		Tamarack	1.29%
		Black Ash	0.35%
		Mixed Deciduous/Coniferous Forested Wetland	0.09%
Developed Lands	6.05%	Developed-High Intensity	2.42%
		Developed-Low Intensity	3.63%

*Wiscland 2 Level 4 Cover Type

Table 4.5.1.1-2: Cover Types within Existing Trego Project Boundary

General Cover Type Description	Percent Land Cover	Detailed Cover Type Description*	Percent Land Cover
Open Water	69.90%%	Open Water	69.90%
Coniferous Forest	13.30%	Fir/Spruce	2.47%
		Jack Pine	9.67%
		Red Pine	0.18%
		White Pine	1.01%
Wetland	10.03%	Floating Aquatic Herbaceous	4.72%
		Cattails	3.39%
		Tamarack	0.41%
		Aspen Forested Wetland	0.41%
		Other Broad-leaved Deciduous Scrub/Shrub	0.37%
		Other Coniferous Forested Wetland	0.32%
		Broad-leaved Evergreen Scrub/Shrub	0.27%
		Mixed Deciduous/Coniferous Forested Wetland	0.14%
Deciduous Forest	4.45%	Aspen Forest	1.15%
		N. Pin Oak, Black Oak	3.30%
Developed Lands	1.56	Developed-High Intensity	0.55%
		Developed-Low Intensity	1.01%
Mixed Deciduous/ Coniferous Forest	0.73%	Mixed Deciduous/ Coniferous Forest	0.73%
Developed Lands	1.56	Developed-High Intensity	0.55%
		Developed-Low Intensity	1.01%

*Wiscland 2 Level 4 Cover Type

4.5.2 Wildlife

4.5.2.1 Mammal Species

The mammal species likely to be found in the vicinity of the Hayward Project and Trego Project are detailed in **Table 4.5.2.1-1** (NSPW, 1991a; NSPW 1991b; WDNR, 2015).

Table 4.5.2.1-1: Mammal Species in the Vicinity of Both Projects

Mammal Species	Scientific Name
Arctic shrew	*Sorex arcticus*
Badger	*Taxidea taxus*
Beaver	*Castor canadensis*
Bobcat	*Lynx rufus*
Big brown bat	*Eptesicus fuscus*
Black bear	*Ursus americanus*
Deer mouse	*Peromuscus maniculatus*
Coyote	*Canis latrans*

Eastern chipmunk	*Tamias striatus*
Eastern cottontail	*Sylvilagus floridans*
Eastern fox squirrel	*Sciurus niger*
Fisher	*Martes pennanti*
Gray fox	*Urocyon cenereoargenteus*
Gray wolf	*Canis lupus*
Hoary bat	*Lasiurus 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*
Plains pocket gopher	*Geomys bursarius*
Porcupine	*Erethizon dorsatum*
Pygmy shrew	*Microsorex hoyi*
Northern flying squirrel	*Glaucomys sabrinus*
Northern long-eared bat	*Myotis septentionalis*
Raccoon	*Procyon lotor*
Red bat	*Lasiurus borealis*
Red-backed vole	*Clethrionomys gapperi*
Red fox	*Vulpes fulva*
Red squirrel	*Tamiasciurus hudsonicus*
River otter	*Lutra canadensis*
Short-tailed weasel	*Mustela erminea*
Shorttail shrew	*Blarina brevicauda*
Silver-haired bat	*Lasionycteris noctivagans*
Snowshoe hare	*Lepus americanus*
Star-nosed mole	*Condylura cristata*
Striped skunk	*Mephitis mephitus*
Southern bog lemming mouse	*Synaptomys cooperi*
Thirteen-lined ground squirrel	*Citellus tridecemlineatus*
Water shrew	*Sorex palustris*
White-footed mouse	*Peromyscus leucopus*
White-tailed deer	*Odocoileus virginianus*
White-tailed jackrabbit	*Lepus townsendi*
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 Hayward Project and Trego Project are detailed in **Table 4.5.2.2-1** (Cornell Ebird, 2020a; Cornell Ebird, 2020b).

Table 4.5.2.2-1: Bird Species in the Vicinity of Both Projects

Bird Species	Scientific Name
Alder flycatcher	*Empidonax alnorum*
American crow	*Corvus brachyrhynchos*
American goldfinch	*Spinus tristis*
American redstart	*Setophaga ruticilla*
American robin	*Turdus migratorius*
Bald eagle	*Haliaeetus leucocephalus*
Baltimore oriole	*Icterus galbula*
Barn swallow	*Hirundo rustica*
Black and white warbler	*Mniotilta varia*
Belted kingfisher	*Megaceryle alcyon*
Black-billed cuckoo	*Coccyzus erythropthalmus*
Black-capped chickadee	*Poecile atricapillus*
Bluejay	*Cyanocitta cristata*
Blue-winged teal	*Anas discors*
Broad-winged hawk	*Buteo platypterus*
Canada goose	*Branta Canadensis*
Cedar waxwing	*Bombycilla cedrorum*
Chestnut-sided warbler	*Dendroica pensylvanica*
Chipping sparrow	*Spizella passerina*
Chimney swift	*Chaetura pelagica*
Common grackle	*Quiscalus quiscula*
Common loon	*Gavia immer*
Common raven	*Corvus corax*
Common yellowthroat	*Geolthlypis trichas*
Downy woodpecker	*Picoides pubescens*
Eastern bluebird	*Sialia sialis*
Eastern kingbird	*Tyrannus tyrannus*
Eastern phoebe	*Sayornis phoebe*
Eastern towhee	*Pipilo erythropthalmus*
Eastern wood pewee	*Contopus virens*
Golden-crowned kinglet	*Regulus satrapa*
Golden-winged warbler	*Vermivora chrysoptera*
Gray catbird	*Dumetella carolinensis*
Great crested flycatcher	*Myiarchus crinitus*
Green heron	*Butorides verscens*

Hooded merganser	*Lophodytes cucullatus*
House wren	*Troglodytes aedon*
Indigo bunting	*Passerina cyanea*
Least flycatcher	*Empidonax minimus*
Killdeer	*Charadrius vociferus*
Mallard	*Anas platyrhynchos*
Mourning dove	*Zenaida macroura*
Mourning warbler	*Geothylpis philadelphia*
Nashville warbler	*Vermivora ruficapilla*
Northern flicker	*Colaptes auratus*
Northern parula	*Setophaga americana*
Osprey	*Pandion haliaetus*
Ovenbird	*Seiurus aurocapilla*
Pileated woodpecker	*Dryocopus pileatus*
Pine warbler	*Setophago pinus*
Purple finch	*Haemorphous purpureus*
Red-bellied woodpecker	*Melanerpes carolinus*
Red-breasted nuthatch	*Sitta canadensis*
Red-eyed vireo	*Vireo olivaceus*
Red-winged blackbird	*Agelaius phoeniceus*
Rock pigeon	*Columba livia*
Rose-breasted grosbeak	*Pheucticus ludovicianus*
Ruby throated hummingbird	*Archilochus colubris*
Ruffed grouse	*Bonasa umbellus*
Scarlet tanager	*Piranga olivacea*
Song sparrow	*Melospiza melodia*
Spotted sandpiper	*Actitis macularius*
Tree swallow	*Tachycineta bicolor*
Turkey vulture	*Carthartes aura*
Veery	*Catharus fuscescens*
White-breasted nuthatch	*Sitta carolinensis*
White-throated sparrow	*Zonotrichia albicollis*
Wild turkey	*Meleagris gallopavo*
Wood duck	*Aix sponsa*
Yellow-bellied sapsucker	*Sphyrapicus varius*
Yellow-rumped warbler	*Setophaga coronata*
Yellow-throated vireo	*Vireo flavifrons*
Yellow warbler	*Steophaga petechia*

4.5.2.3 Reptile and Amphibian Species

Based on existing habitat within Sawyer and Washburn Counties, 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 both the Hayward and Trego Projects are detailed in **Table 4.5.2.3-1** (WDNR, 2020a; WDNR, 2020b; WDNR, 2020c; WDNR, 2020d; WDNR, 2020e).

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

Reptiles and Amphibians	Scientific Name
American toad	*Anaxyrus americanus*
Blanding's turtle	*Emydoidea blandinii*
Blue-spotted salamander	*Ambystoma laterale*
Boreal Chorus Frog	*Pseudacris triseriata*
Bullfrog	*Rana catesbyiana*
Central newt	*Diemictylus viridescens*
Common gartersnake	*Thamnophis sirtalis*
Common snapping turtle	*Chelydra sepentina*
Common watersnake	*Nerodia sipedon*
Dekay's brownsnake	*Storeria dekayi*
Eastern foxsnake (pine)	*Pantherophis vulpinus*
Eastern gray treefrog	*Hyla versicolor*
Eastern hognose snake	*Heterodon platirhinos*
Eastern tiger salamander	*Ambystoma tigrinum*
False map turtle	*Graptemys pseudogeographica*
Four-toed salamander	*Hemidactylylium scutatum*
Green frog	*Lythobates clamitans*
Mink frog	*Lithobates septentrionalis*
Mudpuppy	*Necturus maculosus*
Northern leopard frog	*Lithobates pipiens*
Northern red-bellied snake	*Storeria occipitomaculata*
Northern ring-necked snake	*Diadophis punctatus edwardsii*
Painted turtle	*Chrysemys picta*
Pickerel frog	*Rana palustris*
Red-backed salamander	*Plethodon cinereus*
Smooth greensnake	*Opheodrys vernalis*
Spiny softshell	*Alpone spinifera*
Spotted salamander	*Ambystoma maculatum*
Spring peeper	*Pseudacris crucifer*
Wood frog	*Lythobates sylvatica*
Wood turtle	*Glyptemys insculpta*

4.5.3 Invasive Species

As outlined in Chapter NR 40 of the Wisconsin Administrative Code (NR 40) it is illegal to possess, transport, transfer, or introduce certain invasive species into the State of Wisconsin without a permit. 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. The WDNR developed a flier to assist in early detection of aquatic invasive species, as shown in **Figure 4.5.3-1a** and **Figure 4.5.3-1b** on the following pages.

4.5.3.1 Hayward Project

The WDNR Hayward Lake Facts and Figures webpage identifies four known invasive species within the Project reservoir including Chinese mystery snail, curly-leaf pondweed, Eurasian water milfoil, and hybrid Eurasian/northern water milfoil (WDNR, 2020f).

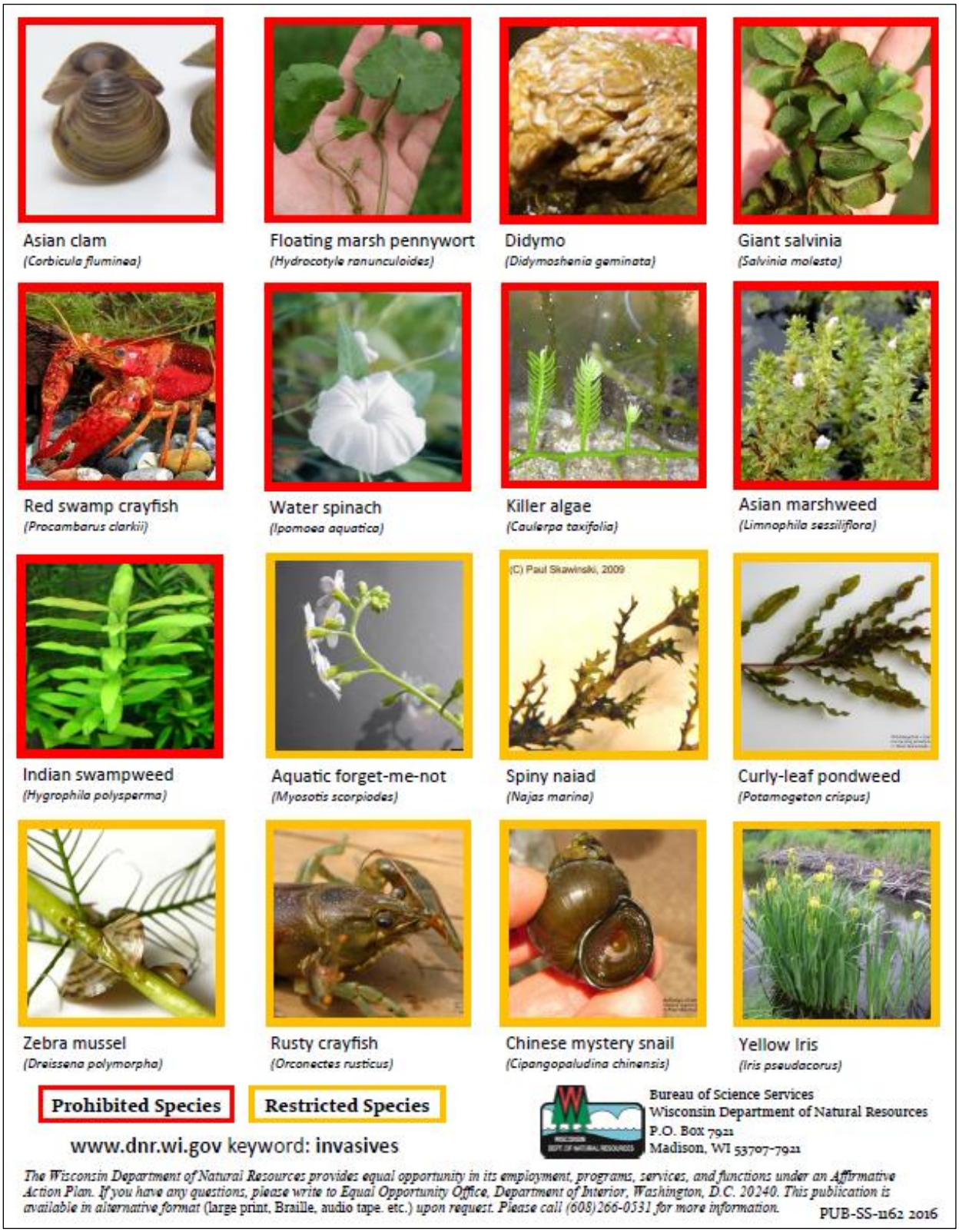
NSPW also monitors Lake Hayward annually for the presence of purple loosestrife. The presence of purple loosestrife in Lake Hayward has been relatively stable over the past five years. In 2020, it was identified as being present or common on 0.57 miles of shoreline. The NPS also conducts purple loosestrife monitoring and control efforts in the Project's tailwater area (NSPW, 2020).

4.5.3.2 Trego Project

The WDNR Trego Lake Facts and Figures webpage identifies four known invasive species within the Project reservoir including Chinese mystery snails, curly-leaf pondweed, Eurasian water milfoil, and Japanese mystery snails (WDNR, 2020g).

Figure 4.5.3-1a: Selected Regulated Aquatic Invasive Species in Wisconsin (side one)

Figure 4.5.3-1b: Selected Regulated Aquatic Invasive Species in Wisconsin (side two)



4.5.4 References

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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 is heavily developed on Hayward Lake and moderately developed on Trego Lake. The shoreline vegetation is typical of Northwest Sands Ecological Landscape vegetation with a primary mixture of upland forest and forested wetlands. Typical upland forest cover types include red and silver maple, aspen, paper birch, green ash, jack pine, red pine, and white pine. Typical forested wetland cover types consist of black spruce, tamarack, and swamp hardwood species such as black ash (WDNR, 2015).

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 Hayward Lake and Trego Lake, wetland functions include flood water storage, filtration, sedimentation reduction, and wildlife habitat and corridors. The value of wetlands in the vicinity of the Hayward and Trego Projects include 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, 2020).

Wetland boundaries are delineated based upon unique hydrologic, soil, and vegetational parameters. Wetlands found at both Projects are restricted to areas within and immediately adjacent to each reservoir. The Wisconsin Wetland Inventory identified five main classes of wetlands within the Hayward and Trego Projects. The two largest wetland classes identified at each Project were open water lacustrine and riverine wetlands. The three remaining wetland classes within the boundaries of each Project include freshwater pond, freshwater emergent, and freshwater forested shrub wetlands. Figures displaying the wetlands in the vicinity of the Hayward and Trego Projects are included in **Appendix 4.6.2-1**.

In general, freshwater ponds include open water areas characterized by submergent and floating leaved vegetation including species such as water lilies (*Nymphaea spp.*), pondweeds (*Potamogeton spp.*), bladderworts (*Utricularia spp.*) and coontail (*Ceratophylum demersum*). Freshwater emergent wetlands include species such as cattails (*Typha spp*.), sedges (*Carex spp*.), grasses, and rushes. Freshwater forested wetlands include bogs and forested floodplain complexes characterized by trees that are 20 feet or more in height including species such as tamarack, white pine, and black ash. Freshwater shrub wetlands are typically dominated by willow (S*alix spp*.) and dogwood (*Cornus spp*.) species (WDNR, 2015).

4.6.3 Littoral Habitat

Littoral habitat is the transition between aquatic and terrestrial habitats and is prevalent along most reservoir margins. Within the Hayward and Trego Project boundaries, littoral habitat is more prevalent within the main body of each reservoir and areas where tributary streams enter the reservoir.

4.6.4 References

- Wisconsin Department of Natural Resources. (2015). The Ecological Landscapes of Wisconsin: an assessment of ecological resources and a guide to planning sustainable management. Chapter 17 Northwest Sands Ecological Landscape. PUB-SS-1131J2014.
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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 Information for Planning and Conservation (IPaC) website was accessed to develop IPaC Resource Lists for the Hayward and Trego Projects. Also, an Endangered Resources Review was completed for each Project to identify potential threatened, endangered, and special concern species located at the Projects.

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 both Projects, which include the Canada lynx (*Lynx canadensis*), Gray wolf (*Canis lupus*), and northern long-eared bat (NLEB) (*Myotis septentriolnalis*). IPaC Resource Lists for both Projects are included in **Appendix 4.7.2-1** and **Appendix 4.7.2-2**, 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 within either Project boundary (USFWS, 2020a) and the species may pass through the Project lands.

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, 2020a). Gray wolves are present throughout northern Wisconsin and may pass through either Project along the upland property.

The gray wolf was removed from the Wisconsin endangered species list in 2004 (WDNR, 2020a). 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 the success of recovery efforts. On May 15, 2019, the proposed rule list was printed in the Federal Register. USFWS extended the comment period to July 15, 2019 to allow an opportunity to hold a public hearing and allow interested parties to submit additional comments. If the species is removed from the list, management of the species will be returned to the states (USFWS, 2020b).

4.7.2.3 Northern Long-Eared Bat

The Northern long-eared bat (NLEB) is a State of Wisconsin 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. Sawyer County and Washburn County are within the NLEB range (USFWS, 2020c). However, according to a Natural Heritage Inventory (NHI) search, no element occurrences of hibernacula or maternity roost trees were identified within or adjacent to either Project.

4.7.3 Wisconsin Natural Heritage Inventory Review

Review of the Natural Heritage Inventory indicates 12 state-listed threatened, endangered, or special concern species are likely to occur within the vicinity of one or both of the Projects. These species are shown below in **Table 4.7.3-1** and described in the following paragraphs (WDNR, 2020b; WDNR, 2020c).

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

Species	Scientific Name	Group	Hayward Project	Trego Project	State Status*
Bald eagle	*Haliaeetus leucocephalus*	Bird	X	X	Eagle Act
Gilt darter	*Percina evides*	Fish		X	THR
Lake sturgeon	*Acipenser fulvescens*	Fish		X	SC
Least darter	*Etheostoma microperca*	Fish		X	SC
Pugnose shiner	*Notropis anogenus*	Fish	X		THR
River redhorse	*Moxostoma carinatum*	Fish		X	THR
Elktoe	*Alasmidonta marginata*	Mussel	X	X	SC
Purple wartyback	*Cyclonaias tuberculata*	Mussel		X	END
Blanding's Turtle	*Emydoidea blandingii*	Reptile	X	X	SC
Wood turtle	*Gleptemys insculpta*	Reptile	X	X	THR
Sioux (Sand) snaketail	*Ophiogomphus smithi*	Insect		X	SC
Missouri rock-cress	*Boechera missouriensis*	Plant		X	SC

*Eagle Act=Bald and Golden Eagle Protection Act, END=Endangered, SC=Special Concern, THR=Threatened

4.7.3.1 Bald Eagle

The NHI review indicates bald eagles are located along the Namekagon River in the vicinity of both Projects (WDNR, 2020b; WDNR, 2020c). 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.

4.7.3.2 Gilt Darter

The gilt darter is a Wisconsin threatened fish species that prefers strong currents, deep riffles, and pools in clear, medium to large streams that have clean, silt free bottoms of cobble and small boulders. Spawning occurs from late May to late June (WDNR, 2020d). According to the WDNR website, the gilt darter is known to occur in Washburn County and additional counties, as shown in **Figure 4.7.3.2-1**.

Figure 4.7.3.2-1: General Known Occurrence of the Gilt Darter.

4.7.3.3 Lake Sturgeon

The lake sturgeon is a Wisconsin special concern fish species. Lake sturgeon prefer large rivers and lakes and prefer the deepest mid-river areas and pools. Spawning occurs from late April through early June in cold, shallow, fast water (WDNR, 2020e). According to the WDNR website, the lake sturgeon is known to occur in Sawyer, Washburn and additional counties, as shown in **Figure 4.7.3.3-1.**

Figure 4.7.3.3-1: General Known Occurrence of the Lake Sturgeon

4.7.3.4 Least Darter

The least darter is a Wisconsin special concern fish species. It prefers clear, warm, quiet waters of overflow ponds, pools, lakes, and streams over substrates of gravel, silt, sand, boulders, mud or clay with dense vegetation or filamentous algal beds. Spawning occurs from late April into July (WDNR, 2020f). According to the WDNR webpage, the least darter is known to occur in Sawyer, Washburn and many other counties, as shown in **Figure 4.7.3.4-1**.

Figure 4.7.3.4-1: General Known Occurrence of the Least Darter

4.7.3.5 Pugnose Shiner

The pugnose shiner is a Wisconsin threatened fish species. It prefers weedy shoals of glacial lakes and low-gradient streams over bottoms of mud, sand, cobble, silt, and clay. Spawning occurs from mid-May through July (WDNR, 2020g). According to the WDNR webpage, the pugnose shiner is known to occur in Sawyer, Washburn and additional counties, as shown in **Figure 4.7.3.5-1**.

Figure 4.7.3.5-1: General Known Occurrence of the Pugnose Shiner

4.7.3.6 River Redhorse

The river redhorse is a Wisconsin threatened fish species. It prefers moderate to swift currents in large river systems, including impoundments and pools. River bottoms of clean gravel are preferred. Spawning occurs from mid-May through June when water temperatures reach 68°F to 74°F (WDNR, 2020h). According to the WDNR webpage, the river redhorse is known to occur in Washburn County and additional counties, as shown in **Figure 4.7.3.6-1**.

Figure 4.7.3.6-1: General Known Occurrence of the River Redhorse

4.7.3.7 Elktoe

The elktoe is a Wisconsin special concern mussel species and is found in various-sized streams with flowing water and a stable substrate containing rock, gravel, and sand. The known host fish species include redhorse, sucker species, and rockbass (WDNR, 2020i). According to the WDNR webpage, the elktoe is known to occur in Sawyer, Washburn, and additional counties, as shown in **Figure 4.7.3.7-1**.

Figure 4.7.3.7-1: General Known Occurrence of the Elktoe

4.7.3.8 Purple Wartyback

The purple wartyback is a Wisconsin endangered mussel species. The mussel is found in large rivers in the western and southern parts of the state. It prefers a stable substrate containing rock, gravel, and sand in swift current. Known host fish include bullhead and catfish species (WDNR, 2020j). According to the WDNR webpage, the purple wartyback is known to occur in Sawyer, Washburn and additional counties, as shown in **Figure 4.7.3.8-1**.

Figure 4.7.3.8-1: General Known Occurrence of the Purple Wartyback

4.7.3.9 Blanding's Turtle

The Blanding's turtle is a Wisconsin special concern turtle species. The turtle utilizes a wide variety of aquatic habitats including deep and shallow marshes, shallow bays of lakes and impoundments where areas of dense emergent and submergent vegetation exists, sluggish streams, oxbows and other backwaters of rivers, drainage ditches, and sedge meadows and wet meadows adjacent to these habitats. This species is semi-terrestrial, and individuals may spend quite a bit of time on land. They often move between a variety of wetland habitats during the active season, which can extend from early March to mid-November. They overwinter in standing water that is typically more than 3 feet deep and with a deep organic substrate but will also use both warm- and cold-water streams and rivers where they can avoid freezing. Blanding's turtles generally breed in spring, late summer or fall. Nesting occurs from about mid-May through early July depending on spring temperatures. They strongly prefer to nest in sandy soils and may travel up to 300 meters from a wetland or waterbody to find suitable nesting sites (WDNR, 2020k). According to the WDNR webpage, the Blanding's turtle is known to occur in Sawyer, Washburn, and additional counties, as shown in **Figure 4.7.3.9-1**.

Figure 4.7.3.9-1: General Known Occurrence of the Blanding's Turtle

4.7.3.10 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 (*Alnus incana*). 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, and 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 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, 2020l). According to the WDNR website, the wood turtle is known to occur in Sawyer, Washburn, and additional counties, as shown in **Figure 4.7.3.10-1**.

Figure 4.7.3.10-1: General Known Occurrence of the Wood Turtle

4.7.3.11 Sioux (Sand) Snaketail

The Sioux (sand) snaketail is a Wisconsin special concern insect species. The dragonfly has been found in small to medium clean, fast-flowing, sandy, warm streams (WDNR, 2020m). According to the WDNR webpage, the Sioux (sand) snaketail is known to occur in Washburn County and additional counties, as shown in **Figure 4.7.3.11-1**.

Figure 4.7.3.11-1: General Known Occurrence of the Sioux (Sand) Snaketail

4.7.3.12 Missouri Rock-Cress

The Missouri rock-cress is a Wisconsin special concern plant species. The plant has been found in soil pockets on acidic cliffs, as well as in pine forests on sterile sand and gravel outwash plains. Blooming occurs from late May through late June and fruiting occurs from late June to late July (WDNR, 2020n). According to the WDNR webpage, the Missouri rock-cress is known to occur in Washburn and additional counties, as shown in **Figure 4.7.3.12-1**.

Figure 4.7.3.12-1: General Known Occurrence of the Missouri Rock-Cress

4.7.4 Summary

The Licensee is not proposing any new facilities or changes to the current operations for either the Hayward Project or Trego Project. As such, continued operation of each Project is not expected to adversely impact any rare, threatened, or endangered species in the area.

Maintenance activities at any facility or removal of trees within the Hayward Project boundary or Trego Project boundary 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

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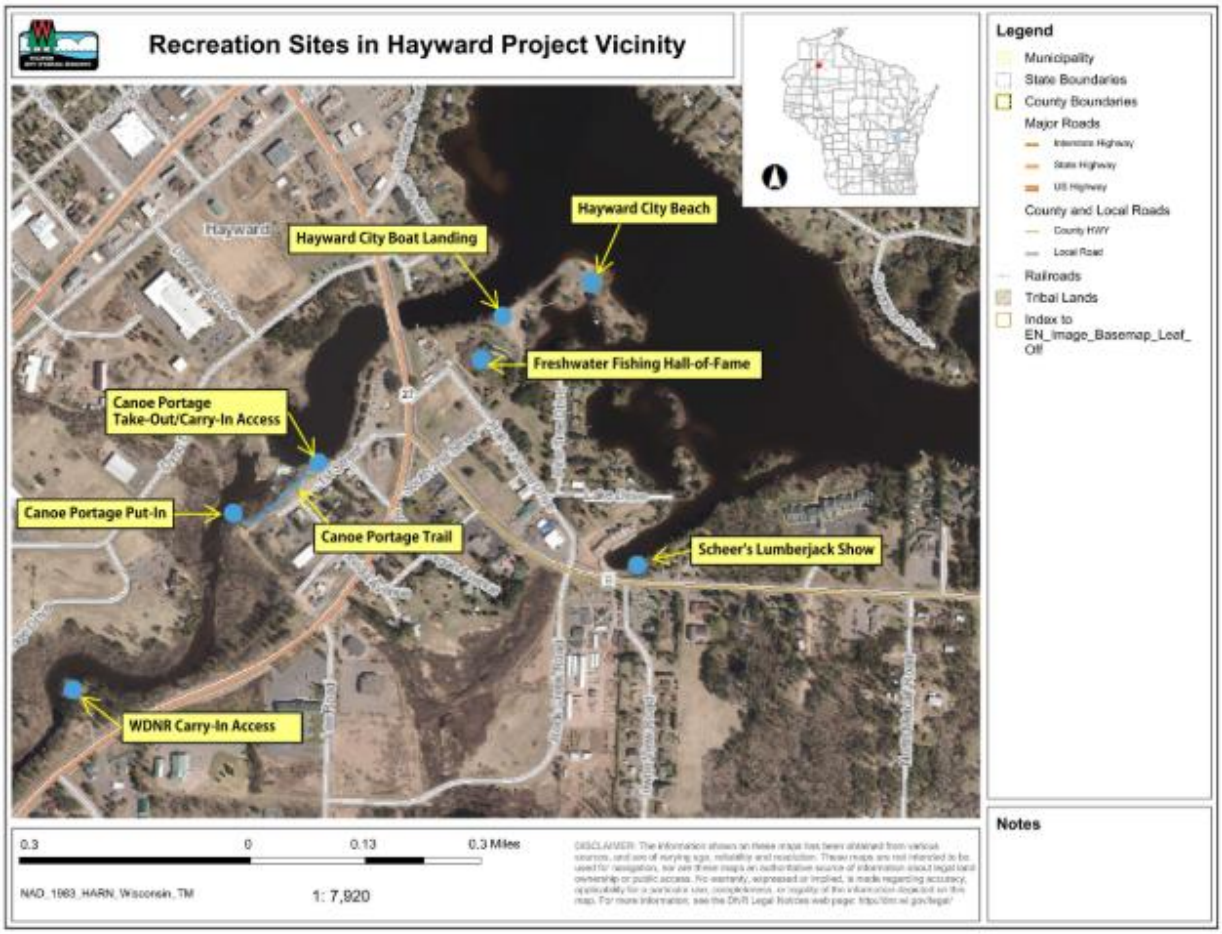
4.8 Recreation and Land Use (18 CFR § 5.6(d)(3)(viii))

4.8.1 Hayward Project Existing Recreation Facilities and Opportunities

There are many opportunities for fishing, wildlife viewing, and water sports within the vicinity of the Hayward Project. Existing recreation facilities are shown in **Figure 4.8.1-1** and described in the following paragraphs (WDNR, 2020a).

Figure 4.8.1-1: Hayward Project Vicinity Recreation Facilities



4.8.1.1 Scheer's Lumberjack Shows

Sheer's Lumberjack Shows and Lumberjack World Championship competition take place along a southern bay of Hayward Lake known as the Lumberjack Bowl. During the open water season, several shows occur each day. Lumberjack shows feature axe throwing, boom run, canoe jousting, logrolling, obstacle course, pole climbing, power sawing, speed carving, springboard chopping, and underhand chopping. **Figure 4.8.1.1-1** to the right shows log rolling from a 2020 Lumberjack Show (Fred Scheer's Lumberjack Shows, 2020).

Figure 4.8.1.1-1: Log Rolling

4.8.1.2 Hayward City Beach

The City of Hayward owns and maintains the Hayward City Beach site, which contains playground equipment, picnic areas with tables, accessible toilet facilities, accessible pathway, barrier-free fishing pier, and swimming beach. There is a paved parking area with parking for 24 vehicles and two dedicated accessible parking spaces.

Figure 4.8.1.2-1: Hayward City Beach Playground Area

Figure 4.8.1.2-2: Hayward City Beach Accessible Fishing Pier

4.8.1.3 Hayward City Boat Landing

The City of Hayward Boat Landing is owned and maintained by the City of Hayward and has a single lane concrete plank boat ramp, large gravel parking area with parking for approximately 30 vehicles with trailers, and a dock. The City of Hayward also cooperates with a local business to provide a life jacket loan program. The landing provides boat access to Hayward Lake, as shown in **Figure 4.8.1.3-1** and **Figure 4.8.1.3-2**.

Figure 4.8.1.3-1: Hayward City Boat Landing

Figure 4.8.1.3-2: Hayward City Boat Landing Parking Area

4.8.1.4 Freshwater Fishing Hall-of-Fame

The City of Hayward is home to the Freshwater Fishing Hall-of-Fame and Museum, which is the international headquarters for education, recognition, and promotion of fresh water sport fishing. Over 50,000 people visit the museum's four building complex annually to view over 50,000 historical and vintage sportfishing artifacts and gear. The highlight of the museum complex is the landmark "Shrine to Anglers", a 4.5-story tall concrete, steel, and fiberglass muskellunge spanning over a half block with a gaping mouth that can accommodate up to 20 people. The mouth also provides visitors with a panoramic view of Hayward Lake, as shown in **Figure 4.8.1.4-1** below (Freshwater Fishing Hall of Fame, 2020).

Figure 4.8.1.4-1: Freshwater Fishing Hall of Fame "Shrine to Anglers"

4.8.1.5 Canoe Portage and Carry-In Access

NSPW owns and maintains the canoe portage and carry-in access on the east side of the Project dam. The portage trail is approximately 650 feet long and includes a small stairway leading from the reservoir up the bank. The portage then runs adjacent to S. First Street to a short pathway leading to the Namekagon River downstream of the spillway. This site also provides carry-in access for launching canoes and kayaks onto Hayward Lake. **Figures 4.8.1.5-1** and **4.8.1.5.2** depict the take-out and a segment of the canoe portage, respectively.

Figure 4.8.1.5-1: Canoe Portage Take-Out and Carry-In Access

Figure 4.8.1.5-2: Canoe Portage Put-In

4.8.1.6 Hayward Project Informal Shoreline Fishing Area

The unimproved shoreline areas downstream of the spillway and powerhouse, which are owned by the Licensee, are often used as informal fishing areas, as shown in **Figure 4.8.1.6-1**. There are no improvements in these areas.

Figure 4.8.1.6-1: Informal Shoreline Fishing Area

4.8.1.7 WDNR Carry-In Access

The WDNR owns and maintains a carry-in access site approximately 0.4 miles downstream of the Project dam along State Highway 27, which has accessible parking, restroom facilities, picnic tables, grills, covered shelter, and canoe/kayak launch on the Namekagon River. This site is located outside of the Project boundary and is shown in **Figure 4.8.1.7-1** and **Figure 4.8.1.7-2**.

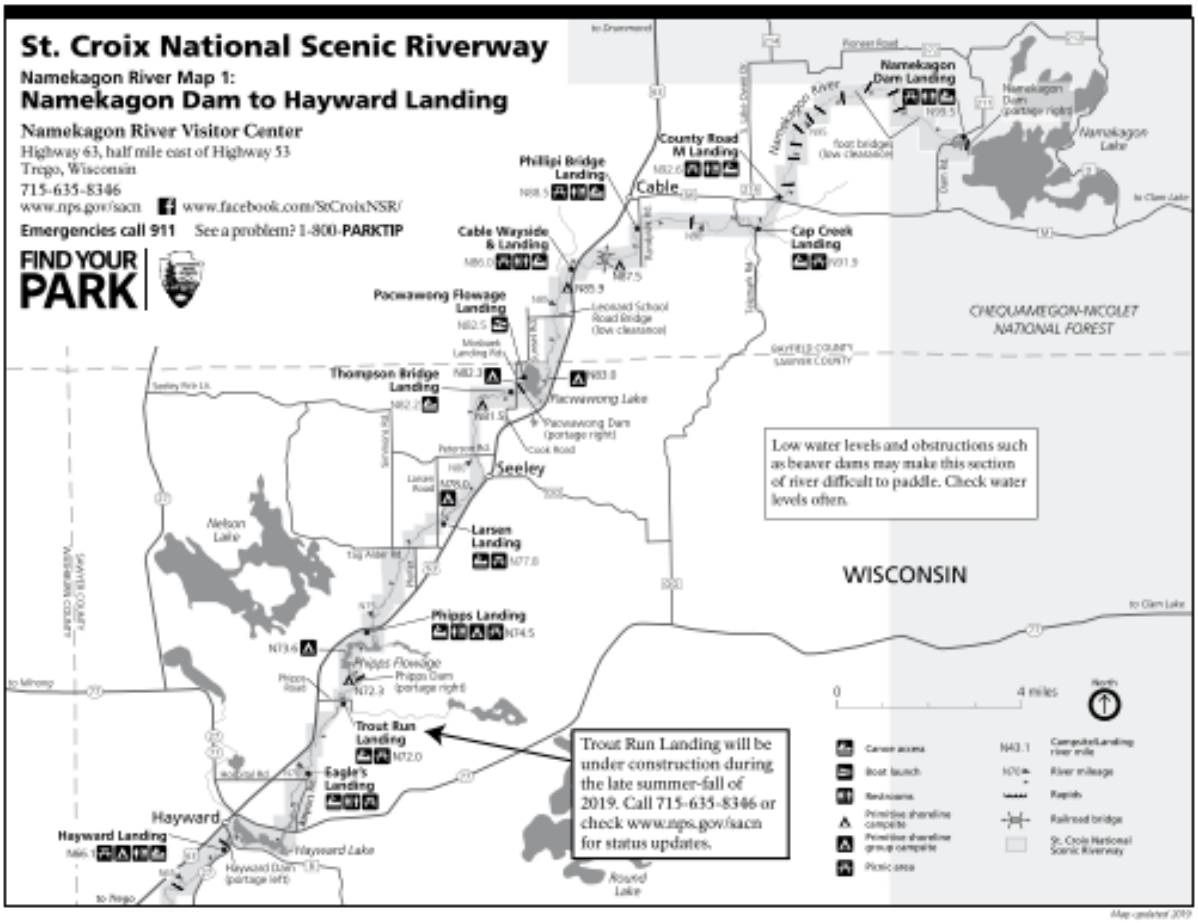
Figure 4.8.1.7-1: WDNR Carry-In Access

Figure 4.8.1.7-2: WDNR Carry-In Access Picnic Shelter and Restrooms

4.8.1.8 St. Croix National Scenic Riverway

The Namekagon and St. Croix Rivers were designated as the St. Croix National Scenic Riverway in 1968 to preserve, protect, and enhance the values of both rivers and their immediate environment for the benefit and enjoyment of present and future generations. The rivers were designated as such due to their free-flowing character; exceptional water quality; and aquatic, riparian, recreational, cultural and historic, geologic, scenic, and aesthetic values present in the rivers (NPS, 2020a). The portion of the riverway from Namekagon Lake to the Hayward Lake boat Landing is shown in **Figure 4.8.1.8-1** (NPS, 2020b).

Figure 4.8.1.8-1: St. Croix National Scenic Riverway, Namekagon Dam to Hayward Landing



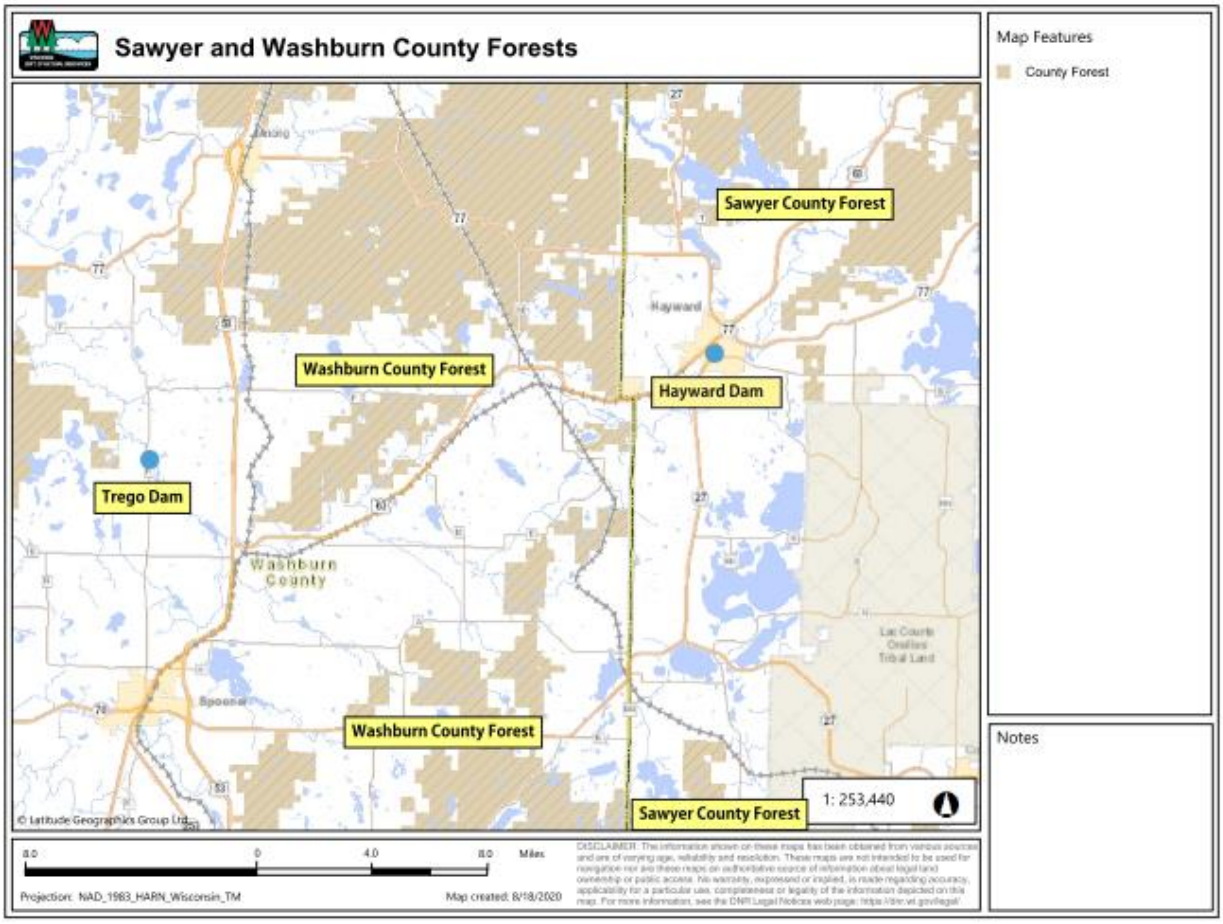
4.8.1.9 Sawyer and Washburn County Forests

The Sawyer County Forest encompasses over 114,000 acres and is actively managed for timber production while providing habitat for game and nongame species. Recreation activities available include hiking, biking, skiing, hunting, ATV riding, and snowmobiling (Sawyer County, 2020).

The Washburn County Forest encompasses 148,000 acres and is managed to balance timber production, wildlife, fisheries, endangered resources, water quality, and recreation. Recreation activities available include snowmobiling, ATV riding, camping, hiking, biking, skiing, and hunting (Washburn County, 2020a).

The Hayward Project is located approximately 0.75 miles west of the nearest portion of the Sawyer County Forest and 3.2 miles east of the nearest portion of the Washburn County Forest, as depicted in **Figure 4.8.1.9-1** (WDNR, 2020a).

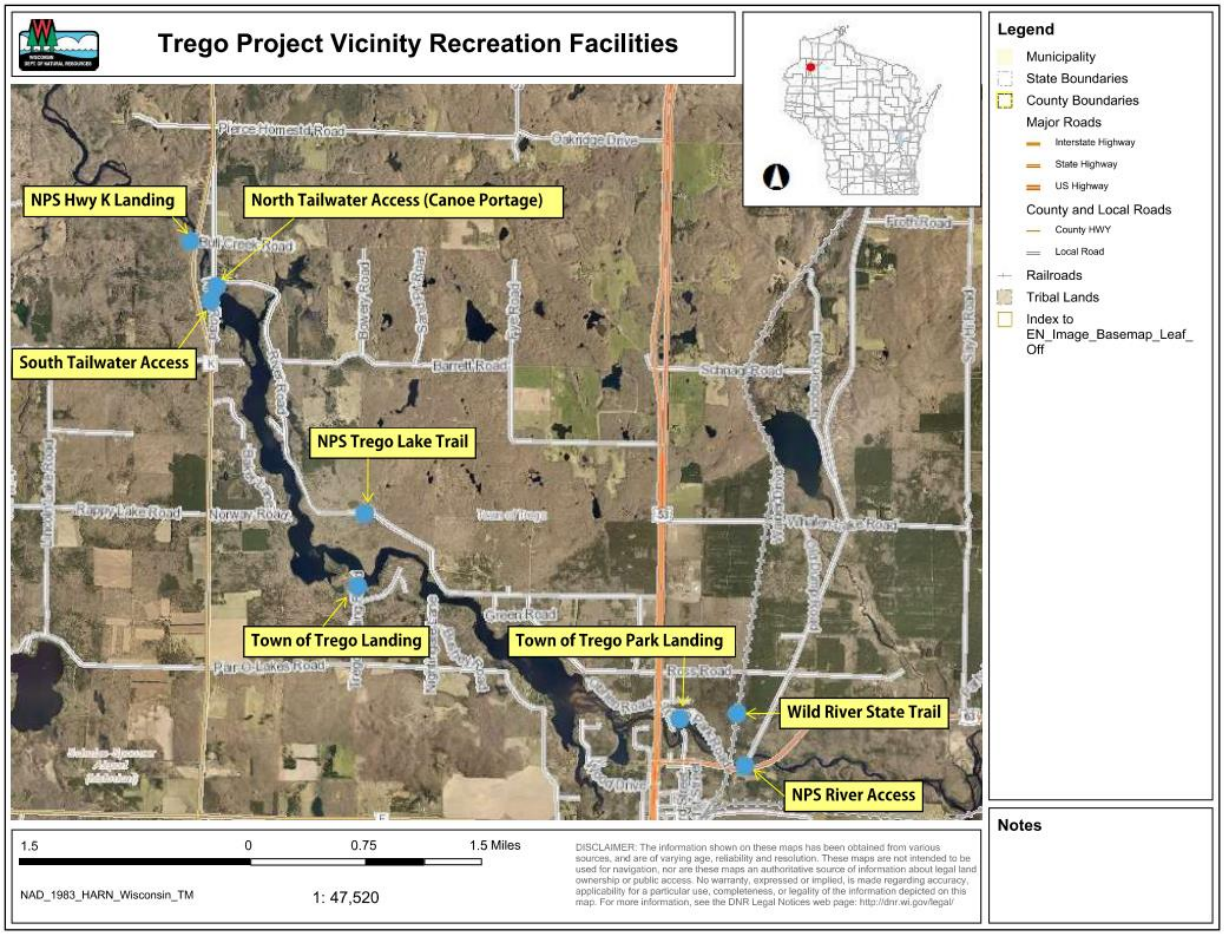
Figure 4.8.1.9-1: Sawyer and Washburn County Forest Lands in the Vicinity of the Project



4.8.2 Trego Project Existing Recreation Facilities and Opportunities

There are many opportunities for fishing, wildlife viewing, and water sports within the vicinity of the Trego Lake. Existing recreation facilities are shown in **Figure 4.8.2-1** and described in the following paragraphs from upstream to downstream (WDNR, 2020a).

Figure 4.8.2-1: Trego Project Vicinity Recreation Facilities



4.8.2.1 NPS River Access

The NPS maintains a river access area along Highway 63, which consists of two carry-in access points, one on each side of the river. Each access point includes steps that lead to the water's edge where users can put-in or take-out canoes, kayaks, or inner tubes. An area for picnicking with a grill is available, but there are no other amenities. The area also provides shoreline fishing, swimming, and wading opportunities. The NPS visitor's center for the St. Croix National Scenic Riverway is located immediately across Highway 63 from the site and provides additional parking and restroom facilities during normal business hours. The three parking areas combined are capable of holding at least 30 vehicles. The access areas, while rustic, are in good condition and receive moderate to heavy use, mostly as a take-out area for boaters and inner tubers (GLEC, 2015). **Figures 4.8.2.1-1** and **4.8.2.1-2** show the river access areas.

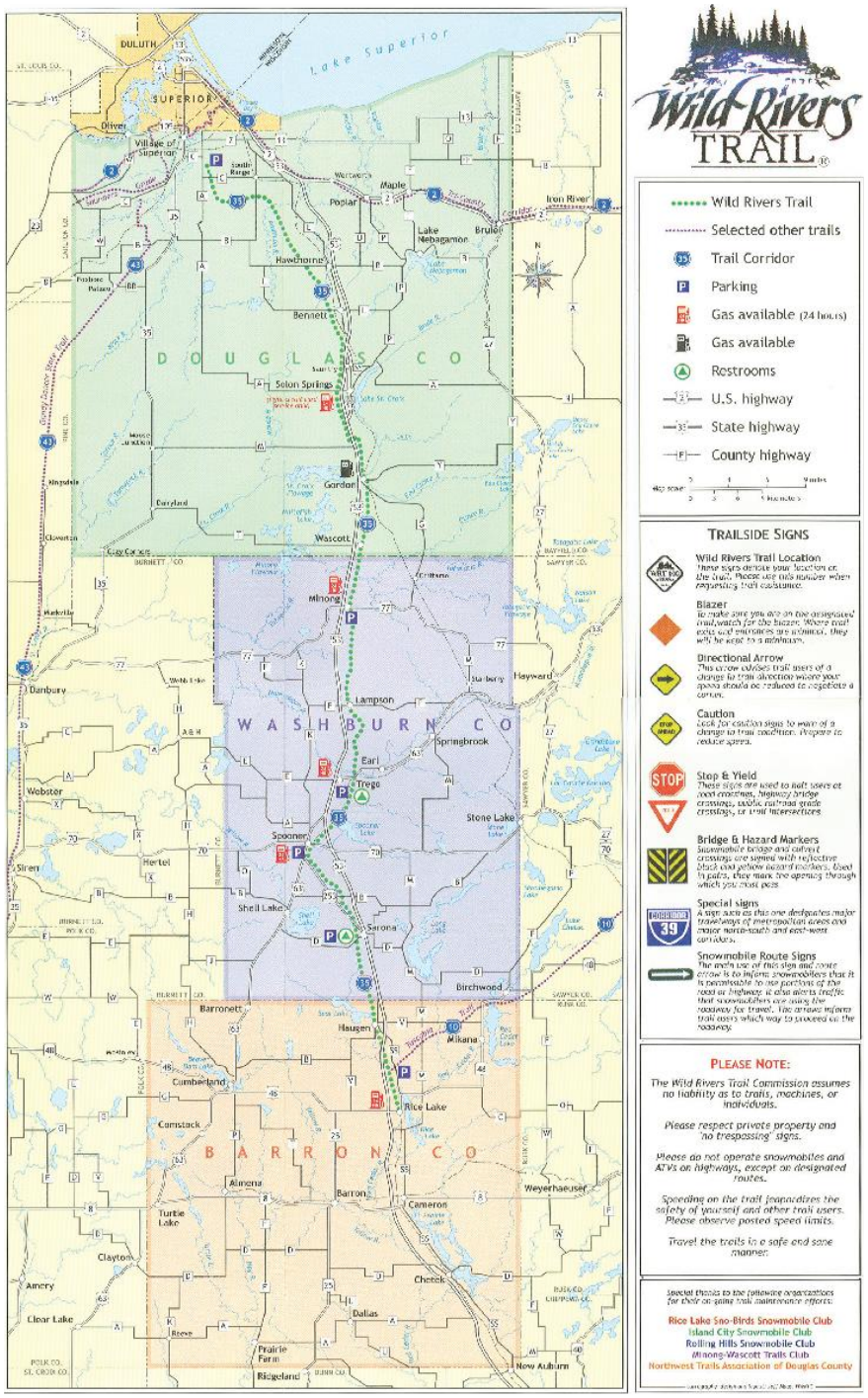
Figure 4.8.2.1-1: NPS River Access (South Side)

Figure 4.8.2.1-2: NPS River Access (North Side)

4.8.2.2 Wild River State Trail

The Wild Rivers State Trail stretches 104 miles through Douglas, Washburn, and Barron Counties along an old railroad route. The surface is comprised of compacted gravel or rough ballast. Recreation activities permitted on the trail include hiking, mountain biking, horseback riding, and ATV riding. In winter the trail is open for snowmobiling, snowshoeing, and cross-country skiing (Traillink.com, 2020). The trail crosses the Namekagon River just downstream from the NPS' Hwy. 63 River Access site (Section 4.8.2.1). **Figure 4.8.2.2-1** shows a map of the trail.

Figure 4.8.2.2-1: Wild River State Trail



4.8.2.3 Town of Trego Park Landing

The Town of Trego owns and maintains a park and boat landing on the east end of Trego Lake upstream of US Highway 53. The park contains a campground with 19 seasonal recreational vehicle sites, 29 campsites, 3 pavilions, showers, picnic areas, and shore fishing opportunities. The park also contains a small boat landing with a single lane launch area with concrete planks. There is a gravel parking area that can accommodate 8 to 10 vehicles (GLEC, 2015). The launch area is shallow and primarily used as a take-out for canoes and kayaks before they enter the main basin of Trego Lake. The area receives light use in the summer. **Figure 4.8.2.3-1** shows the boat landing.

Figure 4.8.2.3-1: Town of Trego Park Landing

4.8.2.4 NPS Trego Lake Trail

The NPS' Trego Lake Trail is located on North River Road adjacent to the north-central portion of the reservoir and serves as a cross-country ski and hiking trail. Amenities include accessible parking, accessible restroom facilities, interpretive signage, and ski/hiking trails. The trailhead and parking area are shown in **Figure 4.8.2.4-1**.

Figure 4.8.2.4-1: NPS Trego Lake Trail Parking Area

4.8.2.5 Town of Trego Landing

The Town of Trego Landing is located on Trego Landing Road on the south-central portion of the reservoir and is owned and maintained by the Town of Trego. It is the only public landing on the reservoir capable of launching larger motorized boats. The landing offers a single lane concrete launch with a paved approach and courtesy dock. Parking is located within the road right-of-way (GLEC, 2015). The landing and courtesy dock are shown in **Figure 4.8.2.5-1**.

Figure 4.8.2.5-1: Town of Trego Landing

4.8.2.6 South Tailwater Access

The South Tailwater Access is located at the end of Ricci Road on the southwest side of the Trego Dam. The site includes a paved parking area capable of holding six vehicles. A stairway and fishing platform are located on the downstream side of the dam. The shoreline upstream of the dam along Ricci Road is used for bank fishing. There are no other amenities at the site. The downstream stairway and fishing platform are shown in **Figure 4.8.2.6-1**.

Figure 4.8.2.6-1: South Tailwater Access Stairway and Fishing Platform

4.8.2.7 North Tailwater Access (Canoe Portage)

The North Tailwater Access is located off River Road and provides parking for 4 vehicles adjacent to an access road to the Trego Dam. Amenities include portable toilet facilities and a garbage receptacle. A gravel canoe portage extends from the take-out on the reservoir to the put-in below the dam. The canoe portage take-out and put-in are shown in **Figures 4.8.2.7-1** and **4.8.2.7-2**, respectively.

Figure 4.8.2.7-1: Canoe Portage Take-Out

Figure 4.8.2.7-2: Canoe Portage Put-In

4.8.2.8 NPS Highway K Landing

The NPS owns and maintains a carry-in access site on County Highway K approximately 0.4 miles downstream of the Trego Dam. The site includes a paved parking area with several dedicated accessible parking spaces, accessible pathways, accessible restroom facilities, picnic tables, carry-in boat access, and interpretive signs; all are in excellent condition. The carry-in access and the accessible path and restroom facilities are shown in **Figure 4.8.2.8-1** and **Figure 4.8.2.8-2**, respectively.

Figure 4.8.2.8-1: NPS Highway K Landing Carry-in Access

Figure 4.8.2.8-2: NPS Highway K Landing Accessible Path and Restroom Facilities

4.8.2.9 St. Croix National Scenic Riverway

The Namekagon and St. Croix Rivers were designated as the St. Croix National Scenic Riverway in 1968 to preserve, protect, and enhance the values of both rivers and their immediate environment for the benefit and enjoyment of present and future generations. The rivers were designated as such due to their free-flowing character; exceptional water quality; and aquatic, riparian, recreational, cultural and historic, geologic, scenic, and aesthetic values present in the rivers (NPS, 2020a). The scenic riverway portion from the Hayward Lake Boat Landing to the Town of Trego is shown in **Figure 4.8.2.9-1** and the section from the Town of Trego to Riverside Landing is shown in **Figure 4.8.2.9-2** (NPS, 2020b; NPS, 2020c).

Figure 4.8.2.9-1 St. Croix National Riverway Hayward Lake Landing to Town of Trego

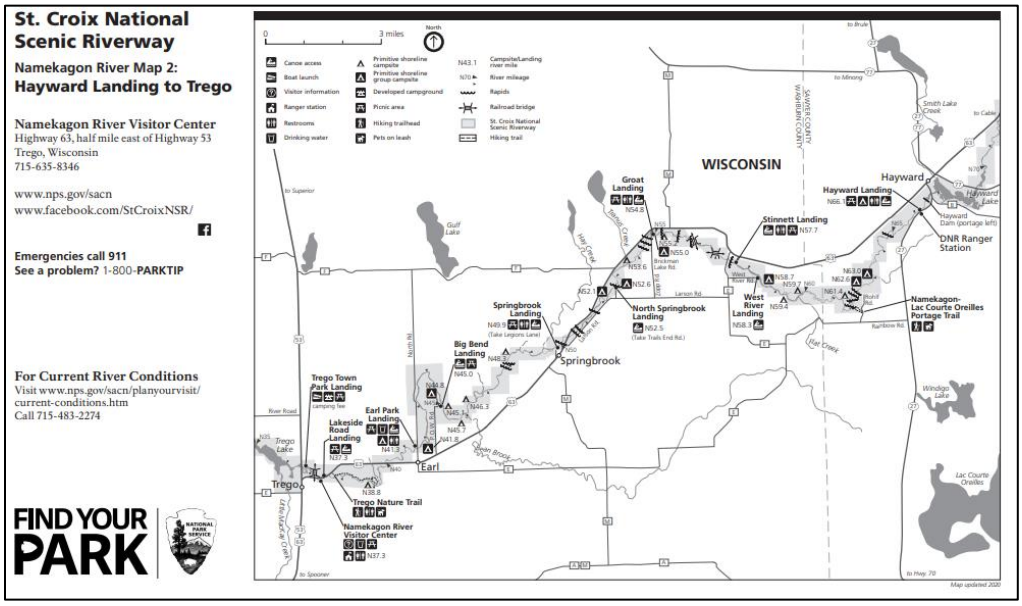
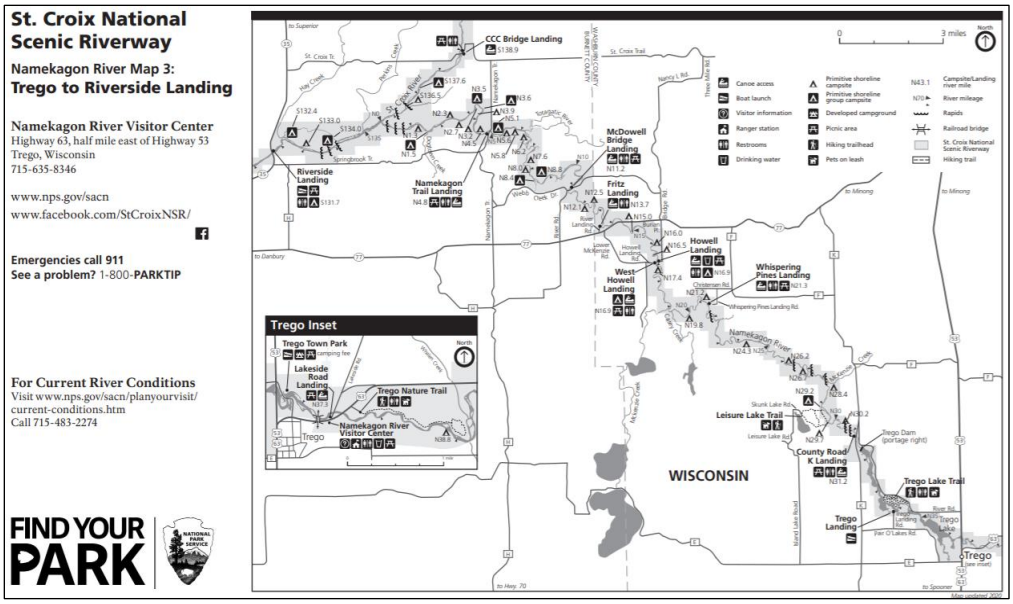


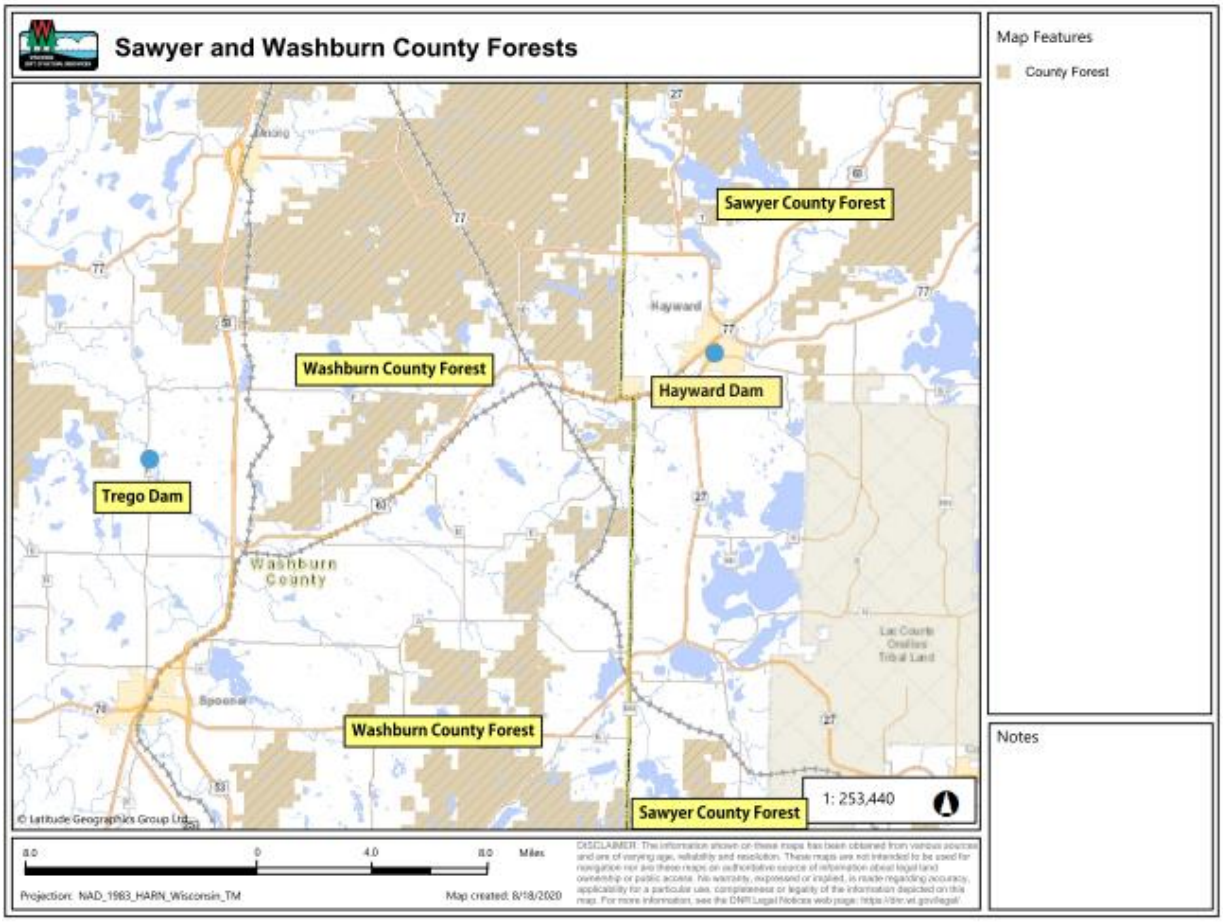
Figure 4.8.2.9-2 St. Croix National Riverway Town of Trego to Riverside Landing



4.8.2.10 Washburn County Forest

The Washburn County Forest encompasses 148,000 acres and is managed to balance timber production, wildlife, fisheries, endangered resources, water quality, and recreation. Recreation activities include snowmobiling, ATV riding, camping, hiking, biking, skiing, and hunting (Washburn County, 2020a). Washburn County Forest lands are located approximately 1 mile to the west of the Trego Project boundary; none are within the boundary. The Washburn County Forest location is shown in **Figure 4.8.2.10-1** (WDNR, 2020a).

Figure 4.8.2.10-1: Sawyer and Washburn County Forest Lands in the Vicinity of the Project



4.8.3 Recreational Needs Identified in Management Plans

4.8.3.1 State of Wisconsin

The 2019 to 2023 Statewide Comprehensive Outdoor Recreation Plan (SCORP) was released in March of 2019. The SCORP identified a need to support nature-based recreation including trails and water and shore access for fishing and boating (WDNR, 2020c). The recreation amenities provided in the vicinity of the Hayward and Trego Projects help fulfill these goals. A copy of the SCORP is provided in **Appendix 4.8.3.1-1**.

4.8.3.2 Sawyer County, Wisconsin

The Sawyer County Plan for Outdoor Recreation 2014-2020 identified several recommended improvements to county, town, and city recreation facilities. The plan did not identify any improvements to county-owned recreation facilities located within or adjacent to the Hayward Project boundary. However, the plan did recommend improvements for facilities within both the Town of Hayward and City of Hayward. The plan recommended establishing bike trails to tie into the City of Hayward and county trail systems and defined parking for boat access at the Hayward City Beach (Sawyer County, 2014). No other specific needs identified in the plan are located within the vicinity of the Hayward Project. A copy of the 2014-2020 Plan is provided in **Appendix 4.8.3.2-1**.

4.8.3.3 Washburn County, Wisconsin

The Washburn County Forest Comprehensive Land Use Plan guides recreation including but not limited to activities on County Forest lands. The only recommended recreational improvements within the vicinity of the Trego Project included the development of camping facilities at the Town of Trego along the Wild River Trail (Washburn County, 2020b). A copy of Chapter 900 of the Washburn County Forest Comprehensive Land Use Plan is provided in **Appendix 4.8.3.3-1**.

4.8.4 Recreation Accessibility Under the Americans with Disabilities Act

Americans with Disabilities Act needs are accommodated in several locations in the vicinity of the Hayward and Trego Projects. Hayward City Beach provides accessible parking, pathways, restrooms, and a barrier-free fishing pier. NPS' Trego Lake Trail provides accessible parking and restroom facilities. NPS' County Highway K Landing provides accessible parking, pathways, and restroom facilities.

4.8.5 References

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- Wisconsin Department of Natural Resources. (2020b). WDNR Website. Wild Rivers State Trail. https://dnr.wisconsin.gov/topic/parks/wildrivers/maps. Accessed August 25, 2020.
- Wisconsin Department of Natural Resources. (2020c). Statewide Comprehensive Outdoor Recreation Plan (SCORP) 2019-2023.

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

Sawyer County is 1,349 square miles and includes 87.8 square miles of surface waters (Sawyer County, 2010). Washburn County encompasses approximately 810 square miles and includes 49.6 square miles of surface waters (Washburn County, 2017). The topography surrounding both Projects is an outwash plain that was formed when the St. Croix valley drained a number of glacial lakes that formed ahead of glacial ice sheets. The topography surrounding the Hayward Project varies approximately 100 feet in elevation; the highest land surface elevation of about 1,270 feet descends to the Namekagon River surface elevation of approximately 1,171 feet downstream of the powerhouse (USGS, 2020; NSPW, 2010). The topography surrounding the Trego Project varies approximately 196 feet in elevation; the highest land surface elevation of about 1,200 feet descends to the Namekagon River surface elevation of approximately 1,004 feet downstream of the powerhouse (USGS, 2020; NSPW, 2016).

4.9.1 Visual Character of Project Land and Waters

4.9.1.1 Hayward Project

The view of the Hayward Dam from the east bank is dominated by the reservoir safety buoys, powerhouse spillway and wooded shoreline as shown in **Figure 4.9.1.1-1**.

Figure 4.9.1.1-1: View of the Hayward Dam from the East Bank

Looking upstream of the dam from the left embankment provides a scenic view of the Hayward Lake and its wooded shorelines and residential and business developments, as shown in Figure **4.9.1.1-2**.

Figure 4.9.1.1-2: View Upstream of the Hayward Dam

A scenic view of the overflow spillway is visible from downstream, as shown in **Figure 4.9.1.1-3**.

Figure 4.9.1.1-3: Hayward Project Spillway

4.9.1.2 Trego Project

The upstream view of the Trego Dam from the southwest bank is dominated by the earth embankments, powerhouse, boat barriers, and wooded shoreline as shown in **Figure 4.9.1.2-1**.

Figure 4.9.1.2-1: View of the Trego Dam

Looking upstream of the dam from the right embankment provides a scenic view of the Project reservoir and its wooded shorelines, as shown in **Figure 4.9.1.2-2** on the following page. The Namekagon River downstream of the Trego powerhouse is shown in **Figure 4.9.1.2-3** on the following page.

Figure 4.9.1.2-2: View of the Reservoir Upstream of the Trego Dam

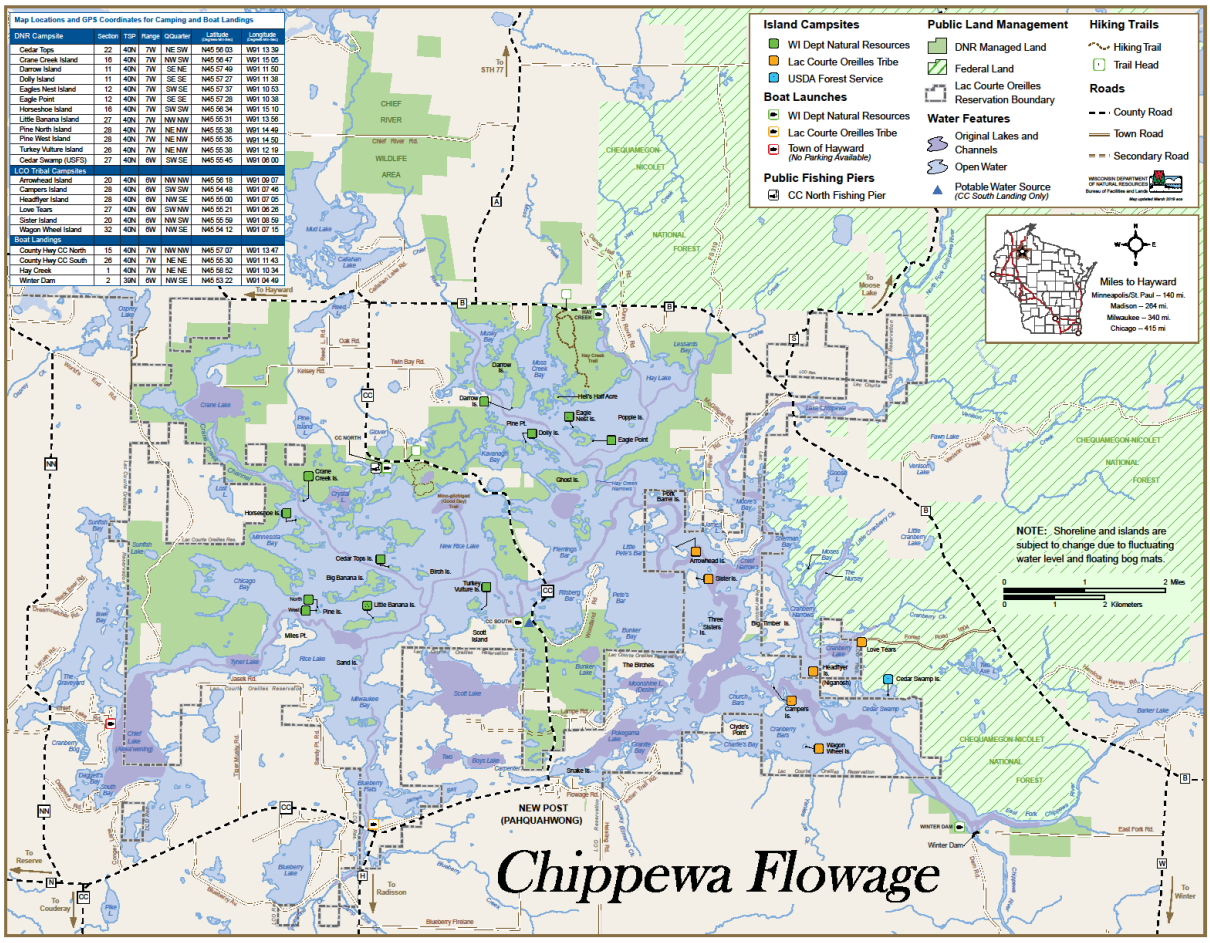
Figure 4.9.1.2-3: View of the Namekagon River Downstream of the Trego Dam

4.9.2 Nearby Scenic Attractions

4.9.2.1 Chippewa Flowage

The largest scenic attraction in the area is the Chippewa Flowage, a 15,300-acre reservoir located approximately 15 miles east of the City of Hayward. The Chippewa Flowage is dotted with over 200 islands and boasts an irregular, wooded, and generally undeveloped shoreline. The overall management goal is to protect the natural character of the 233-miles of shoreline. A map of the flowage is shown in **Figure 4.9.2.1-1**. Ownership along the shoreline is as follows: 50% state-owned lands, 30% tribal lands, 12% Chequamegon-Nicolet National Forest lands, and 8% private lands (WDNR, 2020a).

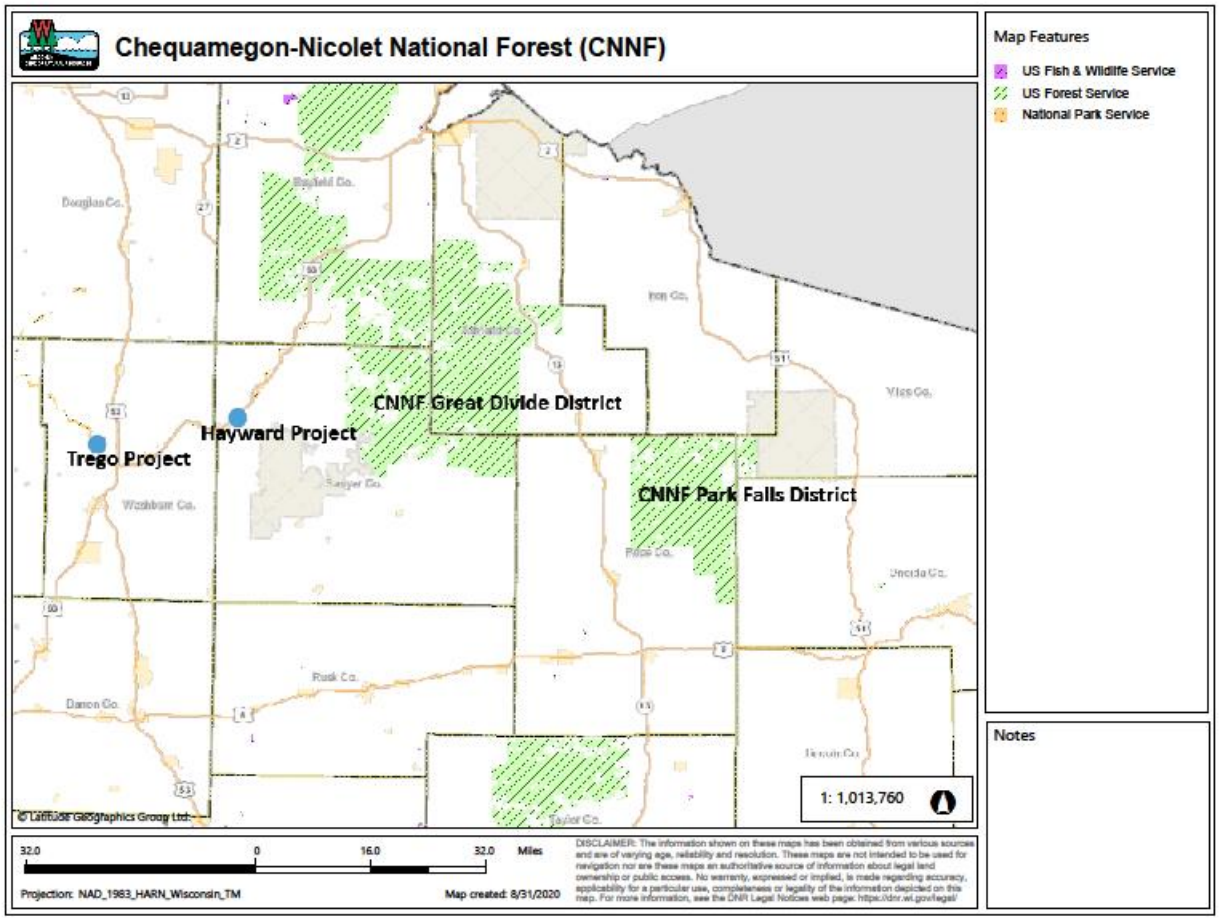
Figure 4.9.2.1-1: Chippewa Flowage



4.9.2.2 Chequamegon-Nicolet National Forest

The Chequamegon-Nicolet National Forest (CNNF) was formed when the former Chequamegon and Nicolet National Forests were combined into one forest in February of 1998. The Chequamegon portion covers about 858,400 acres of land in Ashland, Bayfield, Sawyer, Price, Taylor, and Vilas Counties (USFS, 2020). The Great Divide Ranger District is located approximately 14 miles east of Hayward Lake. The lands within the CNNF are managed for multiple uses including forestry, wildlife habitat, outdoor recreation, fisheries management, special forest products, gathering, wilderness, and natural area management. **Figure 4.9.2.2-1** shows the location of the Hayward Project and Trego Project in relation to the CNNF (WDNR, 2020b).

Figure 4.9.2.2-1: Chequamegon-Nicolet National Forest



4.9.2.3 American Birkebeiner Trail

The American Birkebeiner Trail is a scenic cross-country ski trail that extends over 60 miles through the rolling forests of Bayfield and Sawyer Counties between the Cities of Cable and Hayward (The Berkie Trail, 2020). The trail is used to host the American Birkebeiner cross-country ski race, the largest race in the United States with thousands of participants each year. Near the end of the course, the skiers cross Hayward Lake before finishing the race in downtown Hayward. A map showing the location of the American Birkebeiner Trail is shown in **Appendix 4.9.2.3-1**.

4.9.2.4 Namekagon Visitor Center

The NPS' Namekagon Visitor Center for the St. Croix National Scenic Riverway is located along State Highway 63, approximately 0.5 miles east of U.S. Highway 53 and is near the Trego Project boundary, as shown in **Figure 4.9.2.4-1**. The Visitor Center features a native plant demonstration garden, picnic area, children's activities, gift shop, several interpretive river exhibits, and trip planning assistance. Interpretive river exhibits include a life-size sturgeon replica, interactive hands-on displays, and a diorama featuring animals found along the river (NPS, 2020).

Figure 4.9.2.4-1 Namekagon Visitor Center

4.9.3 References

- The Berkie Trail. (2020). The Berkie Trail Website. Accessed August 31, 2020. https://www.birkie.com/trail/.
- National Park Service. (2020). Namekagon River Visitor Center website. Accessed August 31, 2020. https://namekagonriver.org/visitor-center/.
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- Wisconsin Department of Natural Resources. (2020b). WDNR website. WDNR Surface Water Data Viewer. https://dnrmaps.wi.gov/H5/?Viewer=SWDV. Accessed August 12, 2020.
- U.S. Forest Service. (2020).Chequamegon-Nicolet National Forest Webpage. https://www.fs.usda.gov/cnnf/. Accessed August 31, 2020.

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 listed in the National Register of Historic Places (NRHP). An area of potential effect (APE) was established to identify historic and archaeological resources within the current project boundaries of both Projects (FERC, 1995; FERC, 1994). There is also an existing Historical Resources Monitoring Plan (HRMP) for the Hayward Project and a Cultural Resources Monitoring Plan (CRMP) for the Trego Project.

4.10.1 Historic/Architectural Resources

NSPW conducted a thorough literature search of the WHPD database to identify known historic and archaeological resources within the current boundaries of the Hayward Project and Trego Project.

4.10.1.1 Hayward Project

The Hayward Dam was originally constructed in the late 1800s. The original dam was built of logs and was used to power a saw mill. The dam washed out in 1907 and was reconstructed that same year with earth dams and a timber crib spillway. The spillway was surfaced with reinforced concrete in 1918 and resurfaced in 1928 and 1980. The original powerhouse located in the middle earth embankment was abandoned and a new powerhouse was built around 1928. Remains of the old powerhouse foundation are present on the downstream slope of the middle earth embankment adjacent to the overflow spillway. Steel sheet pile was installed on the upstream side of the middle earth embankment in 1954 (NSPW, 2010).

A review of the Wisconsin Architecture and History Inventory (AHI) revealed two structures within the Hayward Project boundary; the structures are assigned site numbers 18564 and 227709. Site 18564 is the Hayward Water Works pump house, the build date is debated but is likely late 1800s to early 1900s. Site 227709 is the Hayward Dam, which is over 100 years old. The dam was evaluated and determined not eligible for the NRHP (SHPO, 2020). No further evaluation of either site is planned as part of the relicensing process.

4.10.1.2 Trego Project

The Trego Project was originally constructed between 1926 and 1927. Routine maintenance has been completed on a regular basis. No major changes or additions to the project facilities have occurred since it was constructed. Extensive concrete repairs were performed in 1979 to preserve the integrity of structures. Additional repairs included regrading and installing drains in areas downstream of the left and right embankments, raising the dikes, and raising and extending the downstream right retaining wall (NSPW, 2015).

A review of the AHI revealed two structures within the Trego Project boundary; the structures are assigned site numbers 18075 and 18081. Site 18075 is the Trego Dam Historic District and includes the Trego Dam and Power Plant. These structures were evaluated in 1991 and determined eligible for inclusion in the NRHP. Site 18081 is the Old U.S. Highway 53 Bridge, which was surveyed in 1976 (SHPO, 2020). No further evaluation of either site is planned as part of the relicensing process.

4.10.2 Archaeological Resources

The WHPD also includes information on previously surveyed areas and locations of any known archaeological sites within the project boundaries of the Hayward and Trego Projects. NSPW is proposing to complete a shoreline survey for archaeological evidence for both Projects as part of the relicensing process.

4.10.2.1 Hayward Project

A WHPD database search for previously surveyed areas and archaeological sites within the Hayward Project boundary identified seven surveys under one project number, which are summarized in **Table 4.10.2.1-1**, and three previously identified archaeological sites reported along the Lake Hayward shoreline, which are summarized in **Table 4.10.2.1-2** (SHPO, 2020).

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

SHPO Project #	Report Author	Type of Survey	Results
90-0001	Allen Van Dyke	1991 Archaeological Survey	No new sites were found. Of three previously reported sites, two were determined not to be in the project corridor. One site inside the project area, SY-0121, a submerged railroad bridge piling, was determined to be important to local logging history. Evaluation for the NRHP was recommended.
90-0001	Allen Van Dyke	1992 Archaeological Evaluation	Evaluation determined site SY-0121 was not significant and did not meet criteria for listing on the NRHP.
90-0001	Allen Van Dyke	1997 Archaeological Survey	Canoe portage area at Hayward Lake; no evidence of a cultural resource site.
90-0001	Allen Van Dyke	1997 Archaeological Survey	Three land parcels; no sites of cultural resource importance were detected on the surveyed parcels; three parcels were removed from the project boundary (approximately 7 acres total).
90-0001	Allen Van Dyke	1998 Archaeological Monitoring	No known archaeological sites eroding from banks, very stable and well vegetated shorelines with little or no erosion; revisit in 5 years.
90-0001	Allen Van Dyke	2003 5-Year Reservoir Shoreline Surveys for Eroding Archaeological Sites	No known archaeological sites eroding from banks, very stable and well vegetated shorelines with little or no erosion. Recommend surveying every 10 years.
90-0001	Allen Van Dyke	2013 10-Year Archaeological Monitoring	No erosion or exposed artifacts were noted along the shorelines, stable and well-vegetated shorelines at the waterline.

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

State Site #	Report Author	Site Type	Year
SY-0029	Donald Weir	Campsite/village, site is within a private vegetable garden on the west bank of Lake Howard; outside of the reservoir operating limits.	1979
SY-0119	Weir Franzen	HCM concentration, site is on private property and has been disturbed by road construction, determined to be outside the project boundary.	1978
SY-0121	James Fitting	Transportation, pillar supports of a former railroad bridge across Lake Hayward, likely associated with the Hayward Mill. Determined ineligible in 1992.	1977

4.10.2.2 Trego Project

A WHPD database search for previously surveyed areas and archaeological sites within the Trego Project boundary identified five surveys under one project number, which are summarized in **Table 4.10.2.2-1**. Seven previously identified archaeological sites, reported within about one-eighth of a mile from the shoreline of Trego Lake, are summarized in **Table 4.10.2.2-2** (SHPO, 2020).

Table 4.10.2.2-1: Previous Archaeological Surveys within the Trego Project Boundary

SHPO Project #	Report Author	Type of Survey	Results
89-0517	Christina Harrison	1991 Report on Cultural Resource Investigation Along The Trego Reservoir Shoreline, Washburn County, Wisconsin.	Phase I investigation - six prehistoric sites discovered (WB-0105 through WB-0110); two historic structures identified. One prehistoric site and both historic sites are outside the project corridor. Of the remaining sites, one is disturbed, one is eligible for the NRHP, and the other three appear to be intact.
89-0517	Christina Harrison	1991 Letter Report of Survey: Addendum to Report on Cultural Resource Investigation Along the Trego Reservoir Shoreline, Washburn County, Wisconsin.	Phase II investigation conducted at previously surveyed site in Washburn County; site WB-0108 is a briefly occupied camp on the edge of a larger site; inundated under the reservoir.
89-0517	Allen Van Dyke	1998 Archaeological Monitoring	No known sites eroding from banks, very stable and well vegetated shorelines with little or no erosion; revisit in 5 years.
89-0517	Allen Van Dyke	2003 5-Year Reservoir Shoreline Surveys for Eroding Archaeological Sites	No known sites eroding from banks, very stable and well vegetated shorelines with little or no erosion. Recommend 10-year survey cycle.
89-0517	Allen Van Dyke	2013 10-Year Archaeological Monitoring	Project operation is not causing a disturbance to sites, stable and well-vegetated shorelines, and no known sites are eroding from the banks.

Table 4.10.2.2-2: Previously Identified Archaeological Sites within the Trego Project Boundary

State Site #	Report Author	Site Type	Year
WB-0039	Rhiannon Jones	Campsite/village, site of the home of a band of Ojibwe, long used by explorers, missionaries, and fur traders; 2017 update – unable to relocate the original surveyed site; area surveyed has been disturbed.	2017
WB-0105	Christina Harrison	Cabin/homestead, log structure used as a trading post or stopping place at west end of a well-used river crossing; well outside of the reservoir operating limits.	1991
WB-0106	Christina Harrison	Trading/fur post, remains of an old homestead under water in the bay.	1991
WB-0107	Christina Harrison	Campsite/village, current status of the site is unknown and additional investigations may need to be completed.	1991
WB-0108	Christina Harrison	Campsite/village, this site represents either a briefly used campsite or the edge of a larger site that has now been inundated by the impoundment; determined not eligible for the NRHP.	1991
WB-0109	Christina Harrison	Campsite/village, site is located across from entrance to a small bay.	1991
WB-0110	Christina Harrison	Campsite/village, site is located along a peninsula.	1991

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, 2020).

4.10.3.1 Forest County Potawatomi

The Potawatomi arrived in Wisconsin in the mid-seventeenth century from Canada and the western United States. In the early 1800s, the U.S. Government took away Potawatomi land rights. In 1913, the Forest County Potawatomi bought back approximately 12,000 acres of land 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, however, 1,270 acres were subsequently 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).

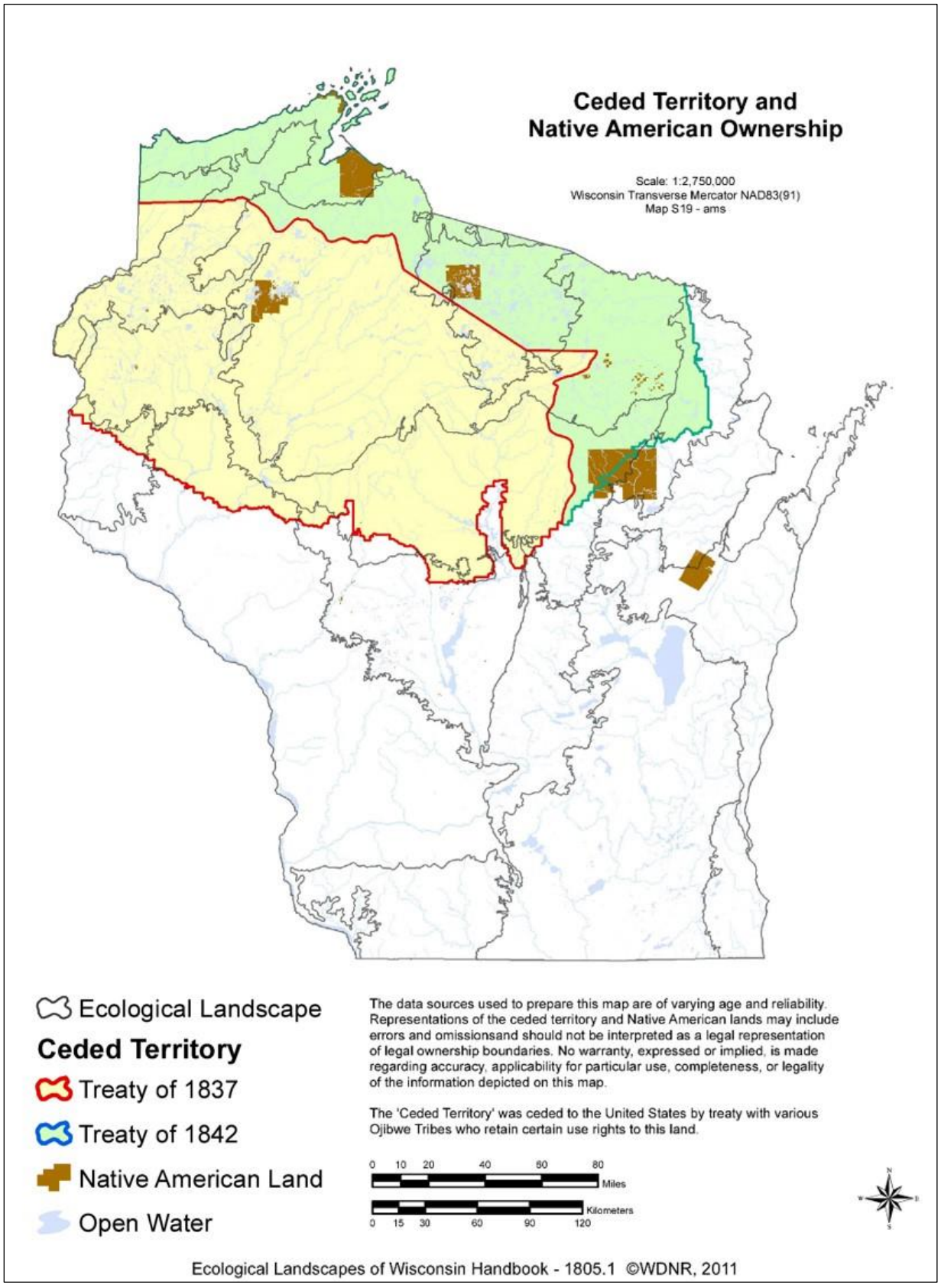
4.10.3.6 Ojibwe (Chippewa) Tribes

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 of Northern Wisconsin, using Madeline Island, Wisconsin as a resting site. 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 fur trading business 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. Government under negotiations in 1837 and 1842. The Ojibwe ceded territories are shown in **Figure 4.10.3.6-1**. Both the Hayward and Trego Projects 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. Government began to relocate the Ojibwe to the 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

In July 2020, two separate questionnaires, one for each Project, were sent to tribal representatives requesting any known information or potential impacts from operations at the Hayward t and Trego Project operations. The tribal representatives who were sent the questionnaires are listed in **Table 4.10.3.7-1**.

Ms. Bridgett Quist, Mille Lacs Band of Ojibwe Tribe, responded to the Trego questionnaire indicating they intended to participate in the relicensing 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 the Lake Superior Tribe of Chippewa Indians
Mr. Michael Wiggins	Bad River Band of the Lake Superior Tribe of Chippewa Indians
Mr. Clinton Parish	Bay Mills Indian Community of Michigan
Mr. Kevin Dupuis, Sr.	Fond du Lac Band of the Lake Superior Chippewa Indian Tribe
Ms. Jill Hoppe	Fond du Lac Band of the Lake Superior Chippewa Indian Tribe
Mr. Ned Daniels, Jr.	Forest County Potawatomi Community of Wisconsin
Mr. Michael LaRonge	Forest County Potawatomi Community of Wisconsin
Mr. Andrew Werk	Fort Belknap Indian Community
Mr. Michael Black Wolf	Fort Belknap Indian Community
Ms. Beth Drost	Grand Portage Band of Chippewa Indians
Mr. Jared Swader	Grand Portage Band of Chippewa Indians
Mr. Marlin WhiteEagle	Ho Chunk Nation of Wisconsin
Mr. William Quackenbush	Ho Chunk Nation of Wisconsin
Mr. Warren C. Swartz, Sr.	Keweenaw Bay Indian Community of Michigan
Mr. Alden Connor	Keweenaw Bay Indian Community of Michigan
Mr. Brian Bisonette	Lac Courte Oreilles Band of Lake Superior Chippewa Indians of Wisconsin
Mr. Louis Taylor, Sr.	Lac Courte Oreilles Band of Lake Superior Chippewa Indians of Wisconsin
Mr. Joseph Wildcat, Sr.	Lac Du Flambeau Band of Lake Superior Chippewa Indians
Ms. Melinda Young	Lac Du Flambeau Band of Lake Superior Chippewa Indians
Mr. James Williams, Jr.	Lac Vieux Desert Band of Lake Superior Chippewa Indians
Ms. Daisy McGeshick	Lac Vieux Desert Band of Lake Superior Chippewa Indians
Mr. Faron Jackson, Sr.	Leech Lake Band of Ojibwe
Ms. Amy Brunette	Leech Lake Band of Ojibwe
Ms. Joan Delabreau	Menominee Indian Tribe of Wisconsin
Mr. David Grignon	Menominee Indian Tribe of Wisconsin

Mr. Douglas Lankford	Miami Tribe of Oklahoma
Mr. Diane Hunter	Miami Tribe of Oklahoma
Ms. Melanie Benjamin	Mille Lacs Band of Ojibwe
Ms. Natalie Weyaus	Mille Lacs Band of Ojibwe
Mr. Gary Frazer	Minnesota Chippewa Tribe
Ms. Stacie Cutbank	Oneida Tribe of Wisconsin
Mr. Tehassi Hill	Oneida Tribe of Wisconsin
Mr. Chad Able	Red Cliff Band of Lake Superior Chippewa Indians
Mr. Richard Peterson	Red Cliff Band of Lake Superior Chippewa Indians
Mr. Marvin DeFoe	Red Cliff Band of Lake Superior Chippewa Indians
Mr. Chris McGeshick	Sokaogon Chippewa Community of Wisconsin
Mr. Adam VanZile	Sokaogon Chippewa Community of Wisconsin
Mr. Lewis Taylor	St. Croix Chippewa Indians of Wisconsin
Ms. Wanda McFaggen	St. Croix Chippewa Indians of Wisconsin
Ms. Shannon Holsey	Stockbridge Munsee Tribe of Mohican Indians
Ms. Sherry White	Stockbridge Munsee Tribe of Mohican Indians
Mr. Michael Fairbanks	White Earth Band of the Minnesota Chippewa Tribe
Ms. Jaime Arsenault	White Earth Band of the Minnesota Chippewa Tribe

4.10.3.8 Tribal Representatives Consulted via FERC Letter

On July 22, 2020, 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 Hayward Project and the second letter was to invite them to participate in the relicensing process for the Trego Project (FERC, 2020a; FERC, 2020b).

On September 11, 22, and 28, 2020, FERC followed up the letters via email and telephone to determine if any of the tribes were interested in consultation for the Projects. The Fort Belknap Indian Community, White Earth band of the Minnesota Chippewa Tribe, Lac Du Flambeau Band of Lake Superior Chippewa Indians, and Lac Vieux Desert Band of Lake Superior Chippewa Indians all requested digital copies of the consultation letters. On September 23, 2020, the Miami Tribe of Oklahoma responded via email stating that the tribe does not need to be consulted for projects in Sawyer or Washburn Counties. No other responses were received.

Table 4.10.3.8-1: 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
Mr. Kevin Dupuis, Sr.	Fond du Lac Band of the Lake Superior Chippewa Indian Tribe

Ms. Jill Hoppe	Fond du Lac Band of the Lake Superior Chippewa Indian Tribe
Mr. Andrew Werk	Fort Belknap Indian Community
Mr. Michael Black Wolf	Fort Belknap Indian Community
Ms. Beth Drost	Grand Potage Band of Chippewa Indians
Mr. Jared Swader	Grand Portage Band of Chippewa Indians
Mr. Warren C. Swartz, Sr.	Keweenaw Bay Indian Community of Michigan
Mr. Alden Connor	Keweenaw Bay Indian Community of Michigan
Mr. Brian Bisonette	Lac Courte Oreilles Band of Lake Superior Chippewa Indians of Wisconsin
Mr. Louis Taylor, Sr.	Lac Courte Oreilles Band of Lake Superior Chippewa Indians of Wisconsin
Mr. Joseph Wildcat	Lac Du Flambeau Band of Lake Superior Chippewa Indians
Ms. Melinda Young	Lac Du Flambeau Band of Lake Superior Chippewa Indians
Mr. James Williams, Jr.	Lac Vieux Desert Band of Lake Superior Chippewa Indians
Ms. Daisy McGeshick	Lac Vieux Desert Band of Lake Superior Chippewa Indians
Mr. Faron Jackson, Sr.	Leech Lake Band of Ojibwe
Ms. Amy Brunette	Leech Lake Band of Ojibwe
Ms. Joan Delabreau	Menominee Indian Tribe of Wisconsin
Mr. David Grignon	Menominee Indian Tribe of Wisconsin
Mr. Douglas Lankford	Miami Tribe of Oklahoma
Mr. Diane Hunter	Miami Tribe of Oklahoma
Ms. Melanie Benjamin	Mille Lacs Band of Ojibwe
Ms. Natalie Weyaus	Mille Lacs Band of Ojibwe
Mr. Gary Frazer	Minnesota Chippewa Tribe
Mr. Richard Peterson	Red Cliff Band of Lake Superior Chippewa Indians
Mr. Marvin DeFoe	Red Cliff Band of Lake Superior Chippewa Indians
Mr. Chris McGeshick	Sokaogon Chippewa Community of Wisconsin
Mr. Adam VanZile	Sokaogon Chippewa Community of Wisconsin
Mr. Lewis Taylor	St. Croix Chippewa Indians of Wisconsin
Ms. Wanda McFaggen	St. Croix Chippewa Indians of Wisconsin
Mr. Michael Fairbanks	White Earth Band of the Minnesota Chippewa Tribe
Ms. Jaime Arsenault	White Earth Band of the Minnesota Chippewa Tribe

4.10.4 Programmatic Agreements

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 (*1993 Programmatic Agreement*),* executed in December 1993 (ACHP, 1993). The Hayward Project follows the requirements of the 1993 Programmatic Agreement requirements.

Since the previous relicensing process for the Trego Project was initiated prior to the signing of the 1993 Programmatic Agreement, a separate programmatic agreement for the Trego Project was developed which is very similar to the requirements outlined in the 1993 Programmatic Agreement. The *Programmatic Agreement Among The Federal Energy Regulatory Commission; The Advisory Council On Historic Preservation; and the Wisconsin State Historic Preservation Office for the Management of Historic Properties Affected by the Trego Hydroelectric Project (*Trego Programmatic Agreement*),* was executed in June 1992 (ACHP, 1992). The Trego Project follows the requirements of the Trego Programmatic Agreement.

Both programmatic agreements assign the Licensee with the responsibility to ensure historic properties are considered in the continued operation and maintenance of hydroelectric facilities during the term of their federal licenses and required the development and implementation of a Historic Resources Management Plan and Cultural Resources Management Plans (CRMP) for Hayward and Trego, respectively.

Based upon the information available herein, if future operation continues to follow the requirements outlined in the Programmatic Agreements signed in 1992 and 1993, along with any requirements outlined in existing and future HRMP/CRMPs, it is unlikely the continued operation of either the Hayward or Trego Projects will have an adverse effect upon historic, architectural, archeological, or cultural resources.

4.10.5 References

- Advisory Council on Historic Preservation. (1992). Programmatic Agreement Among The Federal Energy Regulatory Commission; The Advisory Council On Historic Preservation; And The Wisconsin State Historic Preservation Office For The Management Of Historic Properties Affected By The Trego Hydroelectric Project, executed on June 16, 1992.
- Advisory Council on Historic Preservation. (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. (1995). Order Issuing Subsequent License (Minor Project), Hayward Hydroelectric Project No. 2417. September 1, 1995.
- Federal Energy Regulatory Commission. (1994). Order Issuing License, Trego Hydroelectric Project No. 2711. June 2, 1994.
- Federal Energy Regulatory Commission. (2020a). Consultation with Tribes for the Hayward Dam Hydroelectric Project No. 2417. July 22, 2020.
- Federal Energy Regulatory Commission. (2020b). Consultation with Tribes for the Trego Dam Hydroelectric Project No. 2711. July 22, 2020.

- Federal Energy Regulatory Commission. (2020c). Telephone Memo. Consultation with Tribes for the Hayward Hydroelectric Project No. 2417. October 13, 2020.
- Federal Energy Regulatory Commission. (2020d). Telephone Memo. Consultation with Tribes for the Trego Hydroelectric Project No. 2711. October 13, 2020.
- Loew, Patty. (2001). Indian Nations of Wisconsin-Histories Endurance and Renewal.
- Northern States Power Company-Wisconsin. (2010). Hayward Hydroelectric Project FERC No 2417. Supporting Technical Information Document. June 2010.
- Northern States Power Company-Wisconsin. (2016). Trego Hydroelectric Project FERC No 2711. Supporting Technical Information Document. November 2016.
- 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. (2020). Wisconsin Historic Preservation Database. Accessed August 6, 2020.

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 Hayward, Town of Trego, Sawyer County and Washburn County, all in Wisconsin.

4.11.1 Population and Housing Patterns

The 2010 populations for Sawyer County and Washburn County were 16,558 and 15,720, respectively. Population density in Sawyer County is 13.2 people per square mile with a housing unit density of 13.3 housing units per square mile. Population density in Washburn County is 20.0 people per square mile with a housing unit density of 16.8 housing units per square mile (US Census Bureau, 2010).

The population of the City of Hayward and Town of Trego increased 10.1% and 13.2%, respectively from 2000 to 2010. The population of Sawyer County increased 2.2% and Washburn County declined 0.8% during that same time period. From the 1970s through 2010, the City of Hayward, Town of Trego, and Sawyer County have seen a consistent population increase. Washburn County showed consistent population increases from the 1970s through 2000 before declining in 2010. Historical population information can be found in **Table 4.11.1-1** (US Census Bureau, 2010; Sawyer County, 2010; Washburn County, 2004).

Table 4.11.1-1: Historical Population Data

Municipality	1970	1980	1990	2000	2010	Population Change 2000-2010
City of Hayward, WI	1,457	1,698	1,897	2,129	2,343	10.1%
Town of Trego, WI	469	697	716	885	1,002	13.2%
Sawyer County, WI	9,670	12,843	14,181	16,196	16,557	2.2%
Washburn County, WI	10,601	13,174	13,772	16,036	15,911	(-0.8%)

The Wisconsin Department of Health Services projects a 5.3% population increase in Sawyer County from 16,557 to 17,430 and an increase of 13.2 % in Washburn County from 15,911 to 18,010 between 2010-2040. The Sawyer County Comprehensive Plan projects a population increase of 18.2% in the City of Hayward between 2010-2040. The Washburn County Comprehensive Plan projects a population increase of 16% in the Town of Trego between 2010-2040. Population forecasts can be found in **Table 4.11.1-2** (WDHS, 2015; Sawyer County, 2010; Washburn County, 2004).

Table 4.11.1-2: Population Forecast Data

Year	2010-Census	2020	2030	2040
City of Hayward, WI	2,343	2,536	2,650	2769*
Town of Trego, WI	1002	1133**	1148**	1,162**
Sawyer County, WI	16,557	17,070	18,010	17,430
Washburn County, WI	15,911	18460	18,460	18,010

* Calculated using same growth rate as 2020-2030
**Calculated using same growth rate as 2010-2020

4.11.2 Economic Patterns

The top three employment sectors from largest to smallest for Sawyer County are educational services, health care, and social assistance; arts, entertainment, recreation, accommodation, and food services; and manufacturing and for Washburn County are educational services, health care and social assistance; manufacturing; and retail trade. 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** for Sawyer County and **Table 4.11.2-2** for Washburn County (U.S. Census Bureau, 2018). Percentages may not add up to 100% due to rounding.

Table 4.11.2-1: Employment Status for Sawyer County, Wisconsin

Industry Sector	Est. # of Jobs	% Jobs
Civilian employed population 16 years and over	7,221	-
Educational services, health care, and social assistance	1,698	24%
Arts, entertainment, recreation, accommodation, and food services	1,053	15%
Manufacturing	930	13%
Retail trade	782	11%
Construction	556	8%
Professional, scientific, and management; administrative; and waste management services	412	6%
Transportation, warehousing, and utilities	360	5%
Agriculture, forestry, fishing, hunting, and mining	294	4%
Finance and insurance, real estate, rental, and leasing	320	4%
Other services, except public administration	293	4%
Public administration	302	4%
Wholesale trade	144	2%
Information	77	1%

Table 4.11.2-2: Employment Status for Washburn County, Wisconsin

Industry Sector	Est. # of Jobs	% Jobs*
Civilian employed population 16 years and over	6,973	-
Educational services, health care, and social assistance	1,676	24%
Manufacturing	1,148	17%
Retail trade	803	12%
Construction	578	8%
Arts, entertainment, recreation, accommodation, and food services	515	7%
Professional, scientific, and management; administrative; and waste management services	390	6%
Public administration	394	6%
Other services, except public administration	338	5%
Transportation, warehousing, and utilities	358	5%
Agriculture, forestry, fishing, hunting, and mining	281	4%
Finance and insurance, real estate, rental, and leasing	262	4%
Wholesale trade	157	2%
Information	73	1%

Sawyer County experienced an increase in jobs in the educational services, health care, and social assistance sector and a decrease in the arts, entertainment, recreation, accommodation, and food service sector from 2010 to 2018. Employment in the manufacturing sector has remained stable (US Census Bureau, 2018).

Washburn County experienced an increase in the number of jobs in the education services, health care, and social assistance sector and manufacturing sector and a decrease in the number of jobs in the retail trade sector from 2010 to 2018 (US Census Bureau, 2018).

NSPW is not proposing any new facilities or changes to the current operation of either the Hayward Project or Trego Project. As such, continued operation of each is not expected to adversely impact the socioeconomic resources in the area.

4.11.3 References

- Sawyer County. (2010). Sawyer County Comprehensive Plan. January 21, 2010.
- US Census Bureau. (2010). QuickFacts, Washburn County, Sawyer County, Wisconsin. https://www.census.gov/quickfacts/fact/table/washburncountywisconsin,sawyercountywisconsin,US/POP010210. Accessed July 20, 2020.
- US Census Bureau. (2018). Selected Economic Characteristics. Wisconsin, Sawyer County, and Washburn County. https://data.census.gov/cedsci/table?d=ACS%205-Year%20Estimates%20Data%20Profiles&table=DP03&tid=ACSDP5Y2018.DP03&g=0400000US55_0500000US55113,55129&hidePreview=true. Accessed July 20, 2020.
- Washburn County. (2004). Washburn County Comprehensive Plan. November 11, 2004.
- Wisconsin Department of Health Services. (2015). County Population Projects through 2040, All Ages Population. September 2015.

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 Hayward Project

In their response to the Hayward Project questionnaire, the Trego Lake District indicated that sedimentation coming down the Namekagon River from the Hayward Project has settled out in the Trego Project reservoir and created impassable boating channels in areas of Trego Lake.

Shoreline surveys completed in 1998, 2003, and 2013 indicated that shorelines along the Hayward Lake were well vegetated and showed little or no erosion. In addition, Sawyer County Zoning has existing regulations that limit ground disturbance in shoreline areas. The requirements outlined in these zoning regulations will reduce the potential for future shoreline erosion in the Project boundary. Additionally, the Hayward Project is located approximately 30 miles upstream of the Trego Project and any sediment originating at the Hayward Project is unlikely to reach the Trego Project.

Since there is no current information indicating that erosion is a problem within the Hayward Project boundary, it is not likely that sediment deposited within the Trego Project reservoir is originating from the Hayward Project.

5.1.1.2 Trego Project

In their response to the Trego Project questionnaire, the Trego Lake District indicated they intended to participate in the licensing process and identified sedimentation coming down the Namekagon River, making navigation difficult in certain areas of the Project Reservoir as an area of concern.

In their response to the Trego Project questionnaire, the Town of Trego indicated that a monetary contribution to the Trego Lake District for dredging is a relicensing concern.

Shoreline surveys completed in 1998, 2003, and 2013 indicated that the Trego Lake shoreline was well vegetated and showed little or no erosion. In addition, Washburn County Zoning has existing regulations that limit ground disturbance in shoreline areas. The requirements outlined in these zoning regulations will reduce the potential for future shoreline erosion in the Project boundary.

Since there is no current information indicating that erosion is a problem within the Trego Project boundary, it is likely that sediment deposited within the reservoir is originating outside of the Project.

5.1.2 Water Resources

5.1.2.1 Hayward Project

No water resources issues were identified from the responses to the Hayward Project questionnaire.

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

5.1.2.2 Trego Project

In their response to the Trego Project questionnaire, the Town of Trego indicated flooding was a relicensing concern; flooding leads to town road closure, closure of the town campground, and damage to residences, personal property, and town roads.

Ice jams occur in restricted riverine areas near the U.S. Highway 53 crossing that occasionally cause flooding. The ice jams are not caused by Project operations.

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

5.1.3 Fish and Aquatic Resources

5.1.3.1 Hayward Project

In their response to the Hayward Project questionnaire, the WDNR provided fisheries survey and stocking information, as well as mussel information. The information was incorporated into the PAD.

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

5.1.3.2 Trego Project

In their response to the Trego Project questionnaire, the Trego Lake District identified a reduction in sport fishing as a resource concern in their response to the questionnaire.

In their response to the Trego Project questionnaire, the WDNR provided fisheries survey and fish stocking information, as well as mussel information. The information was incorporated into the PAD.

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

5.1.4 Terrestrial Wildlife and Botanical Resources

5.1.4.1 Hayward Project

No terrestrial wildlife or botanical resources issues were identified from the Hayward Project questionnaire. There are no proposed construction activities or operational changes that would impact terrestrial wildlife or botanical resources.

5.1.4.2 Trego Flowage

No terrestrial wildlife or botanical resources issues were identified from the Trego Project questionnaire. There are no proposed construction activities or operational changes that would impact terrestrial wildlife or botanical resources.

5.1.5 Wetlands, Riparian, and Littoral Habitat

5.1.5.1 Hayward Project

In their response to the Hayward questionnaire, the Trego Lake District identified hybrid water milfoil in Hayward Lake coming downstream into Trego Lake. The Hayward Lake is located approximately 30 miles upstream of the Trego Project. If hybrid water milfoil at the Trego Project reservoir originated from the Hayward Project, it is more likely it was transported via recreational activities such as boating or fishing rather than flowing down the Namekagon River. The State of Wisconsin has regulations prohibiting the transportation of aquatic plants from one waterbody to another via boats and other recreational gear.

There are no planned changes to operation, reservoir levels, or minimum flows that would cause adverse impacts to wetlands, riparian, and littoral habitat at the Hayward Project.

5.1.5.2 Trego Flowage

In their response to the Trego questionnaire, the Trego Lake District identified hybrid water milfoil and curly leaf pondweed as relicensing issues. The State of Wisconsin has regulations prohibiting the movement of aquatic plants on boats or other recreational gear from one water body to another.

In their response to the Trego questionnaire, the Town of Trego identified curly leaf pondweed and Eurasian water milfoil as relicensing issues in their response to the Trego questionnaire. The State of Wisconsin has regulations prohibiting the transportation of aquatic plants on boats or other recreational gear from one waterbody to another.

There are no planned changes to operation, reservoir levels, or minimum flows that would cause adverse impacts to wetlands, riparian, and littoral habitat at the Trego Project.

5.1.6 Critical Habitat and Threatened and Endangered Species

5.1.6.1 Hayward Project

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

5.1.6.2 Trego Flowage

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

5.1.7 Recreation and Land Use

5.1.7.1 Hayward Project

No recreation and land use resource issues were identified in response to the Hayward Project questionnaire.

There are no new recreation facilities or improvements proposed at the Hayward Project.

5.1.7.2 Trego Project

In their response to the Trego questionnaire, the Trego Lake District identified sedimentation coming in to Trego Lake from the Namekagon River and Potato Creek causing shallow areas with excessive aquatic plant growth that limit recreational access to portions of the reservoir as a navigation and recreation issue.

In their response to the Trego questionnaire, the Town of Trego indicated that the boat landing is unusable due to aquatic vegetation.

There are no new recreation facilities or improvements proposed at the Trego Project.

5.1.8 Aesthetic Resources

5.1.8.1 Hayward Project

No aesthetic resource issues were identified in response to the Hayward Project questionnaire.

There are no proposed operational, reservoir level, minimum flow, or land use changes that would adversely impact aesthetic resources at the Hayward Project.

5.1.8.2 Trego Project

No aesthetic resource issues were identified in response to the Trego Project questionnaire.

There are no proposed operational, reservoir level, minimum flow, or land use changes that would impact aesthetic resources at the Trego Project.

5.1.9 Cultural and Tribal Resources

5.1.9.1 Hayward Project

No cultural or tribal resource concerns were identified from the Hayward Project questionnaire.

Hayward Project facilities are over 50 years old and were determined ineligible for the NRHP in 1989.

5.1.9.2 Trego Project

No cultural or tribal resource concerns were identified from the Trego Project questionnaire.

Trego Project facilities are over 50 years old and were determined eligible for the NRHP in 1991.

5.1.10 Socio-Economic Resources

5.1.10.1 Hayward Project

No socio-economic resource issues were identified from the Hayward Project questionnaire.

There are no proposed changes to the operations, reservoir levels, or minimum flows that would cause adverse impacts to socio-economic resources at the Hayward Project.

5.1.10.2 Trego Project

No socio-economic resource issues were identified from the Trego Project questionnaire.

There are no proposed changes to the operations, reservoir levels, or minimum flows that would cause adverse impacts to socio-economic resources at the Trego Project.

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 Hayward 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 Hayward 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 this study.

5.2.1.2 Trego 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 reservoir 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 this study.

5.2.2 Water Resources

5.2.2.1 Hayward Project

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

5.2.2.2 Trego Flowage

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

5.2.3 Fish and Aquatic Resources

5.2.3.1 Hayward Project

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

5.2.3.2 Trego Flowage

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 Hayward Project

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

5.2.4.2 Trego Flowage

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 Hayward Project

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

5.2.5.2 Trego 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 Hayward Project

Should the consultation process outlined in Section 5.1.6 not identify any adverse effects from Hayward 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 Trego Project

Should the consultation process outlined in Section 5.1.6 not identify any adverse effects from Trego 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.

5.2.7 Recreation and Land Use

5.2.7.1 Hayward Project

The June 15, 2015 Hayward Recreation Report, provided in **Appendix 5.2.7.1-1**, indicated the number, size, and capacity of existing recreation facilities is sufficient to accommodate the current amount of recreational use on all but the busiest of days (GLEC, 2015a).

Since the sites are sufficient to accommodate recreational use, the Licensee is not proposing any studies specific to recreation or land use.

5.2.7.2 Trego Project

The June 23, 2015 Trego Recreation Report, provided in **Appendix 5.2.7.2-1**, indicated the number, size, and capacity of the existing recreation facilities is sufficient to accommodate the current amount of recreational use on all but the busiest of days. Additionally, over 90% of the estimated day use occurs upstream of the U.S. Highway 53 Bridge, typically by canoers, kayakers, and inner tubers as a take-out prior to entering the reservoir (GLEC, 2015b).

Since the sites are sufficient to accommodate recreational use, the Licensee is not proposing any studies specific to recreation or land use.

5.2.8 Aesthetic Resources

5.2.8.1 Hayward Project

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

5.2.8.2 Trego Project

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

5.2.9 Historical and Cultural Resources

5.2.9.1 Hayward Project

The Hayward 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[12].

5.2.9.2 Trego Project

The Trego Project site was evaluated in 1991 and determined eligible 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[13].

[12] 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.

[13] 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; And The Wisconsin State Historic Preservation Office For The Management Of Historic Properties Affected By The Trego Hydroelectric Project, executed on June 16, 1992.

5.2.10 Socio-Economic Resources

5.2.10.1 Hayward Project

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

5.2.10.2 Trego Project

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

5.2.11 Tribal Resources

5.2.11.1 Hayward Project

NSPW 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 Trego Project

NSPW 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.

5.2.12 References

- Great Lakes Environmental Center. (2015a). Recreation Report for the Hayward Hydroelectric Project (FERC Project 2417). June 15, 2015.
- Great Lakes Environmental Center. (2015b). Recreation Report for the Trego Hydroelectric Project (FERC Project 2711). June 23, 2015.

5.3 Mitigation Enhancement

5.3.1 Hayward 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 maintain a minimum flow of 8 cfs, or inflow, whichever is less, into the bypassed reach of the Namekagon River to protect aquatic resources in the river.
- Continue to operate the Project to maintain a target elevation of 1,187.4 feet with a fluctuation around the target elevation such that the reservoir is maintained between 1,187.0 and 1,187.5 feet.
- Continue to maintain the Licensee-owned lands downstream of the dam for wildlife habitat.

The Hayward Project in its current configuration has operated since the powerhouse was rebuilt in 1928. 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 Trego 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 into the Project reservoir.
- Continue to operate the Project at target elevation of 1,034.9 feet, with fluctuations limited to 0.3 feet around the target elevation, between elevations 1,034.6 and 1,035.2 feet.

The Trego Project has operated since 1927. 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 both the Hayward Project and Trego Project is presented on the following page. If an updated version of a plan is available, the updated plan is listed (FERC, 2020).

A list of current FERC-approved comprehensive plans include the following:

- National Park Service, The Nationwide Rivers Inventory. U.S. Department of the Interior. 1993.
- National Park Service, St. Croix National Scenic Riverway final master plan. August 10, 1976.
- National Park Service, Statement for management, St. Croix and Lower St. Croix National Scenic Riverways. November 1986.
- Upper St. Croix Management Commission, Upper St. Croix management policy resolution. November 1, 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 Department of Natural Resources, An evaluation of the sedimentation process and management alternatives for the Trego Flowage, Washburn County, Wisconsin. May 1989.
- 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 following plans are believed to be relevant to the Projects:

- City of Hayward. City of Hayward Comprehensive Plan. March 19, 2010.
- Sawyer County. A Plan for Outdoor Recreation, Sawyer County Wisconsin 2014-2020. 2014.
- Sawyer County. Sawyer County Comprehensive Plan. January 21, 2010.
- Town of Hayward. Town of Hayward Comprehensive Plan 2009-2030. 2009.
- Washburn County. Washburn County Comprehensive Land Use Plan 2006-2020. 2006.
- Wisconsin Department of Natural Resources, Wisconsin’s Wildlife Action Plan (2015-2025). 2016.

5.6 References

- Federal Energy Regulatory Commission. (2020). List of Comprehensive Plans. July 2020.

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

NSPW 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 Hayward Project and Trego Project and any other entities thought to be potential stakeholders. The information for each Project was sent via postal mail service on July 22, 2020. A copy of each Project questionnaire, fact sheet, and stakeholder list is enclosed in **Appendix 6-1.**

NSPW received several written responses to the questionnaires. The information contained in the responses is incorporated into the PAD as appropriate. Responses are also included in **Appendix 6-1**.

A summary of the written responses is provided below:

- The Town of Trego responded to both questionnaires providing contact information, indicated they planned to participate in the relicensing process, and identified resource issues including aquatic invasive species, sedimentation, aquatic vegetation, and flooding. The Town of Trego was not familiar with the TLP and did not express support for or opposition to use of the TLP.
- The Trego Lake District responded to both questionnaires providing contact information, indicated they planned to participate in the relicensing process, and identified resource issues including aquatic invasive species, fisheries, aquatic vegetation, sedimentation, and recreation. The Trego Lake District was not familiar with the TLP and did not express support for or opposition to use of the TLP.
- The Wisconsin Office of Attorney General responded to the questionnaires and requested they be removed from the distribution list for both Projects.
- The WDNR returned both questionnaires, and in addition provided detailed information for both Projects, including survey data for several resource areas. The WNDR provided information regarding water resources, fish and aquatic resources, invasive species, threatened and endangered species, and recreation resources. This information was incorporated into the PAD. The WDNR did not express support for or opposition to use of the TLP.
- The Mille Lacs Band of Ojibwe responded to the Trego questionnaire indicating they would be participating in the relicensing process. They did not express support for or opposition to use of the TLP.

7. Public Utilities Regulatory Policies Act

The Licensee is not seeking benefits under the Public Utilities Regulatory Policies Act for either the Hayward Project or Trego Project.