

**ENVIRONMENTAL ASSESSMENT  
FOR HYDROPOWER LICENSE**

Arpin Dam Project  
FERC Project No. 2684-010  
Wisconsin

Federal Energy Regulatory Commission  
Office of Energy Projects  
Division of Hydropower Licensing  
888 First Street, NE  
Washington, D.C. 20426

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## ACRONYMS AND ABBREVIATIONS

ACHP	Advisory Council on Historic Preservation
APE	area of potential effect
Arpin Project	Arpin Dam Project
certification	water quality certification
cfs	cubic feet per second
Commission	Federal Energy Regulatory Commission
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DO	dissolved oxygen
EA	environmental assessment
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission
FERC Form-80	Licensed Hydropower Development Recreation Report
Flambeau Hydro	Flambeau Hydro, LLC
FPA	Federal Power Act
FWS	U.S. Fish and Wildlife Service
HPMP	historic properties management plan
Interior	U.S. Department of the Interior
IPaC	Information for Planning and Consultation
kV	kilovolts
kW	kilowatts
mg/L	milligrams per liter
MISO	Midwest Independent System Operator, Inc.
MRO	Midwest Reliability Organization
MW	megawatts
MWh	megawatt-hour
National Register	National Register of Historic Places
NAVD88	North American Vertical Datum of 1988
NERC	North American Electric Reliability Council
NGVD29	National Geodetic Vertical Datum of 1929
NHPA	National Historic Preservation Act
NLEB	northern long-eared bat
PA	Programmatic Agreement
QHEI	Qualitative Habitat Evaluation Index
SCORP	State Comprehensive Outdoor Recreation Plan
SVA	Stream Visual Assessment Protocol
USGS	U.S. Geological Survey
Wisconsin DNR	Wisconsin Department of Natural Resources

Wisconsin SCORP

Wisconsin SHPO

Wisconsin Statewide Comprehensive Outdoor  
Recreation Plan

Wisconsin State Historic Preservation Officer

# **ENVIRONMENTAL ASSESSMENT**

**Federal Energy Regulatory Commission  
Office of Energy Projects  
Division of Hydropower Licensing  
Washington, D.C.**

**ARPIN DAM PROJECT  
FERC Project No. 2684-010 - Wisconsin**

## **1.0 INTRODUCTION**

### **1.1 APPLICATION**

On April 26, 2017, Flambeau Hydro, LLC (Flambeau Hydro) filed an application with the Federal Energy Regulatory Commission (Commission) for a subsequent license to continue to operate and maintain the Arpin Dam Project No. 2684 (Arpin Project or project).<sup>1</sup> The 1.45-megawatt (MW) project is located on the Chippewa River, near the Village of Radisson, in Sawyer County, Wisconsin (Figure 1). The project does not occupy federal land.

### **1.2 PURPOSE OF ACTION AND NEED FOR POWER**

#### **1.2.1 Purpose of Action**

The purpose of the Arpin Project is to provide a source of hydroelectric power. Therefore, under the provisions of the Federal Power Act (FPA), the Commission must decide whether to issue a subsequent license for the Arpin Project and what conditions should be placed on any license issued. In deciding whether to issue a license for a hydroelectric project, the Commission must determine that the project would be best adapted to a comprehensive plan for improving or developing the waterway. In addition to the power and developmental purposes for which licenses are issued (such as flood control, irrigation, and water supply), the Commission must give equal consideration to the purposes of: (1) energy conservation; (2) the protection, mitigation of damage to, and enhancement of fish and wildlife resources; (3) the protection of recreational opportunities; and (4) the preservation of other aspects of environmental quality.

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<sup>1</sup> The Federal Power Commission issued the current, original license for the project on June 3, 1969, with an effective date of May 1, 1969, and term of 50 years. *See North Central Power Company, Inc.*, 41 FPC ¶ 682 (1969) (1969 License Order).



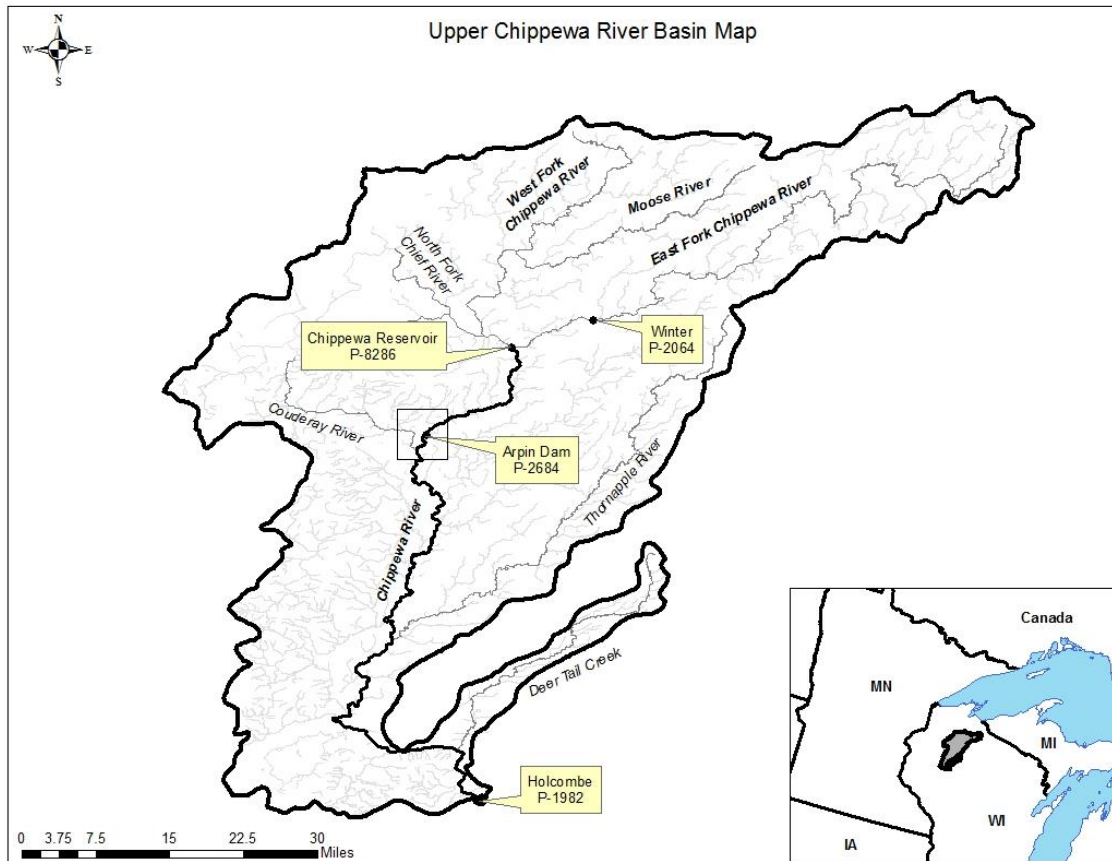


Figure 1. Location of the Arpin Project and other dams in the Upper Chippewa River Basin (Source: staff).

Issuing a subsequent license for the Arpin Project would allow Flambeau Hydro to generate electricity at the project for the term of the subsequent license, making electric power from a renewable resource available to the regional grid.

This environmental assessment (EA) analyzes the effects associated with operation of the project and alternatives to the project, and makes recommendations to the Commission on whether to issue a license, and under what terms and conditions.

The EA assesses the environmental and economic effects of: (1) operating and maintaining the project as proposed by Flambeau Hydro; and (2) operating and maintaining the project as proposed by Flambeau Hydro, with additional staff recommended measures (staff alternative). We also consider the effects of the no-action alternative. Under the no-action alternative, the project would continue to operate as it does under the existing license, and no new environmental protection, mitigation, or enhancement measures would be implemented. The primary issues associated with relicensing the project are protecting fish from potential

entrainment and protecting aquatic habitat in the impoundment and bypassed reach.

### **1.2.2 Need for Power**

The Arpin Project has an installed capacity of 1.45 MW and an average annual generation of about 7,336 megawatt-hours (MWh). The project provides power that helps meet part of the region's power requirements, resource diversity, and capacity needs.

The power generated is sold to the North Central Power Company. To assess the need for power, we looked at the needs in the operating region in which the project is located. The North American Electric Reliability Corporation (NERC) annually forecasts electrical supply and demand nationally and regionally for a 10-year period. The Arpin Project is located within NERC's Midwest Reliability Organization (MRO) region and NERC's Midcontinent Independent System Operator, Inc. (MISO) assessment area. According to NERC's 2017 Long-Term Reliability Assessment, the summer internal demand for MISO is projected to increase by 0.3 percent from 2018 to 2027. The anticipated reserve margin (*i.e.*, the primary metric used to evaluate the adequacy of projected generation resources to serve forecasted peak load) is forecasted to range from 19.23 percent in 2018 to 14.56 percent in 2027. The MISO assessment area is forecast to meet MISO's target reserve margin of 15.8 percent through the year 2022, but fall below 15.8 percent beginning in 2023 and continuing through 2027 (NERC, 2017).

We conclude that power from the Arpin Project would help continue to meet the need for power in the MRO region. The project provides power that can displace non-renewable, fossil-fired generation and contributes to a diversified generation mix. Displacing the operation of non-renewable facilities may avoid some power plant emissions and create an environmental benefit.

## **1.3 STATUTORY AND REGULATORY REQUIREMENTS**

A subsequent license for the project would be subject to numerous requirements under the FPA and other applicable statutes. The major regulatory and statutory requirements are described below.

### **1.3.1 Federal Power Act**

#### **1.3.1.1 Section 18 Fishway Prescriptions**

Section 18 of the FPA states that the Commission is to require construction, operation, and maintenance by a licensee of such fishways as may be prescribed by the Secretaries of the U.S. Department of Commerce or the U.S. Department of

the Interior (Interior). On February 12, 2018, Interior requested that the Commission include a reservation of authority to prescribe fishways under section 18 in any license issued for the project.

#### **1.3.1.2 Section 10(j) Recommendations**

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

On February 12, 2018, Interior filed timely recommendations under section 10(j). These recommendations are summarized in Table 5 and discussed in section 5.3, *Summary of Section 10(j) Recommendations*.

#### **1.3.2 Clean Water Act**

Under section 401(a)(1) of the Clean Water Act (CWA), 33 U.S.C. § 1341(a)(1), a license applicant must obtain either a water quality certification (certification) from the appropriate state pollution control agency verifying that any discharge from the project would comply with applicable provisions of the CWA, or a waiver of such certification. A waiver occurs if the state agency does not act on a request for certification, within a reasonable period of time, not to exceed one year after receipt of such request.

On January 30, 2018, Flambeau Hydro applied to the Wisconsin Department of Natural Resources (Wisconsin DNR) for certification for the Arpin Project. Wisconsin DNR received the request for certification on February 1, 2018. Wisconsin DNR has not yet acted on the application.

#### **1.3.3 Endangered Species Act**

Section 7 of the Endangered Species Act (ESA), 16 U.S.C. § 1536, requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of the critical habitat of such species. On May 2, 2018, we accessed the U.S. Fish and Wildlife Service's (FWS) Information for Planning and Consultation (IPaC) database to determine federally listed species that could occur in the project vicinity. According to the IPaC database, the

federally endangered gray wolf (*Canis lupus*) and sheepsnose mussel (*Plethobasus cyphus*), and the federally threatened northern long-eared bat (*Myotis septentrionalis*) and Canada lynx (*Lynx canadensis*) could occur in the project vicinity.<sup>2</sup> No critical habitat for these species is present in the project vicinity.

Our analysis of project impacts on the gray wolf, sheepsnose mussel, northern long-eared bat, and Canada lynx is presented in section 3.3.3, *Threatened and Endangered Species*. Based on available information, we conclude that licensing the project, as proposed with staff-recommended measures, would be “not likely to adversely affect” the gray wolf, sheepsnose mussel, and northern long-eared bat, and would not affect the Canada lynx.

#### **1.3.4 Coastal Zone Management Act**

The Coastal Zone Management Act (CZMA) of 1972, as amended, requires review of the project’s consistency with a state’s Coastal Management Program for projects within or affecting the coastal zone. Under section 307(c)(3)(A) of the CZMA, 16 U.S.C. §1456(c)(3)(A), the Commission cannot issue a license for a project within or affecting a state’s coastal zone unless the state’s CZMA agency concurs with the license applicant’s certification of consistency with the state’s CZMA Program, or the agency’s concurrence is conclusively presumed by its failure to act within 180 days of its receipt of the applicant’s certification.

The project is not located within the state-designated Coastal Management Zone, which extends to 15 counties on the state boundary with Lake Superior and Lake Michigan, and the project would not affect Wisconsin’s coastal resources. Therefore, the project is not subject to Wisconsin’s coastal zone program review and no consistency certification is needed for the action. On March 20, 2017, Flambeau Hydro requested concurrence from the Wisconsin Coastal Resources Management Program that a consistency review for the project is not required. On March 20, 2017, the Wisconsin Coastal Resources Management Program concurred that the Arpin Project is outside of Wisconsin’s coastal zone, and therefore, does not need to be reviewed for consistency.<sup>3</sup>

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<sup>2</sup> See Interior’s official list of threatened and endangered species, accessed by staff using the IPaC database (<https://ecos.fws.gov/ipac/>) on May 2, 2018, and filed on May 3, 2018.

<sup>3</sup> See Flambeau Hydro’s April 26, 2017 license application at Appendix E-16.1.

### **1.3.5 National Historic Preservation Act**

Section 106 of the National Historic Preservation Act (NHPA), 54 U.S.C. § 306108, requires that a federal agency “take into account” how its undertakings could affect historic properties. Historic properties are districts, sites, buildings, structures, traditional cultural properties, and objects significant in American history, architecture, engineering, and culture that are eligible for inclusion in the National Register of Historic Places (National Register).

In response to Flambeau Hydro’s April 24, 2014 request, Commission staff designated Flambeau Hydro as its non-federal representative for the purposes of conducting section 106 consultation under the NHPA on June 19, 2014. Pursuant to section 106, and as the Commission’s designated non-federal representative, Flambeau Hydro initiated consultation with the Wisconsin State Historic Preservation Officer (Wisconsin SHPO) to identify historic properties, determine the National Register-eligibility, and assess potential adverse effects on historic properties within the project’s area of potential effects (APE). Flambeau Hydro circulated a copy of the draft license application to the Wisconsin SHPO and, on March 20, 2017, sought concurrence with the Wisconsin SHPO that the APE should be limited to the project boundary. The Wisconsin SHPO has not replied to this request.

To meet the requirements of section 106 of the NHPA, Commission staff executed a Programmatic Agreement (PA) with the Wisconsin SHPO on December 16, 1993 (FERC, *et al.*, 1993). The PA contains principals and procedures for the protection of historic properties from the effects of the operation of hydroelectric projects in the state of Wisconsin. The terms of the PA ensure that Flambeau Hydro address and treat all historic properties identified within the project’s APE through implementation of a historic properties management plan (HPMP) for the project.

Our analysis presented in section 3.3.5, *Cultural Resources*, concludes that an APE that encompasses all lands within the project boundary is consistent with the extent of potential project effects on cultural resources, and that relicensing the project as proposed and with the staff-recommended measures would not have an adverse effect on cultural resources.

## **1.4 PUBLIC REVIEW AND COMMENT**

The Commission’s regulations (18 CFR § 16.8) require applicants to consult with appropriate resource agencies, tribes, and other entities before filing an application for a license. This consultation is the first step in complying with the Fish and Wildlife Coordination Act (16 U.S.C. § 661 *et seq.*), ESA, NHPA,

and other federal statutes. Pre-filing consultation must be completed and documented according to the Commission's regulations.

#### **1.4.1 Scoping**

Before preparing this EA, staff conducted scoping to determine what issues and alternatives should be addressed. A scoping document was distributed to interested agencies and others on November 2, 2017. The scoping document was noticed in the *Federal Register* on November 8, 2017. No comments were filed.

#### **1.4.2 Interventions**

On December 13, 2017, the Commission issued a notice accepting the application and setting February 12, 2018 as the deadline for filing motions to intervene and protests. In response to the notice, the following entities filed notices of intervention (none opposed issuance of a license):

<b><u>Intervenor</u></b>	<b><u>Date Filed</u></b>
Interior	February 6, 2018
Wisconsin DNR	December 14, 2017

#### **1.4.3 Comments on the Application**

On December 13, 2017, the Commission issued a notice setting February 12, 2018 as the deadline for filing comments, recommendations, terms and conditions, and prescriptions. The following entities responded:

<b><u>Commenting Entity</u></b>	<b><u>Date Filed</u></b>
Interior	February 12, 2018
Wisconsin DNR	January 30, 2018

## **2.0 PROPOSED ACTION AND ALTERNATIVES**

### **2.1 NO-ACTION ALTERNATIVE**

Under the no-action alternative, the project would continue to operate under the terms and conditions of the existing license, and no new environmental protection, mitigation, or enhancement measures would be implemented. We use this alternative to establish baseline environmental conditions for comparison with other alternatives.

### 2.1.1 Existing Project Facilities

The Arpin Project is located on the Chippewa River near the Village of Radisson, Sawyer County, Wisconsin, approximately 1.2 river miles upstream of the confluence of the Chippewa and Couderay Rivers. The project facilities are shown in Figure 2.

The Arpin Project dam is comprised of three sections: **(1)** an approximately 742.5-foot-long, 19-foot-high stone masonry dam section (west dam section) that includes: (a) a 258.1-foot-long non-overflow section; (b) a 45-foot-long spillway section that includes a 16.9-foot-wide, 10.5-foot-high timber stoplog spillway bay and a 15.9-foot-wide, 6.52-foot-high timber stoplog spillway bay; (c) an approximately 318.9-foot-long overflow section with a crest elevation of 1,227.55 feet North American Vertical Datum of 1988 (NAVD88); and (d) a 120.5-foot-long non-overflow section; **(2)** an approximately 452.2-foot-long, 18-foot-high masonry dam section (middle dam section) that includes: (a) a 97.7-foot-long non-overflow section; (b) a 53.1-foot-long spillway section that includes a 19.2-foot-wide, 6.84-foot-high steel vertical lift gate and a 19.6-foot-wide, 8.96-foot-high steel vertical lift gate; (c) an approximately 237.9-foot-long overflow section with a crest elevation of 1,227.65 feet NAVD88; and (d) a 63.5-foot-long non-overflow section; and **(3)** an approximately 319.8-foot-long, 16-foot-high masonry dam section (east dam section) that includes: (a) a 25.5-foot-long non-overflow section; (b) an 108-foot-long overflow section with a crest elevation of 1,227.8 feet NAVD88; (c) a 44.4-foot-long spillway section that includes 16.3- and 15.9-foot-wide tainter gates; and (d) a 141.9-foot-long non-overflow section.

The three dam sections abut two natural islands to impound approximately 294 surface acres<sup>4</sup> at a normal maximum water surface elevation of 1,227.22 feet

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<sup>4</sup> Exhibit A of Flambeau Hydro's April 26, 2017 license application states the project impounds a surface area of approximately 294 acres. However, the geo-referenced Exhibit G project boundary filed on April 5, 2018 suggests the project impoundment is smaller (approximately 202 acres). Commission staff issued a letter on June 11, 2018 requesting additional information from Flambeau Hydro to clarify this inconsistency within 60 days.



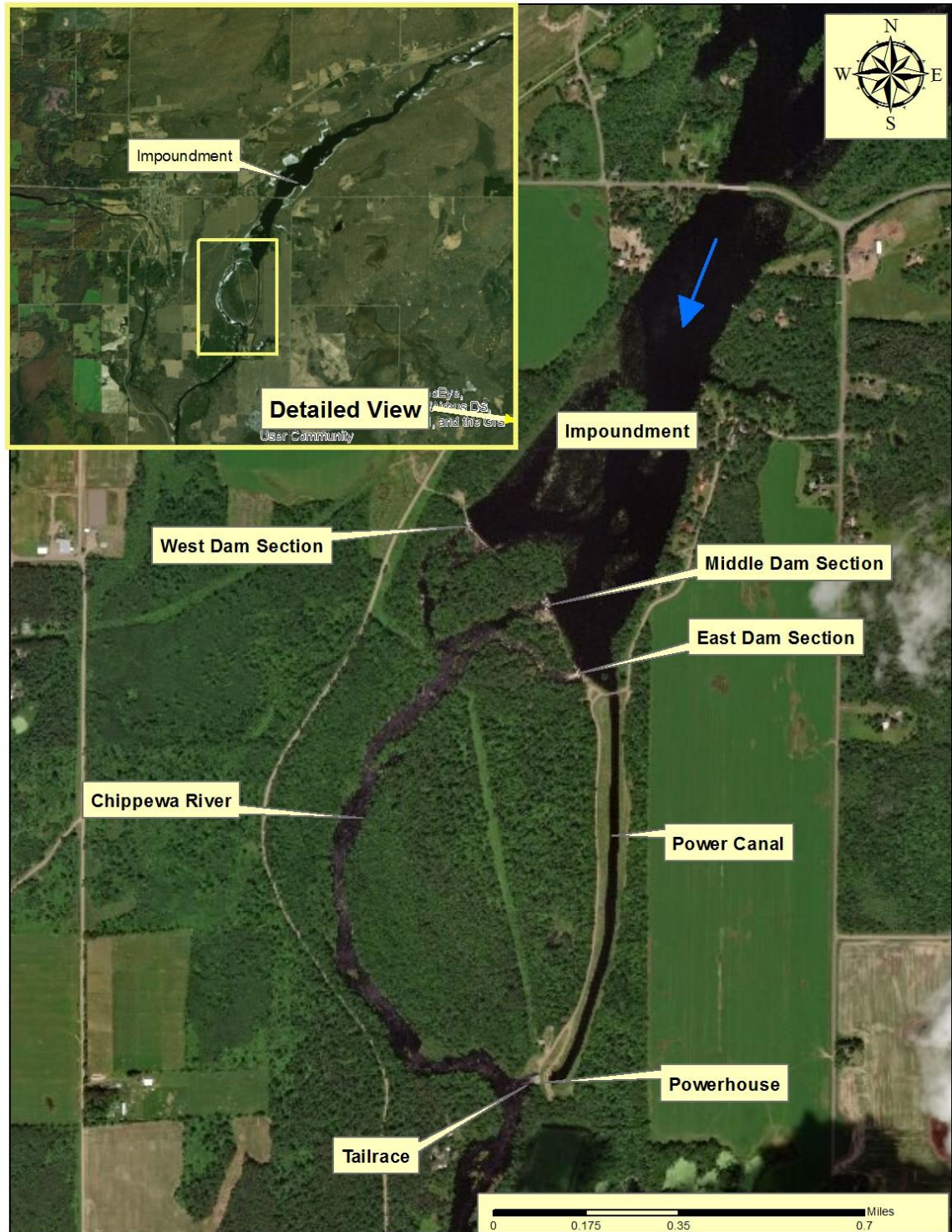


Figure 2. Location of project facilities (Source: staff).



NAVD88.<sup>5</sup> From the impoundment, water passes through a 37-foot-long, 11.5-foot-wide, 14-foot-high concrete, canal headworks structure on the eastern side of the impoundment and enters an approximately 3,200-foot-long, 56-foot-wide, 6-foot-deep power canal. Water exits the power canal through a 13.5-foot-long, 48-foot-wide, 14.4-foot-high concrete intake structure that includes two 9-foot-wide, 11-foot-high steel stop gates and a 44-foot-wide, 14.4-foot-high trashrack with 1.5- to 1.75-inch clear bar spacing. From the intake structure, water flows through three 79-foot-long, 8-foot-diameter steel penstocks to two 600-kW and one 250-kW vertical Francis turbine-generator units located within a 52-foot-long, 24-foot-wide, 25-foot-high cement block powerhouse. Water is then discharged back into the Chippewa River via three approximately 14-foot-long, 9-foot-diameter draft tubes and an approximately 130-foot-long, 77-foot-wide, 7-foot-deep concrete tailrace.

A 15-foot-long, 2.4-kilovolt (kV) underground generator lead line transmits electricity generated by the project from the three project generators to a substation containing three 2.4/22.9-kV step-up transformers. A 3,645-foot-long, 22.9-kV above-ground transmission line transmits electricity generated by the project from the step-up transformers to the interconnection with the regional grid, at a transmission line owned by North Central Power Company.

The project includes four recreational facilities that are depicted on a revised Exhibit K drawing that was approved by the Commission on December 10, 1981<sup>6</sup> in accordance with Article 18 of the current license. The approved

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<sup>5</sup> Exhibit A of Flambeau Hydro's license application states that the normal maximum authorized impoundment elevation is 1,227.32 feet "USGS datum." Exhibit A references the U.S. Geological Survey's (USGS) gage 05356000, which uses National Geodetic Vertical Datum of 1929 (NGVD29). See [https://waterdata.usgs.gov/nwis/nwismap/?site\\_no=05356000&agency\\_cd=USGS](https://waterdata.usgs.gov/nwis/nwismap/?site_no=05356000&agency_cd=USGS). To convert from NGVD29 to NAVD88, Commission staff used the National Oceanic and Atmospheric Administration's vertical datum conversion method, which yields an approximate elevation of 1,227.22 NAVD88. See [https://www.ngs.noaa.gov/cgi-bin/VERTCON/vert\\_con.prl](https://www.ngs.noaa.gov/cgi-bin/VERTCON/vert_con.prl).

<sup>6</sup> *North Central Power Company, Inc.*, 17 FERC ¶ 62,387 (1981).

project recreation facilities include a public boat ramp, a canoe portage trail, a picnic area on the west bank of the bypassed reach below the west dam section,<sup>7</sup> and a picnic and fireplace area on the island between the west and middle dam sections.

### **2.1.2 Current Project Boundary**

The current project boundary for the Arpin Project as established in the Commission's June 3, 1969 license order, encompasses approximately 317 acres<sup>8</sup> and includes the impoundment and lands that are needed for project purposes, including lands associated with the dam sections, powerhouse, power canal, tailrace, generator lead line, transmission line, recreation facilities, and appurtenant facilities.

According to the June 3, 1969 license order and the revised Exhibit K drawing that was approved by the Commission on December 10, 1981, the shoreline of the 2.5-acre island located between the east and middle dam sections and the shoreline of the 11-acre island located between the west and middle dam sections, are used to form the project impoundment. The remainder of the islands occurring above the normal maximum water surface elevation of 1,227.22 feet NAVD88, with the exception of the approximately 2-acre picnic and fireplace area on the island between the west and middle dam sections, are excluded from the current project boundary. Similarly, the 90-acre island that is located between the power canal and the bypassed reach is not included within the current project boundary, except for the land associated with the transmission line corridor, canoe

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<sup>7</sup> Because they are in the same location, Commission staff infers that the walk-in fishing access area presented in Flambeau Hydro's FLA is the picnic area located downstream of the west dam section that is presented on the Exhibit K drawing approved by the Commission on December 10, 1981. Therefore, this recreation facility will herein after be referred to as the west bank fishing access area.

<sup>8</sup> The original license issued by the Commission on June 3, 1969 does not specify a total project boundary acreage. Staff estimates that the existing project boundary encompasses approximately 317 acres based on project features identified in the original license order and the revised Exhibit K drawing that was approved by the Commission on December 10, 1981. Staff used georeferenced shapefiles, aerial photographs, Exhibit K maps, and the project descriptions in the June 3, 1969 license order and the December 10, 1981 order to measure lands associated with the project features.

portage, and service road. The current project boundary does not include any federal land.

### **2.1.3 Project Safety**

The Arpin Project has been operating for more than 46 years under its existing license. During this time, Commission staff has conducted operational inspections focusing on the continued safety of the structures, identification of unauthorized modifications, efficiency and safety of operations, compliance with the terms of the license, and proper maintenance.

As part of the licensing process, Commission staff will evaluate the continued adequacy of the project's facilities under a subsequent license. Special articles will be included in any license issued, as appropriate. Commission staff will continue to inspect the project during the term of any subsequent license to assure continued adherence to Commission-approved plans and specifications, special license articles relating to construction (if any), operation and maintenance, and accepted engineering practices and procedures.

### **2.1.4 Current Project Operation**

On-site Flambeau Hydro staff manually operate the project in a run-of-river mode for the protection of impoundment and downstream aquatic resources by limiting impoundment surface elevation fluctuations such that outflow from the project approximates inflow. Flambeau Hydro limits fluctuations in the project impoundment to 1 foot below the maximum water surface elevation from June 1 through March 31, and 6 inches below the maximum water surface elevation from April 1 through May 31.

The project has a minimum hydraulic capacity of 53 cubic feet per second (cfs) and a collective maximum capacity of 664 cfs. When inflows exceed 664 cfs, excess water is spilled into the bypassed reach by passing flows through the east dam section tainter gates, followed by the middle dam section vertical gates to maintain a maximum water surface elevation of 1,227.22 feet NAVD88 in the project impoundment. Inflows exceeding the combined hydraulic capacity of the project's turbines, tainter gates, and vertical lift gates pass over the three dam overflow sections.

Project generation flows bypass approximately 6,834 feet of the Chippewa River, including: (a) an approximately 1,004-foot-long western channel, located just downstream of the west dam section; (b) an approximately 812-foot-long middle channel located just downstream of the middle dam section; (c) an approximately 748-foot-long eastern channel located just downstream of the east dam section; and (d) an approximately 4,270-foot-long main channel that begins at

the confluence of the west, middle and east channels and continues downstream to the Chippewa River near the project tailrace. While generating, Flambeau Hydro maintains a continuous minimum flow release of 40 cubic feet per second (cfs) from a tainter gate located at the east dam section to protect aquatic resources in most of the bypassed reach.

## **2.2 APPLICANT'S PROPOSAL**

### **2.2.1 Proposed Project Facilities**

Based on the Exhibit G filed on April 5, 2018, Flambeau Hydro proposes to add approximately 76 acres of land and water to the project boundary,<sup>9</sup> including approximately 20 acres of bypassed channels, the approximately 2.5-acre island between the east and middle dam sections, an approximately 9-acre parcel of land on the island between the middle and west dam sections (in addition to the 2-acre parcel that is listed as an existing project recreation facility), an approximately 1.5-acre island within the project impoundment, an approximately 20-acre area of forested land on the west bank of the impoundment that abuts River Road, an approximately 0.1-acre informal tailwater fishing area adjacent to the canoe portage trail along the northern bank of the project tailrace, and additional land and water around existing project features. Outside of the informal tailwater fishing area, Flambeau Hydro has not specified a project purpose for this additional land and water.

### **2.2.2 Proposed Operation and Environmental Measures**

Flambeau Hydro proposes to:

- Continue to operate the project in a run-of-river mode;
- Continue to release a continuous minimum flow of 40 cfs or inflow, whichever is less, from the east dam section to protect aquatic habitat in the bypassed reach;

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<sup>9</sup> Flambeau Hydro's final license application does not include a discussion about adding these areas to the project boundary; however, these areas are included within the revised Exhibit G filed on April 5, 2018. For purposes of our analysis herein, Commission staff considers Flambeau Hydro's Exhibit G to be a proposal to revise the project boundary. Commission staff issued a letter on June 11, 2018 requesting that Flambeau Hydro clarify whether or not it is proposing to revise the existing project boundary.

- Continue to limit impoundment fluctuations to 1 foot from June 1 through March 31, and 6 inches from April 1 through May 31;
- Continue to operate and maintain the existing canoe portage trail, boat ramp, and west bank fishing access area;
- Operate and maintain the existing informal tailwater fishing area located on the northern bank of the project tailrace as a formal project recreation facility;
- Discontinue operation and maintenance of the 2-acre picnic and fireplace area located on the island between the west and middle dam sections; and
- Develop an HPMP consistent with the statewide PA to protect historic properties.

## **2.3 STAFF ALTERNATIVE**

Under the staff alternative, the project would be operated as proposed by Flambeau Hydro with the modifications and additional staff-recommended measures described below.

- Develop an operation compliance monitoring plan to document compliance with run-of-river operation and minimum flow releases that may be required in any subsequent license issued for the project;
- Develop a debris management plan to protect fish from impingement on the trashrack and enhance aquatic habitat downstream from the dam sections;
- Avoid cutting trees between June 1 and July 31 to protect roosting northern long-eared bats;
- Develop a recreation monitoring plan to monitor and evaluate recreation use and needs at the project;
- Install picnic tables at the existing boat ramp and west bank fishing access areas;
- Develop an HPMP as proposed by Flambeau Hydro, with the following additional provisions: (1) procedures for protecting the historical integrity of the dam sections while operating and maintaining the project, including when repairs are needed to the dam structures; (2) conducting an archaeological survey in the planning stage of any proposed significant ground-disturbing activity that may disturb historic properties and procedures for the proper treatment of any historic resources identified

during the survey; and (3) procedures to be implemented prior to conducting routine maintenance activities in the project area or on project facilities; and

- Revise the project boundary by adding the existing, informal tailwater fishing area located on the northern bank of the project tailrace, and removing the 2-acre picnic and fireplace area on the island between the west and middle dam sections.

#### Section 10(j) Measure Not Recommended<sup>10</sup>

The staff alternative does not include Interior's recommendation to reduce entrainment potential at the project intake through physical exclusion or through some other action, in consultation with FWS. As discussed in section 5.3, *Summary of Section 10(j) Recommendations*, this measure is outside the scope of section 10(j).

## **2.4 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS**

Project decommissioning was considered as an alternative to the project, but has been eliminated from further analysis because it is not reasonable in the circumstances of this case. We discuss our justification for eliminating project decommissioning as an alternative below.

### **2.4.1 Project Decommissioning**

As the Commission has previously held, decommissioning is not a reasonable alternative to relicensing a project in most cases, when appropriate protection, mitigation, and enhancement measures are available.<sup>11</sup> The

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<sup>10</sup> See section 5.3, *Summary of Section 10(j) Recommendations*, for additional details on the recommendation.

<sup>11</sup> See, e.g., *Eagle Crest Energy Co.*, 153 FERC ¶ 61,058, at P 67 (2015); *Public Utility District No. 1 of Pend Oreille County*, 112 FERC ¶ 61,055, at P 82 (2005); *Midwest Hydro, Inc.*, 111 FERC ¶ 61,327, at PP 35-38 (2005).

Commission does not speculate about possible decommissioning measures at the time of relicensing, but rather waits until an applicant actually proposes to decommission a project, or there are serious resource concerns that cannot be addressed with appropriate license measures, making decommissioning a reasonable alternative to relicensing.<sup>12</sup> This is consistent with NEPA and the Commission's obligation under section 10(a) of the FPA to issue licenses that balance developmental and environmental interests.

Project retirement could be accomplished with or without dam removal.<sup>13</sup> Either alternative would involve denial of the license application and surrender or termination of the existing license with appropriate conditions.

No participant has recommended project retirement, there are no critical resource concerns, and we have no basis for recommending project retirement. The Arpin Project is a source of clean, renewable energy. This source of power would be lost if the project was retired. There also could be significant costs associated with retiring the project's powerhouse and appurtenant facilities.

Project retirement without dam removal would involve retaining the dam and disabling or removing equipment used to generate power. Certain project works could remain in place and could be used for historic or other purposes. This approach would require the State of Wisconsin to assume regulatory control and supervision of the remaining facilities. However, no participant has advocated for this alternative, and we do not have any basis for recommending it. Removing the dam would be more costly than retiring it in place, and removal could have substantial, negative environmental effects.

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<sup>12</sup> See generally *Project Decommissioning at Relicensing; Policy Statement*, FERC Stats. & Regs., Regulations Preambles (1991-1996), ¶ 31,011 (1994); see also *City of Tacoma, Washington*, 110 FERC ¶ 61,140 (2005) (finding that unless and until the Commission has a specific decommissioning proposal, any further environmental analysis of the effects of project decommissioning would be both premature and speculative).

<sup>13</sup> In the unlikely event that the Commission denies relicensing of a project or a licensee decides to surrender an existing project, the Commission must approve a surrender "upon such conditions with respect to the disposition of such works as may be determined by the Commission." 18 C.F.R. § 6.2 (2017). This can include simply shutting down the power operations, removing all or parts of the project (including the dam), or restoring the site to its pre-project condition.

### 3.0. ENVIRONMENTAL ANALYSIS

This section includes: (1) a general description of the project vicinity, (2) an explanation of the scope of our cumulative effects analysis, and (3) our analysis of the proposed action and other recommended environmental measures. Sections are organized by resource area (aquatic, recreation, *etc.*). Historic and current conditions are described under each resource area. The existing conditions are the baseline against which the environmental effects of the proposed action and alternatives are compared, including an assessment of the effects of proposed mitigation, protection, and enhancement measures, and any cumulative effects of the proposed action and alternatives. Staff conclusions and recommended measures are discussed in section 5.1, *Comprehensive Development and Recommended Alternative*.<sup>14</sup>

#### 3.1 GENERAL DESCRIPTION OF THE RIVER BASIN

The Arpin Project is located at river mile 169.6 on the mainstem of the Chippewa River. The Chippewa River Basin, which is the second largest basin in Wisconsin, has a total drainage area of about 9,500 square miles.<sup>15</sup> The Chippewa River is formed by two major tributaries, the East Fork of the Chippewa River and the West Fork of the Chippewa River, that join at Lake Chippewa to form the mainstem of the Chippewa River. The Chippewa River flows nearly 300 miles from its headwaters in north-central Wisconsin to the Mississippi River near Pepin, Wisconsin. The Arpin Project is located between the Chippewa Reservoir Project (FERC Project No. 8286) at Lake Chippewa and the Holcombe Project (FERC Project No. 1982). From the Holcombe Project, the Chippewa River flows about 111 miles in a southwesterly direction to the Mississippi River.

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<sup>14</sup> Unless otherwise indicated, information in this EA is taken from the application for license filed by Flambeau Hydro on April 26, 2017, and additional information filed by Flambeau Hydro November 29, 2017 and April 5, 2018.

<sup>15</sup> See Wisconsin DNR's Upper Chippewa River Basin webpage (<https://dnr.wi.gov/topic/Watersheds/basins/upchip/>), last accessed by staff on June 6, 2018.



The Chippewa River Basin is divided into the Upper Chippewa River Basin and Lower Chippewa River Basin by Wisconsin DNR for management purposes. The Upper Chippewa River Basin, where the Arpin Project is located, is defined as the area between the headwaters of the Chippewa River and the impoundment of the Holcombe Project (identified as Holcombe Flowage). The Upper Chippewa River Basin spans 4,680 square miles and includes portions of Iron, Ashland, Sawyer, Rusk, Price, Vilas, Chippewa, and Taylor Counties.

Topography in the Chippewa River Basin varies from relatively flat and swampy areas in the headwater areas to rolling terrain in the middle and lower portion of the basin. Climate varies by season with warm summers and cold winters. Temperatures range from summer highs near 80 to winter lows around zero on the Fahrenheit scale.<sup>16</sup> Precipitation occurs year around, with summer months being the wettest. The mean annual precipitation in the project vicinity is about 32 inches. The majority of land in the project vicinity is forested, with some agricultural areas.

### **3.2 SCOPE OF CUMULATIVE EFFECTS ANALYSIS**

According to the Council on Environmental Quality's regulations that implement the National Environmental Policy Act (40 C.F.R. § 1508.7), a cumulative effect is the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time, including hydropower and other land and water development activities.

Based on our review of the license application and agency and public comments, we have not identified any resources that could be cumulatively affected by continued operation of the Arpin Project.

### **3.3 PROPOSED ACTION AND ACTION ALTERNATIVES**

In this section, we discuss the project-specific effects of the project alternatives on environmental resources. For each resource, we first describe the affected environment, which is the existing condition and baseline against which

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<sup>16</sup> See Midwestern Regional Climate Center's Midwest Climate: Climate Summaries (1981 – 2010) ([http://mrcc.isws.illinois.edu/mw\\_climate/climateSummaries/climSumm.jsp](http://mrcc.isws.illinois.edu/mw_climate/climateSummaries/climSumm.jsp)), last accessed by staff on June 6, 2018.

we measure project effects. We then discuss and analyze the site-specific environmental issues.

Only the resources that would be affected, or about which comments have been received, are addressed in detail in this EA. Based on this, we have determined that aquatic resources, terrestrial resources, threatened and endangered species, land use and recreation, and cultural resources may be affected by the proposed action and alternatives. We have not identified any substantive issues related to geology and soils, aesthetic resources, or socioeconomics associated with the proposed action; therefore, these resources are not addressed in the EA. We present our recommendations in section 5.1, *Comprehensive Development and Recommended Alternative*.

### 3.3.1 Aquatic Resources

#### 3.3.1.1 Affected Environment

##### Water Quantity

The Chippewa River at the project has a drainage area of 831 square miles. The project impoundment has a maximum depth of about 12 feet. Seventy-five percent of the impoundment is less than 5 feet deep.<sup>17</sup> Historical monthly average flows at the USGS gage no. 05356000 at Bishops Bridge, about 10 miles upstream from the project dam sections, range from a low of 512 cfs in March to a high of 1,130 cfs in May (Table 1).

Table 1. Monthly flows (cfs) at the Bishops Bridge USGS gauge 05356000 from 1986 to 2017 (Source: Flambeau Hydro and staff).

Month	Minimum	Maximum	Mean	Median
January	132	1650	685	619
February	80	1620	637	598
March	101	2310	512	459
April	101	6340	815	404
May	100	6090	1130	744
June	163	5320	840	698

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<sup>17</sup> Wisconsin DNR, 2012 Fishery Survey, from Appendix E-3.2 of Flambeau Hydro's application.

Month	Minimum	Maximum	Mean	Median
July	117	4040	710	548
August	142	2740	552	488
September	140	5710	678	489
October	140	3780	706	461
November	152	2690	695	510
December	180	2500	687	501

As described in section 2.1.4, *Existing Project Operation*, a minimum flow of 40 cfs is released from the east dam section into the bypassed reach. Flows in excess of the hydraulic capacity (664 cfs) are released first from the east dam section tainter gate, next from the middle dam section vertical gate, and then from each of the three dam sections' overflow sections.

Besides hydroelectric power production, the only other water uses in the project area are for recreation, including boating, fishing, and swimming. There are no public water supply uses or withdrawals for agricultural or industrial purposes.

#### Water Quality

State water quality standards for the Chippewa River in the project vicinity, including the impoundment, specify a minimum dissolved oxygen (DO) level of 5.0 milligrams per liter (mg/L), monthly sub-lethal maximum water temperatures ranging from 49 degrees Fahrenheit in December and January to 79 degrees in July and August, and a pH in the range of 6 to 9. This section of the Chippewa River was removed from the CWA 303(d) list in 2008. As part of its 2018 listing cycle under the 303(d) program, Wisconsin DNR assessed water quality and concluded that the general condition of the water for fish and aquatic life use was "good" (Wisconsin DNR, 2018a).

Flambeau Hydro conducted water quality monitoring during 2015. Ten parameters were recorded monthly from May through October, including Chlorophyll *a*, color, conductivity, ammonia, nitrate, total Kjeldahl nitrogen, pH, total phosphorous, organic phosphorous, and total suspended solids at a site upstream of the impoundment, as well as a site downstream of the project tailrace. In addition, DO and temperature were recorded at the same two sites three times per week from August 3 through September 25. On August 16, 2016, Flambeau Hydro recorded DO and temperature vertical profiles at three locations in the

project impoundment. Finally, conductivity and turbidity were sampled on two dates in August 2015 at three impoundment sites as well as six sites in the bypassed reach. No DO or temperature measurements were taken in the bypassed reach.

At the upstream and downstream sites, all ten parameters were consistent with Wisconsin DNR's 2018 determination of "good" water quality in the project vicinity. Color, conductivity, and pH were typical for lakes in the Northwest region and parameters that indicate pollution, such as Chlorophyll a, ammonia, nitrate, total Kjeldahl nitrogen, pH, total phosphorous, and organic phosphorous were substantially below levels that would indicate degradation. Water temperatures, DO, and pH were always in compliance with state standards. August and September water temperatures at the upstream and downstream sites showed that the project impoundment had no detectable warming influence. Turbidity and conductivity in the bypassed reach were similar to those recorded in the impoundment and at the upstream and downstream sites.

The DO and temperature profiles for the two of the three impoundment monitoring sites (the middle and lowermost sites) showed that water was well mixed from top to bottom, with relatively steady temperatures and DO concentrations that exceeded state standards throughout the water column. At the most upstream site, DO concentrations were above the state standard near the surface, but decreased below the state standard at lower depths, to near 0 mg/L at the bottom of the impoundment.

### Fishery Resources

Fish habitat in the impoundment is diverse and high quality. The substrate is a mix of mud, sand, gravel, boulder, and bedrock. The impoundment shoreline has abundant submerged vegetation, emergent vegetation, and large woody debris that provide habitat for a variety of species and life stages, including habitat for spawning, rearing, and foraging.

The bypassed reach consists of three shorter channels corresponding to each of the three dam sections, and ranging from 748 feet to 1,004 feet in length. These three channels converge to form a single channel, which then flows 4,270 feet until it reaches the powerhouse. There are additional smaller channels that form around islands within the bypassed reach, collectively totaling 1,748 feet in length. The bypassed reach has a variety of pools, runs, and riffles, most of which is less than 2 feet deep. The maximum depth of the bypassed reach is about 7 feet. Substrate in the bypassed reach is a mix of sand, gravel, cobble, boulder, and bedrock.

According to Wisconsin DNR, 55 species of fish are known to occur in the Chippewa River in Sawyer County and 39 of the species have the potential to be in the project waters, including lake sturgeon, a state species of special concern. Lake sturgeon have been documented in the bypassed reach of the project as well as upstream of the project impoundment on the east fork of the Chippewa River. Flambeau Hydro conducted a fish survey of the bypassed reach in the summer and fall of 2015 and documented 24 species, including lake sturgeon. In addition, Wisconsin DNR fishery surveys documented 12 additional species in the project impoundment between 1966 and 2012. Therefore, a total of 36 species have been documented in the project impoundment and bypassed reach. Besides lake sturgeon, these include several species of minnows, suckers, darters, and chubs, as well as popular species for angling such as walleye, bluegill and pumpkinseed sunfish, crappie, channel catfish, smallmouth and largemouth bass, muskellunge, and northern pike.

Flambeau Hydro conducted a sturgeon spawning survey in the bypassed reach during the spring of 2016. The study included egg collection using fixed mats, as well as larval drift sampling using nets. Although many of the egg mats were washed out due to the high flows (including all of the mats deployed in the east channel), eggs and larvae were collected from the west, middle, and main channels of the bypassed reach. Adult sturgeon have been observed in the west, middle, east, and main channels. Although eggs and larvae were not found in the east channel, the study concluded that spawning in this location is also likely, given the presence of suitable sturgeon habitat and access.

#### Freshwater Mussels

Flambeau Hydro conducted a mussel and mussel habitat suitability survey of the impoundment and bypassed reach during 2015. The survey documented the occurrence of 15 species, including five designated Wisconsin special concern species (black sandshell, creek heelsplitter, elktoe, mucket, and round pigtoe) and one state-designated endangered species, the purple wartyback. The federally listed endangered sheepsnose mussel was not documented during the study, but is discussed further in section 3.3.3, *Threatened and Endangered Species*.

### **3.3.1.2 Environmental Effects**

#### Mode of Operation

Flambeau Hydro proposes no changes to the way the project is operated. Currently, the project operates in a run-of-river mode and Flambeau Hydro limits impoundment fluctuations to 1 foot or less throughout the year, except for the period from April 1 through May 31, when fluctuations are limited to 6 inches in

order to protect impoundment fish spawning habitat. Interior recommends (10(j) recommendation 1) continuation of run-of-river operation.

### *Our Analysis*

Continuing to operate the project in a run-of-river mode would limit impoundment fluctuations associated with project operation. Operating the project in a run-of-river mode would also continue to result in minimal to no adverse project effects on the natural flow regime of the Chippewa River downstream of the tailrace, and minimal to no disruption to any fish-spawning habitat near the riverbanks in the downstream reach. Relative to the existing environmental conditions, there would be no change in the amount, schedule, and duration of flow released from the project to the Chippewa River downstream of the tailrace. The priority for spilling flows in excess of the 664-cfs hydraulic capacity would continue to be the east dam section, followed by the middle dam section, and then the overflow sections of all three dam sections. Therefore, there would be no expected change to the abundance, suitability, or distribution of sturgeon spawning habitat in the east, middle, west, and main channels of the bypassed reach under continued run-of-river operation.

### Minimum Flow in Bypassed Reach

Flambeau Hydro proposes to continue to release a year-round minimum flow of 40 cfs from the east dam section into the bypassed reach. This proposal matches Interior's 10(j) recommendation 1. Wisconsin DNR states that it plans to "require" a "fish stranding management plan" to be approved by Wisconsin DNR within one year of the issuance of a project license. Wisconsin DNR provides no details about the plan, including whether or not the plan will be a condition of the certification. Because fish stranding is related to flow in the bypassed reach, we discuss both aquatic habitat and fish stranding below.

### *Our Analysis*

Flambeau Hydro conducted a minimum flow study in the summer of 2015 to determine the relationship between aquatic habitat and flow in the bypassed reach. Water surface elevations were measured throughout the entire lengths of the west, middle, east, and main channels, and stream bed and water surface elevations were measured at 10 representative cross sections in the three sub-channels and main channel (one in each sub-channel and seven in the main channel).

The study evaluated the existing minimum flow release of 40 cfs as well as flow releases of 30 cfs and 50 cfs using the change in water surface elevations and wetted widths. The study also employed two qualitative methods for

characterizing and scoring the habitat at the existing minimum flow release of 40 cfs, the Qualitative Habitat Evaluation Index (QHEI; Ohio EPA, 2006) and the Stream Visual Assessment Protocol (SVA; USDA, 1998). The QHEI method scores habitat on a scale from 0 to 100, with descriptions of very poor, poor, fair, good, and excellent. The SVA method scores habitat on a scale of 0 to 10, with descriptions of poor, fair, good, and excellent.

At the existing flow release of 40 cfs, the mean wetted width of the 10 cross sections was 116.15 feet, resulting in an estimated total area of wetted habitat in the combined channels of 862,065 square feet, or 19.80 acres. The QHEI score of the 40-cfs release ranged from 76 to 90 at the 10 cross sections, corresponding to “excellent.” The SVA scores at the 10 cross sections was between 7.0 and 8.25, corresponding to “fair” or “good.”

At a flow release of 30 cfs, the mean wetted width of the 10 cross sections was 115.64 feet, resulting in an estimated total area of wetted habitat of 19.71 acres, or a 0.4-percent decrease from the baseline condition of a 40-cfs release. The QHEI and SVA scores were not calculated at 30-cfs release, but given the minor change in the wetted area of the channel, it is not likely that the scores would have been different.

At a flow release of 50 cfs, the mean wetted width of the 10 cross sections was 118.07 feet, resulting in an estimated total area of wetted habitat of 20.13 acres, or a 1.6-percent increase from the baseline condition of a 40-cfs release. The QHEI and SVA scores were not calculated for a 50-cfs release, but given the minor change in the wetted area of the channel, it is not likely that the scores would have been different.

Flambeau Hydro also studied the occurrence of fish stranding on August 27 and October 6, 2015, and May 4-5 and July 14, 2017. Using backpack electrofishing, 15 sites were sampled to determine the abundance and species composition within pools in the bypassed reach. The flows for the August and October sampling dates were 497 cfs and 536 cfs, respectively. Because these flows are less than the project’s hydraulic capacity, the minimum flow of 40 cfs was being released into the bypassed reach. During the May and July sampling dates, flows were 1,800 cfs and 850 cfs, respectively, resulting in flows in the bypassed reach of 1,136 cfs and 186 cfs.

In August 2015, 14 of the 15 sites had fish present, with a total of 10 species. Fantail darter and smallmouth bass dominated the sites. In October 2015, there were also fish in 14 of the 15 sites, with a total of 14 species documented. Fantail darter and burbot dominated the sites. All but one of the pools sampled maintained a physical connection to the main channel at the 40-cfs release. The study noted that, although these connections to the rest of the channel would allow

almost all species in the pools to avoid physical stranding, lake sturgeon would be unable to escape some of the pools due to water depths at channel connection points that were less than 10 inches deep, the minimum depth considered to be passable by adult lake sturgeon. No lake sturgeon were found in the August and October sampling dates, indicating that lake sturgeon might not use the habitat sampled at the 15 sites during the summer and fall.

The 2017 surveys documented 24 species of fish, none of which were described as being stranded. Higher flows during the study season resulted in greater water depths and greater connectedness between the sampled pools and the flow in the bypassed channel. Lake sturgeon were not found during the May and July 2017 sampling dates, but were likely present during the months of March and April, when the 2016 sturgeon spawning survey documented their presence. During the sturgeon spawning survey, several adult lake sturgeon were captured and relocated because they had become stranded in pools in the bypassed reach, presumably after they accessed spawning habitat under high flows, and then were unable to leave the areas after flows receded.

In summary, maintaining the minimum flow release of 40 cfs, as proposed by Flambeau Hydro and recommended by Interior, would continue to provide fish habitat varying from fair to excellent and would continue to prevent fish stranding in the bypassed reach for all species except lake sturgeon. Although a minimum flow release of 50 cfs would increase the amount of wetted habitat compared to the baseline flow release of 40 cfs, lake sturgeon could still be stranded in the bypassed reach at a minimum flow release of 50 cfs because there is effectively no difference in the number of potential sturgeon stranding sites that exist at 40 cfs versus 50 cfs.

#### Operation Compliance Monitoring Plan

Flambeau Hydro is not proposing to monitor compliance with the operation of the project, including the proposed run-of-river operation and minimum flow releases. Interior recommends (10(j) recommendation 3) that Flambeau Hydro develop a plan to monitor compliance with project operation and employ mechanisms (staff gauges and automatic water level recorders) to document inflow, discharge, and impoundment and tailrace fluctuations. Interior also states that Flambeau Hydro should consult with FWS on matters affecting fish and wildlife throughout the term of the license that may pose a threat to fish and wildlife resources in the vicinity of the project, such as power outages, low flows, and unexpected emergencies. Wisconsin DNR states that it plans to “require” an “operations management plan” and a “drawdown management plan” to be approved by Wisconsin DNR within one year of the issuance of a project license.



Wisconsin DNR provides no details about the plans, including whether or not the plans will be conditions of the certification.

### *Our Analysis*

Although compliance measures do not directly affect environmental resources, they do allow the Commission to ensure that a licensee complies with the environmental requirements of a license. Therefore, operation compliance monitoring and reporting are typical requirements in Commission-issued licenses.

An operation compliance monitoring plan would help Flambeau Hydro document its compliance with the operational provisions of any subsequent license, and provide a mechanism for reporting deviations. An operation compliance monitoring plan would also help the Commission verify that the project is operating in a run-of-river mode and releasing the required minimum flow into the bypassed reach, thereby facilitating administration of the license and assisting with the protection of resources that are sensitive to impoundment fluctuations and deviations from normal operating conditions.

The plan could be developed in consultation with FWS and Wisconsin DNR and include provisions for: (1) monitoring run-of-river operation, minimum flows, and impoundment elevation levels to document compliance with the operational conditions of any subsequent license; (2) standard operating procedures to be implemented (a) outside of normal operating conditions, including during scheduled facility shutdowns, impoundment drawdowns, and impoundment refilling and (b) during emergency conditions such as unscheduled facility shutdowns and maintenance, in order to minimize project effects on environmental resources; (3) reporting deviations to the Commission; and (4) maintaining a log of project operations.

### Water Quality

Besides operating in a run-of-river mode and releasing a minimum flow of 40 cfs from the east dam section into the bypassed reach, Flambeau Hydro is not proposing any additional measures to protect or enhance water quality at the project, nor is it proposing to monitor water quality. Wisconsin DNR states that it plans to “require” a “water resources management plan” (including water quality provisions) to be approved by Wisconsin DNR within one year of the issuance of a

project license. Wisconsin DNR provides no details about the plan, including whether or not the plan will be a condition of the certification.

### *Our Analysis*

There are no proposed or recommended environmental measures that would adversely affect water quality in the impoundment, bypassed reach, or downstream of the project tailrace, relative to the existing environmental conditions. Water quality in the impoundment currently meets or exceeds the state standards for minimum DO (5.0 mg/L) and maximum temperature (79 degrees Fahrenheit during August), with the exception of low DO in the hypolimnion<sup>18</sup> during the summer at the most upstream impoundment sampling site. Considering that the middle and downstream impoundment sampling sites showed high DO levels throughout the water column (6.5 to 7.0 mg/L), the low DO levels in the hypolimnion of the upstream sampling site are most likely attributed to the accumulation and decomposition of organic debris in the uppermost reach of the impoundment. Based on the variety of fish species present in the project impoundment and higher DO levels in the rest of the impoundment, there is no indication that the lower DO levels in the hypolimnion of the upper impoundment have significantly affected biological productivity in the impoundment.

### Fish Entrainment Protection

Flambeau Hydro is not recommending any measures to protect existing fisheries resources from entrainment and turbine mortality at the project. Interior recommends (10(j) recommendation 2) that Flambeau Hydro address the potential for fish entrainment “either through physical exclusion, with narrow spaced trash racks, or through some other action to mitigate for the proposed losses.” Interior suggests that Flambeau Hydro should work with the FWS on a suitable method of fish protection and/or mitigation. Wisconsin DNR states that it plans to “require” a “water resources management plan” (including fish protection and enhancement provisions) to be approved by Wisconsin DNR within one year of the issuance of a project license. Wisconsin DNR provides no details about the plan, including whether or not the plan will be a condition of the certification.

### *Our Analysis*

Flambeau Hydro conducted a desktop study of fish entrainment and mortality by reviewing entrainment and mortality studies conducted at 56 hydroelectric projects (EPRI, 1997; FERC, 1995; CH2M HILL, 2000) and

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<sup>18</sup> Hypolimnion refers to a cool dense lower layer of water in a thermally-stratified body of water.

comparing the results from those studies to the fish assemblage in the project impoundment and project facility specifications (impoundment size, hydraulic head, turbine type, turbine size and speed, *etc.*). Flambeau Hydro's study indicates that fish species residing in the project impoundment could be entrained at the project's intake and injured or killed when passing through the project's turbines during operation. Specifically, the study estimates that an average of 7,417 fish are entrained annually at the project and that 28 percent of entrained fish are killed by turbine passage.

However, Flambeau Hydro's desktop study did not address several other site-specific factors that can affect fish entrainment and impingement on the project's intake. These factors include the estimated approach velocity at the intake,<sup>19</sup> clear spacing of the trashrack, through-rack velocity,<sup>20</sup> burst speeds<sup>21</sup> of the fish species at the project, and the degree to which debris loading occurs at the project's trashrack.

The estimated approach velocity at the intake ranges from 0.08 to 1.05 feet per second (fps). With the existing clear bar spacing of 1.5 to 1.75 inches, and the 45-degree angle of the rack, the estimated through-rack velocity ranges from 0.14 to 1.85 fps. Based on information available from Fisheries and Oceans Canada (2016),<sup>22</sup> it appears that all adult resident fish species are likely to have burst speeds in excess of the maximum estimated approach velocity of 1.05 fps and

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<sup>19</sup> The approach velocity is the velocity of water as it approaches the trashrack, as calculated from the surface area of the trashrack (630 square feet) and the range of flows during project operation (53 cfs minimum to 664 cfs maximum hydraulic capacity).

<sup>20</sup> The through-rack velocity is the velocity of water as it passes through the bars of the trashrack, as calculated from effective surface area of the trashrack, which varies depending on clear spacing and angle of the trashrack.

<sup>21</sup> Burst speed is the maximum speed a fish can swim for about 1 second.

<sup>22</sup> See Swim Speed and Swim Time Tool (<http://www.fishprotectiontools.ca/speedtime.html>) last accessed by staff June 6, 2018.

through-rack velocity of 1.85 fps, which reduces the risk of impingement and entrainment at the project. Even some of the smaller species and weaker swimmers in the project impoundment, such as shiners, have burst speeds of approximately 2.5 fps. Most adults of larger species, such as 12-inch walleye or smallmouth bass, have burst speeds of at least 5 to 6 fps.

To evaluate the potential effect of reducing trashrack clear spacing, staff analyzed fish entrainment and impingement using a trashrack with 1-inch clear bar spacing. A 1-inch spacing size would physically exclude more fish from passing through the intake structures compared to the existing trashrack. Based on the results of studies conducted by Lawler et al. (1991), 1-inch clear spacing would generally not allow passage of smallmouth bass or similarly shaped fish species greater than 9 inches in total length,<sup>23</sup> thus preventing all adult resident bass from entering the project turbines. For comparison, the existing trashrack with bar spacing of 1.5 to 1.75 inches only excludes passage of smallmouth bass 13 to 15 inches long or greater. In addition, the turbulence generated by a 1-inch clear spacing trashrack may create a behavioral deterrent to reduce entrainment of the smaller individuals that would otherwise be able to fit through the racks.

A trashrack with 1-inch clear spacing would have an estimated maximum through-rack velocity of 2.04 fps, which would be low enough for all adult species in the impoundment to overcome, in order to avoid impingement on the trashrack. However, along with the potential entrainment reduction benefits that would result from reducing clear spacing to 1 inch, comes the potential increased risk of impingement due to increased debris loading on the trashrack. When debris accumulates on the trashrack, it effectively reduces the area through which water can flow and thereby increases through-rack velocities in areas where debris has not accumulated. The 2.04 fps through-rack velocity estimated above assumes a trashrack with no debris accumulation. Flambeau Hydro states that debris loading is a known problem at the project, as indicated by the fact that the trashracks are angled at 45 degrees to facilitate debris removal. It is possible that, for this project, the potential entrainment reduction benefits of a 1-inch trashrack would be partially or entirely offset by the increased impingement risk due to debris loading.

Altogether, considering that: (1) all adult resident fish species and some weaker swimmers are likely to have burst speeds in excess of the approach and through-rack velocity at the intake; (2) no site-specific evidence is available to demonstrate that an entrainment issue actually exists with the existing trashrack (*e.g.*, there is no evidence of any fish kill events in the project history); and (3) there is a likely increased risk of impingement associated with a narrower clear

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<sup>23</sup> Total length is defined as the distance from the furthest forward protruding portion of a fish's head to the tip of the furthest protruding tail fin ray.

spacing size due to heavy debris loading at the project, staff concludes that installing a new trashrack with narrower clear spacing size on the order of 1 inch, would not substantially reduce mortality or otherwise significantly benefit fish in the project impoundment.

### Fish Passage

Flambeau Hydro is not proposing to facilitate upstream or downstream fish passage at the project. In its comments, Interior states that methods for facilitating fish movement for the recovery of the federally endangered sheepsnose mussel and the conservation of other migratory fish, such as lake sturgeon, should be considered. Interior notes that facilitating fish movement at the project's dam sections could extend the range of lake sturgeon, walleye, muskellunge, and other game and non-game fish species, including host fish for the sheepsnose mussel. Based on recent developments in fishway technology, Interior states that the configuration of project's dam sections appears to be amenable to construction of a nature-like fishway, such as a roughened rock chute or a spiral-shaped pool and weir fishway type, similar to the one recently constructed at the Winter Project No. 2064. Interior further states that it is not exercising its authority under section 18 of the FPA to prescribe fishways at this time, but requests that the Commission reserve its authority to prescribe fishways as may be warranted during the term of any subsequent license issued for the project. Wisconsin DNR states that it plans to "require" a "water resources management plan" (including fish protection and enhancement provisions) to be approved by Wisconsin DNR within one year of the issuance of a project license. Wisconsin DNR provides no details about the plan, including whether or not the plan will be a condition of the certification.

### *Our Analysis*

The project impoundment and bypassed reach support a diverse fishery. However, lake sturgeon and other resident fish species are blocked from passing upstream of the three project dam sections and accessing 13 miles of the Chippewa River upstream to the Chippewa Reservoir dam, located at the confluence of the East Fork and West Fork of the Chippewa River (Figure 1). The possible routes fish have for passing downstream from the Arpin Project impoundment are either through the turbines or via spill released from the east dam section tainter gate, the middle dam section vertical gate, or the overflow sections of all three dam sections, depending on Chippewa River flow conditions and whether the Arpin Project is generating.

Flambeau Hydro compared the economic feasibility of three fish passage options for the Arpin Project: (1) no action, (2) trap and truck, and (3) a "nature-like" fishway. Although the primary objective of the study was to compare the

costs of the three options, some environmental benefits and drawbacks were discussed in the study report.

If trap and truck fish passage is implemented at the Arpin Project, there would be an opportunity to sort fish by species to ensure that non-desirable fish (such as common carp or any other invasive species) are prevented from moving upstream of the dam. In addition, fish could be moved to any location upstream of the Arpin Project, including the Chippewa Reservoir or into the East Fork of the Chippewa River, either downstream or upstream of the Winter Project No. 2064. The trap and truck method of fish passage would collect fish from the channels below the three project dam sections and, as such, would not be a method for downstream passage at the Arpin Project.

A “nature-like” fishway is sometimes referred to as a rock ramp fishway, and typically resembles a natural stream channel, with pools and chutes constructed out of rocks, boulders, and other natural materials. The channel is constructed so that fish are attracted to enter downstream from the project and then swim upstream to the outlet of the channel, located somewhere in the project impoundment. A rock ramp fishway could be an effective means of providing both upstream and downstream fish passage for a variety of species, but there would be no opportunity for excluding any non-desirable fish species.

Although Interior states that methods for fish passage should be considered, there is no indication that the project is limiting access to habitat that is necessary for the survival, growth, or reproduction of fish or mussel species. As discussed above, the sturgeon spawning study documented successful spawning in the west and middle channels and suggests that habitat is available for spawning in the east channel. In addition, the nearest documented occurrence of sheepsnose mussel is approximately 50 miles downstream of the project. As documented by the mussel habitat survey, suitable habitat is available downstream of the dam for sheepsnose mussels that are transported to the project vicinity by potential host species. Although fish passage at the project could potentially benefit lake sturgeon and sheepsnose mussel populations by providing access to additional habitat in the 13-mile reach of the Chippewa River between the Arpin dam and the Chippewa Reservoir dam, the benefits would most likely be minimal due to the fact that habitat availability does not appear to be a limiting factor for survival, reproduction, or distribution of mussel and fish species at the project.

### Debris Management

Flambeau Hydro states that it currently removes debris from the project forebay using a mechanical rake. Flambeau Hydro does not specifically propose to continue this practice as a condition of a subsequent license, nor does it propose other license measures for removing debris. No agencies have recommended

additional measures related to debris management at the project, although Wisconsin DNR stated that it plans to “require” a “woody debris management plan” to be approved by Wisconsin DNR within one year of the issuance of a project license. Wisconsin DNR provides no details about the plan, including whether or not the plan will be a condition of the certification.

### *Our Analysis*

Debris that accumulates on the trashrack reduces the effectiveness of the trashrack at protecting fish from entrainment or impingement. If the trashrack is covered with debris, fish may become entangled in the debris rather than sliding off the trashrack as intended. In addition, the approach velocity at the trashrack increases with debris loading, which could result in a greater amount of fish entrainment or impingement.

Downstream of the project, organic debris sustains lower order trophic organisms, such as benthic macroinvertebrates, which in turn influences the productivity of higher order organisms, such as fish. Organic debris also provides habitat for macroinvertebrates and fish. In contrast, inorganic debris such as trash cannot be used as a food source and provides little-to-no benefit to aquatic resources.

To ensure that the trashrack protects fish from entrainment as intended and that desirable organic material is reintroduced to the river downstream of the dam, a debris management plan could be used to identify procedures for: (1) removing and sorting debris that collects on project structures; (2) passing organic debris (*i.e.*, leaves and wood) downstream of the project; and (3) removing and disposing of trash.

## **3.3.2 Terrestrial Resources**

### **3.3.2.1 Affected Environment**

The project is located in the Northern Lakes and Forests ecoregion (Omernik *et al.*, 2000), which is characterized by nutrient-poor glacial soils and coniferous and northern-hardwood forests. Lakes and wetlands are prominent across the region. The project vicinity is predominately forested upland and wetland areas, with some agricultural and residential land. Wetlands in the project vicinity consist of forested, scrub-shrub, and emergent wetland types.

Land near the project contains a well-developed multi-layered riparian forest with mature trees, an understory of younger trees and shrubs, and an herbaceous ground cover. Northern mixed forests in the project vicinity are transitional between Canadian boreal forests to the north and broadleaf deciduous forests to the south (Perry, *et. al.*, 2008). Deciduous hardwoods are found in

combination with conifers in this area. Typical deciduous hardwood species include maples, beech, and birch. Conifer species include pine, tamarack, and spruce.

Approximately 23 acres of upland occur within the project boundary. These lands are associated with the project dam sections, powerhouse, operator residence, transmission line, power canal, and recreation areas. Current vegetation management within the project boundary is limited to mechanical vegetation removal techniques (*e.g.*, mowing and weed-wacking) to maintain these areas.

#### Invasive Species

Flambeau Hydro conducted surveys for terrestrial and aquatic invasive plants in 2015. Based on the surveys, three invasive plant species are present in the impoundment (curly-leaf pondweed, purple loosestrife, and Eurasian water-milfoil) and two invasive plant species are present in the bypassed reach (purple loosestrife and reed canary grass).

#### Wildlife Resources

The project vicinity supports various wildlife habitats, including wooded upland areas and wetland habitats. Mammals common to the project vicinity include white-tailed deer, black bear, coyotes, red and gray fox, river otters, beavers, and porcupines. In addition, several species of interest are known to occur in the project vicinity, including the gray wolf, American marten, fisher, bobcat, elk, and cougar. The federally endangered gray wolf is discussed further in section 3.3.3, *Threatened and Endangered Species*.

Numerous bird species use the project land and water for breeding. Sixty bird species were observed during 2016 breeding bird survey efforts, including three Wisconsin species of concern, the American woodcock, bald eagle, and golden-winged warbler.

### **3.3.2.2 Environmental Effects**

#### Wetlands

Flambeau Hydro proposes to continue to operate the project in a run-of-river mode and limit impoundment fluctuations to 1 foot or less from June 1 through March 31 and 6 inches or less from April 1 through May 31. Flambeau Hydro also proposed to release a continuous minimum flow of 40 cfs from the east dam section into the bypassed reach.



### *Our Analysis*

Current operational measures, including run-of-river operation, limited impoundment fluctuations, and a 40-cfs minimum flow release to the bypassed reach, protect existing wetlands in the vicinity of the project. As proposed by Flambeau Hydro, the project would continue to operate as it currently does, and would not alter water levels from existing conditions. As such, continued operation would not adversely affect wetlands in the project relative to the existing environmental conditions.

### Invasive Species

Flambeau Hydro is not proposing any specific measures to monitor or control invasive plant species at the project.

Wisconsin DNR states that it plans to “require” a “terrestrial invasive species management plan” and a “water resource management plan” (including aquatic invasive species provisions) to be approved by Wisconsin DNR within one year of the issuance of a project license. Wisconsin DNR provides no details about the plans, including whether or not the plans will be conditions of the certification.

### *Our Analysis*

Non-native invasive plant species are able to out-compete and displace native species, thereby reducing biodiversity and altering compositions of existing native plant and animal communities.

Once established, invasive plant species can be difficult to remove from an area. However, mechanical and chemical methods can be used to restrict the abundance of existing populations, allowing for greater vegetation diversity.

No significant ground-disturbing activities that would facilitate the spread of terrestrial invasive plant species within the project boundary, such as road construction or land clearing, have been proposed. Further, no changes to project operation or water levels within the project boundary have been proposed that would disturb additional areas in the project vicinity or otherwise promote the expansion of the invasive species.

Further, because the invasive species do not appear to be affecting project operation or other environmental resources, there is no indication that a plan or other invasive species management measures are needed to protect fish and wildlife resources at this time.

### 3.3.3 Threatened and Endangered Species

FWS's IPaC system indicates four federally listed threatened and endangered species could occur in the project vicinity: the threatened northern long-eared bat and Canada lynx, and the endangered gray wolf and sheepsnose mussel. No critical habitat designated for these species occurs on project-affected lands.

#### 3.3.3.1 Affected Environment

##### Northern Long-eared Bat

The northern long-eared bat (NLEB) was listed as a federally threatened species under the ESA on May 4, 2015. Wisconsin has also designated the NLEB as a threatened species. In January 2016, the FWS finalized the 4(d) rule for this species, which focuses on preventing effects on bats in hibernacula associated with the spread of white-nose syndrome<sup>24</sup> and effects of tree removal on roosting bats or maternity colonies (FWS, 2017b). As part of the 4(d) rule, FWS proposes that take incidental to certain activities conducted in accordance with the following habitat conservation measures, as applicable, would not be prohibited: (1) occurs more than 0.25 mile from a known, occupied hibernacula; (2) avoids cutting or destroying known, occupied maternity roost trees during the pup season (June 1 – July 31);<sup>25</sup> and (3) avoids cutting or destroying any tree within a 150-foot radius of a known, occupied maternity tree during the pup season (June 1 to July 31). The 4(d) rule provides flexibility to landowners, land managers, government agencies, and others as they conduct activities in areas that could be NLEB habitat.

Traditional ranges for the NLEB include most of the central and eastern U.S., as well as the southern and central provinces of Canada, coinciding with the greatest abundance of forested areas. The NLEB, whose habitat includes large

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<sup>24</sup> A hibernaculum is where a bat hibernates over the winter, such as in a cave. White-nose syndrome is a fungal infection that agitates hibernating bats, causing them to rouse prematurely and burn fat supplies. Mortality results from starvation or, in some cases, exposure.

<sup>25</sup> Pup season refers to the period when bats birth their young.

tracts of mature, upland forests, typically feeds on moths, flies, and other insects. These bats are flexible in selecting roost sites, choosing roost trees that provide cavities and crevices, and trees with a diameter of 3 inches or greater at breast height.<sup>26</sup> Winter hibernation typically occurs in caves and areas around them and can be used for fall-swarming<sup>27</sup> and spring-staging.<sup>28</sup> No critical habitat has been designated for this species.

The project is located within the white-nose syndrome buffer zone for this species.<sup>29</sup> Maternity roosts have previously been documented in Sawyer County.<sup>30</sup> Although there is no documentation of NLEB at the project, and no known NLEB hibernacula sites occur within 0.25 mile of the project, the project vicinity contains

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<sup>26</sup> Diameter at breast height refers to the tree diameter as measured about 4 to 4.5 feet above the ground.

<sup>27</sup> Fall-swarming fills the time between summer and winter hibernation. The purpose of swarming behavior may include: introduction of juveniles to potential hibernacula; copulation; and gathering at stop-over sites on migratory pathways between summer and winter regions.

<sup>28</sup> Spring-staging is the time period between winter hibernation and migration to summer habitat. During this time, bats begin to gradually emerge from hibernation and exit the hibernacula to feed, but re-enter the same or alternative hibernacula to resume daily bouts of torpor (*i.e.*, a state of mental or physical inactivity).

<sup>29</sup> The white-nose syndrome buffer zone encompasses counties within 150 miles of a U.S. county or Canadian district in which white-nose syndrome or the fungus that causes white-nose syndrome is known to have infected bat hibernacula.

<sup>30</sup> See Wisconsin DNR: Northern long-eared bat counties with documented hibernacula and maternity roosts as of March 14, 2016 (<https://dnr.wi.gov/topic/EndangeredResources/documents/NLEBMap.pdf>), last accessed by staff on June 19, 2018.

mature, upland forest that could provide suitable habitat for NLEB summer roosting and foraging activities.

### Canada Lynx

The Canada lynx was listed as threatened under the ESA on March 24, 2000. Wisconsin has also designated the Canada lynx as a species of special concern. In the United States, the southern-most extent of the lynx's range occurs in the Northeast, western Great Lakes region, northern and southern Rockies, and northern Cascades.

Canada lynx is very uncommon in Wisconsin. There are no known established populations of lynx in Wisconsin, although lynx are thought to cross into Wisconsin from Canada periodically.<sup>31</sup> Its habitat includes large areas of young, dense stands of spruce and fir, approximately 12 to 30 years old, which have dense understory vegetation that support high densities of snowshoe hares. Areas of prime habitat shift with time as stands mature and new areas of growth are opened up by disturbance. Populations of snowshoe hare have a direct effect on lynx populations that fluctuate in response to prey availability. No critical habitat for this species has been designated within the project vicinity.

There is no documentation of Canada lynx at the project, and suitable habitat is not known to occur in the project vicinity.

### Gray Wolf

The gray wolf is known to occur in Sawyer County, Wisconsin. It was initially listed as endangered under the ESA in May 1974, and was delisted in December 2011. In the western Great Lakes area (including Michigan, Minnesota, and Wisconsin), the gray wolf was relisted under the ESA, effective December 19, 2014. Wisconsin has also designated the gray wolf as a species of concern. Gray wolves have a large home range and are adept at using a variety of habitat types with a sufficient prey base, primarily deer. Gray wolves once ranged throughout

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<sup>31</sup> See Wisconsin DNR's Furbearers webpage (<https://dnr.wi.gov/topic/wildlifehabitat/furbearers.html>), last accessed by staff on June 6, 2018.

most of the continental United States; however, by the early 20<sup>th</sup> century, government-sponsored predator control programs and declines in prey brought gray wolves to near extinction.

Wisconsin DNR's 2006 gray wolf management plan has a goal of 350 wolves outside of Indian Reservations in the state. Wisconsin DNR actively monitors gray wolf populations in the state, and reported that in 2017 there were 232 gray wolf pack sightings.<sup>32</sup> Flambeau Hydro reported sighting gray wolf tracks at the project during the wildlife habitat use surveys that were conducted in February 2016.

### Sheepnose Mussel

The sheepnose mussel was listed as a federally endangered species under the ESA on March 12, 2002. Wisconsin has also designated the sheepnose mussel as an endangered species. The sheepnose mussel is known to occur approximately 50 miles downstream of the project near the confluence of the Flambeau and Chippewa Rivers (river mile 119.7).

Sheepnose mussel prefer shallow areas with moderate to swift currents that flow over coarse sand and gravel. However, they have been found in areas of mud, cobble, and boulders. In large rivers, they have also been found in deep runs (FWS, 2012).

Freshwater mussels require a fish host to complete their life cycles. The mussel larvae (glochidia) attach to the gills of the fish host as they transform into juvenile mussels, at which time they drop from the fish's gills and become independent.<sup>33</sup> Sauger are the only known fish host species for sheepnose mussel,

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<sup>32</sup> See Wisconsin DNR: Pack and lone wolf summaries for Wisconsin in winter 2016-17 ([https://dnr.wi.gov/topic/Wildlifehabitat/wolf/documents/2017\\_Pack\\_Summaries.pdf](https://dnr.wi.gov/topic/Wildlifehabitat/wolf/documents/2017_Pack_Summaries.pdf)), last accessed by staff on June 6, 2018.

<sup>33</sup> See Wisconsin DNR's Life Cycle of a Freshwater Mussel webpage (<https://dnr.wi.gov/water/basin/mississippi/pdf%20files/pdf%20files/mussels/Life>

although sheepnose mussel glochidia have successfully transformed into juvenile mussels on fathead minnow, creek chub, brook stickleback, and central stoneroller in the laboratory.<sup>34</sup> Sauger have not been documented in the project vicinity, but fathead minnow, creek chub, brook stickleback, and central stoneroller have been documented.

The sheepnose mussel was not observed during Flambeau Hydro's 2015 mussel survey. However, because potential host fish are present at the project, sheepnose mussel could be present at or near the project.<sup>35</sup>

### **3.3.3.2 Environmental Effects**

#### Northern Long-eared Bat

Flambeau Hydro does not propose any measures for the protection of the NLEB, and no agency recommendations were received regarding the NLEB.

#### *Our Analysis*

Flambeau Hydro has not proposed any major ground disturbing or tree clearing activities that would affect potential NLEB summer roosting and foraging habitat. However, project maintenance activities during the term of any subsequent license could require periodic tree removal that may affect NLEB habitat (e.g., vegetation maintenance in the 3,645-foot-long transmission line right-of-way and at project recreation sites).

While no occupied maternity roost trees are known to occur in the project vicinity, no surveys have been conducted to verify the absence of maternity roost trees. Based on the fact that maternity roost trees have been documented in Sawyer County, maternity roosts could potentially occur in the project boundary and could potentially be affected by project maintenance.

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[%20Cycle%20of%20a%20Freshwater%20Mussel.pdf](#)), last accessed by staff on June 6, 2018.

<sup>34</sup> FWS stated that it is reasonable to assume the sheepnose mussel could be in the project area considering the movement of their glochidia through host fish migration. See U.S. Fish and Wildlife Service: Sheepnose (a freshwater mussel) Fact Sheet (<https://www.fws.gov/Midwest/endangered/clams/sheepnose/pdf/SheepnoseFactSheetMarch2012.pdf>), last accessed by staff on June 6, 2018.

<sup>35</sup> See FWS's February 12, 2018 filing.

Removing occupied maternity roost trees or any trees within 150 feet of an occupied roost tree is prohibited during the NLEB pup season (June 1 – July 31) (FWS, 2017b). To avoid prohibited incidental take of NLEB, Flambeau Hydro could restrict tree removal activities to time periods outside of the pup season. With this measure in place, we conclude that the project would not be likely to adversely affect NLEB. We will follow FWS's optional streamlined consultation framework that allows federal agencies to rely on the 4(d) rule to fulfill section 7(a)(2) consultation requirements for northern long-eared bat (FWS, 2016).

### Canada Lynx

Flambeau Hydro does not propose any measures for the protection of the Canada lynx, and no agency recommendations were received regarding the Canada lynx.

#### *Our Analysis*

Canada lynx are not known to occur in the project vicinity, and there are no documented self-sustaining Canada lynx populations in Wisconsin. Although snowshoe hare tracks were observed during Flambeau Hydro's winter tracking furbearer survey, indicating that prey is available in the project vicinity, there is no indication that the existing project is adversely affecting Canada lynx food availability, or that the proposed project or its alternatives would adversely affect Canada lynx food availability. Further, suitable habitat is not present in the project vicinity. Based on the absence of any known occurrence of Canada lynx in the project vicinity, and lack of suitable habitat, we conclude that relicensing the Arpin Project with any of the measures considered in this EA would have no effect on the Canada lynx.

### Gray Wolf

Flambeau Hydro does not propose any measures for the protection of the gray wolf, and no agency recommendations were received regarding the gray wolf.

#### *Our Analysis*

The gray wolf is known to occur in the project vicinity. Gray wolf tracks were identified at the project during wildlife habitat use surveys conducted by Flambeau Hydro in 2016. In addition, white-tailed deer are common to the area and were observed during Flambeau Hydro's winter tracking furbearer survey, indicating that prey is available in the project vicinity for gray wolf. However, there is no indication that project operation and maintenance are adversely affecting the gray wolf or its habitat, and the applicant does not propose and the

action alternatives do not provide for any ground disturbing activities or changes to project operation as part of relicensing that would affect the gray wolf, or its habitat and food availability. Based on this information, we conclude that relicensing the Arpin Project with any of the measures considered in this EA would not be likely to adversely affect the gray wolf. We will request FWS concurrence on our finding.

### Sheepnose Mussel

Flambeau Hydro does not propose any measures for the protection of the sheepnose mussel. In its comments, Interior identified improved fish movement in the project vicinity as a conservation measure for the sheepnose mussel to provide access to additional habitat for species recovery.

### *Our Analysis*

The sheepnose mussel has not been identified in the project vicinity, either by Interior, Wisconsin DNR, or during Flambeau Hydro's 2015 mussel and habitat suitability survey, which documented 15 other mussel species from the bypassed reach and impoundment. The nearest known location of the sheepnose mussel is at river mile 119.7, near the confluence of the Flambeau and Chippewa Rivers, approximately 50 miles downstream from the project.

However, suitable habitat for sheepnose mussel may be present in the Chippewa River downstream from the tailrace. In addition, preferred shallow areas with moderate to swift currents that flow over coarse sand and gravel are common in the bypassed reach, as documented during the mussel habitat survey, fish habitat survey, and minimum flow study. The fact that sheepnose mussel have been found in deep runs of large rivers, suggests that suitable habitat may also exist in certain portions of the project impoundment.

Although sauger (the only known fish host species for sheepnose mussel) has not been documented in the vicinity of the project, potential host species are known to occur at the project, including fathead minnow, creek chub, brook stickleback, and central stoneroller.

The presence of suitable habitat and the possibility that mussel glochidia could be transported 50 miles upstream to the project vicinity by potential fish hosts, indicates that the sheepnose mussel has the potential to occupy the project vicinity.

There is no indication that the existing project is adversely affecting the sheepnose mussel and there are no proposed or recommended measures that would alter habitat downstream of the dam relative to existing conditions. Flambeau



Hydro proposes to continue operating the project as a run-of-river facility, which would minimize project effects on the natural flow regime of the Chippewa River downstream of the tailrace. In addition, Flambeau Hydro proposes to maintain a 40-cfs minimum flow release from the east dam section to the bypassed reach, which would provide stable habitat for aquatic organisms in the bypassed reach.

Although fish passage at the project could potentially benefit sheepsnose mussel populations by providing potential host species with access to additional habitat upstream of the Arpin dam, there is no indication that sheepsnose mussel populations in the downstream reach are restricted by limited habitat availability or that the dam is reducing the reproduction, numbers, or distribution of the species. Suitable habitat appears to be available for sheepsnose mussels downstream of the dam and habitat does not appear to be a limiting factor in the downstream reach, as discussed above in section 3.3.1.2 (*Environmental Effects*).

Based on this information, we conclude that relicensing the Arpin Project with any of the measures considered in this EA would not be likely to adversely affect sheepsnose mussel. We will request FWS concurrence on our finding.

### **3.3.4 Land Use and Recreation**

#### **3.3.4.1 Affected Environment**

##### Land Use

In Sawyer County, nearly two-thirds of the land is forested, one-third is open water or wetlands, and a small percentage is agricultural or developed land. The Village of Radisson is predominantly forested with some agricultural areas. In the vicinity of the Arpin Project, land use is primarily forested, open water or wetlands, agricultural, and single-family residential.

The existing project boundary for the Arpin Project as established in the Commission's June 3, 1969 license order, encompasses approximately 317 acres<sup>36</sup> and includes the impoundment and lands that are needed for project purposes,

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<sup>36</sup> The original license issued by the Commission on June 3, 1969 does not specify a total project boundary acreage. Staff estimates that the existing project boundary encompasses approximately 317 acres based on project features identified in the original license order and the revised Exhibit K drawing that was approved by the Commission on December 10, 1981. Staff used ArcView shapefiles, aerial photographs, Exhibit K maps, and the project descriptions in the June 3, 1969 license order and the December 10, 1981 order to measure lands associated with the project features.

including lands associated with the dam sections, powerhouse, power canal, tailrace, generator lead line, transmission line, recreation facilities, and appurtenant facilities. The shoreline surrounding the project impoundment is heavily forested, with limited agriculture and residential development. Recreational activities, project operation, and project maintenance are the primary activities that occur on project land.

No federal land exists within or adjacent to the project boundary. No lands in the immediate vicinity of the project are included in the national trails system, nor are there any designated wilderness lands. The Chippewa River is not on the list of wild and scenic rivers.

### Statewide Recreation Plan

The 2011- 2016 Wisconsin State Comprehensive Outdoor Recreation Plan (SCORP) identifies outdoor recreation as central to the state's economic, environmental, and community values. The SCORP identifies broad goals of using outdoor recreation to improve health, increase access to recreation on public lands, and drive economic development in Wisconsin. The SCORP recommends expanding public boating access; promoting awareness of existing recreation lands, facilities, and opportunities; and supporting efforts to increase access to outdoor recreation (Wisconsin DNR, 2018b).

### Regional Recreation

The Chippewa River is located in Wisconsin's Northern Highland region. The Northern Highland region has an abundance of lakes, streams, reservoirs, and public lands that provide recreation opportunities, including; boating, paddling, swimming, fishing, hunting, hiking, wildlife watching, backpacking, off-road biking, and camping. In winter months, regional recreation includes snowmobiling, skiing, and ice fishing.

Of the total land area in Sawyer County, 37 percent is in public ownership, including approximately 113,300 acres in county forest land, 124,600 acres in National Forest, and over 70,000 acres in State Forest and State Wilderness areas. Recreational opportunities associated with these lands include camping, picnicking, hunting, hiking, cross-country skiing, bird watching, and fishing. Numerous lakes and stream located near the Arpin Project provide opportunities for fishing and boating.

The Flambeau River State Forest is approximately 22 miles east of the project and has 75 miles of whitewater canoeing, rustic camping at 35 riverside sites; and camping at 60 improved sites in two campgrounds. In addition, the Flambeau River State Forest provides opportunities for fishing, hiking, mountain

biking, bird watching, 38 miles of designated ATV trails, and 22 miles of cross-country skiing trails.

There are five public boat launches, several private boat launches on local lakes and reservoirs, and numerous public and private campgrounds within a 30-mile radius of the project.

### Recreation at the Project

Recreation opportunities are available in the project impoundment and downstream of the dam sections, including motorized and non-motorized boating, fishing, and swimming. According to the revised Exhibit K drawing that was approved by the Commission on December 10, 1981, the approved project recreation facilities include: (1) a public boat ramp upstream of the west dam section that provides impoundment access to motorized and non-motorized boats; (2) a canoe portage trail that crosses from the power canal to the project tailrace; (3) a west bank fishing access area located below the west dam section; and (4) a 2-acre picnic and fireplace area on the island between the west and middle dam sections.

In the license application, Flambeau Hydro describes operation and maintenance of the public boat ramp, the west bank fishing access area, and the canoe portage trail, but does not discuss the 2-acre picnic and fireplace area. In addition, Flambeau Hydro states that it owns and maintains a tailwater fishing area located adjacent to the canoe portage trail along the northern bank of the project tailrace (Figure 3).

### Recreational Use

Recreational use at the project has been documented as part of the FERC Form 80 reporting requirement. For 2015, Flambeau Hydro reported fishing as the primary recreation activity. The 2015 FERC Form 80 also indicates that recreation facilities at the Arpin Project were underutilized, with the canoe portage having the highest average use (20 percent capacity utilization) of the public access sites during peak summer season. The tailwater fishing access area and boat launch had an average use of 15 and 7 percent capacity utilization, respectively.



### 3.3.4.2 Environmental Effects

#### Recreation

Flambeau Hydro proposes to continue maintaining the public boat ramp, the west bank fishing access area, and the canoe portage trail. In addition to these facilities, Flambeau Hydro proposes to maintain an existing, informal tailwater fishing area that is located adjacent to the canoe portage trail along the northern bank of the project tailrace. However, Flambeau Hydro does not propose to continue operating and maintaining the 2-acre island picnic and fireplace area as a project recreation facility. Wisconsin DNR states that it plans to “require” a “recreation management plan” to be approved by Wisconsin DNR within one year of the issuance of a project license. Wisconsin DNR provides no details about the plan, including whether or not the plan will be a condition of the certification.

#### *Our Analysis*

As of 2003, the FERC Form 80 showed that the 2-acre island picnic and fireplace area had a low utilization rate.<sup>37</sup> The apparently low level of recreation demand at the facility might be attributed to limited accessibility at the site. Since the picnic and fireplace area is located on an island that is relatively close to the middle dam section, site access is limited to boaters that are able to navigate across the impoundment from the boat ramp to the island, while maintaining a safe distance from the dam. Separately, the isolated nature of the facility potentially limits the frequency of maintenance activities, which could degrade the overall recreation experience for recreational visitors at the picnic and fireplace area. Based on the under-utilization of the island picnic and fireplace area, it appears that discontinuing operation and maintenance at the site, and removing the area from the list of formal project recreation facilities would not significantly affect recreation opportunities at the project. To ensure that members of the public have continued access to a picnic area at the project and that the quality of recreation opportunities at the project does not diminish, picnic tables could be installed at the existing boat ramp and west bank fishing access areas.

Regarding Flambeau Hydro’s proposal to operate and maintain an existing, approximately 0.1-acre informal tailwater fishing area as a formal project recreation facility, the Form 80 report indicates that there is an ongoing demand for fishing access in the tailrace area, and there would be a benefit to operating and maintaining the tailwater fishing area as a formal project recreation facility.

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<sup>37</sup> The licensee has not reported recreation usage at the facility after 2003. Flambeau Hydro also has not described any ongoing operation and maintenance measures at the island facility.



Furthermore, the addition of the tailwater fishing area would offset any residual recreation loss associated with removing the 2-acre island picnic and fireplace area from the list of formal project recreation facilities.

During the history of the license, the project recreation facilities and recreational use have not been consistently reported. For instance, the Form 80 reports included the 2-acre picnic and fireplace area on the island between the west and middle dam sections through March 27, 2003, but subsequent Form 80 reports no longer included the area. In addition, the west bank fishing access area was accounted for in Form 80 reports through March 2009, but not accounted for afterwards.

A recreation monitoring plan could be used to document recreation use and project visitor demands over the term of any subsequent license issued for the project. The monitoring plan would provide a mechanism for assessing whether project visitor needs are being met. A recreation monitoring plan could also be used to ensure project facilities are serving their intended purpose, and could help indicate whether investment in rehabilitating or reconstructing new facilities is warranted. These types of assessments could be conducted every 6 years.

#### Modification of the Project Boundary

According to the Exhibit G filed on April 5, 2018, Flambeau Hydro proposes to add approximately 76 acres of land and water to the existing project boundary,<sup>38</sup> including approximately 20 acres of bypassed channels, an approximately 2.5-acre island between the east and middle dam sections, an approximately 9-acre parcel of land on the island between the middle and west dam sections (in addition to the 2-acre parcel that is listed as an existing project recreation facility), an approximately 1.5-acre island within the project impoundment, an approximately 20-acre area of forested land on the west bank of the impoundment that abuts River Road, an approximately 0.1-acre informal tailwater fishing area adjacent to the canoe portage trail along the northern bank of the project tailrace, and additional land and water around existing project facilities. Outside of the recreation facility located downstream of the powerhouse,

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<sup>38</sup> Flambeau Hydro's final license application does not include a discussion about adding these areas to the project boundary; however, these areas are included within the revised Exhibit G filed on April 5, 2018. For purposes of our analysis herein, Commission staff considers Flambeau Hydro's Exhibit G to be a proposal to revise the project boundary. Commission staff issued a letter on June 11, 2018 requesting that Flambeau Hydro clarify whether or not it is proposing to revise the existing project boundary.

Flambeau Hydro has not specified a project purpose for this additional land and water.

### *Our Analysis*

The inclusion of land and water within a project boundary serves the function of indicating that the land and water are used in some manner for project purposes. The project boundary clarifies the geographic scope of the licensee's responsibilities under its license and the Commission's regulatory responsibilities with regard to the project. The identification of land and water in the project boundary also reduces the potential for ambiguity in administering and enforcing the license conditions, because the geographic scope of those obligations will be a matter of record. This can also reduce or prevent disputes about the Commission's authority over the licensee as to its activities on those lands.

Flambeau Hydro's proposal to add approximately 76 acres of land and water to the project boundary would expand the project boundary by approximately 24 percent. Flambeau Hydro has not identified a project purpose that would be served by the additional land and water, except for the informal tailwater fishing area located downstream of the powerhouse.

The land and water associated with the bypassed channels, the island between the east and middle dam sections, the island between the middle and west dam sections, the island within the project impoundment, and the forested land on the west bank of the impoundment do not appear to be necessary for project operation, flood control, recreation, the protection of fish and wildlife, or other developmental and non-developmental interests of the project. However, as discussed above, the tailwater fishing area is currently being used at the project to provide fishing access, and therefore serves a project purpose warranting inclusion in the project boundary.

To the extent that the 2-acre picnic and fireplace area is not included in the list of formal project recreational facilities in any subsequent license issued for the project, as proposed by Flambeau Hydro, the area would no longer serve a project purpose and there would be no basis for continuing to include it in the project boundary.

## **3.3.5 Cultural Resources**

### **3.3.5.1 Affected Environment**

#### Area of Potential Effect

Under section 106 of the NHPA of 1966, as amended, the Commission must take into account whether any historic properties within the proposed

project's APE could be affected by the issuance of a license for the project. The Advisory Council on Historic Preservation (ACHP) defines an APE as the geographic area or areas in which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist (36 C.F.R. 800.16(d)).

In its application, Flambeau Hydro proposes an APE that encompasses the land and water within the project boundary. On March 20, 2017 and April 14, 2017, Flambeau Hydro sought concurrence from the Wisconsin SHPO regarding the APE; however, no response from the SHPO has been filed.

### Regional History

The earliest evidence of Native American occupation in Wisconsin dates to the Paleo-Indian period (10,000-8500 B.C.). Occupation continued through the Archaic (8,000-1,000 B.C.), Woodland (1000-300 B.C.), and Mississippian periods (A.D. 900-1600). The Menominee, Chippewa (Ojibwa), and Potawatomi Tribes, extending from the Algonkian language family, have been the predominant indigenous groups living in the Great Lakes region for the last five centuries. At the time of European contact, the project area was home to the Menominee and Ojibwe Tribes, which hunted the transition zone between northern hardwood forests and prairies, and fished its waters. In the early 1800s, much of the land originally occupied the Menominee and Ojibwe was taken by colonists. The Tribes later repurchased some of these lands.

The first European explorer to the Wisconsin region was Jean Nicolet in 1634. In 1763, Great Britain seized dominion over the area during the French and Indian Wars. The United States government acquired the area after the Revolutionary War. Immigrants began settling in the area in the 1850s, soon after the Wisconsin Territory became a state in 1848. Approximately two-thirds of the immigrants came from the eastern United States, and the remaining immigrants primarily originated from Germany, Ireland, and Norway. Early settlers participated in either fur trading or logging in the early 1800s.

### Archaeological and Historic Resources

The Sawyer County Comprehensive Plan provides a list of the known archaeological sites within the county. The comprehensive plan identifies three sites on the Wisconsin National Register of Historic Places in the Village of Radisson, including the North Wisconsin Lumber Company Office, which is located approximately 30 miles northwest from the Arpin Project, in the town of Hayward, and the Hall-Raynor Stopping Place and the Ojibwa Courier Press



Building, which are located approximately 6 miles upstream from the Arpin Project, in the town of Ojibwa.

The three project dam sections and part of the existing power canal for the project were originally constructed in 1912 and 1913 by a lumber company at the head of a series of rapids called Belille Falls. In 1937, gates and stop logs were installed on the dam to raise the pool level about ten feet. In that year, Sawyer County leased the facilities to develop a pond for recreational purposes.

After the project was licensed in 1969 by the Federal Power Commission, North Central Power Company repaired the existing facilities, completed excavation of the power canal, constructed the powerhouse and appurtenant facilities, and installed the generating units. The June 3, 1969 license order also required repairs and improvements to the existing facilities, including repairing mortar joints, loose stones, and timber and stoplogs at the dam.

Over the term of the previous license, certain repairs were necessary to continue operating the project and to maintain the structural integrity and stability of the project. In 1970, the licensee had to repair a leak downstream of the penstock. In 1997, the middle dam section required spillway rehabilitation and reinforcement, including constructing a buttress retaining wall and abutment wall on the downstream side of the spillway, and adding new concrete to reinforce the dam. In 2004, the middle dam section required additional repairs, including the removal of tainter gates and the construction and installation of two vertical lift gates, concrete pier repairs that required dewatering, and installation of an embedded steel track for the spill gate.

### **3.3.5.2 Environmental Effects**

In its application, Flambeau Hydro proposes an APE that encompasses all land and water within the project boundary. The existing project boundary encompasses approximately 317 acres, including the impoundment, and land associated with the dam sections, powerhouse, power canal, tailrace, generator lead line, transmission line, recreation facilities, and appurtenant facilities.

Flambeau Hydro proposes to comply with the PA that was executed by Commission staff and the Wisconsin SHPO on December 16, 1993 (FERC, *et al.*, 1993). The PA requires that every hydroelectric project in Wisconsin develop an HPMP to avoid, lessen, or mitigate for any adverse effects on both identified and unidentified historic properties within the APE. To address any potential adverse effects, Flambeau Hydro proposes to develop an HPMP for the project.

### *Our Analysis*

Flambeau Hydro proposes to continue operating the project as a run-of-river facility, with minimal impoundment fluctuation, and has not proposed any changes to project facilities or project operation that would disturb additional areas in the project vicinity or otherwise affect cultural resources outside of the project boundary. The project boundary, including the impoundment and land necessary for project purposes, fully encompasses the geographic area in which the undertaking may directly or indirectly cause alterations in the character or use of any historic properties that could be located in the vicinity of the project. Therefore, limiting the APE to the project boundary is consistent with ACHP's regulations.

Archaeological surveys have not been conducted to determine if there are architectural or archaeological resources in the APE. Therefore, staff is unable to determine with certainty whether or not there are any historic properties in the project vicinity that have the potential to be adversely affected by the continued operation and maintenance of the Arpin Project. However, the original construction of the dam sections at the project back to 1912 and it is possible that the dam sections could be eligible for listing in the National Register, given the relatively limited repairs performed to-date, especially on the west dam section and east dam section structures.

Without additional protection measures in place, continued operation and maintenance of the Arpin Project could have adverse effects on the dam sections in the event repairs are needed to maintain the structure and function of the aging dam sections or to fix structural damage that occurs in the course of project operation.

Because the dam sections could be historic properties and relicensing the Arpin Project could have an adverse effect on the dam sections, it would be beneficial to implement the statewide PA during any subsequent license term. The statewide PA requires the licensee to develop an HPMP within one year of license issuance that includes provisions for shoreline monitoring, surveys of previously unsurveyed land, and documentation of previously recorded archaeological properties that occur on lands within the project boundary, which would ensure that cultural resources are properly documented in the APE, and that the project would not adversely affect historic properties.

Because no surveys have been completed in the APE, an HPMP could include provisions for the treatment of unsurveyed land. The PA states that the HPMP should include provisions for conducting: (1) an archaeological survey in the planning stage of any proposed significant ground-disturbing activity that may disturb historic properties; or (2) archaeological surveys for all unsurveyed land

within ten years of the date of license issuance. Developing an HPMP with either of these provisions, along with procedures for the proper treatment of any historic resources identified during the survey, would ensure that any previously undiscovered archaeological resources in the APE are not adversely affected by the project.

To protect the dam sections from adverse effects during any subsequent license, an HPMP could also include provisions for ensuring that any necessary repairs to the dam sections do not diminish the integrity of the design and materials of the dam sections.

Further, during the term of any subsequent license, the applicant would occasionally need to conduct routine maintenance activities in the project area or on project facilities. These activities could include general landscaping and ground-disturbing yard maintenance within the project boundary. These activities would not require prior Commission approval; however, they could affect unidentified historic resources in the project area. Consulting with the Wisconsin SHPO on procedures to be included in the HPMP and implemented prior to conducting these activities would ensure that unidentified historic resources are not adversely affected.

Developing and implementing an HPMP, as specified by the statewide PA and with the measures discussed above, would ensure that continued operation and maintenance of the project would have no adverse effect on historic properties within the APE.

## 4.0 DEVELOPMENTAL ANALYSIS

In this section, we look at the project's use of the Chippewa River for hydropower purposes to see what effects various environmental measures would have on the project's costs and power generation. Under the Commission's approach to evaluating the economics of hydropower projects, as articulated in *Mead Corp.*,<sup>39</sup> the Commission compares the current project cost to an estimate of the cost of obtaining the same amount of energy and capacity using a likely alternative source of power for the region (cost of alternative power). In keeping with Commission policy as described in *Mead Corp.*, our economic analysis is based on current electric power cost conditions and does not consider future escalation of fuel prices in valuing the hydropower project's power benefits.

For each of the licensing alternatives, our analysis includes an estimate of: (1) the cost of individual measures considered in the EA for the protection, mitigation, and enhancement of environmental resources affected by the project; (2) the cost of alternative power; (3) the total project cost (*i.e.*, operation, maintenance, and environmental measures); and (4) the difference between the cost of alternative power and total project cost for the project. If the difference between the cost of alternative power and total project cost is positive, the project helps to produce power for less than the cost of alternative power. If the difference between the cost of alternative power and total project cost is negative, then the project helps to produce power for more than the cost of alternative power. This estimate helps to support an informed decision concerning what is in the public interest with respect to a proposed license. However, project economics is only one of many public interest factors the Commission considers in determining whether, and under what conditions, to issue a license.

### 4.1 POWER AND ECONOMIC BENEFITS OF THE PROJECT

Table 2 summarizes the assumptions and economic information we use in our analysis for the project. This information was provided by Flambeau Hydro in its license application or estimated by staff. We find that the values provided by Flambeau Hydro are reasonable for the purposes of our analysis. Cost items common to all alternatives include: taxes and insurance costs, net investment, estimated future capital investment required to maintain and extend the life of

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<sup>39</sup> See *Mead Corporation, Publishing Paper Division*, 72 FERC ¶ 61,027 (1995). In most cases, electricity from hydropower would displace some form of fossil-fueled generation, in which fuel cost is the largest component of the cost of electricity production.

facilities, relicensing costs, normal operation and maintenance cost, and Commission fees.

Table 2. Parameters for the economic analysis of the Arpin Project (Source: Flambeau Hydro and staff).

<b>Parameters</b>	<b>Values (2017 dollars)</b>	<b>Sources</b>
Period of analysis	30 years	Staff
Term of financing	20 years	Staff
Escalation rate	0 percent	Staff
Alternative energy value	\$57.60/MWh	Flambeau Hydro
Federal tax rate	35 percent	Staff
Local tax rate	7.9 percent	Staff
Interest rate	7 percent	Staff
Discount rate	7 percent <sup>a</sup>	Staff
Net remaining investment	\$400,000 <sup>b</sup>	Flambeau Hydro
Annual operation and maintenance cost	\$252,516 <sup>c</sup>	Flambeau Hydro, as modified by staff

<sup>a</sup> Assumed by staff to be the same as the interest rate.

<sup>b</sup> Based on Flambeau Hydro's remaining undepreciated net investment and cost to develop the license application for the project.

<sup>c</sup> Operation and maintenance costs for the three years provided by Flambeau Hydro (2014, 2015, and 2016) were averaged to determine an annual operation and maintenance cost.

## 4.2 COMPARISON OF ALTERNATIVES

Table 3 summarizes the installed capacity, annual generation, annual cost of alternative power, annual project cost, and difference between the cost of alternative power and project cost for each of the alternatives considered in this EA: no action, Flambeau Hydro's proposal, and the staff alternative.

Table 3. Summary of the annual cost of alternative power and annual project costs for the three alternatives for the Arpin Project (Source: staff).

	<b>No Action</b>	<b>Flambeau Hydro's Proposal</b>	<b>Staff Alternative</b>
Installed capacity (megawatts)	1.45	1.45	1.45
Annual generation (MWh)	7,336	7,336	7,336
Annual cost of alternative power (\$ and \$/MWh)	\$422,554 \$57.60/MWh	\$422,554 \$57.60/MWh	\$422,554 \$57.60/MWh
Annual project cost (\$ and \$/MWh)	\$352,489 \$48.05/MWh	\$352,995 \$48.12/MWh	\$354,856 \$48.37/MWh
Difference between the cost of alternative power and project cost (\$ and \$/MWh)	\$70,065 \$9.55	\$69,559 \$9.48	\$67,698 \$9.23

### 4.2.1 No-Action Alternative

Under the no-action alternative, the project would continue to operate as it does now. The project would have an installed capacity of 1.45 MW, and generate an average of 7,336 MWh of electricity annually. The cost of alternative power would be about \$422,554, or \$57.60/MWh. The average annual project cost would be about \$352,489, or \$48.05/MWh. Overall, the project would produce power at a cost that is about \$70,065, or \$9.55/MWh, less than the cost of alternative power.

#### **4.2.2 Flambeau Hydro's Proposal**

Table 4 lists all environmental measures, and the estimated cost of each, considered for the Arpin Project. Under Flambeau Hydro's proposal, the Arpin Project would have an installed capacity of 1.45 MW, and generate an average of 7,336 MWh of electricity annually. The cost of alternative power would be about \$422,554 or \$57.60/MWh. The average annual project cost would be about \$352,995, or \$48.12/MWh. Overall, the project would produce power at a cost that is \$69,559, or \$9.48/MWh, less than the cost of alternative power.

#### **4.2.3 Staff Alternative**

The staff alternative is based on Flambeau Hydro's proposal with staff modifications and additional measures. The staff alternative would have an installed capacity of 1.45 MW and an average annual generation of 7,336 MWh. The cost of alternative power would be about \$422,554, or \$57.60/MWh. The average annual project cost would be about \$354,856, or \$48.37/MWh. Overall, the project would produce power at a cost that is \$67,698, or \$9.23/MWh, less than the cost of alternative power.

### 4.3 COST OF ENVIRONMENTAL MEASURES

Table 4. Cost of environmental mitigation and enhancement measures considered in assessing the effects of the Arpin Project (Source: Flambeau Hydro and staff).

Enhancement/Mitigation Measures	Entity	Capital cost	Annual cost <sup>a</sup>	Levelized annual cost <sup>b</sup>
<b>General</b>				
Continue to operate the project in a run-of-river mode.	Flambeau Hydro, Interior, <sup>c</sup> Staff	\$0	\$0	\$0
Develop an operation compliance monitoring plan.	Interior, <sup>c</sup> Staff	\$10,000	\$0	\$1,011
Consult with Interior on power outages, low flows, and unexpected emergencies that may pose a threat to fish and wildlife resources in the vicinity of the project, during the term of any subsequent license.	Interior	\$0	\$0	\$0
<b>Aquatic Resources</b>				
Continue to provide a continuous minimum flow of 40-cfs or inflow, whichever is less, into the bypassed reach below the east dam section.	Flambeau Hydro, Interior, <sup>c</sup> Staff	\$0	\$0	\$0



Enhancement/Mitigation Measures	Entity	Capital cost	Annual cost <sup>a</sup>	Levelized annual cost <sup>b</sup>
Continue to limit water surface elevation fluctuations to 1 foot below the normal maximum water surface elevation from June 1 through March 31, and 6 inches below the maximum water surface elevation from April 1 through May 31 to protect fish spawning habitat.	Flambeau Hydro, Staff	\$0	\$0	\$0
Reduce entrainment potential at the project intake either through physical exclusion ( <i>i.e.</i> , by replacing the existing trashrack with a trashrack that has a narrower clear bar spacing), or through some other action, in consultation with FWS.	Interior <sup>c</sup>	Unknown – recommendation lacks specificity needed to estimate a cost	Unknown – recommendation lacks specificity needed to estimate a cost	Unknown – recommendation lacks specificity needed to estimate a cost
Consider fish passage and other methods to facilitate fish movement for the recovery of the sheepsnose mussel and the conservation of migratory fish, such as lake sturgeon.	Interior	\$450,000 <sup>d</sup>	\$2,162 (45 MWh in lost generation) <sup>e</sup>	\$46,922
Develop a debris management plan.	Staff	\$2,000	\$0 <sup>f</sup>	\$202
<b>Threatened and Endangered Species</b>				
Avoid cutting trees between June 1 and July 31 to protect roosting northern long-eared bats.	Staff	\$0	\$0	\$0

Enhancement/Mitigation Measures	Entity	Capital cost	Annual cost <sup>a</sup>	Levelized annual cost <sup>b</sup>
<b>Recreation Resources</b>				
Continue to operate and maintain the existing canoe portage trail, boat ramp, and west bank fishing access area immediately downstream of the west dam section.	Flambeau Hydro, Staff	\$0	\$0	\$0
Operate and maintain the existing informal tailwater fishing recreation area adjacent to the canoe portage trail along the northern bank of the project tailrace as a formal project recreation facility.	Flambeau Hydro, Staff	\$0 <sup>g</sup>	\$0	\$0
Discontinue operation and maintenance of the 2-acre picnic and fireplace area located on the island between the west and middle dam sections.	Flambeau Hydro, Staff	\$0	\$0	\$0
Develop a recreation monitoring plan.	Staff	\$5,000	\$0	\$506
Install picnic tables at the existing boat ramp area and west bank fishing access area.	Staff	\$1,400 <sup>h</sup>	\$0	\$142

<b>Enhancement/Mitigation Measures</b>	<b>Entity</b>	<b>Capital cost</b>	<b>Annual cost<sup>a</sup></b>	<b>Levelized annual cost<sup>b</sup></b>
<b>Archaeological and Historic Resources</b>				
Develop an HPMP consistent with the statewide PA.	Flambeau Hydro	\$5,000	\$0	\$506
Develop an HPMP consistent with the statewide PA, and with the following provisions: (1) procedures for protecting the historical integrity of the dam sections in the event repairs are needed to the dam structures; (2) conducting an archaeological survey in the planning stage of any proposed significant ground-disturbing activity that may disturb historic properties and procedures for the proper treatment of any historic resources identified during the survey; (3) procedures to be implemented prior to conducting routine maintenance activities in the project area or on project facilities.	Staff	\$5,000	\$0	\$506
<b>Land Use</b>				
Add approximately 76-acres of land and water to the existing project boundary.	Flambeau Hydro	\$0	\$0	\$0

Enhancement/Mitigation Measures	Entity	Capital cost	Annual cost <sup>a</sup>	Levelized annual cost <sup>b</sup>
Add the existing, informal tailwater fishing area adjacent to the canoe portage trail along the northern bank of the project tailrace to the project boundary and remove the 2-acre picnic and fireplace area on the island between the west and middle dam sections from the project boundary.	Staff	\$0	\$0	\$0

<sup>a</sup> Annual costs typically include operational and maintenance costs and any other costs which occur on a yearly basis.

<sup>b</sup> All capital and annual costs are converted to equal annual costs over a 30-year period to give a uniform basis for comparing all costs.

<sup>c</sup> Section 10(j) recommendation.

<sup>d</sup> Staff assumes that the cost of designing and constructing a nature-like fishway at the Arpin Project is comparable to the cost of designing and constructing the nature-like fishway at the Winter Project No. 2064. The Winter Project has approximately 8 feet of head at the fishway, which is similar to the head at the east dam of the Arpin Project. *See* Flambeau Hydro, LLC's *Alternative Fish Passage Plan for the Winter Hydroelectric Project* (FERC No. 2064), filed on November 2, 2009 (as revised on February 8, 2010). According to Wisconsin DNR (2017), the cost of providing fish passage at the Winter Project was \$450,000.

<sup>e</sup> Staff estimated this cost based on the cost of the lost generation associated with operating the fish passage facility from April through June with a 50 cfs attraction flow for lake sturgeon (FWS, 2017a). Staff assumes the 40 cfs currently passed as a minimum flow could be supplemented with an additional 10 cfs to be used for attraction flows.

<sup>f</sup> Staff assumes that there will be no annualized costs associated with the proposed debris management plan beyond regular project operation and maintenance currently performed by the existing licensee.

<sup>g</sup> Staff assumes that there will be no capital costs associated with the proposed recreation facility because an informal fishing area already exists and Flambeau Hydro is not proposing any capital improvements.

<sup>h</sup> Staff assumes this cost based on the installation and affixing of two 8-foot metal picnic tables at the boat ramp and west bank fishing access area.

## **5.0 CONCLUSION AND RECOMMENDATIONS**

### **5.1 COMPREHENSIVE DEVELOPMENT AND RECOMMENDED ALTERNATIVE**

Sections 4(e) and 10(a)(1) of the FPA require the Commission to give equal consideration to the power development purposes and to the purposes of energy conservation; the protection, mitigation of damage to, and enhancement of fish and wildlife; the protection of recreational opportunities; and the preservation of other aspects of environmental quality. Any license issued shall be such as in the Commission's judgment would be best adapted to a comprehensive plan for improving or developing a waterway or waterways for all beneficial public uses. This section contains the basis for, and a summary of, our recommendations for relicensing the project. We weigh the costs and benefits of our recommended alternative against other proposed measures.

Based on our independent review of agency comments filed on the project and our review of the environmental and economic effects of the proposed project and project alternatives, we selected the staff alternative as the preferred alternative. We recommend this alternative because: (1) issuing a subsequent license for the project would allow Flambeau Hydro to continue operating its project as a dependable source of electrical energy; (2) the 1.45 MW of electric capacity comes from a renewable resource that does not contribute to atmospheric pollution; (3) the public benefits of the staff alternative would exceed those of the no-action alternative; and (4) the proposed and recommended measures would protect and enhance fish and wildlife resources, and improve public recreation opportunities at the project.

In the following section, we make recommendations as to which environmental measures proposed by Flambeau Hydro or recommended by agencies should be included in any subsequent license issued for the project. In addition to Flambeau Hydro's proposed environmental measures listed below, we recommend additional staff-recommended environmental measures to be included in any license issued for the project.

#### **5.1.1 Measures Proposed by Flambeau Hydro**

Based on our environmental analysis of Flambeau Hydro's proposal in section 3.0, *Environmental Analysis*, and the costs presented in section 4.0, *Developmental Analysis*, we conclude that the following environmental measures proposed by Flambeau Hydro would protect and enhance environmental resources and would be worth the cost. Therefore, we recommend including these measures in any license issued for the project.

To protect or enhance aquatic habitat, fish and wildlife habitat, and recreation at the project, Flambeau Hydro proposes to:

- Continue to operate the project in a run-of-river mode;
- Continue to release a continuous minimum flow of 40 cfs or inflow, whichever is less, downstream of the east dam section to protect aquatic habitat in the bypassed reach;
- Continue to limit impoundment fluctuations to 1 foot from June 1 through March 31, and 6 inches from April 1 through May 31 to protect fish spawning habitat;
- Continue to operate and maintain the existing canoe portage trail, boat ramp, and west bank fishing access area;
- Operate and maintain the existing informal tailwater fishing recreation area located on the northern bank of the project tailrace as a formal project recreation facility;
- Discontinue operation and maintenance of the 2-acre picnic and fireplace area located on the island between the west and middle dam sections; and
- Develop an HPMP consistent with the statewide PA to protect historic properties.

#### **5.1.2 Additional Measures Recommended by Staff**

In addition to Flambeau Hydro's proposed measures listed above, we recommend including the following additional measures in any license that may be issued for the Arpin Project:

- Develop an operation compliance monitoring plan to document compliance with run-of-river operation and minimum flow releases that may be required in any subsequent license issued for the project;
- Develop a debris management plan to protect fish from impingement on the trashrack and enhance aquatic habitat downstream from the dam sections;
- Avoid cutting trees between June 1 and July 31 to protect roosting northern long-eared bats.
- Develop a recreation monitoring plan to monitor and evaluate recreation use and needs at the project;
- Install picnic tables at the existing boat ramp and west bank fishing access areas;

- Develop an HPMP consistent with Flambeau Hydro’s proposal, with the following additional provisions: (1) procedures for protecting the historical integrity of the dam sections in the event repairs are needed to the dam structures; (2) conducting an archaeological survey in the planning stage of any proposed significant ground-disturbing activity that may disturb historic properties and procedures for the proper treatment of any historic resources identified during the survey; and (3) procedures to be implemented prior to conducting routine maintenance activities in the project area or on project facilities; and
- Revise the project boundary by adding the existing, approximately 0.1-acre informal tailwater fishing area located on the northern bank of the project tailrace and removing the 2-acre picnic and fireplace area located on the island between the west and middle dam sections.

Below, we discuss the basis for our additional staff-recommended measures.<sup>40</sup>

### Operation Compliance Monitoring Plan

Flambeau Hydro is proposing to continue operating the project in a run-of-river mode, releasing a continuous minimum flow of 40 cfs or inflow, whichever is less, downstream of the east dam section, and limiting impoundment fluctuations to 1 foot from June 1 through March 31, and 6 inches from April 1 through May 31.

Interior recommends (10(j) recommendation 3) that Flambeau Hydro develop a plan to monitor compliance with project operation and employ mechanisms (staff gauges and automatic water level recorders) to document inflow, discharge, and impoundment and tailrace fluctuations. Interior also states that Flambeau Hydro should consult with FWS on matters affecting fish and wildlife throughout the term of the license that may pose a threat to fish and wildlife resources in the vicinity of the project, such as power outages, low flows, and unexpected emergencies.

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<sup>40</sup> Wisconsin DNR filed general comments on resource issues without providing an explanation of how the project is affecting the resources or providing specific measures that could be implemented to reduce potential project effects (*e.g.*, a list of plans that could be filed by the Wisconsin DNR as part of the certification). Without specific measures to evaluate, there is no information to analyze and no information to determine whether measures would or would not provide benefits to environmental resources occurring at the project. Therefore, there is no justification for recommending any measures associated with these issues, and we do not include a detailed discussion of Wisconsin DNR’s comments below. Our environmental analysis of the resource issues is provided in section 3.3 (*Proposed Action and Action Alternatives*).



Flambeau Hydro did not specify how it would document compliance with run-of-river operation, minimum flows, and impoundment elevation limits. An operation compliance monitoring plan would help Flambeau Hydro document its compliance with the operational provisions of any subsequent license, and provide a mechanism for reporting operational data and deviations. The plan would also help facilitate administration of the license, and ensure the protection of resources that are sensitive to impoundment fluctuations and deviations from normal operating conditions. We recommend that Flambeau Hydro develop an operation compliance monitoring plan in consultation with FWS and Wisconsin DNR that includes: (1) monitoring run-of-river operation, minimum flows, and impoundment elevation levels to document compliance with the operational conditions of any subsequent license; (2) standard operating procedures to be implemented (a) outside of normal operating conditions, including during scheduled facility shutdowns, impoundment drawdowns, and impoundment refilling and (b) during emergency conditions such as unscheduled facility shutdowns and maintenance, in order to minimize project effects on environmental resources; (3) reporting deviations to the Commission; and (4) maintaining a log of project operations. The benefits of developing and implementing this plan would be worth the estimated annual levelized cost of \$1,011.

We do not recommend a license condition requiring Flambeau Hydro to consult with FWS throughout the license term during power outages, low flows, and unexpected emergencies that may pose a threat to fish and wildlife resources in the vicinity of the project. The operation compliance monitoring plan recommend by staff would be developed in consultation with FWS, and would include provisions for implementing standard operating procedures outside of normal conditions to minimize project effects on environmental resources, including fish and wildlife resources.

### Debris Management

Flambeau Hydro states that it currently removes debris from the project forebay using a mechanical rake. Flambeau Hydro has not proposed specific debris management procedures and the agencies have not recommended or required any specific procedures. Debris that accumulates on the trashrack reduces the effectiveness of the trashrack at protecting fish from entrainment or impingement. A debris management plan would ensure that the trashrack operates effectively for reducing fish impingement and that beneficial organic debris is passed downstream of the project dam to improve aquatic habitat. Therefore, staff recommends the development and implementation of a debris management plan that includes procedures for: (1) removing and sorting debris that collects on project structures; (2) passing organic debris (*i.e.*, leaves and wood) downstream of the project; and (3) removing and disposing of trash. We conclude that the benefits of a debris management plan would be worth the estimated annual levelized cost of \$202.

### Northern Long-Eared Bat Protection

As discussed in section 3.3.3, *Threatened and Endangered Species*, maintenance of the transmission right-of-way and recreation facilities could periodically require the removal of vegetation, including trees within the project boundary. Trees provide valuable habitat for NLEB during their roosting reproductive phase, which takes place in the summer months, and tree removal during these months may disturb NLEB. Implementing a seasonal clearing restriction for trees greater than 3 inches in width at breast height, between June 1 and July 31, would avoid the time period when NLEB may be occupying nearby roosting trees, at no additional cost to Flambeau Hydro.

### Recreational Resources

Flambeau Hydro currently operates and maintains project recreation facilities that provide opportunities for boating, fishing, and swimming in the project impoundment and non-motorized boating and fishing downstream of the dam. Flambeau Hydro proposes to continue operating and maintaining the public boat ramp in the impoundment, the west bank fishing access area below the west dam section, and the canoe portage trail from the power canal to the tailrace. However, Flambeau Hydro does not propose to continue operating and maintaining the 2-acre island picnic and fireplace area.

As of 2003, the FERC Form 80 showed that the 2-acre picnic and fireplace area had a low utilization rate.<sup>41</sup> The apparently low level of recreation demand at the facility might be attributed to limited accessibility at the site. Since the picnic and fireplace area is located on an island that is relatively close to the middle dam section, site access is limited to boaters that are able to navigate across the impoundment from the boat ramp to the island, while maintaining a safe distance from the dam. Separately, the isolated nature of the facility potentially limits the frequency of maintenance activities, which could degrade the overall recreation experience at the picnic and fireplace area. Based on the under-utilization of the island picnic and fireplace area, it appears that discontinuing operation and maintenance at the site, and removing the area from the list of formal project recreation facilities would not significantly affect recreation opportunities at the project. To ensure that members of the public have continued access to a picnic area at the project, staff recommend installing a picnic table at the boat ramp facility and the west bank fishing access area. The benefits of adding a picnic table both above the impoundment and below the impoundment would be worth the estimated annual levelized cost of \$142.

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<sup>41</sup> The licensee has not reported recreation usage at the facility after 2003. Flambeau Hydro also has not described any ongoing operation and maintenance measures at the island facility.

In addition to the existing project recreation facilities, Flambeau Hydro proposes to operate and maintain an existing, approximately 0.1-acre non-project tailwater fishing area as a formal project recreation facility. Although the fishing area is not an existing project recreation facility, the Form 80 report for the project includes information on recreation usage at the tailwater fishing area. The utilization rate at the area was 10 percent in 2003, 15 percent in 2009, and 15 percent in 2015. The documented use of the tailwater fishing area indicates that there is an ongoing demand for fishing access in the tailrace area, and there would be a benefit to operating and maintaining the tailwater fishing area as a formal project recreation facility. Furthermore, the addition of the tailwater fishing area would offset any residual recreation loss associated with removing the 2-acre island picnic and fireplace area from the list of formal project recreation facilities. Therefore, staff recommends the addition of the existing informal tailwater fishing area to the formal project recreation facilities.

During the history of the license, the project recreation facilities and recreational use at the project have not been consistently reported. For instance, the Form 80 reports included the 2-acre picnic and fireplace area on the island between the west and middle dam sections through March 27, 2003, but subsequent Form 80 reports no longer included the 2-acre picnic and fireplace area. In addition, the west bank fishing access area was accounted for in Form 80 reports through March 2009, but not accounted for afterwards.

A recreation monitoring plan could be used to document recreation use and project visitor demands over the term of any subsequent license issued for the project. The monitoring plan would provide a mechanism for assessing whether project visitor needs are being met. A recreation monitoring plan could also be used to ensure project facilities are serving their intended purpose, and could help indicate whether investment in rehabilitating or reconstructing new facilities is warranted. To ensure accurate documentation and reporting of the visitor demands of recreation facilities and recreational use across time at the project and to ensure that project facilities are serving their intended purpose, we conclude that a recreation monitoring plan is warranted and would be worth the estimated annual cost of \$506.

### Cultural Resources

Flambeau Hydro proposes to develop an HPMP for the project consistent with the statewide PA that was executed by Commission staff and the Wisconsin SHPO on December 16, 1993 (FERC, *et al.*, 1993).

No archaeological surveys have been conducted in the project boundary to determine if there are architectural or archaeological resources in the APE. Therefore, staff is unable to determine with certainty whether or not there are any historic properties in the project vicinity that could be adversely affected by the continued operation and maintenance of the Arpin Project. However, the original construction of the project dam

sections dates back to 1912 and, given the relatively limited repairs performed to-date, it is possible that the dam sections could be eligible for listing as historic properties in the National Register. Without additional protection measures in place, continued operation and maintenance of the Arpin Project could have adverse effects on the dam sections in the event repairs are needed to maintain the structure and function of the aging dam sections or to fix structural damage that occurs in the course of project operation.

Because the dam sections could be historic properties and relicensing the Arpin Project could have an adverse effect on the dam sections, staff recommends implementing the PA during any subsequent license term to protect the dam sections. Because no surveys have been completed in the APE, an HPMP could include provisions for the treatment of unsurveyed land. The PA states that the HPMP should include provisions for conducting: (1) an archaeological survey in the planning stage of any proposed significant ground-disturbing activity that may disturb historic properties; or (2) archaeological surveys for all unsurveyed land within ten years of the date of license issuance. Developing an HPMP that requires an archaeological survey to be conducted in the planning stage of significant ground-disturbing activity and procedures for the proper treatment of any historic resources identified during the survey, would ensure that any previously undiscovered archaeological resources in the APE are not adversely affected by the project.

To protect the dam sections from adverse effects during any subsequent license, an HPMP could also include provisions for ensuring that any necessary repairs to the dam sections do not diminish the integrity of the design and materials of the dam sections.

Further, during the term of any subsequent license, the applicant would occasionally need to conduct routine maintenance activities in the project area or on project facilities. These activities could include general landscaping and ground-disturbing yard maintenance within the project boundary. These activities would not require prior Commission approval; however, they could affect unidentified historic resources in the project area. Consulting with the Wisconsin SHPO on procedures to be included in the HPMP and implemented prior to conducting these activities would ensure that unidentified historic resources are not adversely affected.

Developing and implementing an HPMP, as specified by the statewide PA and with the measures discussed above, would ensure that continued operation and maintenance of the project would have no adverse effect on historic properties within the APE. Staff recommends developing and implementing the HPMP, as discussed above, and finds that benefits outweigh the estimated annual levelized cost of \$5,000.

### **5.1.3 Measures Not Recommended**

Some of the measures and general comments proposed by Flambeau Hydro and Interior would not contribute to the best comprehensive use of the Chippewa River's

water resources. The following discussion includes the basis for staff's conclusion not to recommend such measures.

### Fish Entrainment Protection

The existing trashrack at the project intake has clear spacing between the bars ranging from 1.5 to 1.75 inches. Interior recommends (10(j) recommendation 2) that Flambeau Hydro address the potential for fish entrainment "either through physical exclusion, with narrow spaced trash racks, or through some other action to mitigate for the proposed losses." Interior suggests that Flambeau Hydro should work with the FWS on a suitable method of fish protection and/or mitigation.

Flambeau Hydro is not proposing any measures to protect fisheries resources from entrainment and turbine mortality at the project. Flambeau Hydro's desktop entrainment study, which compared the Arpin Project's design specifications to those of 56 other hydroelectric projects, concluded that an estimated 7,417 fish are entrained annually and that 28 percent of them are killed by turbine passage.

There is no site-specific information in the record to indicate that fish entrainment and impingement are currently a problem at the project. The fish community in the impoundment appears to be healthy and diverse. Furthermore, Flambeau Hydro's desktop study did not consider several project-specific factors that have implications for assessing the potential benefits of a trashrack with reduced clear spacing. As our analysis in section 3 explains, the existing trashrack has both an approach velocity and through-rack velocity that can be readily avoided by all the adult fish species known to occur in the project impoundment, even though the existing clear spacing would not physically exclude many juveniles or smaller adult fish from passing through the trashracks. For example, smallmouth bass would not be physically excluded from passing through the racks until they reach a size of approximately 13 inches long, but could easily swim away from the approach and through-rack velocities.

Although Interior did not recommend a specific measure for addressing entrainment at the project, staff's analysis in section 3.3.1.2 examined the potential effects of installing a new trashrack with 1-inch clear bar spacing on fish in the project impoundment. According to our analysis, if a trashrack with 1-inch clear spacing is installed at the project intake, more fish would be physically excluded from potential entrainment, but the through-rack velocities would increase to 2.04 cfs and the risk of impingement would increase. The existing trashrack is angled at 45 degrees from vertical, a design that is meant to mitigate the debris accumulation problem at the project. At this project, the increased risk of impingement is related the issue of debris loading on the trashrack, which could not only increase through-rack velocities substantially above 2.04 cfs (depending on the percentage of the trashrack surface area covered by debris), but could increase the costs of removing debris from the trashrack and decrease

generation at the project. In addition, the estimated annual levelized cost of a new trashrack with 1-inch clear bar spacing would be \$60,689.

Given the healthy and diverse fish community in the impoundment, the low approach and through-rack velocities of the existing trackrack (relative to the burst swimming speeds of impoundment fish species), and the potential risk of increased impingement that could result from a trackrack with reduced clear spacing, we do not recommend installing a new trashrack at the project.

### Fish Passage

Flambeau Hydro is not proposing to facilitate upstream or downstream fish passage at the project. In its comments, Interior states that methods for facilitating fish movement for the recovery of the federally endangered sheepsnose mussel and the conservation of other migratory fish, such as lake sturgeon, should be considered. Based on recent developments in fishway technology, Interior states that the configuration of the project's dam sections appears to be amenable to construction of a nature-like fishway, similar to the one recently constructed at the Winter Project No. 2064.

There is no indication that the project is adversely affecting fish or mussel populations in the project area or that lake sturgeon and sheepsnose mussel populations in the downstream reach are restricted by limited habitat availability. The sturgeon spawning study documented successful spawning in the west and middle channels and suggests that additional habitat is available for spawning in the east channel. In addition, the nearest documented occurrence of sheepsnose mussel is approximately 50 miles downstream of the project, and suitable habitat is available downstream of the dam for any glochidia that are transported to the project vicinity by potential host species.

Although fish passage at the project could potentially benefit lake sturgeon and sheepsnose mussel populations by providing access to additional habitat above Arpin dam, the benefits would most likely be minimal due to the fact that habitat availability does not appear to be a limiting factor for survival, reproduction, or distribution of mussel and fish species at the project. In addition, the cost of designing and constructing a nature-like fishway would be approximately \$450,000. Lastly, Interior's reservation of authority to prescribe fishways provides a mechanism for responding to changes in agency management goals for lake sturgeon in the future.

Given the lack of demonstrated need and the high cost, we do not recommend fish passage measures.

### Project Boundary

According to the Exhibit G filed on April 5, 2018, Flambeau Hydro proposes to add approximately 76 acres of land and water to the existing project boundary,<sup>42</sup> including approximately 20 acres of bypassed channels, an approximately 2.5-acre island between the east and middle dam sections, an approximately 9-acre parcel of land on the island between the middle and west dam sections, an approximately 1.5-acre island within the project impoundment, an approximately 20-acre area of forested land on the west bank of the impoundment that abuts River Road, an approximately 0.1-acre informal tailwater fishing area located on the northern bank of the project tailrace, and additional land and water around existing project features.

The inclusion of land and water within a project boundary serves the function of indicating that the land and water are used in some manner for project purposes. The project boundary clarifies the geographic scope of the licensee's responsibilities under its license and the Commission's regulatory responsibilities with regard to the project. The identification of land and water in the project boundary also reduces the potential for ambiguity in administering and enforcing the license conditions, because the geographic scope of those obligations will be a matter of record. This also removes any dispute about the Commission's authority over the licensee as to its activities on those lands.

Flambeau Hydro does not identify a project purpose that would be served by the 76 acres of additional land and water that it proposes to include in the project boundary, except for the informal tailwater fishing area located on the northern bank of the project tailrace. The additional land and water associated with the bypassed channels, the island between the east and middle dam sections, the island between the middle and west dam sections, the island within the project impoundment, and the forested land on the west bank of the impoundment do not appear to be necessary for project operation, flood control, recreation, the protection of fish and wildlife, or other developmental and non-developmental interests of the project. However, the tailwater fishing area is currently being used at the project to provide fishing access, and serves a project purpose that warrants inclusion in the project boundary. Therefore, we do not recommend revising the

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<sup>42</sup> Flambeau Hydro's final license application does not include a discussion about adding these areas to the project boundary; however, these areas are included within the revised Exhibit G filed on April 5, 2018. For purposes of our analysis herein, Commission staff considers Flambeau Hydro's Exhibit G to be a proposal to revise the project boundary. Commission staff issued a letter on June 11, 2018 requesting that Flambeau Hydro clarify whether or not it is proposing to revise the existing project boundary.

project boundary to add the bypassed channels and three islands, but do recommend adding the tailwater fishing area to the project boundary as a formal recreation facility.

Because the 2-acre picnic and fireplace area is no longer being used for project recreation, as discussed above, there is no basis for continuing to include it in the project boundary. Accordingly, staff recommends removing the 2-acre picnic and fireplace area from the project boundary.

## **5.2 UNAVOIDABLE ADVERSE IMPACTS**

Although there is no documented fish entrainment or mortality at the project, it is likely that some fish pass and would continue to pass through the project turbines and some of those fish are probably injured or killed.

## **5.3 SUMMARY OF SECTION 10(j) RECOMMENDATIONS**

Under the provisions of section 10(j) of the FPA, each hydroelectric license issued by the Commission shall include conditions based on recommendations provided by federal and state fish and wildlife agencies for the protection, mitigation, or enhancement of fish and wildlife resources affected by the project.

Section 10(j) of the FPA states that whenever the Commission finds that any fish and wildlife agency recommendation is inconsistent with the purposes and the requirements of the FPA, or other applicable law, the Commission and the agency shall attempt to resolve any such inconsistency, giving due weight to the recommendations, expertise, and statutory responsibilities of the agency.

In response to our December 13, 2017 notice accepting the application to relicense the project and soliciting motions to intervene, protests, comments, recommendations, preliminary terms and conditions, and preliminary fishway prescriptions, Interior filed three 10(j) recommendations on February 12, 2018. Table 5 lists the recommendations filed pursuant to section 10(j), and indicates whether the recommendations are included under the staff alternative, as well as the basis for our preliminary determinations concerning measures that we consider inconsistent with section 10(j). Environmental recommendations that we consider outside the scope of section 10(j) have been considered under section 10(a) of the FPA and are addressed in the specific resource sections of this document.



Table 5. Analysis of fish and wildlife agency recommendations for the Arpin Project  
(Source: staff).

<b>Recommendation</b>	<b>Agency</b>	<b>Within Scope of Section 10(j)</b>	<b>Levelized Annual Cost (\$)</b>	<b>Recommend Adopting?</b>
1. Continued operation of the project as run-of-river, with no hydroelectric peaking, and continuation of 40 cfs minimum flow through the east dam section.	Interior	Yes.	\$0	Yes.
2. Reduce entrainment potential at the project intake either through physical exclusion ( <i>i.e.</i> , by replacing the existing trashrack with a trashrack that has a narrower clear bar spacing), or through some other action, in consultation with FWS.	Interior	No. <sup>a</sup>	Unknown – recommendation lacks specificity needed to estimate a cost.	No.
3. Develop a plan to monitor compliance with run-of-river operation and minimum flow releases to protect fish and wildlife.	Interior	Yes.	\$1,011	Yes.

<sup>a</sup> This is not a specific fish and wildlife measure. The statement, “or some other action” renders the recommendation open-ended, non-specific, and uncertain as to the type and cost of measure to implement. Costs would vary widely based on the specific structural or operational measure ultimately selected.

## **5.4 CONSISTENCY WITH COMPREHENSIVE PLANS**

Section 10(a)(2)(A) of the FPA, 16 U.S.C. §803(a)(2)(A), requires the Commission to consider the extent to which a project is consistent with federal or state comprehensive plans for improving, developing, or conserving a waterway or waterways affected by the project. We reviewed 14 qualifying comprehensive plans that are applicable to the Arpin Project. No inconsistencies were found.

Forest Service. 2004. Chequamegon-Nicolet National Forest land and resource management plan. Department of Agriculture, Park Falls, Wisconsin. July 2004.

National Park Service. The Nationwide Rivers Inventory. Department of the Interior, Washington, D.C. 1993.

Upper Mississippi River Basin Commission. 1981. Comprehensive master plan for the management of the Upper Mississippi River system - environmental report. Minneapolis, Minnesota. September 1981.

Upper Mississippi River Basin Commission. 1982. Comprehensive master plan for the management of the Upper Mississippi River system. Minneapolis, Minnesota. January 1, 1982.

U.S. Fish and Wildlife Service. Canadian Wildlife Service. 1986. North American waterfowl management plan. Department of the Interior. Environment Canada. May 1986.

U.S. Fish and Wildlife Service. 1993. Upper Mississippi River & Great Lakes Region joint venture implementation plan: A component of the North American waterfowl management plan. March 1993.

U.S. Fish and Wildlife Service. n.d. Fisheries USA: the recreational fisheries policy of the U.S. Fish and Wildlife Service. Washington, D.C.

Wisconsin Department of Natural Resources. 1978. Lower Chippewa River Basin area wide water quality management plan and river basin report. Madison, Wisconsin. March 1978.

Wisconsin Department of Natural Resources. 1980. Upper Chippewa River Basin area wide water quality management plan. Madison, Wisconsin. January 1980.

Wisconsin Department of Natural Resources. Wisconsin Statewide Comprehensive Outdoor Recreation Plan (SCORP): 1991-96. Madison, Wisconsin. October 1991.

Wisconsin Department of Natural Resources. 1992. Wisconsin water quality assessment report to Congress. Madison, Wisconsin. April 1992.

Wisconsin Department of Natural Resources. 1995. Wisconsin's forestry best management practices for water quality. Madison, Wisconsin. March 1995.

Wisconsin Department of Natural Resources. 1995. Wisconsin's biodiversity as a management issue. Madison, Wisconsin. May 1995.

Wisconsin Department of Natural Resources. 1996. Upper Chippewa River Basin water quality management plan. Madison, Wisconsin. February 1996.

## **6.0 FINDING OF NO SIGNIFICANT IMPACT**

If the Arpin Project is issued a subsequent license as proposed with the additional staff-recommended measures, the project would continue to operate while providing enhancements to aquatic resources, protection to terrestrial resources, continued access to recreation facilities, and protection of cultural and historic resources in the project area.

Based on our independent analysis, we find that the issuance of a license for the Arpin Project, with additional staff-recommended environmental measures, would not constitute a major federal action significantly affecting the quality of the human environment.

## **7.0 LITERATURE CITED**

- CH2M HILL. 2000. Fish entrainment/mortality study: Alexander Project (FERC No. 1979). Prepared for Wisconsin Public Service Corporation, Green Bay, Wisconsin. April 2000.
- Electric Power Research Institute (EPRI). 1997. Turbine entrainment and survival database – field tests. Prepared by Alden Research Laboratory, Inc., Holden, Massachusetts. EPRI Report No. TR-108630. October 1997.
- Federal Energy Regulatory Commission. 1995. Preliminary assessment of fish entrainment at hydropower projects, a report on studies and protective measures, volumes 1 and 2 (appendices). FERC Office of Hydropower Licensing, Washington, D.C. Paper No. DPR-10. June 1995 and December 1994.
- Federal Energy Regulatory Commission, Advisory Council on Historic Preservation, Wisconsin State Historic Preservation Officer, and Michigan State Historic Preservation Officer. 1993. 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 the adjacent portions of the State of Michigan. December 30, 1993.
- Fisheries and Oceans Canada. 2016. Fish swimming performance database and analyses. Research Document 2016/002. Winnipeg, Manitoba. April 2016.
- Flambeau Hydro, LLC. 2017. Arpin Hydroelectric Project (FERC No. 2684) Final License Application.
- Lawler, Matusky and Skelly Engineers. 1991. Length/width size estimation. In Fish entrainment monitoring program at the Hodenpyl Hydroelectric Project, FERC No. 2599, Application, Jackson, Michigan: Consumers Power Company, 1991.
- Ohio Environmental Protection Agency (Ohio EPA). 2006. Methods for Assessing Habitat in Flowing Waters: Using the Qualitative Habitat Evaluation Index (QHEI). Ohio EPA, Division of Surface Water.
- Omernik, J.M., S.S. Chapman, R.A. Lillie, and R.T. Dumke. 2000. Ecoregions of Wisconsin. Transactions of the Wisconsin Academy of Science, Arts and Letters 88(2000):77-103.

- NERC (North American Electric Reliability Corporation). 2017. 2017 Long-Term Reliability Assessment; March 2018.
- Perry, Charles H. (Hobie), *et. al.* 2008. Wisconsin's Forests, 2004. Resource Bulletin NRS-23. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 104 p.
- Sammons, S.M. and Bettoli, P.W. 2000. Population dynamics of a reservoir sport fish community in response to hydrology. *North American Journal of Fisheries Management* 20:791-800.
- U.S. Department of Agriculture (USDA). 1998. National Water and Climate Center Technical Note 99-1: Stream Visual Assessment Protocol, December 1998.
- U.S. Fish and Wildlife Service (FWS). 2016. Programmatic biological opinion on final 4(d) rule for the northern long-eared bat and activities excepted from take prohibitions. U.S. Fish and Wildlife Service, Midwest Regional Office.
- \_\_\_\_\_. 2017a. Fish Passage Engineering Design Criteria Manual. USFWS, Northeast Region R5, Hadley, Massachusetts.
- \_\_\_\_\_. 2017b. Endangered and Threatened Wildlife and Plants; 4(d) Rule for the Northern Long-Eared Bat. 81 Fed. Reg. 9, 1900-1922 (January 14, 2016).
- Wisconsin Department of Natural Resources (Wisconsin DNR). 2017. Fish Passage at Dams, Strategic Analysis. Madison, Wisconsin. August, 2017.
- \_\_\_\_\_. 2018a. Wisconsin 2018 Consolidated Assessment and Listing Methodology (WisCALM) for Clean Water Act Section 303(d) and 305(b) Integrated Reporting. Madison, Wisconsin. April 2017.
- \_\_\_\_\_. 2018b. Wisconsin State Comprehensive Outdoor Recreation Plan (SCORP): 2011- 2016. Madison, Wisconsin. January 2018.

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