ENVIRONMENTAL ASSESSMENT
FOR
HYDROPOWER LICENSE

White River Hydroelectric Project

FERC Project No. 2444-042

Wisconsin

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

July 2025

COMMISSION STAFF PAGE LIMIT AND DEADLINE CERTIFICATIONS

I certify that Commission staff has considered the factors mandated by the National Environmental Policy Act (NEPA) and that this environmental document represents a good-faith effort to disclose the most important considerations required by NEPA within the statutory page limit (42 U.S.C. § 4336a(e)) and the statutory deadline (42 U.S.C. § 4336a(g)). This certification reflects staff's expert judgment that the analysis contained within this environmental document is an accurate representation of the potential environmental effects of the proposed action and the analysis is substantially complete. In staff's judgment, any considerations addressed briefly or left unaddressed would not meaningfully inform the assessment of environmental effects.

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TABLE OF CONTENTS

TABLE OF CONTENTS i
LIST OF FIGURES iii
LIST OF TABLES iv
ACRONYMS AND ABBREVIATIONS v
1.0 INTRODUCTION 1
1.1 APPLICATION 1
1.2 PURPOSE OF ACTION AND NEED FOR POWER 1
1.2.1 Purpose of Action 1
1.2.2 Need for Power 3
1.3 STATUTORY AND REGULATORY REQUIREMENTS 4
1.4 PUBLIC REVIEW AND COMMENT 4
1.4.1 Scoping 4
1.4.2 Interventions 4
1.4.3 Comments on the Application 5
2.0 PROPOSED ACTION AND ALTERNATIVES 5
2.1 NO-ACTION ALTERNATIVE 5
2.1.1 Existing Project Facilities 5
2.1.2 Current Project Boundary 8
2.1.3 Project Safety 8
2.1.4 Current Project Operation and Environmental Measures 9
2.2 PROPOSED ACTION 10
2.3 STAFF ALTERNATIVE 12
2.4 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS 14
3.0 ENVIRONMENTAL ANALYSIS 14
3.1 GENERAL DESCRIPTION OF THE RIVER BASIN 15
3.2 SCOPE OF CUMULATIVE EFFECTS ANALYSIS 16
3.3 PROPOSED ACTION AND ACTION ALTERNATIVES 16
3.3.1 Geology and Soils 16
3.3.2 Aquatic Resources 18
3.3.3 Terrestrial Resources 38
3.3.4 Threatened and Endangered Species 44
3.3.5 Land Use, Recreation, and Aesthetics 45
3.3.6 Cultural Resources 50

3.4 NO-ACTION ALTERNATIVE 57
4.0 DEVELOPMENTAL ANALYSIS 57
5.0 CONCLUSIONS AND RECOMMENDATIONS 58
5.1 COMPREHENSIVE DEVELOPMENT AND RECOMMENDED ALTERNATIVE 58
5.1.1 Measures Proposed by the Applicant 59
5.1.2 Additional Measures Recommended by Staff 60
5.1.3 Conclusion 62
5.2 UNAVOIDABLE ADVERSE EFFECTS 62
5.3 FISH AND WILDLIFE AGENCY RECOMMENDATIONS 62
5.4 CONSISTENCY WITH COMPREHENSIVE PLANS 63
6.0 FINDING OF NO SIGNIFICANT IMPACT 63
7.0 LITERATURE CITED 63
8.0 LIST OF PREPARERS 63

APPENDIX A – Glossary of Terms
APPENDIX B – Figures
APPENDIX C – Tables
APPENDIX D – Statutory and Regulatory Requirements
APPENDIX E – Biological Assessment
APPENDIX F – Alternatives Considered but Eliminated from Detailed Analysis
APPENDIX G – Developmental Resources
APPENDIX H – Costs of Environmental Measures
APPENDIX I – Comprehensive Development
APPENDIX J – Fish and Wildlife Agency Section 10(j) Recommendations
APPENDIX K – Comprehensive Plans
APPENDIX L – Literature Cited
APPENDIX M – List of Preparers

LIST OF FIGURES

Figure 1. Location of the White River Project in the White River Basin 2
Figure 2. White River Project boundary and facilities 7
Figure B-1. Location of Kakagon Sloughs National Natural Landmark B-1
Figure B-2. Average annual discharge from 1949 through 2023 at USGS gage 04027500 located in the tailrace..... B-2
Figure B-3. Hourly DO and water temperature upstream of the project B-3
Figure B-4. Hourly DO and water temperature downstream of the powerhouse B-3
Figure B-5. FWS range boundary for northern long-eared bat in the project vicinity B-4
Figure B-6. FWS range boundary for tricolored bat in the project vicinity B-5

LIST OF TABLES

Table C-1. River flows (in cubic feet per second) by month for the White River Project based on USGS Gage No. 04027500, on the White River near Ashland, Wisconsin, from 1948 through 2021 ..... C-1
Table C-2. Daily maximum temperatures for Class II trout streams C-2
Table C-3. Fish species located in the White River during the fisheries survey conducted in May through September 2022 ..... C-3
Table G-1. Parameters for the economic analysis of the White River Project G-1
Table G-2. Summary of the annual cost of alternative power and annual project cost for the three alternatives for the White River Project G-2
Table H-1. The cost of environmental measures considered in assessing the environmental effects of operating the White River Project H-1
Table J-1. Analysis of Interior's fish and wildlife recommendations for the White River Project J-1

ACRONYMS AND ABBREVIATIONS

Advisory Council	Advisory Council on Historic Preservation
APE	area of potential effects
Applicant	Northern States Power Company
Bad River Tribe	Bad River Band of the Lake Superior Tribe of Chippewa Indians
BITP/A	Wisconsin Department of Natural Resources' Broad Incidental Take Permit/Authorization
certification	water quality certification
C.F.R.	Code of Federal Regulations
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
EIA	U.S. Energy Information Administration
ESA	Endangered Species Act
°F	degrees Fahrenheit
fps	feet per second
FERC	Federal Energy Regulatory Commission
FPA	Federal Power Act
FWS	U.S. Fish and Wildlife Service
GLIFWC	Great Lakes Indian Fish and Wildlife Commission
HPMP	Historic Properties Management Plan
Interior	U.S. Department of the Interior
IPaC	Information for Planning and Consultation
kV	kilovolt
kW	kilowatt
mg/L	milligrams per Liter
MISO	Midcontinent Independent System Operator, Inc.
MRO	Midwest Reliability Organization
MWh	megawatt-hour
National Register	National Register of Historic Places
NEPA	National Environmental Policy Act of 1966
NERC	North American Electric Reliability Corporation
NHI	Wisconsin's Natural Heritage Inventory
NHPA	National Historic Preservation Act of 1966
NLEB	northern long-eared bat
NNL	National Natural Landmark
Northern States	Northern States Power Company
NRI	Nationwide Rivers Inventory
ORV	outstandingly remarkable value
PA	Programmatic Agreement
PAD	Pre-Application Document
Park Service	National Park Service
PM&E	Protection, Mitigation, and Enhancement

project	White River Hydroelectric Project
REA	Ready for Environmental Analysis
SD1	Scoping Document 1
TCB	tricolored bat
U.S.C.	United States Code
USGS	United States Geological Survey
White River Project	White River Hydroelectric Project
Wisconsin DOA	Wisconsin Department of Administration
Wisconsin DNR	Wisconsin Department of Natural Resources
Wisconsin SHPO	Wisconsin State Historic Preservation Officer

ENVIRONMENTAL ASSESSMENT

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Division of Hydropower Licensing
Washington, D.C.

White River Hydroelectric Project
FERC Project No. 2444-042 – Wisconsin

1.0 INTRODUCTION

1.1 APPLICATION

On July 21, 2023, Northern States Power Company (Northern States) filed an application with the Federal Energy Regulatory Commission (Commission or FERC) for a subsequent license to continue to operate and maintain the White River Hydroelectric Project No. 2444 (White River Project or project).[1] The 1,200-kilowatt (kW) project is located on the White River in Ashland and Bayfield Counties, Wisconsin (Figure 1).

1.2 PURPOSE OF ACTION AND NEED FOR POWER

1.2.1 Purpose of Action

The purpose of the 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 to Northern States for the 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 will 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 of, 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. Issuing a subsequent license for the project would allow Northern States to continue to generate electricity at the project for the term of the license, making electric power from a renewable resource available to the regional electric grid.

[1] The Commission issued the current license for the project on August 29, 1995, for a term of 30 years, with an effective date of August 1, 1995, and an expiration date of July 31, 2025. *See Northern States Power Company*, 72 FERC ¶ 62,182 (1995).

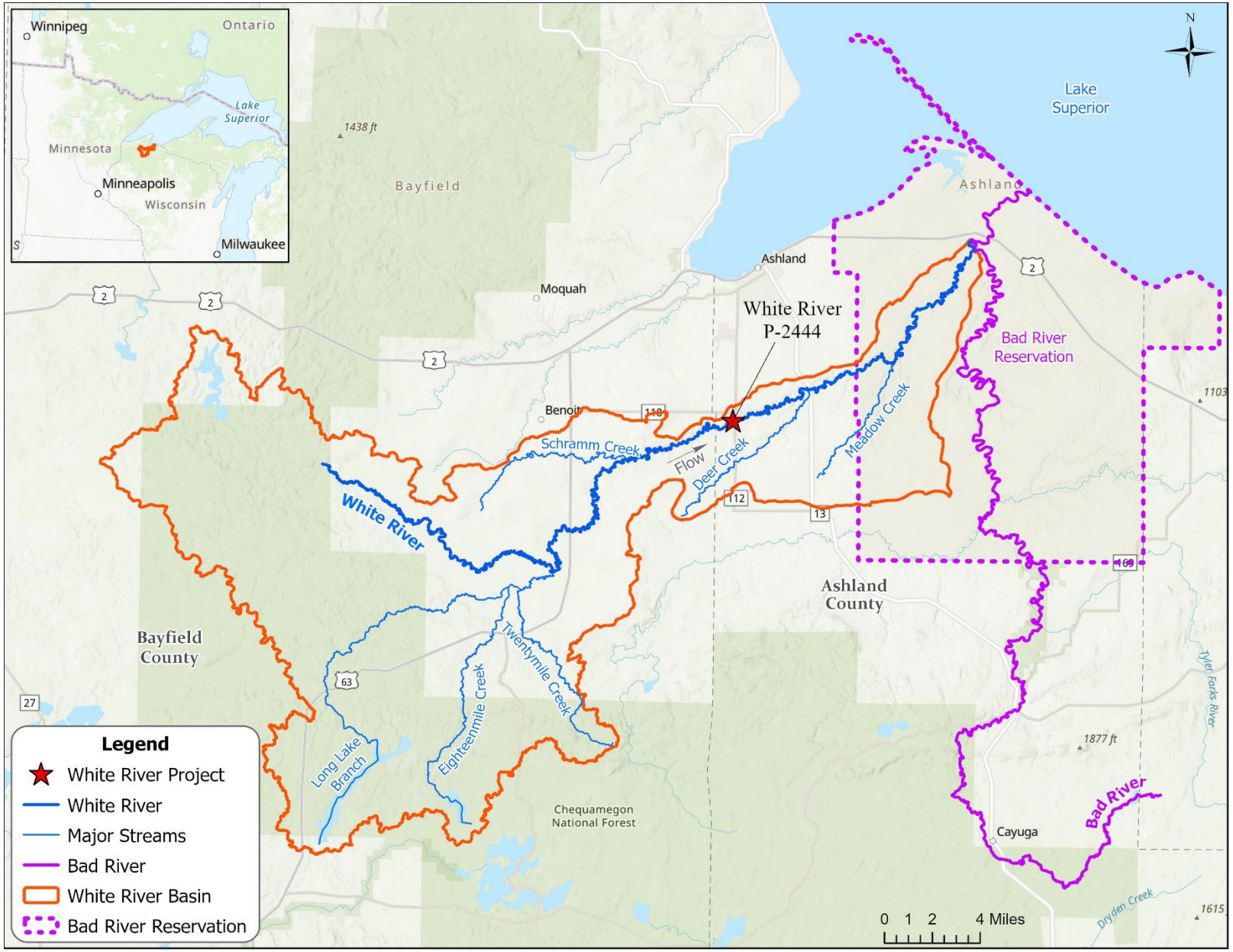

Figure 1. Location of the White River Project in the White River Basin(Source: Staff).

We prepared this environmental assessment (EA) in compliance with the requirements of the National Environmental Policy Act of 1969 (NEPA)[2] and the Commission's implementing regulations.[3] This EA assesses the environmental and economic effects associated with continued operation of the project and alternatives to the proposed project. It includes recommendations to the Commission on whether to issue a subsequent license, and if so, recommends terms and conditions to become a part of any license issued.

In this EA, we assess the environmental and economic effects of: (1) no action (No-Action Alternative); (2) operating and maintaining the project as proposed by Northern States (Proposed Action); and (3) operating and maintaining the project as proposed by Northern States, with additional and modified measures recommended by Commission staff (Staff Alternative). Under the No-Action Alternative, the project would continue to operate as it does under the current license, and no new environmental protection, mitigation, or enhancement (PM&E) measures would be implemented. The primary issues associated with relicensing the project are the effects of relicensing the project on aquatic, terrestrial, recreational, and cultural resources, and federally listed threatened and endangered species.

1.2.2 Need for Power

The project provides hydroelectric generation to meet part of the State of Wisconsin's power, resource diversity, and capacity needs. The project has an installed capacity of 1,200 kW and an average annual energy production of 4,927 megawatt-hours (MWh) from 2017 to 2022.

To assess the need for power, we looked at the needs in the operating region in which the project is located. Power produced at the project is used to support demand in the Midcontinent Independent System Operator, Inc. (MISO) assessment area of the Midwest Reliability Organization (MRO) region. MRO is a regional electric reliability council in the North American Electric Reliability Corporation (NERC). NERC annually forecasts electrical supply and demand in the nation and region for a 10-year period. According to NERC's 2024 Long-Term Reliability Assessment for the period 2025-2034, the annual total internal demand in the MISO assessment area is expected to increase from 122,328 MW in 2025 to 131,952 MW in 2034 (NERC, 2024). According to NERC, the MISO assessment area is classified as an "elevated risk" for the period 2025-2028, shifting to "high risk" for the period 2028–2031, depending on new resource additions/retirements (NERC, 2025).

If relicensed, power from the project would continue to help meet a need for power in the MISO assessment area in both the short and long-term.

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[2] National Environmental Policy Act of 1969, amended (Pub. L. 91-190. 42 U.S.C. §§ 4321–4347, as amended by Pub. L. 94-52, July 3, 1975, Pub. L. 94-83, August 9, 1975, Pub. L. 97-258, §4(b), September 13, 1982, Pub. L. 118-5, June 3, 2023). For tracking purposes under NEPA, the unique identification number for documents relating to this environmental review is EAXX-019-20-000-1725362410.

[3] 18 C.F.R. pt. 380.

1.3 STATUTORY AND REGULATORY REQUIREMENTS

Any 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 in Appendix D, *Statutory and Regulatory Requirements*.

1.4 PUBLIC REVIEW AND COMMENT

The Commission's regulations (18 C.F.R. § 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.), Endangered Species Act (ESA) (16 U.S.C. § 1536), National Historic Preservation Act (NHPA) (54 U.S.C. § 306108), 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, Commission staff conducted scoping to determine what issues and alternatives should be addressed for the project's proposed relicensing. Scoping Document 1 (SD1) was distributed to interested agencies, Tribes, and others on November 13, 2023. On that same day, the Commission issued a notice setting June 12, 2023, as the deadline for filing comments on SD1. The notice was published in the *Federal Register* on November 20, 2023.[4] The National Park Service (Park Service), Wisconsin Department of Natural Resources (Wisconsin DNR), Bad River Band of the Lake Superior Tribe of Chippewa Indians (Bad River Tribe), and Bureau of Indian Affairs filed comments on December 12, 13, 14, and 21, 2023, respectively. The comments did not require changes to SD1. Commission staff issued a letter on April 22, 2024, stating that a Scoping Document 2 was not warranted.

1.4.2 Interventions

On June 14, 2024, the Commission issued a notice accepting the license application and setting August 13, 2024, as the deadline for filing protests and motions to intervene. The notice was published in the *Federal Register* on June 24, 2024.[5] The U.S. Department of the Interior (Interior) filed a notice of intervention on August 8, 2024.[6] Wisconsin DNR and Bad River Tribe filed motions to intervene on August 13, 2024.[7] None of the intervenors oppose the project.

[4] 88 Fed. Reg. 80,713-80,714 (November 20, 2023).

[5] 89 Fed. Reg. 52,456-52,457 (June 24, 2024).

[6] Under Rule 214(a)(2) of the Commission's Rules of Practice and Procedure, Interior became a party to the proceeding upon the timely filing of its notice of intervention. 18 C.F.R. § 385.214(a)(2).

[7] Timely, unopposed motions to intervene are granted by operation of Rule 214(c) of the Commission's Rules of Practice and Procedure. 18 C.F.R. § 385.214(c).

1.4.3 Comments on the Application

On June 14, 2024, the Commission issued a ready for environmental analysis (REA) notice setting August 13, 2024, as the deadline for filing comments, recommendations, terms, conditions, and fishway prescriptions. The notice also established a deadline of September 27, 2024, for filing reply comments. The notice was published in the *Federal Register* on June 24, 2024.[8] On July 25, 2024, and August 13, 2024, Interior filed comments and recommendations under sections 10(a) and 10(j) of the FPA, and preliminary fishway prescriptions under section 18 of the FPA. The Bad River Tribe filed comments on August 13, 2024. Wisconsin DNR filed comments on August 14, 2024. Northern States filed reply comments on August 30 and September 26, 2024.

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 current license, and no new PM&E measures would be implemented. We use this alternative to establish baseline environmental conditions for comparison with other alternatives, and to compare the benefits and costs of any measures that might be required under any subsequent license issued.

2.1.1 Existing Project Facilities

The project includes an approximately 782-foot-long, 46-foot-high dam that includes the following sections: (1) a 400-foot-long north earthen embankment; (2) a 22-foot-long concrete intake structure equipped with a 16-foot-long trashrack with 1.25-inch clear bar spacing and a 16-foot-long stoplog gate; (3) an approximately 60-foot-long concrete section that includes two 25-foot-long bays with Tainter gates that have sill elevations of 685.17 feet[9] and crest elevations of 711.7 feet; and (4) a 300-foot-long south earthen embankment.[10]

The dam creates an impoundment that has a surface area of 39.9 acres and a gross storage capacity of 297 acre-feet at an elevation of 711.6 feet, which is the normal maximum surface elevation of the impoundment. From the impoundment, water flows through the intake structure to a 7-foot-diameter, 1,345-foot-long concrete pipe that conveys water to a 16-foot-diameter, 62-foot-high steel surge tank and two 30-foot-long steel penstocks. The penstocks provide water to a 69-foot-long, 39-foot-wide powerhouse that contains 700-kW and 500-kW horizontal Francis turbine-generator units, for a total installed capacity of 1,200 kW. Water is discharged from the

[8] 89 Fed. Reg. 52,456-52,457.

[9] All elevations discussed in the EA are referenced to a vertical datum of National Geodetic Vertical Datum of 1929.

[10] A non-project road, Wisconsin State Highway 112, crosses over the dam.

powerhouse to a 120-foot-long, 40-foot-wide tailrace. The project creates an approximately 1,400-foot-long bypassed reach of the White River. A 4.5-foot-long, 1-foot-diameter steel pipe (minimum flow pipe) conveys minimum flows from the intake structure to the bypassed reach, immediately downstream of the dam.

The project generators are connected to the regional electric grid by a 220-foot-long, 2.4-kilovolt (kV) underground transmission line and a 2.4/69-kV step-up transformer that is located in a non-project substation.

Project recreation facilities include: (1) a trailer and hand-carry boat access site on the shoreline of the north embankment of the dam that includes a concrete boat ramp (impoundment access site); (2) a parking area for four vehicles with boat trailers adjacent to the impoundment access site; (3) an approximately 2,260-foot-long hand-carry boat portage route; (4) a portage put-in site approximately 90 feet downstream of the powerhouse; (5) a tailrace fishing area at the powerhouse; and (6) a parking area for 10 vehicles adjacent to the put-in site and tailrace fishing area.

The project facilities are shown in Figure 2.

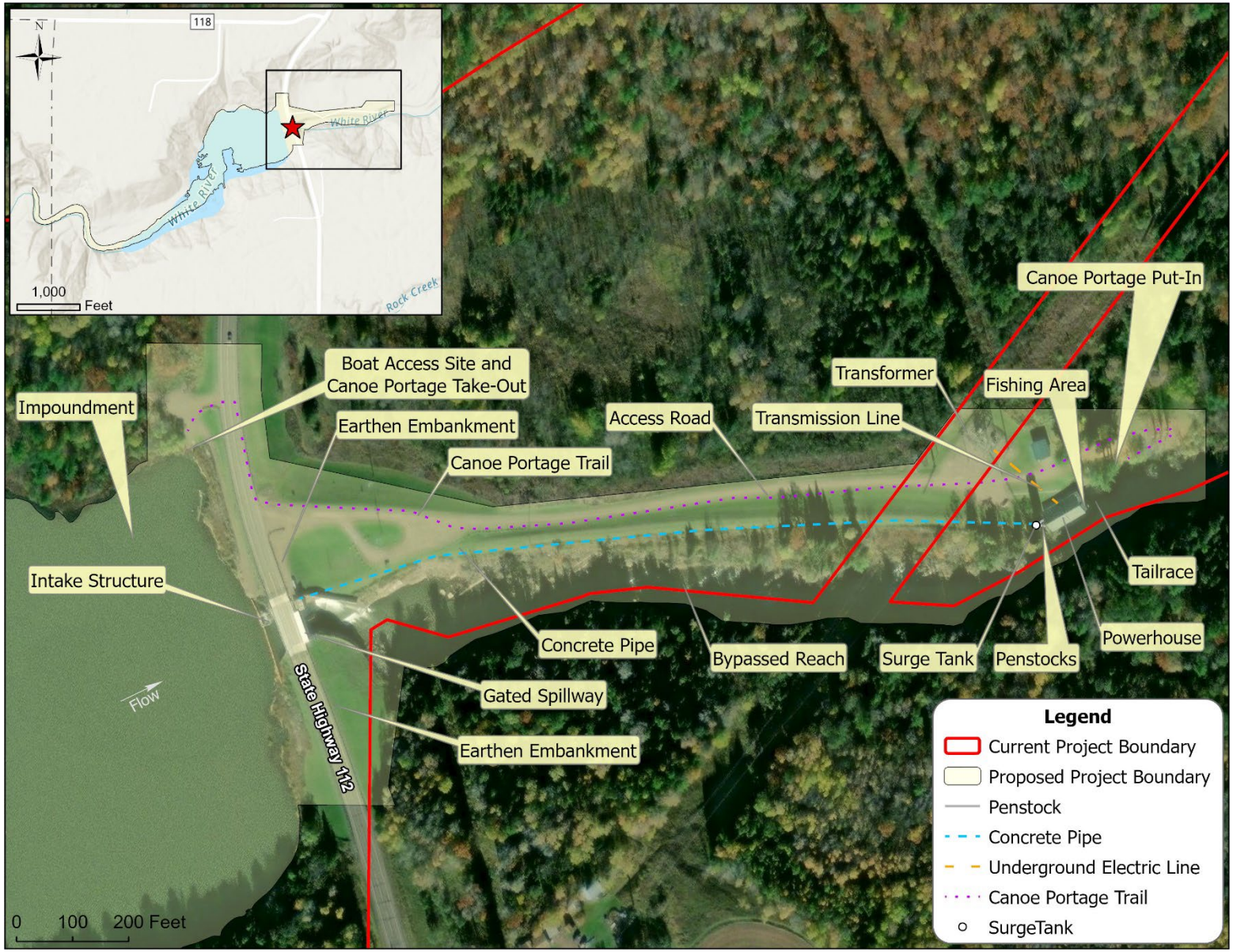

Figure 2. White River Project boundary and facilities(Source: Staff).

2.1.2 Current Project Boundary

The Exhibit G approved on August 29, 1995,[11] includes a project boundary that encloses approximately 125.1 acres, including: (1) 39.8 acres of the 39.9-acre impoundment;[12] (2) 9.1 acres of land underlying most of the project facilities;[13] (3) 0.2 acre of the 0.3-acre tailrace; (4) 29.7 acres of land adjacent to the impoundment; (5) 34.5 acres of land north of the project's access road; (6) 10.6 acres of land northeast of the powerhouse; and (7) 1.2 acres of the bypassed reach.[14] As shown in Figure 2, the current project boundary is split into two parts by a non-project transmission line.

2.1.3 Project Safety

The project has been operating for more than 29 years under its current license. During this time, Commission staff 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 relicensing 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 would 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.

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[11] *See Northern States Power Company*, 72 FERC ¶ 62,182 at Ordering Paragraph (C) (1995).

[12] Section 11.2 of Exhibit E filed on December 14, 2023, states that Northern States remapped the project boundary using Light Detection and Ranging (i.e., LiDAR) elevation data with an accuracy of ± 0.13 foot, which revealed that the upper limit of the current project boundary does not extend far enough upstream to encompass all areas inundated by the impounding effects of the dam at the normal maximum impoundment elevation of 711.6 feet. The upper extent of the 39.9-acre impoundment that is formed at the elevation of 711.6 feet extends approximately 100 feet outside of the upstream limit of the current project boundary.

[13] The current project boundary does not enclose: (1) an approximately 50-foot-long portion of the transmission line and the transformer; (2) an approximately 50-foot-long portion of the 1,345-foot-long concrete pipe; and (3) an approximately 50-foot-long portion of the 2,260-foot-long canoe portage trail.

[14] Section 11.4 of Exhibit E of the application states that the current project boundary includes 2.9 acres associated with the bypassed reach. Based on a review of the Exhibit G map approved on August 29, 1995, and aerial photographs, staff concludes that the current project boundary includes approximately 1.2 acres of the bypassed reach. The current project boundary bisects the bypassed reach and the White River downstream of the tailrace.

2.1.4 Current Project Operation and Environmental Measures

The current license requires Northern States to operate the project in a run-of-river mode, such that outflow from the project approximates inflow to the impoundment to protect aquatic resources in the White River,[15] and the surface elevation of the impoundment is maintained between 710.4 and 711.6 feet.[16] In addition, the current license requires a maximum impoundment drawdown rate, during non-emergency drawdowns, of 12 inches per 24 hours for the first 48 hours and 6 inches per 24 hours after that.[17]

The current license requires a minimum flow release of 16 cubic feet per second (cfs) or inflow, whichever is less, to the bypassed reach at all times, to protect aquatic resources.[18] Northern States releases the 16-cfs minimum flow to the bypassed reach through the 4.5-foot-long, 1-foot-diameter pipe at the intake structure.

The current license requires Northern States to implement: (1) a Reservoir Operating Plan to ensure compliance with run-of-river operation;[19] (2) a Fly Ash/Cinders Monitoring Plan to ensure that cinders used to seal the spillway gates do not introduce significant levels of contaminants to the White River;[20] (3) a Purple Loosestrife Management Plan to monitor and control purple loosestrife in project waters;[21] and (4) a Land Management Plan that includes restrictions on land management and timber harvest within the project boundary.[22]

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[15] *Northern States Company – Wisconsin*, 72 FERC ¶ 62,182, at Article 401 (1995).

[16] *Northern States Company – Wisconsin*, 102 FERC ¶ 62,163, at ordering paragraph A (2003).

[17] *Northern States Company – Wisconsin*, 72 FERC ¶ 62,182, at Article 402 (1995).

[18] *Northern States Company – Wisconsin*, 78 FERC ¶ 61,120, at ordering paragraph B (1997).

[19] *Northern States Company – Wisconsin*, 102 FERC ¶ 62,163, at ordering paragraph A (2003).

[20] *Northern States Company – Wisconsin*, 84 FERC ¶ 62,288, at ordering paragraph A (1998).

[21] *Northern States Company – Wisconsin*, 79 FERC ¶ 62,061, at ordering paragraph A (1997).

[22] *Northern States Company – Wisconsin*, 80 FERC ¶ 62,170, at ordering paragraph A (1997).

The minimum and maximum hydraulic capacities of the powerhouse are 50 and 350 cfs, respectively.[23] When inflow is less than 66 cfs (i.e., the 50-cfs minimum hydraulic capacity of the powerhouse plus the 16-cfs minimum flow), Northern States releases 16 cfs to the bypassed reach through the minimum flow pipe and releases the remaining flow through the Tainter gates. When inflow is between 66 and 366 cfs (i.e., the 350-cfs maximum hydraulic capacity of the powerhouse plus the 16-cfs minimum flow), Northern States operates the two turbine-generator units up to their maximum hydraulic capacities and releases 16 cfs to the bypassed reach through the minimum flow pipe. When inflow exceeds 366 cfs, Northern States operates the two turbine-generators at their maximum hydraulic capacities, releases 16 cfs to the bypassed reach through the minimum flow pipe, and releases the remaining flow to the bypassed reach through the Tainter gates.

2.2 PROPOSED ACTION

Northern States proposes the following measures for relicensing the project.

Project Facilities

- Continue maintaining the existing project facilities listed above in section 2.1.1.

Project Boundary

- Modify the current project boundary to include the following land and water, which would decrease the acreage enclosed by the project boundary from 125.1 to 52.7 acres: (1) a 39.9-acre impoundment at the normal maximum surface elevation of 711.6 feet, including the addition of 0.1 acre of water; (2) 10.1 acres of land underlying the project facilities, including the addition of 0.3 acre associated with the south earthen embankment, 0.3 acre associated with the transmission line and transformer, and 0.6 acre associated with the access road and concrete pipe that conveys water from the dam to the surge tank; (3) 2.4 acres of the bypassed reach, which would add 1.2 acres of water associated with the bypassed reach;[24] and (4) 0.3 acre of the tailrace, which would add 0.1 acre of water associated with the tailrace.

- Modify the current project boundary by removing 29.7 acres of land adjacent to the impoundment, 34.5 acres of land north of the project's access road, and 10.6 acres of land northeast of the powerhouse.

[23] The minimum and maximum hydraulic capacities of the 500-kW turbine-generator unit are 50 and 150 cfs, respectively. The 700-kW turbine-generator unit is only capable of operating at the maximum hydraulic capacity of 200 cfs and does not have the ability to ramp up or down when operating.

[24] Section 11.4 of Exhibit E of the application states that Northern States is proposing to include 2.4 acres of the bypassed reach in the project boundary, which is 1.2 acres more than the 1.2 acres in the current project boundary.

Project Operation and Environmental Measures

- Conduct shoreline erosion surveys within the project boundary every 10 years and file a report with the Commission, Tribes, and resource agencies that includes the results of the erosion survey and recommendations on whether mitigation of any erosion sites is warranted.

- To protect aquatic resources, continue operating the project in a run-of-river mode such that outflow from the project approximates inflow to the impoundment at any given time and the surface elevation of the impoundment is maintained between 710.4 and 711.6 feet.

- To protect aquatic resources, continue releasing a minimum flow of 16 cfs or inflow, whichever is less, from the minimum flow pipe to the bypassed reach.

- Notify the Commission, resource agencies, and the Bad River Tribe of planned and unplanned deviations (e.g., impoundment drawdowns), and only modify project operation for short periods of time of up to 3 weeks, after mutual agreement with the U.S. Fish and Wildlife Service (FWS), Wisconsin DNR, and the Bad River Tribe.

- Develop an operation compliance monitoring plan to document compliance with the operational requirements of any license, including the following provisions: (1) locations of headwater monitoring gages; (2) frequency of monitoring; (3) procedures for maintaining and calibrating monitoring equipment; (4) standard operating procedures to be implemented outside of normal operating conditions, such as scheduled or emergency facility shutdowns or maintenance activities; (5) schedule for installing and operating the monitoring equipment, including a staff gage that displays the normal operating range of the impoundment (i.e., 710.4 to 711.6 feet); and (6) procedures to remove ice from the spillway as a planned deviation.

- Continue using cinders to seal the spillway gates.

- Remove trash and woody debris from the trashrack and dispose of it in an upland location outside of the White River.

- Continue to maintain the existing invasive species sign at the impoundment access site to inform boaters on how to prevent the spread of invasive species at the project.

- To help prevent the introduction and spread of invasive species, develop an invasive species monitoring plan that includes a provision for conducting invasive species surveys every other year.

- Continue to implement the Land Management Plan.

- To protect bald eagles at the project, review the Wisconsin Natural Heritage Inventory (NHI) to determine the location of bald eagle nests and avoid vegetation management and construction activities within 660 feet of any bald eagle nests during the nesting season.

- To protect the northern long-eared bat (NLEB) and tricolored bat (TCB), implement the Wisconsin DNR's Broad Incidental Take Permit and Broad Incidental Take Authorization (BITP/A) for Wisconsin Cave Bats, filed as Appendix E-23 of the application.[25]

- To protect the wood turtle, implement the Wisconsin DNR's BITP/A for wood turtles, filed as Appendix E-24 of the application.

- Continue to maintain the existing project recreation facilities.

- To improve recreation safety and access, update recreation signage to comply with Part 8 of the Commission's regulations at the impoundment access site and portage route, for a total of two signs.

- Develop an historic properties management plan (HPMP) in consultation with the Wisconsin State Historic Preservation Officer (Wisconsin SHPO), Bad River Tribe, and other interested Tribes, to protect historic properties that are eligible for or listed on the National Register of Historic Places (National Register).

2.3 STAFF ALTERNATIVE

Under the Staff Alternative, the project would be operated as proposed by Northern States, except for the following measures because, pursuant to sections 4(e) and 10(a) of the FPA, the benefits of these measures do not justify the costs or the conditions are for actions that would not address a project-related effect or provide a project-related benefit: (1) conducting shoreline erosion surveys; (2) developing an invasive species monitoring plan; (3) implement the Wisconsin DNR's BITP/A for Wisconsin Cave Bats; and (4) developing an HPMP. The Staff Alternative includes the following staff-recommended measures and modifications.

Project Boundary

- Modify the proposed project boundary to not include 2.4 acres of water associated with the bypassed reach.

[25] Northern States indicates that it currently implements and would continue to implement guidance from the FWS to protect NLEB, but Northern States does not identify any specific FWS guidance or measures.

Project Operation and Environmental Measures

- To protect aquatic resources, implement an impoundment refill procedure following planned and unplanned drawdowns, whereby 90% of inflow is passed downstream and 10% of inflow is used to refill the impoundment (90/10 refill procedure).

- Modify the proposed operation compliance monitoring plan to include the following measures: (1) a detailed description of how Northern States will maintain, monitor, and document compliance with run-of-river operation, impoundment elevation limits, and minimum bypassed reach flows, including: (a) the monitoring and recording frequency for each gage and/or measuring device; and (b) a provision to maintain a log of project operation; (2) a description of the gages and other measuring devices that will be used to monitor compliance with license requirements, including the locations of the measuring devices; (3) a description of the procedures for maintaining and calibrating monitoring equipment; (4) a description of standard operating procedures to be implemented outside of normal operating conditions, including during: (a) scheduled facility shutdowns and maintenance, including ice removal from the spillway; and (b) emergency conditions such as unscheduled facility shutdowns and maintenance; and (5) a schedule for installing any monitoring equipment needed to document compliance with the operational requirements of the license, including a staff gage that displays the normal operating range of the impoundment (i.e., 710.4 to 711.6 feet).

- To protect aquatic resources from heavy metal contamination when using cinders to seal the spillway gates, continue implementing the Fly Ash/Cinders Monitoring Plan and file contaminant testing results for any new sources of cinders with the Commission for review at least 90 days prior to using the new cinders, including documentation of consultation with FWS, Wisconsin DNR, the Bad River Tribe, and the Great Lakes Indian Fish and Wildlife Commission (GLIFWC).

- To protect aquatic resources, develop a debris management plan with the following provisions: (1) methods, procedures, and schedules for collecting trash and debris that accumulate on the project trashrack; (2) a provision to dispose of trash and debris at suitable facilities or locations other than the White River, during normal operating conditions; (3) a description of operating conditions where debris sluicing is necessary for project safety; (4) standard operating procedures to be implemented in the event debris cannot be safely removed and debris sluicing is necessary, including consultation with the Bad River Tribe, FWS, and Wisconsin DNR prior to any debris sluicing, including the need for any protection measures during debris sluicing; and (5) file a report with the Commission, Bad River Tribe, and resource agencies no later than 14 calendar days after any debris sluicing, including the reason why debris sluicing was necessary, any comments from the Tribe or resource agencies, documentation of any observed or reported environmental effects, and where applicable, a description of measures implemented to prevent debris sluicing in the future.

- To protect wood turtles, restrict grading on gravel access roads and parking areas during the wood turtle nesting season (May 20 through September 18).

- Implement the following measures to protect bald eagles that occur in the project boundary: (1) prior to clearing trees within the project boundary, survey the area to be cleared for bald eagle nests; and (2) if such nests are discovered, then: (a) consult with Interior and Wisconsin DNR on measures to be implemented prior to tree-clearing activities, if any; and (b) perform tree-clearing activities in accordance with FWS's National Bald Eagle Management Guidelines (FWS, 2007), including avoiding any tree clearing within 660 feet of any known eagle nests, as proposed by Northern States, and any ground-disturbing activities within 0.25 mile of any known eagle nests during the nesting season (December 1 through August 31).

- To protect previously unidentified cultural resources that are discovered during project operation, maintenance, or other project-related work involving land-disturbing activities, stop all land-clearing and land-disturbing activities in the vicinity of the resources and consult with the Wisconsin SHPO, Bad River Tribe, and other interested Tribes, to determine the need for any cultural resource studies or measures.

- To protect cultural resources from any project modifications not specifically authorized by any subsequent license, consult with the Wisconsin SHPO, Bad River Tribe, and other interested Tribes, prior to implementing such project modifications, to determine the effects of the activities and the need for any cultural resource studies or measures.

2.4 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

Certain alternatives to Northern States' proposal were considered but eliminated from further analysis because they are not reasonable in this case. These alternatives are presented in Appendix F, *Alternatives Considered but Eliminated from Detailed Analysis*.

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 recommended environmental measures.[26] Sections are organized by resource area (aquatics, terrestrial, recreation, etc.), with historic and current conditions described first. Current conditions are the baseline against which the environmental effects of the Proposed Action and alternatives are compared. Staff conclusions and recommendations are discussed in section 5.1,

[26] Appendix A, *Glossary of Terms*, includes definitions of selected terms relating to the project, environment, and our analysis.

Comprehensive Development and Recommended Alternative, and in Appendix I, *Comprehensive Development.*[27]

3.1 GENERAL DESCRIPTION OF THE RIVER BASIN

The White River Project is located on the White River in Ashland and Bayfield Counties, Wisconsin, approximately 23.5 river miles upstream of the confluence of the White River and the Bad River. The White River Basin encompasses approximately 334.6 square miles of mostly forested land in northern Wisconsin. The White River originates from a series of lakes near the town of Delta, Wisconsin. From its origin, the White River flows east/northeast for approximately 66.9 miles to its confluence with the Bad River. From the confluence with the White River, the Bad River flows approximately 5.3 miles before reaching Lake Superior. The drainage area at the project is approximately 269.3 square miles.

The Chequamegon-Nicolet National Forest occupies over 1.5 million acres in northern Wisconsin, including portions of the White River Basin near the headwaters of the White River. The Bad River Tribe's reservation is in northern Wisconsin and includes portions of Ashland and Iron Counties. The 124,459-acre reservation is approximately 5 miles east and downstream of the White River Project. The Kakagon and Bad River Sloughs wetland complex, a 16,000-acre coastal wetland that includes the 2,850-acre Kakagon Sloughs National Natural Landmark (NNL), is within the boundary of the reservation, approximately 25 miles downstream of the project (Figure B-1). The Nationwide Rivers Inventory (NRI) includes a 43-mile-long segment of the White River that stretches from the headwaters of the White River in Bayfield County downstream to the project dam. The NRI also includes a 51-mile-long segment of the Bad River from Mellen, Wisconsin to Lake Superior.

The project is located in the Superior Coastal Plain Ecological Landscape, which is a region of nearly flat but deeply dissected lake plain of glacial origin. The plain is characterized by till-covered hills of the Bayfield Peninsula and level plains that gently slope towards Lake Superior on both sides of the peninsula. Lands in the vicinity of the project are mostly forested, followed by agricultural lands and few developed areas.

The climate in the project area is characterized by warm summers and cold winters, with some variation due to lake effects cause by Lake Superior. The average monthly minimum temperature ranges from 1 degree Fahrenheit (°F) in January to 55 °F in July, and the average monthly maximum temperature ranges from 22 °F in January to 80 °F in July. The mean annual rainfall near the project is 30.8 inches and the mean annual snowfall is 107 inches.

[27] Unless otherwise noted, the sources of our information are the license application filed by Northern States on July 21, 2023, and additional information filed by Northern States on December 14, 2023, February 27, 2024, May 13, 2024, May 17, 2024, and June 7, 2024.

3.2 SCOPE OF CUMULATIVE EFFECTS ANALYSIS

A cumulative effect is the effect on the environment that results from the incremental effect of the action when added to the effects of other past, present, and reasonably foreseeable 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 time, including hydropower and other land and water development activities.

Based on Commission staff's review of the license application, as well as agency and public comments, staff did not identify any resources that would be cumulatively affected by the continued operation and maintenance of the project.

3.3 PROPOSED ACTION AND ACTION ALTERNATIVES

In this section, we discuss the effects of the Proposed Action and project alternatives on environmental resources. For each resource, we first describe the affected environment, which is the existing condition and baseline against which we measure effects. We then discuss and analyze the site-specific environmental issues.

Only the resources that have the potential to be affected are addressed in this EA. Based on this, we determined that geology and soils, aquatic resources, terrestrial resources, threatened and endangered species, land use, recreation and aesthetic resources, and cultural resources may be affected by the Proposed Action and action alternatives. We present our recommendations in section 5.1, *Comprehensive Development and Recommended Alternative*.

3.3.1 Geology and Soils

3.3.1.1 Affected Environment

The project is located within one of the deeply incised, large rivers on the Superior Coastal Plain. The White River has eroded through about 50 feet of red clay overburden and exposed sedimentary bedrock consisting of sandstone and shale at the project site. The dam and powerhouse are founded on bedrock. Bedrock downstream of the spillway consists of very hard sandstone. Visible bedrock along the lower portions of the right bank downstream from the dam is a layered sandstone overlying clayey sandstone (shale) bedrock. Apart from the White River dam, appurtenant facilities, and recreation sites, the reservoir shoreline is undeveloped and has a natural, vegetative buffer.

Odanah silt loam, Sanborg-Badriver complex, and Moquah fine sandy loam soils are the most prevalent soil series found in the project vicinity, with the most commonly identified soil classifications being Odanah silt loam soils, Sanborg-Badriver complex soils, and Moquah fine sandy loam-frequently flooded soils, in respective order of abundance. All three dominant soil types are moderately to well drained, have a moderate to high runoff potential for saturated and bare soils and low to moderate susceptibility to erosion.

In 2022, Northern States conducted an archaeological shoreline survey throughout the project area. Northern States inspected the entire shoreline for actively eroding sites and

determined that the impoundment shoreline is largely buffered by emergent vegetation of cattails and marsh grasses with woody shrubs dominating the west end of the reservoir. Downstream of the dam, Northern States observed that the riverbank includes exposed bedrock or is heavily wooded and stable. Small areas of erosion (bank undercutting) and exposed bedrock were documented at a few points along the south shoreline of the impoundment and riverbank downstream of the dam. Northern States did not identify any actively eroding sites during the survey.

3.3.1.2 Environmental Effects

Northern States proposes to continue operating the project in a run-of-river mode and maintaining the surface elevation of the impoundment between 710.4 and 711.6 feet. Northern States proposes to conduct shoreline erosion surveys within the project boundary every 10 years during the term of any license issued by the Commission; review the status of previously identified erosion sites; develop a report that would include erosion mitigation measures, if warranted; and submit the report to the Commission, the Bad River Tribe, FWS, and Wisconsin DNR.

Our Analysis

Northern States currently operates the project in a run-of-river mode and maintains the surface elevation of the impoundment between 710.4 and 711.6 feet, which minimizes the degree of water level fluctuations in the impoundment and, in turn, minimizes project effects on shoreline erosion. The erosion identified during the archaeological shoreline survey is likely caused by wind-driven wave action, erodible soils, and loss of vegetation due to natural causes (e.g., flooding, ice), not project operation.

There is an abundance of riparian and littoral vegetation along the impoundment shoreline and riverbank and no indication that the existing erosion is adversely affecting the environment, such as aquatic, terrestrial, or cultural resources. Riparian and littoral vegetation along the impoundment shoreline would continue to maintain stable soils and protect the shoreline from any erosion associated with natural events, such as flooding and freezing.

Northern States is not proposing any land-disturbing activities, construction, or modifications to project facilities or operation that would adversely affect geology and soil resources. Continuing to operate the project in a run-of-river mode would continue to minimize erosion of the impoundment shoreline and riverbank downstream of the dam by reducing the exposure of these areas to periodic inundation and dewatering. Maintaining the impoundment between 710.4 and 711.6 feet, as proposed, would continue to minimize shoreline erosion associated with impoundment fluctuations.

Northern States' proposal to survey the shoreline and mitigate erosion could reduce the extent of erosion at the project. However, the proposal would not likely significantly benefit environmental resources at the project because the erosion only occurs in limited areas and the majority of the shoreline is heavily vegetated.

3.3.2 Aquatic Resources

3.3.2.1 Affected Environment

Water Quantity and Quality

The primary uses of the White River are hydroelectric power generation, animal habitat, and recreation. There are no known surface water withdrawals or point source discharges within the project boundary or in the vicinity of the project. The median monthly flows at the project range from 180 cfs in January to 427 cfs in April (Table C-1). Based on the Unites States Geological Survey (USGS) record,[28] flows equal or exceed 366 cfs approximately 15% of the year and equal or exceed 66 cfs most of the time. USGS flow records from 1949 through 2023, show that the mean annual flow was 282 cfs with no discernable long-term change in flow over this period (Figure B-2).

Wisconsin classifies the White River at the project as an Exceptional Resource Water (Wisconsin DNR, n.d.), coldwater community, and Class II trout stream. Wisconsin's water quality standards at the project include: (1) dissolved oxygen (DO) must be greater than or equal to 6.0 milligrams per liter (mg/L) at any time and greater than or equal to 7.0 mg/L during the spawning season from September 15 through May 15; and (2) the daily maximum water temperature must be no greater than 68 °F to 73 °F depending on the month (Table C-2).

Northern States conducted a *Water Quality Monitoring Study*[29] and recorded hourly DO measurements in a riverine section of the upper impoundment from July 13 to September 3, 2022, and downstream of the powerhouse from July 13 to July 29 and August 17 to September 28, 2022. DO concentrations were equal to or greater than 7.0 mg/L upstream and downstream of the dam (Figures B-3 and B-4). Northern States collected hourly temperature data at the upstream riverine site from May 18 through September 1, 2022, and downstream of the powerhouse from May 18 to October 11, 2022. Average water temperature from May 18 through September 1, 2022, downstream of the powerhouse was only 0.7 °F higher than the average water temperature upstream of the powerhouse (Figures B-3 and B-4). Water temperatures were occasionally greater than the daily maxima for a Class II trout stream, including at the upstream riverine site from June through August. Discrete water quality sampling showed that DO concentrations were at or above 7.0 mg/L and water temperatures were less than the daily maxima for a Class II trout stream from May through October 2022.

Aquatic Habitat and Resources

The impoundment shoreline is 2.27 miles long, heavily vegetated with trees and buffered by emergent vegetation including cattails, marsh grasses, and wild rice. The average depth of the

[28] USGS Gage No. 04027500 is located on the White River near Ashland, Wisconsin, immediately downstream of the powerhouse.

[29] *See* Northern States' July 21, 2023, Final License Application at Volume 3, Appendix E-10, *White River Water Quality Monitoring Study Report*.

impoundment is 7 feet, and the substrate is dominated by clay and silt.[30] In 2022, Northern States surveyed the bypassed reach and a 1,320-foot-reach downstream of the powerhouse to characterize habitats and describe the local riverine fish community in the White River.[31] The bypassed reach has an average wetted width of 58 feet and thalweg depth of 2 feet during the minimum flow release of 16 cfs.[32] Habitat downstream of the dam and powerhouse includes various mesohabitats (i.e., riffles, runs, and pools) while substrate in the bypassed reach is primarily bedrock and substrate downstream of the powerhouse consists of bedrock, boulder, cobble, and gravel. Northern States also qualitatively assessed habitats in the bypassed and downstream reaches following Wisconsin DNR (2002) methods to score riverine fish habitat based on bank stability, depth, riffle frequency, rocky substrate, and fish cover. The bypassed reach and the reach downstream of the powerhouse both scored as "good" with numerical scores of 61 and 77, respectively.

The White River supports a diverse assemblage of fish upstream and downstream of the project dam. In 2015, Wisconsin DNR conducted fyke net surveys in the impoundment, and shorthead redhorse, white sucker, bluegill, and northern pike accounted for over 91% of the total catch. Brown trout, bass and other sunfish, and yellow perch are present but less common in the impoundment. As part of the *Fisheries and Riverine Habitat Assessment*, Northern States conducted electrofishing surveys in the bypassed reach and downstream of the powerhouse in May, July, and September 2022 (one sampling event per season). Northern States collected a total of 2,389 fish representing 26 species. Abundant species included cyprinids, shorthead redhorse, longnose dace, trout-perch, hornyhead chub, and smallmouth bass (Table C-3). Northern States collected brown trout in one or both reaches throughout the study and collected a single rainbow trout in the bypassed reach in September 2022.

Lake sturgeon are listed as a species of special concern in Wisconsin. Adult lake sturgeon move from Lake Superior to the Bad and White Rivers to spawn between mid-April and mid-May. In the White River, lake sturgeon spawn approximately 0.3 to 1.0 mile downstream of the powerhouse (Schloesser and Quinlan, 2010). Annual spawning run size estimates from 2001 to 2017 indicate that the Bad River population is stable or slightly increasing. In 2016, spawning adults totaled 739 and 241 individuals in the Bad and White Rivers, respectively, and the total population size was estimated at more than 2,300 adults. The Bad River population is the largest population within a tributary to Lake Superior and is one of only 2 populations considered to be self-sustaining throughout Lake Superior (Schloesser and

[30] *See* Northern States' July 21, 2023, Final License Application at Volume 3, Appendix E-6, *White River Aquatic and Terrestrial Invasive Species Study Report*.

[31] *See* Northern States' July 21, 2023, Final License Application at Volume 3, Appendix E-16, *Fisheries and Riverine Habitat Assessment Study Report.*

[32] Total flow in the bypassed reach was approximately 20 cfs and included 4 cfs leakage flow through the spillway gates.

Quinlan, 2019; Schloesser et al., 2025). Historically, the presence of a waterfall at the current site of the project dam likely blocked the movement of lake sturgeon upstream of this point.

On June 21, 2022, Northern States conducted visual surveys via diving for freshwater mussels in a riverine reach in the upper impoundment and downstream of the powerhouse.[33] Northern States did not detect any mussels or shells in either reach. During an 8-foot drawdown of the impoundment in the fall of 2022, Northern States conducted mussel surveys throughout the impoundment and collected a total of 204 live cylindrical papershell mussels.

3.3.2.2 Environmental Effects

Mode of Operation

Northern States proposes to continue operating the project in a run-of-river mode, such that outflow from the project approximates inflow to the impoundment at any given time and the surface elevation of the impoundment is maintained between 710.4 and 711.6 feet. Interior recommends, under section 10(j), that the project continue to operate in a run-of-river mode.

The Bad River Tribe states that the project area is expected to see, and is already experiencing, increases in unpredictable severe precipitation events and greater fluctuations in water levels and temperature, and that modifications to project operation and maintenance might need to be made to protect water quality and uses downstream of the project.

Our Analysis

The operation of hydropower projects in a run-of-river mode generally provides a more stable upstream and downstream environment than other modes of operation. For example, compared to peaking projects and storage projects, run-of-river operation minimizes the degree of water level fluctuations and associated erosion and temperature fluctuations in impoundment surface waters (due to shorter water residence times), and results in a downstream flow regime that is more similar in magnitude and timing to natural river flows.

As discussed in section 3.3.2.1, *Water Quantity and Quality*, Northern states observed DO concentrations in the summer of 2022 that were adequate to sustain aquatic life, including trout species. Average water temperatures were higher downstream of the powerhouse relative to the upstream section of the impoundment; however, the slight warming that occurred in the impoundment was insignificant and would not affect habitat suitability for trout and other aquatic organisms relative to the upstream riverine reach. Continuing run-of-river operation would minimize the length of time water is retained in the impoundment and minimize the project's effects on water temperatures in the impoundment, which would continue to benefit water quality, fish, and benthic macroinvertebrates.

[33] *See* Northern States' July 21, 2023, Final License Application at Volume 3, Appendix E-17, *Freshwater Mussel Study for the White River Hydroelectric Project.*

The project's run-of-river operation also maintains stable impoundment elevations that protect fish spawning areas from becoming dewatered and limits project-related erosion along the impoundment shoreline. By continuing to operate the project in a run-of-river mode as proposed, habitat in the impoundment and in the White River downstream of the project would remain unchanged from current conditions for aquatic organisms, including fish, mussels, and macroinvertebrates. Therefore, continuing to operate in run-of-river mode would minimize the effects of project operation on water quantity and water quality in the impoundment and downstream of the project to the greatest extent possible.

As for the Bad River Tribe's comments on modifying project operation and maintenance due to changes in flow and water temperature, the USGS records for the White River discussed above in section 3.3.2.1, *Water Quantity and Quality*, show that the mean annual flow has not changed significantly since recordkeeping began in the late 1940s (Figure B-2). This suggests that there is no ongoing long-term effect, including changing precipitation conditions, on the mean annual flow in the White River. Continuing to operate the project in run-of-river mode would minimize any project effects on water levels and temperature in the White River downstream of the project.

Minimum Flow Releases

Northern States proposes to continue releasing a minimum flow of 16 cfs or inflow, whichever is less, from the minimum flow pipe to the bypassed reach.

Our Analysis

As described in section 3.3.1.1, *Aquatic Habitat and Resources*, the project's bypassed reach includes diverse mesohabitats and a diverse assemblage of fish. Maintaining the current minimum flow of 16 cfs as proposed would not change current habitat conditions in the bypassed reach and would continue to protect aquatic species.

Impoundment Drawdown and Refill

The current license requires a maximum impoundment drawdown rate, during non-emergency drawdowns, of 12 inches per 24 hours for the first 48 hours and 6 inches per 24 hours after that. Northern States is not proposing any impoundment drawdowns during the term of any subsequent license but proposes to: (1) notify the Commission, resource agencies, and the Bad River Tribe of any planned and unplanned deviations, including impoundment drawdowns; and (2) only modify project operation for short periods of time, of up to 3 weeks, after mutual agreement with the FWS, Wisconsin DNR, and the Bad River Tribe. For planned deviations exceeding 3 weeks, Northern States intends to file, for Commission approval, an application for a temporary amendment of license.

Interior recommends that Northern States consult with Tribes on impoundment drawdowns and to schedule drawdowns so as not to harm downstream wild rice populations. The Bad River Tribe recommends that Northern States consult with the Tribe on maintenance activities that fall outside of normal run-of river operation, including impoundment drawdowns.

Our Analysis

Impoundment drawdowns for maintenance and emergencies can be brief or last for several weeks (or more) and can involve a rapid dewatering of the impoundment. Dewatering aquatic habitat during a drawdown can impact the breeding, feeding, and sheltering of aquatic organisms. Freshwater mussels, given their limited mobility, may be particularly vulnerable to water level drawdowns that exceed their ability to move and can result in stranding, desiccation, and mortality. Drawdowns can also mobilize sediment in an impoundment because water velocity and turbulence along the riverbed increases as water level decreases, thereby resuspending and transporting sediments downstream. Refill of a reservoir after a drawdown could also limit downstream flows, as inflow to the project would need to be stored for refill purposes. Accordingly, the procedures used to draw down and refill an impoundment can significantly affect aquatic habitat and organisms in the impoundment and downstream of the project.

Northern States occasionally conducts drawdowns for maintenance of project facilities (e.g., spillway gates). For example, in 2013, Northern States conducted a full drawdown of the impoundment to repair a spillway gate. Northern States initiated the drawdown on July 13 and reached its target elevation of 686 feet on July 30. After Northern States completed the repairs, it began refilling the impoundment on September 16 and returned to normal operation on October 31. During the drawdown, a significant rain event occurred resulting in a peak flow of 3,000 cfs (2- to 5-year flood) that transported approximately 97,000 cubic yards of sediment from the impoundment to downstream habitats in the White River. In 2022, Northern States conducted an 8-foot drawdown of the impoundment between August 31 and September 25. A small rain event occurred during the 2022 drawdown, which increased turbidity downstream of the project, but no resource concerns were evident.[34] In both cases, Northern States consulted with the Wisconsin DNR and the Bad River Tribe prior to the planned drawdown and implemented environmental measures (e.g., stranded organism relocation, sediment and habitat assessments, turbidity monitoring) pursuant to temporary amendments issued by the Commission.[35]

The effects of any planned or unplanned drawdown on fish, mussels, wild rice, and other resources within and downstream of the impoundment depend on the seasonal timing, magnitude, duration, drawdown and refill rates, and flow releases downstream of the project. Northern States' proposal to only modify project operation for short periods of time, of up to 3 weeks, after mutual agreement with FWS, Wisconsin DNR, and the Bad River Tribe and file an application for a temporary amendment of license for planned deviations exceeding 3 weeks, is consistent with the procedures used during the 2013 and 2022 planned drawdowns described above. Obtaining agreement from the resource agencies and the Tribe on the timing prior to any planned drawdowns of up to 3 weeks would help protect aquatic resources, consistent with

[34] *See* Northern States' July 21, 2023, Final License Application at Volume 3, Appendix E-11, *White River 2022 Drawdown Monitoring Report.*

[35] *Northern States Company*, 144 FERC ¶ 62,063 (2013) and 180 FERC ¶ 61,096 (2022).

Interior's and the Tribe's recommendations. Also, filing reports following unplanned drawdowns, including documentation of any observed or reported environmental effects, a description of measures implemented to prevent similar deviations in the future, and any comments or correspondence received from the resource agencies and the Bad River Tribe, would help mitigate adverse effects after drawdowns. Interior does not specify any particular period when wild rice populations downstream of the project are particularly vulnerable to effects of a drawdown, but protection measures (e.g., timing of a drawdown) could be considered during consultation for any planned drawdown.

Northern States does not propose any procedures for refilling the impoundment after planned or unplanned drawdowns. Retaining all inflow to refill the impoundment after an impoundment drawdown would adversely affect aquatic resources by dewatering aquatic habitat in the bypassed and downstream reaches, potentially stranding fish, mussels, and other aquatic organisms. On the other hand, releasing all flows to the downstream reach would adversely affect aquatic life in the impoundment by sustaining dewatered conditions. Implementing an impoundment refill procedure following planned and unplanned impoundment drawdowns, whereby the impoundment is refilled by passing approximately 90% of the inflow downstream and retaining the remaining 10% of inflow to refill the impoundment (90/10 refill procedure), would protect aquatic resources in the impoundment and downstream reach by ensuring that flows downstream of the project are kept near project inflow levels and that the impoundment is refilled in a timely manner following drawdowns. Minimizing the length of time that the impoundment is drawn down and that flows are reduced downstream of the project, would help maintain the existing aquatic habitat for fish and other aquatic species. If there is a need for a planned deviation from the 90/10 refill procedure, Northern States could follow the proposed notification and consultation procedures for planned deviations discussed above, including obtaining agreement from the resource agencies and the Tribe prior to the deviation.

Operation Compliance Monitoring

The current license requires Northern States to implement a Reservoir Operating Plan to describe and monitor compliance with run-of-river operation, including: (1) maintaining the impoundment operating range of 710.4 to 711.6 feet; (2) maintaining a staff gage in the impoundment; and (3) providing operating records (generation, impoundment elevation, and powerhouse discharge data) to Wisconsin DNR and FWS upon request. Northern States proposes to develop an operation compliance monitoring plan, in consultation with Wisconsin DNR and the Bad River Tribe, to document compliance with the operational requirements of any license, including the following provisions: (1) locations of headwater monitoring gages; (2) frequency of monitoring; (3) procedures for maintaining and calibrating monitoring equipment; (4) standard operating procedures to be implemented outside of normal operating conditions, such as scheduled or emergency facility shutdowns or maintenance activities; (5) schedule for installing and operating the monitoring equipment; and (6) procedures to remove ice from the spillway as a planned deviation. Northern States also proposes to notify the Commission, resource agencies, and the Bad River Tribe of planned and unplanned deviations, and only modify project operation for short periods of time of up to 3 weeks, after mutual agreement with FWS, Wisconsin DNR, and the Bad River Tribe.

Interior recommends, under section 10(j), that Northern States develop an operation compliance monitoring plan that includes the following provisions: (1) mechanisms for documenting inflow and outflow from the project; (2) installation of staff gages that show the operating band of the impoundment; (3) installation of automatic water level recorders for impoundment and tailrace elevations; and (4) recording daily turbine operation, impoundment and tailrace elevations, and flow releases through the powerhouse and spillway. In its comments, Wisconsin DNR states that its Clean Water Act section 401(a)(1) water quality certification (certification) may include an operations plan. The Bad River Tribe recommends that Northern States develop an operation compliance monitoring plan in consultation with the Tribe.

In its reply comments, Northern States states that it would update or replace the staff gage in the impoundment so that the staff gage displays the water elevations required by any license issued.

Our Analysis

Although compliance measures do not directly affect environmental resources, they do assist the Commission with verifying that a licensee is complying with the environmental requirements of a license. An operation compliance monitoring plan would help Northern States document compliance with the operational requirements of any license for the project and provide a mechanism for reporting deviations. It would also help the Commission verify that the project is operating in run-of-river mode; maintaining the impoundment elevation between 710.4 and 711.6 feet; and releasing a minimum of 16 cfs into the bypassed reach, thereby facilitating administration of the license and avoiding misunderstandings.

Interior's recommendation to document inflow and outflow from the project would provide a mechanism for ensuring compliance with run-of-river operation. However, Northern States currently maintains a probe in the impoundment that continuously monitors and records the water surface elevation, as recommended by Interior, and automatically adjusts flow releases from the powerhouse and spillway gates to maintain a consistent impoundment elevation and run-of-river operation. To help ensure compliance with the operational requirements of any subsequent license, the operation compliance monitoring plan could include a detailed description of how Northern States will maintain, monitor, and document compliance with run-of-river operation, impoundment elevation limits, and minimum bypassed reach flows, including (1) the monitoring and recording frequency for each gage and/or measuring device, and (2) a provision to maintain a log of project operation.

As recommended by Interior, Northern States proposes to continue monitoring water levels in the impoundment to verify run-of-river operation and to update the current staff gage or install a new staff gage that displays the normal operating range of the impoundment (i.e., 710.4 and 711.6 feet). The operation compliance monitoring plan could include: (1) a description of the gages and other measuring devices that will be used to monitor compliance with license requirements, including the locations of the measuring devices; and (2) a schedule for installing any monitoring equipment needed to document compliance with the operational requirements of

the license, including a staff gage that displays the normal operating range of the impoundment (i.e., 710.4 to 711.6 feet).

As to Interior's recommendation to install an automatic water level recorder for tailrace elevations, USGS gage no. 04027500 is in the tailrace immediately downstream of the powerhouse and provides continuous flow and water elevation data. Northern States documents flow immediately downstream of the powerhouse through the USGS gage. Because a USGS gage is already located in the tailrace and there is no indication that USGS would discontinue maintenance of the gage during the term of any subsequent license, there would be no compliance benefit associated with installing a gage to monitor tailrace elevations. Further, Interior's recommendation to record daily turbine operation, tailrace elevations, and outflows at the project would not result in benefits beyond those provided by monitoring the impoundment elevation and USGS gage as discussed above.

Northern States' proposal to develop the operation compliance monitoring plan in consultation with the Wisconsin DNR and the Bad River Tribe is consistent with the Bad River Tribe's recommendation. Wisconsin DNR's comment about an operations plan does not include any specific measures. An operation compliance monitoring plan that includes the measures proposed by Northern States and the additional measures specified above, would provide a mechanism for reporting deviations to the Tribe, resource agencies, and the Commission; facilitate the Commission's administration of the license; and ensure that all operational requirements for the protection of environmental resources at and downstream of the project are being met. Altogether, the operation compliance monitoring plan would include the following provisions: (1) a detailed description of how Northern States will maintain, monitor, and document compliance with run-of-river operation, impoundment elevation limits, and minimum bypassed reach flows, including: (a) the monitoring and recording frequency for each gage and/or measuring device; and (b) a provision to maintain a log of project operation; (2) a description of the gages and other measuring devices that will be used to monitor compliance with license requirements, including the locations of the measuring devices; (3) a description of the procedures for maintaining and calibrating monitoring equipment; (4) a description of standard operating procedures to be implemented outside of normal operating conditions, including during: (a) scheduled facility shutdowns and maintenance, including ice removal from the spillway; and (b) emergency conditions such as unscheduled facility shutdowns and maintenance; and (5) a schedule for installing any monitoring equipment needed to document compliance with the operational requirements of the license, including a staff gage that displays the normal operating range of the impoundment (i.e., 710.4 to 711.6 feet).

Effects on NRI Segments and Kakagon Sloughs

Interior recommends that Commission staff evaluate the potential project effects on the White River and Bad River NRI segments and Kakagon Sloughs and identify ways to avoid and mitigate impacts to the NRI segments and the Kakagon Sloughs NNL.

Our Analysis

Approximately 1.1 miles of the White River NRI segment occurs in the project impoundment. Therefore, project operation has the potential to affect approximately 1.1 miles of the White River NRI segment. As discussed above in *Mode of Operation*, continuing to operate the project in run-of-river mode would maintain stable impoundment elevations and minimize erosion along the impoundment shoreline. Therefore, normal project operation would not affect the flow, water quality, or ORVs (outstandingly remarkable values) associated with the White River NRI segment.

The Bad River NRI segment is located approximately 23.5 miles downstream of the project and the Kakagon and Bad River Sloughs wetland complex (e.g., the Bad River Slough), including a small area of the Kakagon Sloughs NNL, overlaps a short reach of the Bad River approximately 2.5 miles downstream of the confluence of the White and Bad Rivers (Figure B-1). As discussed above in *Mode of Operation*, continuing to operate the project in run-of-river mode would minimize the effects of project operation on water quantity and quality downstream of the project to the greatest extent possible. Therefore, normal project operation would not affect the flow, water quality, or ORVs associated with the Black River NRI segment and would not affect the Kakagon Sloughs NNL.

Project maintenance and emergencies could result in deviations from normal project operation, including planned and unplanned drawdowns and subsequent refills of the impoundment as discussed above in *Impoundment Drawdown and Refill*, which could temporarily affect flow/water levels, sediment transport, and turbidity within the NRI segments and the sloughs downstream of the project. An extreme example occurred when the 2013 drawdown coincided with a significant rain event that increased flow to 3,000 cfs (2- to 5-year flood). These abnormal conditions temporarily altered flow/water levels and likely increased turbidity and sedimentation in the Bad River NRI segment and downstream sloughs. As discussed in *Impoundment Drawdown and Refill*, the effect of any planned or unplanned drawdown on aquatic resources depends on the seasonal timing, magnitude, duration, drawdown and refill rates, and flow releases downstream of the project. Northern States' proposal to only modify project operation for short periods of time of up to 3 weeks after mutual agreement with the resource agencies and the Tribe and to file an application for a temporary amendment of the license for planned deviations exceeding 3 weeks, would help protect aquatic resources at and downstream of the project, including the NRI segments and downstream sloughs. Also, filing reports following unplanned deviations, including documentation of any observed or reported environmental effects, a description of measures implemented to prevent similar deviations in the future, and any comments or correspondence received from the resource agencies and the Tribe, as proposed, would help mitigate adverse effects after drawdowns. Finally, implementing a 90/10 refill procedure would minimize project effects on the NRI segments and downstream sloughs because it would ensure that flows downstream of the project are kept near project inflow levels and that the impoundment is refilled in a timely manner following drawdowns.

Interior's recommendation to identify ways to avoid and mitigate impacts to the NRI segments does not identify any specific measures. Without specific measures to analyze and consider under the FPA, staff cannot assess the benefits of this recommendation. As discussed

above, continuing to operate the project in a run-of-river mode as proposed would ensure that effects of the project on the NRI segments and Kakagon Sloughs NNL would not change current conditions in the NRI segments or downstream sloughs.

Cinder Use

The current license requires Northern States to implement a Fly Ash/Cinders Monitoring Plan to ensure that cinders used to seal the spillway gates do not introduce significant levels of contaminants to the White River. The plan includes the following measures: (1) obtain three separate samples from the main cinder stockpile and combine the sample into a composite sample; (2) test the composite sample for heavy metals at a lab certified by the State of Wisconsin; (3) submit the results of the analysis to Wisconsin DNR, the Bad River Tribe, and the GLIFWC for review and comment; and (4) do not use cinders that contain any contaminants in concentrations that are known to be environmentally harmful and instead either use an alternative supply of cinders or an alternative to cindering to seal the gates. Northern States proposes to continue the use of cinders to seal the project's gated spillway as needed, typically during the winter months. However, Northern States does not specifically propose to continue implementing the Fly Ash/Cinders Monitoring Plan.

Interior recommends, under section 10(j), that the Commission prohibit the use of cinders to seal the spillway gates. The Bad River Tribe also recommends that Northern States discontinue the use of cinders to seal the project's gates.

Our Analysis

Cinders are a waste product of coal combustion that are commonly used as a sealant to stop leaks and prevent water loss through dam gates, limit erosion/damage to gates, and reduce ice buildup in the winter so that normal gate operation can be maintained. Article 403 of the current license required Northern States to develop a plan to monitor the cinders to ensure that the cinders do not introduce significant levels of contaminants to the White River, such as heavy metals. The Commission approved Northern States' proposed Fly Ash/Cinders Monitoring Plan in 1998, which concluded that the results of leachate testing showed that the cinders used at the project are benign and do not pose water quality problems. The plan required Northern States to test cinders whenever a new source is obtained, in order to prevent harmful materials from entering the waterway.

In its comments, the Bad River Tribe indicates that Northern States' leachate testing shows that the current sources of cinders exceed the acute toxicity for zinc in some rivers in Wisconsin. The Bad River Tribe also states that Northern States did not conduct contaminant testing in the White River and did not test cinders for per- and poly-fluoroalkyls (PFAS). On June 7, 2024, Northern States filed its chemical analyses of the cinders that it is currently using. Northern States tested its sources of cinders used to seal the dam gates and determined these sources of cinders have very low levels of various heavy metal contaminants with low leachability, such as zinc. Although Northern States did not specifically test for contaminants in the White River, Northern States conducted leachate testing for 8 rivers and collected water samples after cindering dam gates for 5 rivers. The combination of these testing results shows

that the small amount of cinders used at various locations had no significant impact on water quality. Further, the current sources of cinders are a product of coal combustion and do not likely contain PFAS, which are synthetic compounds and do not naturally occur in the environment. Based on Northern States' testing results, Wisconsin DNR has approved the use of cinders at the project since at least 2007 through a Low Hazard Waste Grant of Exemption. Wisconsin DNR's current conditions for using cinders at the project requires periodic testing, minimizing cinder use, documentation of cinder utilization, documentation of hydraulic flows, and an annual report.[36]

The use of cinders to seal gates is a common practice at more than 20 of Northern States' projects in Wisconsin, including the White River Project. The current sources of cinders used at the project have low levels of contaminants and there is no information that indicates the continued use of these cinders would significantly affect water quality or aquatic resources downstream of the project. On the other hand, prohibiting/discontinuing the use of cinders at the project, as recommended by Interior and the Bad River Tribe, could affect Northern States' ability to maintain the operational integrity of the gates.

Continuing to implement the Fly Ash/Cinders Monitoring Plan during the term of any subsequent license would protect aquatic resources and the public by ensuring that cinders used to seal the spillway gates do not introduce significant levels of contaminants to the White River. Filing the contaminant testing results for any new sources of cinders with the Commission for review at least 90 days prior to using the new cinders, including documentation of consultation with FWS, Wisconsin DNR, the Bad River Tribe, and GLIFWC, would allow the Commission to verify that the new cinders do not contain contaminants in concentrations that are known to be environmentally harmful.

Water Quality

Interior recommends, under section 10(j), that Northern States monitor DO and water temperature downstream of the dam in sturgeon spawning areas every two weeks between March 15 to May 15 throughout the term of any license issued. In its comments, Wisconsin DNR states that its certification may require a water quality plan.

Our Analysis

DO is required at an adequate concentration to sustain aquatic resources. Operating a dam on a riverine system has the potential to affect water temperature and DO concentrations by increasing the residence time of water in an impoundment and exposing water at the surface to the heat of the sun. Low flow conditions can result in low DO concentrations that can be

[36] *See* Enclosures 1, 2, and 3 of Northern States' June 7, 2024, Response to Additional Information Request, for Wisconsin DNR's exemption, chemical analyses of cinders, and the 2023 annual cinder report, respectively.

harmful to fish and other aquatic resources, especially during the summer months when warmer water has less capacity to absorb oxygen.

As discussed in section 3.3.2.1, *Water Quantity and Quality*, the results of the 2022 water quality study show that DO concentrations upstream and downstream of the dam were at or above 7.0 mg/L, which is adequate to sustain aquatic life. In addition, water temperatures did not significantly differ between the riverine reach in the upper impoundment and downstream of the dam. Continuing run-of-river operation would minimize the length of time water is retained in the impoundment and maintain DO and temperature conditions that sustain aquatic life and protect fish downstream of the project.

The impoundment is subjected to cycles of solar heating and discrete measurements of temperature near the water surface indicate that some warming occurs in shallow waters of the impoundment. However, thermal and chemical stratification of the impoundment is not likely because run-of-river operation minimizes the residence time of water in the project's small, shallow impoundment to about 1 day.

Lake sturgeon are not riverine residents but are known to spawn downstream of the powerhouse from April 11 through May 19 (Schloesser and Quinlan, 2019). Larval sturgeon could be present in the White River from late April through mid-June based on the time that larvae typically enter the drift after spawning (13 to 24 days) (Smith and King, 2005). Optimal growth of sturgeon larvae occurs at DO concentrations greater than 7.5 mg/L (Kerr et al., 2011), while juvenile and adult sturgeon are tolerant of lower DO concentrations (~ 4.0 mg/L; Altenritter et al., 2013; Damstra and Galarowicz, 2013). Northern States did not collect continuous DO data earlier than July 13, but DO concentration would be greater than 7.5 mg/L during the lake sturgeon spawning and larval development period, based on the DO concentrations observed in September when water temperatures were similar to those observed in May (Figure B-4). Therefore, operation of the project would continue to provide water temperatures and DO concentrations that would support all life stages of lake sturgeon.

Interior's recommendation to monitor DO and temperature downstream of the dam in sturgeon spawning areas between March 15 to May 15, could provide information about DO concentrations during the license term. However, the likelihood of any project-induced change in DO levels is low, because the project would continue to operate in a run-of-river mode. Continuing run-of-river operation as proposed by Northern States would continue to minimize the length of time water is retained in the impoundments and help avoid increasing water temperatures in the upper levels of the impoundments from solar heating, which would continue to benefit water quality, fish, and benthic macroinvertebrates. Finally, no stakeholders have provided any measures to enhance water quality and monitoring itself would not provide any benefits to water quality during the term of a license. Since run-of-river operation would continue to minimize project effects on water quality and monitoring itself would not enhance water quality, monitoring would not benefit lake sturgeon or other aquatic resources.

Wisconsin DNR does not identify any issues related to DO, temperature, or other water quality parameters, nor does Wisconsin DNR identify any specific measures or objectives associated with water quality. Without specific measures to analyze and consider under the FPA, staff cannot assess the benefits of a water quality plan. However, continuing to operate the

project in a run-of-river mode as proposed would ensure that water quality in the impoundment and downstream of the project is unchanged from current conditions and remains suitable for aquatic resources.

Fish Impingement and Entrainment

Northern States proposes to maintain the existing trashrack with 1.25-inch clear bar spacing at the intake. Interior recommends, under section 10(j), that Northern States replace the existing trashrack with a trashrack that has 1-inch clear bar spacing. Interior also recommends, under section 10(j), that Northern States maintain average intake velocities no greater than 2 feet per second (fps)[37] immediately upstream of the trashrack to protect fish from impingement and entrainment.

Our Analysis

As discussed in section 3.3.2.1, *Aquatic Habitat and Resources,* the White River in the project area supports a diverse fish community of at least 26 species. The impoundment supports at least 15 species dominated by shorthead redhorse, white sucker, bluegill, and northern pike. These species utilize a variety of lotic and lentic habitats available in the project impoundment and the upstream reach of the White River, and do not require downstream passage from the impoundment to complete their life history requirements. Although fish in the impoundment do not require downstream passage, fish could still encounter the project intake when foraging or seeking new habitat in the impoundment. Water intake structures can injure or kill fish that encounter intake screens/trashracks. At hydropower projects, fish that pass through the intake(s) are also subject to potential turbine injury/mortality.

Fish that are wider than the clear spacing between the trashrack bars, and/or have burst swim speeds lower than intake velocities can become trapped against intake screens or bars of a trashrack. This process is known as impingement and can cause physical stress, suffocation, and death of some organisms (EPRI, 2003). Entrainment into the intake structure occurs if fish are small enough to pass between trashrack bars but are (a) unable to overcome the intake velocity or (b) choose to pass downstream through the trashrack. If entrainment occurs, injury or mortality can result from collisions with turbine blades, exposure to pressure changes, shear forces in turbulent flows, or water velocity accelerations created by turbines (Rochester et. al., 1984). Fish that are entrained and killed are removed from the river population and no longer available for recruitment to the fishery.

The likelihood of a fish becoming impinged rather than entrained is a function of the spacing between the bars on an intake structure, as well as the size and body shape of fish. Staff examined the relationship between fish size and trashrack bar spacing to estimate the likelihood that a fish would be physically excluded by the current trashrack and Interior's recommended

[37] Interior's recommendation states that average intake velocities should be no greater than 2 cfs; however, staff assumes Interior intended to recommend average intake velocities no greater than 2 fps.

trashrack Staff used proportional measurements for shorthead redhorse, white sucker, bluegill, and northern pike as reported by Smith (1985) to estimate the length of fish that would be physically excluded by the trashrack.[38] The maximum length for these species in Wisconsin is approximately 22, 24, 12, and 50 inches, respectively (Wisconsin Sea Grant, 2025). Shorthead redhorse, white sucker, bluegill, and northern pike less than 9.6, 8.6, 9.4, and 16 inches, respectively, would be able to physically pass through the 1.25-inch spacing between the existing trashrack bars. Shorthead redhorse, white sucker, bluegill, and northern pike less than 7.7, 6.9, 7.5, and 12.8 inches, respectively, would be able to physically pass through the 1-inch spacing between the bars of Interior's recommended trashrack. Fish that are equal to or larger than the lengths specified above for each trashrack would be physically excluded from passing through the trashrack, but smaller fish would still be able to pass through the trashracks.

To assess the potential for impingement on the trashrack, Commission staff compared the intake velocity at the trashrack with burst swim speeds of fish that would be excluded from passing through the trashracks. The burst speeds for the size classes of shorthead redhorse, white sucker, bluegill, and northern pike that would be excluded from passing through the trashrack (either with a 1-inch or 1.25-inch bar spacing) are at least 2.7, 2.6, 3.6, and 3.1 fps, respectively.[39] Northern States calculated the maximum intake velocity at the project to be approximately 1.2 fps for the current trashrack. Staff estimates that the maximum intake velocity for Interior's recommended 1-inch trashrack would be 1.7 fps.[40] Based on the proportional measurements described above, all shorthead redhorse, white sucker, bluegill, and northern pike that are too large to pass through the 1-inch or 1.25-inch bar spacing have burst swim speeds that are higher than the intake velocities associated with either a 1-inch or 1.25-inch trashrack. Thus, none of these fish species are susceptible to impingement on the current trashrack or the trashrack recommended by Interior.

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[38] Staff used proportional measurements to calculate a scaling factor of body width to total length (scaling factor = width/total length), and then used the scaling factor to estimate the length that would be physically excluded by 1.25-inch and 1-inch trashracks. For shorthead redhorse, white sucker, bluegill, and northern pike, we used scaling factors of 0.130, 0.146, 0.133, and 0.078, respectively.

[39] Staff modeled the burst speed (97.5 percentile) for these species and size classes of fish using the Swim Speed & Swim Time Tool available at: https://fishprotectiontools.ca/index.html. Staff used white sucker as a surrogate species for shorthead redhorse.

[40] To estimate the flow velocity through Interior's recommended trashrack, Commission staff calculated the effective area in which flow could pass through the trashrack at the project. Specifically, staff accounted for the following parameters: (1) the effective intake width (10.4 feet), as calculated from (a) the clear spacing of the trashrack (1 inch) and (b) the number of bars necessary to span the 14.25-foot-wide-trashrack (124 bars at an average bar thickness of 0.375 inches); and (2) the trashrack height of 20 feet, installed at an angle of approximately 5 degrees from vertical. Staff calculated the velocity through the clear spaces of the trashrack at 350 cfs by dividing the maximum hydraulic discharge flow by the effective area of the trashrack (206.4 ft^2).

Fish that are physically able to pass through the spacing between the trashrack bar are likely to behaviorally avoid entrainment and could escape entrainment (Knapp et al., 1982). Fish are able to detect obstacles using stimuli such as flow acceleration, turbulence, and sound (Coutant and Whitney, 2000). As fish approach the intake and the trashrack, they sense flow acceleration near the trashrack and typically respond by swimming away from the intake at burst speed. However, some small size classes and small species of fish would be susceptible to entrainment because they could fit through the clear bar spacing of the trashrack and their burst speeds do not exceed the maximum intake velocity at the trashrack. For example, some small northern pike (3 inches or less) would have burst swimming speeds approximately equal to or less than the maximum intake velocity (1.2 fps) at the current 1.25-inch trashrack.[41] Slightly larger northern pike (5.3 inches or less) would have burst swimming speeds approximately equal to or less than the maximum intake velocity (1.7 fps) at Interior's recommended 1-inch trashrack. Accordingly, some larger size classes of fish could not avoid entrainment at a 1-inch trashrack relative to the current trashrack.

Winchell et al. (2000) describes the average composition of entrained fishes by size-class and compiled turbine entrainment survival data to evaluate trends in survival related to fish size, turbine type, rotational speed, and hydraulic capacity. Winchell et al. (2000) found that small fish (8 inches or less), make up over 90% of all entrained fish with very small fish (4 inches or less) accounting for 61% or more of all entrained fish regardless of trashrack spacing. The study found that projects with Francis turbines, such as those at the project,[42] have an average immediate entrainment survival rate of 60% for fish that are 4 to 8 inches long and a slightly higher average survival rate, 70%, for fish that are 4 inches or less.[43] Therefore, while some small fish within the impoundment may be susceptible to entrainment at the project, the survival of these fish is expected to be greater than 60% because small fish are less prone to mechanical injury from turbine passage than larger fish. Additionally, some fish would pass downstream of the dam through the minimum flow pipe and through the Tainter gates when spill occurs. No fish kills downstream of the powerhouse have been reported in the project record or noted by the resource agencies.

[41] The burst swimming speed of 97.5% of 2.95-inch northern pike is 1.15 fps based on the modeled estimates using the Swim Speed & Swim Time Tool.

[42] The project's powerhouse has two horizontal Francis turbine-generators, each with a maximum rotational speed of 450 revolutions per minute (rpm). Winchell et al. (2000) evaluated Francis turbines with hydraulic capacities of 275 to 695 cfs and rotational speeds of greater than 250 rpm.

[43] The maximum hydraulic capacities of Unit 1 (200 cfs) and Unit 2 (150 cfs) are less than the range evaluated in Winchell et al. 2000 (275 – 695 cfs), thus survival rate for fish passing through the turbines could be lower because the potential for blade-strike mortality is likely higher for the project's turbines relative to those evaluated in Winchell et al. 2000.

In summary, regardless of the trashrack spacing (1 inch or 1.25 inches), most fish species in the impoundment have burst swim speeds that exceed the intake velocity and would be able to behaviorally avoid becoming impinged or entrained at the project. Based on the low potential for entrainment and expected survival rate for any fish that are entrained through turbines or pass downstream through the minimum flow pipe and Tainter gates, continuing to operate the project with the 1.25-inch trashrack would continue to protect fish populations in the impoundment. While the 1-inch trashrack recommended by Interior would physically exclude some additional fish from entrainment, the intake velocity through a 1-inch trashrack would be 0.5 fps higher than the current trashrack and could increase entrainment of some fish that have burst swim speeds less than 1.7 fps. For these reasons, installing a new trashrack with 1-inch spacing would not significantly benefit resident fish population in the impoundment relative to the current trashrack.

Lake Sturgeon

Lake Sturgeon Passage and Habitat Enhancement

Interior recommends, under section 10(j), that Northern States "provide a means to facilitate the safe, timely, and effective upstream and downstream movement of lake sturgeon around project developments and take measures to create an environment where sturgeon thrive in the reach of the river below the project."

Our Analysis

Barriers to the upstream movement of sturgeon existed prior to the project's original licensing in 1966.[44] As discussed in section 3.3.2.1, *Aquatic Habitat and Resources*, the presence of a waterfall at the site of the project's dam likely blocked the upstream movement of lake sturgeon. As discussed in section 3.3.6.1, *Cultural Resources, Industrial History*, a dam was constructed to provide water for a mill in the 19th century (Batten and Hindall, 1980), and the hydroelectric dam replaced the mill dam in 1907 (Harrison, 1991). Therefore, the project dam does not affect access to upstream habitats relative to historic conditions and relicensing the project as proposed would not result in new barriers to upstream movement.

There is no information in the record to indicate that sturgeon move upstream in the White River to the project dam. Available literature indicates that sturgeon spawn downstream of the powerhouse and not in the 1,400-foot-long bypassed reach between the project's dam and powerhouse (Mattes and Nelson, 2001; Schloesser and Quinlan, 2010; Schloesser and Quinlan, 2019). Sturgeon likely select spawning habitats downstream of the powerhouse and do not pass upstream of natural bedrock ledges in the bypassed reach. Therefore, the project does not likely restrict the range of sturgeon and Interior's recommendation to provide a means to facilitate upstream and downstream movement of sturgeon around the project would not provide additional access to spawning habitat or otherwise benefit sturgeon. Accordingly, there is no foreseeable benefit to facilitating sturgeon passage upstream and downstream of the project.

[44] *Lake Superior District Power Company*, 35 FPC ¶ 671 (1966).

Interior's recommendation to create an environment where sturgeon thrive downstream of the project does not identify any specific measures. Without specific measures to analyze and consider under the FPA, staff cannot assess the benefits of this recommendation for sturgeon. However, suitable spawning habitat for sturgeon is present between 0.3 and 1 mile downstream of the powerhouse and the current sturgeon population is successfully spawning in this area. The sturgeon population is also in good condition, with long-term surveys showing a stable or slightly increasing number of sturgeons in the Bad River population (Schlosser and Quinlan, 2019). As discussed above in *Mode of Operation* and *Water Quality*, continuing to operate in run-of-river mode would minimize project effects on water quantity, water quality, and aquatic habitat downstream of the project to the greatest extent possible, which would continue to protect lake sturgeon in the White River. Continuing to operate in run-of-river mode would minimize project effects on flow and water temperature and protect the sturgeon spawning area downstream of the powerhouse.

Lake Sturgeon Management and Monitoring

Interior recommends, under section 10(j), that Northern States develop a sturgeon management plan to: (1) determine if any changes in operational/maintenance releases from the impoundment are needed prior to and during the typical sturgeon spawning season; and (2) describe details on managing the lake sturgeon population to ensure that the number and age classes of spawning sturgeon continue to increase. Interior also recommends that every 3 years, Northern States monitor the lake sturgeon population and assess how flows through the project affect sturgeon to ensure that the population is improving and retaining a viable reproductive population. The Bad River Tribe recommends that Northern States develop a monitoring plan for lake sturgeon and other fish of tribal significance to monitor key species that utilize the river within the project area.

Our Analysis

As discussed above in *Mode of Operation*, Northern States' proposal to continue run-of-river operation would provide stable downstream flow releases that are similar in magnitude and timing to natural river flows, which would minimize project effects on water quantity, water quality, and aquatic habitat downstream of the project to the greatest extent possible. Therefore, run-of-river operation would continue to protect sturgeon downstream of the powerhouse. Interior has not provided any specific information about how alternative flow releases or sturgeon monitoring/management would protect sturgeon from project effects.

Interior has not provided any specific information about how alternative flow releases or sturgeon monitoring/management would protect sturgeon from project effects. Also, monitoring itself would not provide any benefits to lake sturgeon or other fish. Therefore, staff does not have sufficient information to assess the benefits of developing a sturgeon management plan or a sturgeon monitoring plan as recommended by Interior and the Bad River Tribe, respectively.

Based on the long-term sturgeon monitoring information (Schloesser and Quinlan, 2019), the Bad River spawning population is in good condition, recruitment is high enough to maintain or slightly increase the population, and sturgeon successfully spawn downstream of the project.

Continuing to operate the project in run-of-river mode would ensure that conditions for lake sturgeon and other fish remain unchanged in the White River. Therefore, additional management and monitoring measures would not likely result in any project-related benefits for lake sturgeon or other fish.

Debris Management

Northern States proposes to remove trash and woody debris from the trashrack and dispose of woody debris in an upland location, unless debris cannot be removed safely. If woody debris cannot be removed from the river, Northern States proposes to sluice debris through the Tainter gates into the bypassed reach.

To protect sturgeon during spawning periods, Interior recommends, under section 10(j), that Northern States develop a debris management plan that includes measures for debris management, including but not limited to restrictions on the timing of debris sluicing and fluctuations in the water surface elevation downstream of the dam during debris sluicing. Interior states that passing woody debris downstream of the dam could cause log jams in the White River that would be detrimental to fish populations and create a flooding risk.

The Bad River Tribe states that there is an abundance of woody debris from natural sources in the White River and that woody debris can form large log jams downstream of the project that can negatively affect resources. The Bad River Tribe recommends a restriction on passing woody debris from the impoundment to the bypassed reach.

Our Analysis

If a trashrack is covered with debris, fish could become entangled in the debris or the intake velocity at the trashrack could increase as intake water is constricted to a smaller area, which could result in a greater amount of fish impingement or entrainment. Therefore, removing debris from the trashrack could reduce the risk of entanglement, impingement, and entrainment.

As described in section 3.3.3.1, *Affected Environment*, the project is located in a mostly forested area, including the impoundment shoreline and upstream and downstream of the dam, except for the areas that include the project facilities. As described in the *White River Aquatic and Terrestrial Invasive Species Study*, *Freshwater Mussel Study*, there is an abundance of large and small woody debris in the impoundment and downstream of the powerhouse. Northern States also documented large accumulations of woody debris at the project during floods in 2005, 2016, and 2018.[45] In its comment letter, the Bad River Tribe states that it observed a nearly 300-foot-long log jam in 2024, and 7 smaller log jams in 2022, along the White River within the boundary of its reservation. The Bad River Tribe also states that a large flood and

[45] *See* Northern States' November 7, 2005, letter regarding debris accumulation and management; January 6, 2017, Flood Incident Report; and July 3, 2018, Report of Pond Level Deviation.

associated debris damaged infrastructure and sensitive habitats downstream of the project in 2016.

Although passing woody debris downstream of a dam can increase habitat complexity in the downstream reach, there is already a large influx of woody vegetation from forested shorelines downstream of the project and there would be no substantial benefit associated with passing woody debris downstream of the project dam.

Northern States is proposing to only sluice woody debris through the Tainter gates if debris cannot be safely removed by project operators. Northern States does not identify the safety conditions that could require debris sluicing, but presumably, sluicing would be infrequent during the term of any subsequent license. However, when needed, debris sluicing could release large woody debris that could injure adult sturgeon and rapidly alter water levels and flows downstream of the dam, which could alter spawning behavior and injure eggs and juvenile sturgeon, if present. Sturgeon typically spawn between mid-April and mid-May in the White River (Schloesser and Quinlan, 2019), and sturgeon larvae could be present as late as mid-June depending on when sturgeon larvae enter the drift (Smith and King, 2005). Separately, debris sluicing could result in log jams as observed by Northern States and the Bad River Tribe, which could affect aquatic habitat, fish, and other aquatic organisms.

Interior's recommendation for a debris management plan does not include any specific measures, but developing a debris management plan with the following provisions would protect sturgeon and other aquatic resources: (1) methods, procedures, and schedules for collecting trash and debris that accumulate on the project trashrack; (2) a provision to dispose of trash and debris at suitable facilities or locations other than the White River, during normal operating conditions; (3) a description of operating conditions where debris sluicing is necessary for project safety; (4) standard operating procedures to be implemented in the event debris cannot be safely removed and debris sluicing is necessary, including consultation with the Bad River Tribe, FWS, and Wisconsin DNR prior to any debris sluicing, including the need for any protection measures during debris sluicing; and (5) file a report with the Commission, Bad River Tribe, and resource agencies no later than 14 calendar days after any debris sluicing, including the reason why debris sluicing was necessary, any comments from the Tribe or resource agencies, documentation of any observed or reported environmental effects, and where applicable, a description of measures implemented to prevent debris sluicing in the future.

Aquatic Invasive Species

Northern States proposes to continue maintaining the existing invasive species sign at the impoundment access site to inform boaters on how to prevent the spread of invasive species at the project.

Interior recommends, under section 10(j), that Northern States install signage to educate recreational users of the potential spread and impacts of invasive species, and install boat washing stations to prevent the spread of invasive species. Interior states that boat washing stations would remove invasive mollusk species that would otherwise be transported between the

project and other lakes/reservoirs. In its comments, Wisconsin DNR states that its certification may require an invasive species plan.

In its reply comments, Northern States states that current and proposed project operation would not contribute to the spread of invasive species and that a boat washing station would require a new well to provide a clean water source for boat washing.

Our Analysis

Northern States is not proposing any land-disturbing activities, construction, or modifications to project facilities or operation that would result in the introduction or spread of aquatic invasive species. The project provides water access for boating and other uses at the impoundment access site and the portage put-in site. If invasive species are present, recreational users can inadvertently spread invasive plants and animals that cling to boats, fishing equipment, or other gear. Northern States currently maintains a sign that informs users how to prevent the spread of invasive species at the impoundment access site.[46]

In 2022, Northern States conducted a survey for invasive aquatic plants and animals in the project impoundment and documented the presence of two invasive plants, narrowleaf cattail and aquatic forget-me-not. Water samples collected to determine the presence of zebra mussels, spiny water flea, and fishhook water flea, tested negative for the presence of these organisms. Sediment samples collected near the boat launch at the impoundment access site did not identify the presence of any invasive macroinvertebrates. Based on these results, no invasive mollusks occur at the project. Also, the results of annual purple loosestrife monitoring from 1998 through 2023 identified no purple loosestrife at the project.

Narrowleaf cattail and aquatic forget-me-not typically spread horizontally through rhizomes and stolons, respectively, and can form dense monocultures. Narrowleaf cattail and aquatic forget-me-not also produce large quantities of seeds that are easily dispersed via wind or flowing water, respectively. Both species are common and widely distributed in Wisconsin. Boaters and other users may encounter the seeds of these species and could transport them on boats or other gear. However, these species are common throughout Wisconsin and narrowleaf cattail already occurs downstream of the project throughout the Bad River Reservation (Bad River NRD, 2015). Little information regarding aquatic forget-me-not is available for Ashland County, but it is known to occur in Lake Superior (Craven, n.d.).

Considering the wide distribution of the aquatic invasive species known to occur at the project and their propensity to disperse naturally, the potential for project-related recreational use to spread these invasive species to a new area is very low and inconsequential. Some seeds of these plants could cling to boats, but seeds are much more likely to spread naturally via the wind or flowing water. Northern States' proposal to maintain the current invasive species sign at the

[46] *See* the Commission's *Environmental Inspection Report* issued on August 4, 2017, for a description of the current invasive species sign. Available at: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20170804-3043&optimized=false&sid=1385af24-4702-4edc-82f5-3d27a164d506.

impoundment access site would continue to provide information to users that could help prevent the spread of invasive plants at the project. Because educational signage about invasive species is already present at the project, Interior's recommendation to install educational signage would not provide any benefits for reducing the spread of invasive species.

Boat washing stations can be used to remove invasive species from watercraft, but may not be effective at reducing the spread of invasive species if: (1) boaters choose not to use the boat washing station; (2) boaters are not trained to properly use the boat washing station; or (3) invasive species are located in areas where they cannot be removed by the boat washing station, such as residual water systems, gear, and bait containers (Bleitz et al., 2024). Because the invasive plants at the project are common in the project vicinity and would continue to spread naturally regardless of any new signs and washing stations, new signs and boat washing stations may not effectively reduce the spread of invasive species.

Wisconsin DNR does not identify any issues related to invasive species, nor does Wisconsin DNR identify any specific measures or objectives associated with invasive species. Without specific measures to analyze and consider under the FPA, staff cannot assess the benefits of an invasive species plan. As discussed above, Northern States is not proposing any land-disturbing activities, construction, or modifications to project facilities or operation that would result in the introduction or spread of aquatic invasive species, and the potential for project-related recreational use to spread invasive species to a new area is very low and inconsequential.

3.3.3 Terrestrial Resources

3.3.3.1 Affected Environment

The impoundment shoreline and riverbanks of the White River downstream of the dam are primarily forested and entirely undeveloped except for the dam, generation facilities, and recreation facilities. Forested areas consist of mixed forest, coniferous forest, deciduous forest, and wooded/shrub wetlands.

The FWS National Wetlands Inventory database identifies approximately 57.9 acres of freshwater wetlands, riverine wetlands, and palustrine open water within the project boundary. The littoral zone of the impoundment includes submerged aquatic and floating vegetation, with persistent emergent vegetation sparse or absent. Common submerged vascular plants for this region of Wisconsin include coontail, leafy pondweed, common waterweed, and grassleaved arrowhead. The project is approximately 25 miles upstream from the 16,000-acre Kakagon and Bad River Sloughs wetland complex that includes the 2,850-acre Kakagon Sloughs NNL (Figure B-1). The Kakagon and Bad River Slough wetland complex consists of marsh, bog, and dune vegetation types, including wild rice (Wisconsin Wetlands Assn., 2024).

Wildlife in the project area include common bird, herpetofauna, and mammal species. According to the Wisconsin DNR's NHI, the state-listed threatened upland sandpiper and wood

turtle may occur in the project vicinity.[47] The upland sandpiper is a medium-sized terrestrial shorebird that feeds and nests in grasslands (FWS, 2024b). The wood turtle prefers rivers and streams with adjacent riparian wetlands and upland, deciduous forests. Wood turtles nest in open or semi-open canopy areas containing gravel or sandy soils, typically within 200 feet of the water.

Northern States completed a *Wood Turtle Nesting Habitat Study* in 2022, to determine the presence of turtles and suitable nesting habitat within the project boundary. A total of 1.41 acres of wood turtle nesting habitat was mapped within 200 feet of the riverbank and shoreline, including the gravel access road to the powerhouse, a small portion of the road shoulder along State Highway 112, and the gravel area at the impoundment access site. No basking wood turtles were observed during the study.

Northern States documented Vasey's pondweed, a state-listed species of special concern, at one location within the project impoundment during the 2022 *Aquatic and Terrestrial Invasive Species Study* (Invasive Species Study). The Wisconsin DNR NHI review did not identify any eagle nests within a 2-mile buffer of the project boundary; however, the project is located within the range of the bald eagle. Bald eagles typically forage over water and other open habitats; and nest in mature trees and snags, and on cliffs, rocks, and artificial structures, generally within 1 mile of water. In the project area, nesting activity, including mating, nest-building, and fledging, occurs between December 1 and August 31 (FWS, 2007).

The current license requires Northern States to implement a Purple Loosestrife Management Plan to monitor and control purple loosestrife in project waters, but no purple loosestrife has been identified since monitoring began in 1998. Invasive plant species often found within riparian habitats in Wisconsin include garlic mustard, Japanese knotweed, and Oriental bittersweet. The Invasive Species Study identified 2 invasive wetland and aquatic plants (narrow-leaf cattail and aquatic forget-me-not) in the project impoundment and 7 terrestrial species (Canada thistle, crown vetch, tansy, common buckthorn, spotted knapweed, wild parsnip, and Eurasian/Amur honeysuckle) along the shoreline and in upland areas within the project boundary. All 9 plant species are classified as restricted by the Wisconsin Administrative Code NR 40.[48] Narrow-leaf cattail was the most abundant invasive species occupying 0.96 mile or 42% of the impoundment shoreline.

[47] Section 3.3.4, *Threatened and Endangered Species*, and Appendix E, *Biological Assessment*, of this EA discuss federally listed species.

[48] Wisconsin DNR's list of prohibited invasive species is available at: https://dnr.wisconsin.gov/sites/default/files/topic/Invasives/nr40lists.pdf.

3.3.3.2 Environmental Effects

Project Operation and Maintenance

Northern States proposes to continue operating the project in a run-of-river mode such that outflow from the project approximates inflow to the impoundment at any given time and the surface elevation of the impoundment is maintained between 710.4 and 711.6 feet. Northern States proposes to continue to implement the Land Management Plan, which includes the following provisions: (1) a restriction on active land management to only include maintenance of land underlying project recreation facilities and land necessary for dam safety and project operation, including the transmission line, and not maintenance on forested land, shorelines, or wetlands, which are to remain in a natural state; (2) a restriction on any timber harvesting on project land unless necessary for maintenance of project structures or hazardous tree removal; (3) a requirement to request approval from the Commission for the sale or removal of project land from the project boundary, including consultation with resource agencies prior to filing the request with the Commission; and (4) an annual visual inspection of project land for any major changes or problems with land use.

As part of its proposal to continue maintaining project facilities, Northern States would continue routine vegetation management at the project, including lawn mowing, trimming vegetation at project recreation facilities, and removing hazardous trees. In addition, Northern States would continue applying herbicides for vegetation management at the access road, stairways, rip-rap at the spillway, and the chain link fence leading from the substation to the surge tank.

Interior recommends that Commission staff evaluate the potential project effects on the Kakagon Sloughs NNL and identify ways to avoid and mitigate impacts to the Kakagon Sloughs NNL.

Our Analysis

There are no anticipated changes in project operation that would materially impact wetlands, riparian habitat, or associated wildlife. By continuing to operate the project in a run-of-river mode and implement the Land Management Plan, terrestrial habitat along the shorelines of the impoundment and tailrace would be substantively unchanged relative to current conditions. Continuing run-of-river operation would minimize the degree of water level fluctuations in the impoundment and associated erosion on the shoreline, and result in a downstream flow regime that is similar in magnitude and timing to natural river flows. Continuing mechanical vegetation maintenance and removal of hazard trees to access project facilities would not significantly affect wildlife or terrestrial habitat.[49] Terrestrial habitats, wetlands, and riparian areas in the project boundary would likely continue to support a variety of wildlife under the terms of any subsequent license issued for the project.

[49] *See* Appendix E, *Biological Assessment*, for the environmental effects analysis of vegetation removal on federally listed species.

Interior's recommendation to identify ways to avoid and mitigate impacts to the Kakagon Sloughs NNL does not identify any specific measures. Without specific measures to analyze and consider under the FPA, staff cannot assess the benefits of this recommendation. Run-of-river operation would maintain natural river flows and water levels in the Kakagon and Bad River Sloughs wetland complex. As discussed in section 3.3.2.2, *Impoundment Drawdown and Refill*, the effect of any planned or unplanned drawdown on wild rice and other resources depends on the seasonal timing, magnitude, duration, drawdown and refill rates, and flow releases downstream of the project. Northern States' proposal to only modify project operation for short periods of time, of up to 3 weeks, after mutual agreement with FWS, Wisconsin DNR, and the Bad River Tribe and file an application for a temporary amendment of license for planned deviations exceeding 3 weeks, would help protect wild rice and other resources in the sloughs. Also, filing reports following unplanned drawdowns, including documentation of any observed or reported environmental effects, a description of measures implemented to prevent similar deviations in the future, and any comments or correspondence received from the resource agencies and the Bad River Tribe, as proposed, would help mitigate adverse effects after drawdowns.

Special Status Species

As part of its proposal to continue maintaining project facilities, Northern States would continue grading the project access road and parking areas annually. Northern States would also continue applying herbicides for vegetation management at the access road, stairways, rip-rap at the spillway, and the chain link fence leading from the substation to the surge tank.

To protect wood turtles, Northern States proposes to implement the Wisconsin DNR's BITP/A for wood turtles, filed as Appendix E-24 of the application, which includes the following measures: (1) relocating any observed wood turtles out of harm's way; and (2) restricting the types of herbicides that can be used when turtles could be in proximity to turtle habitat.

To protect bald eagles, Northern States proposes to review the Wisconsin NHI to determine the location of bald eagle nests and avoid vegetation management and construction activities within 660 feet of any bald eagle nests during the nesting season.

Interior recommends that Northern States protect plant and animal species of cultural importance to Tribes when performing maintenance activities, including: (1) identify the spatial extent of culturally important species at the project; (2) control invasive species that could displace culturally important species; (3) restrict foliar application of herbicides in proximity to known locations of culturally important species; (4) reduce woody growth as necessary to maintain the level of canopy closure; and (5) protect critical life stages (e.g., flowering) of culturally important species from mowing or other activities that could reduce population viability. Interior also recommends that Northern States consult with Tribes on impoundment drawdowns and to schedule drawdowns so as not to harm downstream wild rice populations.

In its comments, Wisconsin DNR states that its certification may require a listed species protection plan. However, Wisconsin DNR does not identify any specific issue related to listed species at the project or whether "listed species" refers to federally listed species, state-listed species, or both.

Our Analysis

By continuing to operate the project in a run-of-river mode and maintain the surface elevation of the impoundment between 710.4 and 711.6 feet, Northern States' proposal would continue to protect wood turtles because wood turtles hibernate at depths of 3 feet or more (Tamplin et al., 2024; Greaves and Litzgus, 2007 and 2008; Ernst, 1986) and therefore would not be at risk of disturbance or emergence during the winter.

The 2022 *Wood Turtle Nesting Habitat Study* found limited areas of suitable nesting habitat within the project boundary, including the gravel access road to the powerhouse and the gravel area at the impoundment access site. Northern States has not proposed any specific construction activities that involve ground disturbance within areas of suitable nesting habitat. However, Northern States' proposal to continue herbicide application along the access road could introduce potentially toxic chemicals to wood turtle nesting habitat and harm wood turtles. Restricting herbicide use and relocating any observed turtles out of harm's way as proposed by Northern States would protect wood turtles.

Northern States' proposal to continue grading the gravel access roads and parking areas could affect wood turtles nesting in these areas. Restricting grading on gravel access roads and parking areas during the wood turtle nesting season (May 20 through September 18) would protect nesting habitat and any turtles that might be present.

Loud and disruptive activities can cause eagles engaged in nest building, incubating, or other reproductive behaviors to abandon the nest. Project maintenance activities could result in limited tree removal in the project boundary that could disturb bald eagles during the nest building, incubation, and fledging phases of their life cycle. Avoiding vegetation management and construction activities within 660 feet of any bald eagle nests during the nesting season, as proposed, would protect bald eagles from tree removal activities. However, the Wisconsin NHI might not be an accurate and up-to-date source for determining the location of bald eagle nests in the project boundary, especially nests that are actively being constructed and newly established nests. Relying solely on the Wisconsin NHI to determine the location of nests could result in tree cutting that disturbs bald eagle nest building, incubation, and fledging. Surveying for bald eagle nests prior to any tree clearing during the nesting season would ensure bald eagle nests are identified prior to tree clearing. Also, Northern States does not identify the dates for the nesting season. According to FWS's Information for Planning and Consultation (IPaC) system, the breeding season for the bald eagle in the project area is December 1 through August 31.[50] Implementing the following measures would protect bald eagles that occur in the project boundary: (1) prior to clearing trees within the project boundary, survey the area to be cleared for bald eagle nests; and (2) if such nests are discovered, then: (a) consult with Interior and Wisconsin DNR on measures to be implemented prior to tree-clearing activities, if any, and (b) perform tree-clearing activities in accordance with FWS's National Bald Eagle Management Guidelines (FWS, 2007), including avoiding any tree clearing within 660 feet of any known

[50] *See* Commission staff's January 24, 2025 Memorandum on Endangered Species Act List.

eagle nests, as proposed by Northern States, and any ground-disturbing activities within 0.25 mile of any known eagle nests during the nesting season (December 1 through August 31).

Regarding Vasey's pondweed, Northern States' proposal to continue operating the project in a run-of-river mode and maintaining the surface elevation of the impoundment between 710.4 and 711.6 feet would continue to protect littoral habitat where Vasey's pondweed is located. Northern States is not proposing any construction or changes to project operation that would affect Vasey's pondweed, and the proposed relicensing would not alter current conditions for Vasey's pondweed.

The upland sandpiper feeds and nests in grassland areas that are not present in the current or proposed project boundary. Also, Northern States is not proposing any land-disturbing activities, construction, or modifications to project facilities or operation that would affect any sandpipers that fly through the project boundary. Therefore, relicensing the project would not affect the upland sandpiper.

Regarding Interior's recommendation to protect culturally important species when conducting project maintenance, Interior has not specified any culturally important plant species that could occur at the project or where such species could be located. Therefore, staff cannot assess the benefits of the recommended measures for any such species. As stated above, there are no anticipated changes in project operation or maintenance that would materially affect vegetation, wildlife, or wildlife habitat relative to current conditions.

Wisconsin DNR does not identify any issues related to listed species, nor does Wisconsin DNR identify any specific measures or objectives associated with a listed species protection plan. Without specific measures to analyze and consider under the FPA, staff cannot assess the benefits of a listed species protection plan. However, continuing to operate the project in a run-of-river mode and implement the Land Management Plan would ensure that terrestrial habitat is unchanged from current conditions and remains suitable for terrestrial resources, including special status species.

Invasive Species

Northern States proposes to develop an invasive species monitoring plan in consultation with Wisconsin DNR and the Bad River Tribe that includes provisions for biennial surveys for invasive species and "rapid response" measures to limit the dispersal of established species.

Interior recommends, under section 10(j), Northern States' proposed invasive species monitoring plan.[51] The Bad River Tribe recommends that Northern States develop an invasive species monitoring plan in consultation with the Tribe. Wisconsin DNR states that its certification may require an invasive species plan.

[51] Interior's recommendations to install signage and boat washing stations are discussed in section 3.3.2.2, *Invasive Species Management*.

Our Analysis

The 2022 Invasive Species Study identified 9 species of aquatic and terrestrial invasive plants that are prevalent throughout the region and the State of Wisconsin. There is no available information indicating that project operation and maintenance activities have caused the spread or proliferation of invasive plants at the project. Northern States is not proposing any land-disturbing activities, construction, or modifications to project facilities or operation that would facilitate the spread of invasive plant species. As stated above in *Project Operation and Maintenance*, continuing to operate the project in a run-of-river mode would not affect terrestrial habitat along the shoreline of the impoundment, would minimize water level fluctuations in the impoundment, and would minimize erosion. Therefore, it is unlikely that the proposed operation and maintenance of the project would result in the expansion of invasive plants.

While Northern States' proposal to monitor invasive species could help determine if an invasive species is proliferating at the project, no stakeholders have recommended specific measures for controlling invasive species. Without specific measures, it is unclear whether control measures would be effective for invasive species at the project, especially for invasive species such as narrow-leaf cattail that are already prevalent throughout the region and the State of Wisconsin. Therefore, we cannot assess the benefits of an invasive species monitoring plan for environmental resources at the project.

3.3.4 Threatened and Endangered Species

Section 7 of the ESA[52] requires federal agencies to ensure their actions are not likely to jeopardize the continued existence of any federally listed endangered or threatened species or result in the destruction or adverse modification of the critical habitat of such species. According to FWS's IPaC system, the federally listed endangered gray wolf (*Canis lupus*) and threatened Canada lynx (*Lynx canadensis*) and Fassett's locoweed (*Oxytropis campestris var. chartacea*) have the potential to occur at the project.[53] IPaC also indicates that the proposed threatened monarch butterfly (*Danaus plexippus*) has the potential to occur at the project. No critical habitat for these species occurs at the project.

Although IPaC initially stated that the federally listed endangered NLEB (*Myotis septentrionalis*) and the proposed endangered TCB (*Perimyotis subflavus*) have the potential to occur at the project,[54] the most recent IPaC list does not include these species.[55] Commission staff reviewed the FWS's range maps for these species and conclude that the bats do not have the potential to occur at the project (Figures B-5 and B-6, respectively).

[52] 16 U.S.C. § 1536.

[53] *See* Commission staff's May 14, 2025 Memorandum on Endangered Species Act List.

[54] *See* Commission staff's August 14, 2023 Memorandum on Endangered Species Act List.

[55] *See* Commission staff's May 14, 2025 Memorandum on Endangered Species Act List.

Our analyses of project effects on the federally listed and proposed species are presented in Appendix E, *Biological Assessment*. Based on the available information, we conclude that relicensing the project would: (1) have no effect on the NLEB, gray wolf, Canada lynx, and Fassett's locoweed; and (2) not likely jeopardize the continued existence of the TCB or monarch butterfly.

3.3.5 Land Use, Recreation, and Aesthetics

3.3.5.1 Affected Environment

The White River project located on the White River in Ashland and Bayfield Counties, Wisconsin. Land use in the project area consists mostly of undeveloped, forested lands with some with some agricultural lands and few developed areas. The Exhibit G approved on August 29, 1995,[56] includes a project boundary that encloses approximately 125.1 acres as described in section 2.1.2, *Current Project Boundary*.

There are numerous recreational opportunities near the project, including fishing, boating, wildlife viewing, and water sports. As described in section 2.1.1, *Existing Project Facilities*, and shown in Figure 2, project recreation facilities include the impoundment access site, portage route, put-in site, and tailrace fishing area. Northern States maintains sigs in the project boundary to provide directions to project recreation facilities and comply with Part 8 of the Commission's regulations.

Additional recreation opportunities are available at the following locations in the project vicinity.

- White River Fishery Area – This approximately 745-acre multi-use area consists of multiple land parcels that are owned and maintained by Wisconsin DNR, including land adjacent to the upper impoundment and bypassed reach. It was established in 1961 to protect trout habitat. The area provides opportunities for trout fishing, hunting, and canoeing.

- White River Wildlife Area – This 1,120-acre area is owned and maintained by Wisconsin DNR and located approximately 5.8 river miles downstream of the project. The land is entirely wooded and provides opportunities for hunting, wildlife viewing, and hiking (Wisconsin DNR, 2020).

- Whittlesey Creek National Wildlife Refuge – This national wildlife refuge is owned and maintained by FWS, and located approximately 9 miles northwest of the project. It was established in 1999 to protect, restore, and manage wetland and stream habitat. A total of 304 acres have been acquired. Recreation opportunities include hunting, fishing, and wildlife viewing (Bayfield County, 2021).

[56] *See Northern States Power Company*, 72 FERC ¶ 62,182 at Ordering Paragraph (C) (1995).

Northern States conducted a *Recreation Study* in 2021 to document recreation utilization and recreation needs within the project boundary and determine the current use and maximum capacity of each project recreation facility. Northern States observed a total of 51 users over 14 days during the primary recreation season from April through September, for an average of 3.6 users per day. On average, recreation use at all facilities was less than 20% capacity, but exceeded the maximum daily capacity on a single day at the impoundment access site. The *Recreation Study* determined that two recreation signs, one at the impoundment access site and one at the portage put-in site, do not comply with Part 8 of the Commission's regulations.

The NRI includes a 43-mile-long segment of the White River. The NRI segment begins at the headwaters in Bayfield County and ends at the crossing of State Highway 112 (project dam) in Ashland County. The ORVs for the NRI segment are recreation and scenic. In the upper reaches of the NRI segment, upstream of the project, the ORVs also include outstanding water quality and trout waters. The NRI segment is also a popular canoe route.

The NRI also includes a 51-mile-long segment of the Bad River. The NRI segment is within a heavily forested watershed flowing from the town of Mellen, Wisconsin through Copper Falls State Park and the Bad River Reservation before emptying into Lake Superior. The ORVs for the NRI are geologic and scenic. The NRI segment is located approximately 23.5 miles downstream of the project, following the convergence of the White River with the Bad River.

3.3.5.2 Environmental Effects

Recreation

Northern States proposes to continue to operate the project in run-of-river mode, such that outflow from the project approximates inflow, and the surface elevation of the impoundment is maintained between 710.4 and 711.6 feet. Northern States proposes to continue to maintain the existing project recreation facilities. In addition, Northern States proposes to update recreation signage to comply with Part 8 of the Commission's regulations at the impoundment access site and portage put-in site, for a total of two signs.

Interior states that the Commission should evaluate potential project effects on the White River and Bad River NRI segments and identify ways to avoid and mitigate impacts to the NRI segments because impacts on flow, water quality, and ORVs could foreclose options to designate any portion of the NRI segments as Wild and Scenic. In its comments, Wisconsin DNR states that its certification may require a recreation plan.

Our Analysis

Project Operation

Continued run-of-river operation would minimize impoundment fluctuation levels and ensure that downstream flows are not affected by normal project operation. Operation of the project in a run-of-river mode would continue to provide flow for water-based recreation activities, including boating upstream or downstream of the project, and would not alter boating opportunities relative to current operation. Therefore, relicensing the project as proposed would not significantly affect recreation use.

Recreation Facilities and Use

Numerous recreational opportunities exist at the project and the immediate project vicinity. Northern States' proposal to continue maintaining the existing project recreation facilities and conduct annual sign maintenance would ensure recreation opportunities continue over the term of any subsequent license and that the public would have continued access. The *Recreation Study* indicates that the project recreation facilities are underutilized and provide the capacity to meet the recreation needs for the term of any subsequent license issued.

While signage is present at the impoundment access site, portage put-in site, and tailrace fishing area, the *Recreation Study* determined that recreation signs at the impoundment access site and portage put-in site, do not comply with Part 8 of the Commission's regulations. Northern States' proposal to replace the signs to comply with Part 8 would ensure that the signs contain the project name and number, a statement that the project is licensed by the Commission, licensee name and contact number for obtaining additional recreation information, and permissible times and activities.

In its comments about a recreation plan, Wisconsin DNR does not identify any issues related to recreation facilities and does not identify any specific measures or objectives that would be included in a recreation plan. Without specific measures to analyze and consider under the FPA, staff cannot assess the benefits of a recreation plan. Based on our conclusion above that existing project recreation facilities are sufficient to meet recreation demand in the project vicinity, a recreation plan would not benefit project recreation.

National River Inventory Segments

The 43-mile segment of the White River that is listed in the NRI includes the project's impoundment and terminates at the project's dam. A 5.3-mile reach of the 51-mile NRI segment of the Bad River is located approximately 23.5 miles downstream of the project. Northern States' proposal to continue operating the project in a run-of-river mode and maintaining the surface elevation of the impoundment between 710.4 and 711.6 feet would continue to minimize project effects on shoreline erosion, water quantity, and water quality in the impoundment and the downstream reach, as discussed in sections 3.3.1.2, *Geology and Soils* and 3.3.2.2, *Aquatic Resources*. Accordingly, continued operation of the project as proposed would not alter the

recreational or scenic ORVs associated with the White River NRI segment and would not alter the geologic and scenic ORVs associated with the Bad River NRI segment.

Interior's recommendation to identify ways to avoid and mitigate impacts to the NRI segments does not identify any specific measures. Without specific measures to analyze and consider under the FPA, staff cannot assess the benefits of this recommendation.

Aesthetics

The White River Project and its associated hydroelectric facilities have been operating since 1927. From its original construction to the present, the project has become part of the local environment. The hydroelectric development is an unobtrusive industrial complex highlighting the largely undeveloped and highly scenic natural environment of the White River corridor. Northern States is not proposing any land disturbing activities, construction or modifications to the project facilities or operations in any way that would adversely affect the existing aesthetic setting of the area.

Land Use

Northern States proposes to modify the current project boundary to include the following land and water, which would decrease the acreage enclosed by the project boundary from 125.1 to 52.7 acres: (1) a 39.9-acre impoundment at the normal maximum surface elevation of 711.6 feet, including the addition of 0.1 acre of water; (2) 10.1 acres of land underlying the project facilities, including the addition of 0.3 acre associated with the south earthen embankment, 0.3 acre associated with the transmission line and transformer, and 0.6 acre associated with the access road and concrete pipe that conveys water from the dam to the surge tank; (3) 2.4 acres of the bypassed reach, which would add 1.2 acres of water associated with the bypassed reach;[57] and (4) 0.3 acre of the tailrace, which would add 0.1 acre of water associated with the tailrace.

Northern States also proposes to modify the current project boundary by removing 29.7 acres of land adjacent to the impoundment, 34.5 acres of land north of the project's access road and 10.6 acres of land northeast of the powerhouse.

[57] Section 11.4 of Exhibit E of the application states that Northern States is proposing to include 2.4 acres of the bypassed reach in the project boundary, which is 1.2 acres more than the 1.2 acres in the current project boundary.

Our Analysis

According to the Commission's regulations, project boundaries should enclose "only those lands necessary for operation and maintenance of the project and for other project purposes, such as recreation, shoreline control, or protection of environmental resources."[58]

Northern States' proposal to revise the project boundary around the impoundment to follow the contour of the normal maximum surface elevation of 711.6 feet would result in removal of 29.7 acres of land adjacent to the impoundment and addition of 0.1 acre of water at the upstream limit of the impoundment. The 29.7 acres of land is not necessary for operation, maintenance, or other project purposes, and should be removed from the project boundary as proposed. Removal of this land from the project boundary would not affect project uses or substantially affect land use. The entire 39.9-acre impoundment is necessary for project operation and should be included in the project boundary, as proposed.

The following land and water that Northern States proposes to add to the project boundary includes project facilities that are necessary for project operation and should be included in the project boundary, as proposed: (1) 0.3 acre of land associated with the transmission line and transformer; (2) 0.6 acre of land associated with the access road and concrete pipe; (3) 0.1 acre of water associated with the tailrace; and (4) 0.3 acre of land associated with the south earthen embankment.

The following land that Northern States proposes to remove from the project boundary does not include project facilities or appear to be necessary for project operation, maintenance, or other project purposes, such as recreation, shoreline control, or protection of environmental resources, and removal of these lands from the project boundary would not affect project uses or substantially affect land use: 34.5 acres of land north of the access road and 10.6 acres of land northeast of the powerhouse.

Section 11.4 of Exhibit E of the application states that the current project boundary includes 2.9 acres of the bypassed reach. Based on a review of the Exhibit G map approved on August 29, 1995, and aerial photographs, staff concludes that the current project boundary includes approximately 1.2 acres of the bypassed reach. Northern States proposes to modify the current project boundary to include 2.4 acres of the bypassed reach, which would add 1.2 acres of water associated with the bypassed reach.[59] The bypassed reach does 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. Therefore, inclusion of the 2.4 acres of land and water in the project boundary is not warranted and the 1.2 acres that is currently in the project boundary should be removed.

[58] 18 C.F.R. § 4.41(h)(2).

[59] Section 11.4 of Exhibit E of the application states that Northern States is proposing to include 2.4 acres of the bypassed reach in the project boundary, which is 1.2 acres more than the 1.2 acres in the current project boundary.

Based on the conclusions reached above, the total land needed for project purposes includes 50.3 acres, which is 74.8 acres less than the current project boundary and 2.4 acres less than the proposed project boundary.

3.3.6 Cultural Resources

3.3.6.1 Affected Environment

Cultural resources represent things, structures, places, or archaeological sites that can be either prehistoric or historic in origin. Pursuant to section 106 of the NHPA, the Commission must take into account whether any historic property within the proposed project's area of potential effects (APE) could be affected by the issuance of a license for the project. Northern States describes the APE as lands enclosed by the project boundary as delineated in the existing license; attached or associated buildings and structures extending beyond the project boundary, which contribute to the National Register eligibility of the hydroelectric generating facility; and lands or properties outside the project boundary, where the project may cause changes in the character or use of historic properties, if any historic properties exist. As described in section 2.2, Northern States proposes to reduce the project boundary from 125.1 to 52.7 acres (Figure 2).

Cultural History

The project is in the ceded territory of the Ojibwe (Chippewa). Riverine fishing, hunting, and maple sugar and wild rice harvesting are significant aspects of the Ojibwe subsistence practices. The Kakagon and Bad River Sloughs wetland complex, a large freshwater wetland estuary, represents the primary contemporary wild rice source for the Bad River Tribe (Bad River Tribe, 2024). Lake sturgeon are a culturally sensitive species to the Ojibwe. In 1842, Chippewa Tribes entered into the Treaty with the Chippewa, which ceded the land where the White River project is located to the United States.[60] Article II of the 1842 Treaty provides for the right of hunting and the usual privileges of occupancy, among other provisions. In 1854, Chippewa Tribes entered the Treaty of La Pointe that ceded the lands on the western and northern shores of Lake Superior to the United States.[61] The 1854 Treaty also established reservation land, including the 124,459-acre Bad River Reservation, located approximately 5 miles east of the White River Project.

Industrial History

[60] Treaty of 1842 (7 Stat 591).

[61] September 30, 1854, 10 Stats., 1109, Ratified Jan. 10, 1855; Proclaimed Jan. 29, 1855. The treaty included reserved rights for off-reservation hunting, fishing, and gathering.

Prior to the construction of the existing hydroelectric facilities, the APE contained a 19th century mill and dam (Batten and Hindall, 1980).[62] The hydroelectric facility was constructed in 1907, replacing the dam and mill (Harrison, 1991). The 1907 hydroelectric dam was destroyed by a flood in 1926 and was rebuilt the following year. The reservoir was drained in 1976 for the construction of a new surge tank and concrete pipeline connecting the dam and powerhouse, which included the excavation of the south earthen-dam wall (Batten and Hindall, 1980). A group of early 20th century buildings were located near the project's powerhouse until removal in the early 1980s. These former buildings were associated with the hydroelectric facility and its workers (e.g., operator buildings, sheds, barn, root house) (Harrison, 1991).

Historic Properties

To assess the potential effects of the project's relicensing on cultural resources, Northern States conducted a literature review of architectural and archaeological properties in the APE, a Phase I archaeological shoreline survey, and a review of architectural resources in the APE. The literature review found that an archaeological survey in 1989 concluded that much of the archaeological potential of sites in the APE was destroyed by the construction of the White River Project's access road, penstock, powerhouse, and surge tank and did not identify any properties eligible for listing on the National Register. Also, an archaeological survey in 2013 found no cultural resources in exposed floodplain terraces. According to the December 1, 2022 Archaeological Survey Report, the Phase I survey of the impoundment shoreline did not identify any archaeological sites on the shoreline and concluded that Northern States should search all eroded areas of the impoundment shoreline for archaeological resources every 10 years.[63]

The architectural review determined that the dam, powerhouse, and surge tank have been modernized and are not eligible for listing in the National Register. The review also concluded that State Highway 112 Bridge was rebuilt in 1985 and is ineligible for the National Register.[64]

On September 4, 2020, the Wisconsin SHPO concurred that the project facilities are not eligible for listing in the National Register.[65] On February 15, 2023, the Wisconsin SHPO

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[62] The location contained a sawmill in 1855 that was replaced, or converted to, a papermill in 1884 (Batten and Hindall, 1980).

[63] *See* Northern States' December 1, 2022, *Archaeological Shoreline Monitoring Report at the White River Hydroelectric Project*, filed with the Commission on July 21, 2023 (privileged).

[64] *See* Northern States' December 20, 1991, Final License Application at Appendix D, *National Register of Historic Places Registration Form for the White River Dam Historic District.* The project facilities were also deemed ineligible for listing in the National Register as a Historic District.

[65] *See* Northern States' July 21, 2023, Final License Application at Volume 4, *Documentation of Consultation.*

concurred by electronic mail with the findings and recommendations in the December 1, 2022 Archaeological Survey Report.[66]

3.3.6.2 Environmental Effects

Northern States proposes to develop an HPMP in consultation with the Wisconsin SHPO, Bad River Tribe, and other interested Tribes. Interior recommends that Northern States consult with Tribes and all other potential stakeholders to develop a comprehensive HPMP. The Bad River Tribe requests that the Commission consult with the Tribal Historic Preservation Officer to identify measures to avoid, minimize, and/or mitigate impacts to historic properties and cultural resources. The Bad River Tribe also recommends that Northern States develop an operation compliance monitoring plan, invasive species monitoring plan, and HPMP in consultation with the Tribe to ensure these activities are protective of the Tribe's treaty rights, historic properties, water quality, and downstream uses, including cultural uses of waters downstream of the project, such as fishing and other harvesting.[67]

Interior recommends the establishment of an APE that allows the Commission to thoroughly analyze direct and indirect effects on Tribal cultural resources. Interior and the Bad River Tribe recommend that the license include a condition for Northern States to allow Tribes access to land in the project boundary that is culturally significant to the Tribes. Interior recommends that the Commission and Northern States consult with Tribes to identify specific dates and locations for access.

Our Analysis

Area of Potential Effects

As discussed in section 3.3.5.2, *Land Use*, the total land needed for project purposes includes 50.3 acres, as proposed by Northern States. This land fully encompasses the geographic area in which the project's relicensing may directly or indirectly cause alterations in the character or use of any historic properties, and there is no justification for including additional land in the APE beyond land needed for project purposes. Therefore, the APE should only include the land that is needed for project purposes.

As discussed in section 3.3.5.2, *Land Use*, the following land is not needed for project purposes and should be removed from the project boundary as proposed: 29.7 acres of land adjacent to the impoundment, 34.5 of land north of the project's access road, and 10.6 acres of land northeast of the powerhouse. No historic properties have been identified within these areas.

[66] *Id.* at Appendix B-228.

[67] The Bad River Tribe's recommendations for an operation compliance monitoring plan and an invasive species monitoring plan are discussed in section 3.3.2.2, *Operation Compliance Monitoring*, and section 3.3.2.3, *Invasive Species*, respectively.

According to a filing from the Advisory Council,[68] the Commission's jurisdiction over hydroelectric projects does not constitute "federal ownership or control" as meant in federal regulations,[69] and, therefore, surrendering land once within a licensee's project boundary would not result in an adverse effect to historic properties on that land in and of itself.

Architectural and Archaeological Resources

Hydropower facilities can affect cultural resources as a result of modifications to project facilities or project operation; project-related ground-disturbing activities; construction, modification, or maintenance of project recreation facilities and use of such facilities by visitors; project-induced shoreline erosion;[70] and vandalism. Northern States is not proposing any land-disturbing activities, construction, or modifications to project facilities or operation that would adversely affect cultural resources relative to the project as currently licensed.

As discussed in section 3.3.6.1, archeological investigations did not identify National Register listed or eligible archaeological resources in the APE and the Wisconsin SHPO concluded that the project facilities are not eligible for listing on the National Register.

In its comment letter, Interior states that the project may affect important cultural sites and resources. Interior also states that a former waterfall was once present at the location of the project's dam and that the site is considered sacred to Tribes.[71] Outreach to Tribes between 2019 and 2024, did not result in any information regarding the cultural significance and/or use of the location as a cultural area.[72] In its recommendations for an HPMP, the Tribe did not identify National Register listed or eligible historic properties, nor did it identify specific measures to avoid, minimize, and/or mitigate effects on historic properties. As discussed in section 3.3.6.1, *Industrial History*, multiple dams have existed at the site of the current dam since the mid-19th

[68] Letter filed on May 14, 2024, concerning the draft PA for the Azusa Powerhouse Hydroelectric Project, FERC P-1250-020. https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20240514-5071.

[69] 36 C.F.R. § 800.5(a)(2)(vii) (2024).

[70] Project-induced shoreline erosion does not include shoreline erosion attributable to flood flows or natural phenomena, such as wind-driven wave action, erodible soils, and loss of vegetation due to natural causes.

[71] A 2001 report by GLIFWC presents an anecdotal account from a June 3, 1882, edition of the Ashland Press, that identified a 16-foot waterfall at the current location of the dam (Mattes and Nelson, 2001).

[72] *See* Appendix D, *Statutory and Regulatory Requirements*, for an account of Tribal outreach for the project's relicensing.

century and past construction and demolition[73] have caused significant physical modifications at the base of the dam.[74] Based on available information, staff concludes that the location does not represent a historic property because the resource is unlikely to retain physical integrity[75] as a waterfall feature due to the construction of dams at the site since the mid-19th century. Further, as discussed in section 3.3.6.1, *Historic Properties*, Northern States did not identify any properties eligible for listing on the National Register within the APE. Since there are no known historic properties within the APE for the White River Project, the proposed HPMP is not needed to protect any historic properties during the term of any subsequent license. Staff is not aware of any other benefits of an HPMP.

As discussed in section 3.3.5.2, *Land Use*, the December 1, 2022 Archaeological Survey Report, included a recommendation from Northern States' consultant to search all eroded areas of the impoundment shoreline for archaeological resources every 10 years. The SHPO concurred with this recommendation in its February 15, 2023 comments. However, as stated in section 3.3.1.2, *Environmental Effects*, and section 3.3.2.2, *Mode of Operation*, continuing to operate the project in a run-of-river mode would minimize erosion along the impoundment shoreline. Also, past cultural resource investigations and monitoring of the project, including during an impoundment drawdown, did not identify historic properties. Because there are no reasonably foreseeable project-related effects on shoreline erosion, there would be no benefits associated with surveying the shorelines every 10 years.

It is possible that previously unidentified archaeological or cultural resources could be discovered during project operation, maintenance, or other project-related work involving land-disturbing activities. If cultural resources are discovered during such work, Northern States should stop all land-clearing and land-disturbing activities in the vicinity of the resource and consult with the Wisconsin SHPO and Tribes to determine the need for any cultural resource studies or measures.

To protect cultural resources from any project modifications not specifically authorized by any subsequent license, Northern States should consult with the Wisconsin SHPO and Tribes

[73] A 1991 archaeological survey report conducted in the APE discusses construction and demolition at the site (Harrison, 1991).

[74] *See* photograph of reservoir drawdown, at Attachment G, Appendix E-11 of the License application. An image dated September 13, 2022, depicts a view facing east toward the dam during a drawdown. No natural waterfall features are visible in the image. Cross sections of the dam and bridge provide basal elevation data where the dam is located, which ranges 2 feet from the east (at headwater) to west side (tailwater) of the dam indicating any former natural waterfall in this location is no longer present. *See* Section C-C of the Exhibit F of the license application.

[75] Integrity is assessed on the basis of the presence of the essential physical features that enable a historic property to convey its historic identity (Park Service, 1990).

prior to implementing such project modifications to determine the effects of the activities and the need for any cultural resource studies or measures.

Access to Culturally Significant Sites

The Bad River Tribe and Interior recommend providing Tribes with access to culturally significant lands in the project boundary. The Bad River Tribe does not specify any culturally significant lands in the project boundary, but Interior references the waterfall discussed above. Standard license Article 13 requires a licensee to allow the public free access, to a reasonable extent, to project waters and adjacent project lands owned by the licensee for the purpose of full public utilization of such lands and waters for navigation and for outdoor recreational purposes.[76] Section 3.3.5.1, *Affected Environment,* describes the recreational facilities that provide access to the project lands and waters. Northern States' *Recreation Study* concludes that the capacity of the recreation facilities is expected to be adequate for the foreseeable future. Outside of the fences and gates that ensure public safety (e.g., barriers to the dam's gated spillway, substation, transmission line, and powerhouse), there are no barriers at the project that restrict access to project land or water. Any member of the public can access the shoreline of the impoundment that is adjacent to the dam from State Highway 112 and by accessing the impoundment access site located at the north embankment of the dam. Northern States' proposal to continue maintaining the project recreation facilities, including but not limited to the facilities that provide access to the shoreline of the impoundment, would ensure continued public access to the area of the former waterfall during the term of any subsequent license. Because public access would continue to be available to the impoundment and project recreation facilities, there would be no benefit associated with Interior's and the Bad River Tribe's recommendation to include a license condition to provide the Tribes with access to land in the project boundary that is culturally significant to the Tribe.

Hunting, Fishing, and Gathering

The project provides public access to project land and water for recreation, but not wildlife hunting. The project boundary encloses the impoundment and project facilities. While treaty rights allow for hunting, fishing, and gathering on Tribal lands and lands that are open to the public for those activities, it does not open private land for such activities without permission. Wisconsin applies safety zone regulations for hunting, defined as 100 yards (300 feet) from an occupied building or within 50 feet of public roads (Wisconsin DNR, 2025). Because the project provides recreational access to the public, hunting within the project boundary would pose a safety risk to the public.

There are ample opportunities for hunting in the region on state-owned and managed lands including the nearby White River Wildlife Area in Ashland County and adjacent White River Fishery Area in both Ashland and Bayfield Counties. These Wisconsin DNR managed

[76] *See Standardized Conditions for Inclusion in Preliminary Permits and Licenses Issued Under Part I of the Federal Power Act*, Order No. 540, 54 F.P.C. 1792 (1975) (providing Form L-9, Article 13).

areas allow regulated hunting, fishing, trapping, and gathering activities within five miles of the project. Continuing to operate the project as proposed would not affect Tribal hunting rights relative to current conditions.

In its comment letter, Interior states that Commission staff should evaluate potential impacts and identify ways to avoid and mitigate impacts to the Kakagon Sloughs NNL. The Bad River Tribe also states that releases of water from the White River dam can disrupt tribal harvests of wild rice. Continuing to operate the project in run-of-river mode would minimize the effects of project operation on water quantity and quality downstream of the project to the greatest extent possible. Therefore, normal project operation would not affect the Kakagon Sloughs NNL or resources within the wetland complex that could be important to the Tribes, such as fish and wild rice. As discussed in section 3.2.2.2, *Effects on NRI Segments and Kakagon Sloughs*, project maintenance or emergency conditions could result in deviations from normal project operation, including planned and unplanned drawdowns and refills of the impoundment that could affect flow/water levels downstream of the project. Northern States' proposal to only modify project operation for short periods of time of up to 3 weeks after mutual agreement with the resource agencies and the Tribe and to file an application for a temporary amendment of license for planned deviations exceeding 3 weeks, would help protect aquatic resources at and downstream of the project, including the Kakagon Sloughs NNL and resources within the wetland complex. Also, filing reports following unplanned deviations, including documentation of any observed or reported environmental effects, a description of measures implemented to prevent similar deviations in the future, and any comments or correspondence received from the resource agencies and the Tribe, as proposed, would help mitigate adverse effects after drawdowns. Finally, implementing a 90/10 refill procedure would ensure that flows downstream of the project are kept near project inflow levels and would minimize project effects on the Kakagon Sloughs NNL because it would ensure that flows downstream of the project are kept near project inflow levels and that the impoundment is refilled in a timely manner following drawdowns. As discussed in section 3.3.2.2, *Operation Compliance Monitoring*, developing an operation compliance monitoring plan in consultation with Wisconsin DNR and the Bad River Tribe would provide a mechanism for reporting deviations to the Tribe, resource agencies, and the Commission; facilitate the Commission's administration of the license; and ensure that all operational requirements for the protection of environmental resources at and downstream of the project are being met.

The impoundment is also identified as a wild rice area by the Wisconsin DNR and GLIFWC (Wisconsin DNR, 2024d; GLIFWC, 2024). However, no stakeholder filed comments indicating wild rice harvesting occurs in the project area. There is no information in the record to indicate that Tribes gather plants for food for cultural purposes at the project. However, as discussed in section 3.3.2.2, Northern States proposes to continue operating the project in a run-of-river mode, such that outflow from the project approximates inflow to the impoundment at any given time and the surface elevation of the impoundment is maintained between 710.4 and 711.6 feet. The project's run-of-river operation maintains stable impoundment elevations and the project's relicensing would not change current conditions for any wild rice that grows in the impoundment. Also, as discussed in section 3.3.2.2, *Impoundment Drawdown and Refill*, Northern States' proposals outlined above and a 90/10 refill procedure would help protect aquatic resources in the impoundment, including wild rice. Also, as discussed above in *Access to*

Culturally Significant Sites, there are no barriers that restrict access to project land except those needed for public safety. Accordingly, relicensing the project would not adversely affect Tribal gathering rights relative to current conditions.

Regarding Tribal fishing rights, as discussed in section 3.3.2.2, *Mode of Operation*, Northern States' proposal to continue operating in run-of-river mode would minimize the effects of project operation on water quantity and water quality downstream of the project to the greatest extent possible which would protect fish and other aquatic species that are culturally significant to Tribes. During any planned deviations from run-of-river operation, such as impoundment drawdowns for maintenance, Northern States proposes to consult with the Bad River Tribe as discussed in section 3.3.2.2, *Impoundment Drawdown and Refill*. As discussed in section 3.2.2.2, *Cinder Use*, staff concludes that the practice of using cinders would not affect water quality downstream of the project and continuing to implement the Fly Ash/Cinders Monitoring Plan would protect aquatic resources. As discussed above in *Access to Culturally Significant Sites*, except for safety barriers located around project facilities, standard license Article 13 requires a licensee to allow the public free access, to a reasonable extent, to project waters and adjacent project lands owned by the Licensee for the purpose of full public utilization of such lands and waters for navigation and for outdoor recreational purposes. As discussed in section 3.3.5.2*, Recreation*, Northern States' proposal to continue maintaining the existing project recreation facilities would ensure recreation opportunities continue over the term of any subsequent license and that the public and Tribes would have continued access.

3.4 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, the project would continue to operate as it has in the past. None of the licensee's proposed measures or the resource agencies' recommendations and mandatory conditions would be required.

4.0 DEVELOPMENTAL ANALYSIS

In this section, we look at the project's use of the White River for hydropower generation to see what effect various proposed or recommended environmental measures would have on the cost to operate and maintain the project and on the project's power generation. Under the Commission's approach to evaluating the economics of hydropower projects, as articulated in *Mead Corporation,*[77] the Commission compares the current cost to produce project power to an estimate of the cost to provide the same amount of energy and capacity for the region using the most likely alternative source of power (cost of alternative power). In keeping with the policy described in *Mead Corporation,* our economic analysis is based on current electric power cost conditions and does not anticipate or estimate changes in fuel costs that could occur during a project's license term.

[77] *See Mead Corp.,* 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.

For each of the licensing alternatives, our analysis includes an estimate of: (1) the annualized cost of providing the individual measures considered in the EA; (2) the cost of the most likely alternative source of project power; (3) the total annual project cost (i.e., for construction, operation, maintenance, and environmental measures); and (4) the difference between the cost of the current alternative source of project power and the total annual project cost. If the difference between the cost to produce an equivalent amount of power from an alternative source and the total annual project cost is positive, the project produces power at a cost less than the cost of producing power from the most likely least-cost source of alternative power. If the difference between the alternative source of power's annual cost and the total annual project cost is negative, the project costs more to produce power than the cost to produce an equivalent amount of power from the most likely least-cost source of alternative power. This estimate helps 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.

The power and economic benefits of the project, and the comparison of the cost of each alternative for the project, are discussed in Appendix G, *Developmental Resources*. Appendix H, *Costs of Environmental Measures*, presents the cost of the environmental enhancement measures considered in our analysis.

5.0 CONCLUSIONS 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 will 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. Appendix I, *Comprehensive Development*, contains the basis for staff's recommendations and the rationale for modifying Northern States' proposal for the project. We weigh the costs and benefits of our recommended alternative against other proposed measures.

Based on our independent review of agency and public comments filed on this project and our evaluation of the environmental and economic effects of the Proposed Action and its alternatives, we selected the Staff Alternative as the preferred alternative for the project. We recommend this alternative because: (1) issuing a subsequent license for the project would allow Northern States to continue operating the project and transmit a dependable source of electrical energy; (2) the 1.2 MW of electric capacity from the project comes from a renewable resource that does not contribute to atmospheric pollution; (3) the public benefits of this alternative would exceed those of the No-Action Alternative; and (4) the recommended measures would protect and enhance aquatic, terrestrial, recreation, and cultural resources at the project.

In the following section, we make recommendations as to which environmental measures proposed by Northern States, or recommended by agencies or other entities, should be included

in any subsequent license issued for the project. In addition to Northern States' proposed environmental measures listed below, we recommend additional staff-recommended environmental measures to be included in any subsequent license issued for the project.

5.1.1 Measures Proposed by the Applicant

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

Project Facilities

- Continue maintaining the existing project facilities listed in section 2.1.1.

Project Boundary

- Modify the current project boundary to include the following land and water: (1) a 39.9-acre impoundment at the normal maximum surface elevation of 711.6 feet, including the addition of 0.1 acre of water; (2) 10.1 acres of land underlying the project facilities, including the addition of 0.3 acre associated with the south earthen embankment, 0.3 acre associated with the transmission line and transformer, and 0.6 acre associated with the access road and concrete pipe that conveys water from the dam to the surge tank; and (3) 0.3 acre of the tailrace, which would add 0.1 acre of water associated with the tailrace.

- Modify the current project boundary by removing 29.7 acres of land adjacent to the impoundment, 34.5 acres of land north of the project's access road, and 10.6 acres of land northeast of the powerhouse.

Project Operation and Environmental Measures

- To protect aquatic resources, continue operating the project in a run-of-river mode such that outflow from the project approximates inflow to the impoundment at any given time and the surface elevation of the impoundment is maintained between 710.4 and 711.6 feet.

- To protect aquatic resources, continue releasing a minimum flow of 16 cfs or inflow, whichever is less, from the minimum flow pipe to the bypassed reach.

- Notify the Commission, resource agencies, and the Bad River Tribe of planned and unplanned deviations (e.g., impoundment drawdowns), and only modify project operation for short periods of time of up to 3 weeks, after mutual agreement with the FWS, Wisconsin DNR, and the Bad River Tribe.

- Develop an operation compliance monitoring plan to document compliance with the operational requirements of any license, including the following provisions: (1) locations

of headwater monitoring gages; (2) frequency of monitoring; (3) procedures for maintaining and calibrating monitoring equipment; (4) standard operating procedures to be implemented outside of normal operating conditions, such as scheduled or emergency facility shutdowns or maintenance activities; (5) schedule for installing and operating the monitoring equipment, including a staff gage that displays the normal operating range of the impoundment (i.e., 710.4 to 711.6 feet); and (6) procedures to remove ice from the spillway as a planned deviation.

- Continue using cinders to seal the spillway gates.

- Remove trash and woody debris from the trashrack and dispose of it in an upland location outside of the White River.

- Continue to maintain the existing invasive species sign at the impoundment access site to inform boaters on how to prevent the spread of invasive species at the project.

- Continue to implement the Land Management Plan.

- To protect bald eagles at the project, review the Wisconsin NHI to determine the location of bald eagle nests and avoid vegetation management and construction activities within 660 feet of any bald eagle nests during the nesting season.

- To protect the wood turtle, implement the Wisconsin DNR's BITP/A for wood turtles, filed as Appendix E-24 of the application.

- Continue to maintain the existing project recreation facilities.

- To improve recreation safety and access, update recreation signage to comply with Part 8 of the Commission's regulations at the impoundment access site and portage route, for a total of two signs.

5.1.2 Additional Measures Recommended by Staff

Under the Staff Alternative, the project would be operated with Northern States' proposed measures identified above, and the following staff-recommended measures and modifications. We discuss the basis for the staff-recommended measures and the rationale for modifying Northern States' proposal in Appendix I, *Comprehensive Development*.

Project Boundary

- Modify the proposed project boundary to not include 2.4 acres of water associated with the bypassed reach.

Project Operation and Environmental Measures

- To protect aquatic resources, implement a 90/10 refill procedure when refilling the impoundment following planned and unplanned drawdowns.

- Modify the proposed operation compliance monitoring plan to include the following measures: (1) a detailed description of how Northern States will maintain, monitor, and document compliance with run-of-river operation, impoundment elevation limits, and minimum bypassed reach flows, including: (a) the monitoring and recording frequency for each gage and/or measuring device; and (b) a provision to maintain a log of project operation; (2) a description of the gages and other measuring devices that will be used to monitor compliance with license requirements, including the locations of the measuring devices; (3) a description of the procedures for maintaining and calibrating monitoring equipment; (4) a description of standard operating procedures to be implemented outside of normal operating conditions, including during: (a) scheduled facility shutdowns and maintenance, including ice removal from the spillway; and (b) emergency conditions such as unscheduled facility shutdowns and maintenance; and (5) a schedule for installing any monitoring equipment needed to document compliance with the operational requirements of the license, including a staff gage that displays the normal operating range of the impoundment (i.e., 710.4 to 711.6 feet).

- To protect aquatic resources from heavy metal contamination when using cinders to seal the spillway gates, continue implementing the Fly Ash/Cinders Monitoring Plan and file contaminant testing results for any new sources of cinders with the Commission for review at least 90 days prior to using the new cinders, including documentation of consultation with FWS, Wisconsin DNR, the Bad River Tribe, and the GLIFWC.

- To protect aquatic resources, develop a debris management plan with the following provisions: (1) methods, procedures, and schedules for collecting trash and debris that accumulate on the project trashrack; (2) a provision to dispose of trash and debris at suitable facilities or locations other than the White River, during normal operating conditions; (3) a description of operating conditions where debris sluicing is necessary for project safety; (4) standard operating procedures to be implemented in the event debris cannot be safely removed and debris sluicing is necessary, including consultation with the Bad River Tribe, FWS, and Wisconsin DNR prior to any debris sluicing, including the need for any protection measures during debris sluicing; and (5) file a report with the Commission, Bad River Tribe, and resource agencies no later than 14 calendar days after any debris sluicing, including the reason why debris sluicing was necessary, any comments from the Tribe or resource agencies, documentation of any observed or reported environmental effects, and where applicable, a description of measures implemented to prevent debris sluicing in the future.

- To protect wood turtles, restrict grading on gravel access roads and parking areas during the wood turtle nesting season (May 20 through September 18).

- Implement the following measures to protect bald eagles that occur in the project boundary: (1) prior to clearing trees within the project boundary, survey the area to be cleared for bald eagle nests; and (2) if such nests are discovered, then: (a) consult with

Interior and Wisconsin DNR on measures to be implemented prior to tree-clearing activities, if any, and (b) perform tree-clearing activities in accordance with FWS's National Bald Eagle Management Guidelines (FWS, 2007), including avoiding any tree clearing within 660 feet of any known eagle nests, as proposed by Northern States, and any ground-disturbing activities within 0.25 mile of any known eagle nests during the nesting season (December 1 through August 31).

- To protect previously unidentified cultural resources that are discovered during project operation, maintenance, or other project-related work involving land-disturbing activities, stop all land-clearing and land-disturbing activities in the vicinity of the resources and consult with the Wisconsin SHPO, Bad River Tribe, and other interested Tribes, to determine the need for any cultural resource studies or measures.

- To protect cultural resources from any project modifications not specifically authorized by any subsequent license, consult with the Wisconsin SHPO, Bad River Tribe, and other interested Tribes, prior to implementing such project modifications, to determine the effects of the activities and the need for any cultural resource studies or measures.

5.1.3 Conclusion

Based on our review of the agency and public comments filed for the project and our independent analysis pursuant to sections 4(e), 10(a)(1), and 10(a)(2) of the FPA, we conclude that licensing the project, as proposed by Northern States with the additional staff-recommended measures and modifications, would be best adapted to a plan for improving the White River Basin.

5.2 UNAVOIDABLE ADVERSE EFFECTS

Continued operation of the project would result in ongoing resident fish mortality due to entrainment. However, our analysis in section 3.3.2.2, *Fish Impingement and Entrainment*, indicates that the level of entrainment mortality would not significantly affect resident fish populations in the impoundment.

5.3 FISH AND WILDLIFE AGENCY RECOMMENDATIONS

Under the provisions of section 10(j) of the FPA, a hydroelectric license issued by the Commission should 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 June 14, 2024, REA notice, Interior filed 12 recommendations under section 10(j) on August 13, 2024. Appendix J, *Fish and Wildlife Agency Section 10(j)*

Recommendations, lists the recommendations filed pursuant to section 10(j) for the project. Appendix J also 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 the FPA.

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 16 qualifying comprehensive plans that are applicable to the project. The comprehensive plans identified for this project are presented as Appendix K, *Comprehensive Plans*. No inconsistencies were found.

6.0 FINDING OF NO SIGNIFICANT IMPACT

If the project is relicensed as proposed, with the additional staff-recommended measures and modifications, the project would continue to operate as it does today, while providing protection and enhancements for aquatic, terrestrial, recreation, and cultural resources in the project area.

Based on our independent analysis, issuance of a subsequent license for the project, as proposed with additional staff-recommended measures and modifications, would not constitute a major federal action significantly affecting the quality of the human environment.

7.0 LITERATURE CITED

The literature cited in this EA is presented as Appendix L.

8.0 LIST OF PREPARERS

The list of preparers of this EA is presented as Appendix M.

APPENDIX A

GLOSSARY OF TERMS

Archaeological resources: The material remains of past human activity, including, but not limited to: man-made or modified objects; refuse left through human occupation and consumption; and earthworks and structural ruins associated with past human activity or occupation.

Architectural resources: Extant structures or infrastructure that may retain importance based on physical aspects of design, materials, form, style, or workmanship.

Area of Potential Effects (APE): The geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties (36 C.F.R. § 800.16(d)).

Burst swim speed: The fastest swimming speed that can be maintained for approximately 20 seconds.

Capacity benefit: The benefit a project receives for providing capacity to the grid, which may be in the form of a dependable capacity credit or credit for monthly capacity provided.

Cyprinid: A group of freshwater fish in the family Cyprinidae, including carps and minnows.

Diameter at breast height: The diameter of a tree as measured about 4 to 4.5 feet above the ground.

Dissolved oxygen (DO): One of the most commonly employed measures of water quality, DO is the amount of gaseous oxygen in a liquid. Low DO levels can adversely affect fish and other aquatic life. In this document, DO is expressed in units of milligrams per liter (mg/L).

Emergent vegetation: Aquatic plants that have leaves and stems that extend above the surface of the water or soil.

Exceptional Resource Water: Surface waters that provide valuable fisheries, hydrologically or geologically unique features, outstanding recreational opportunities, unique environmental settings, and are not significantly impacted by human activities.

Freshwater wetlands: Wetlands that do not experience intrusions of salt water.

Hibernaculum: A place where a bat hibernates over the winter, such as in a cave.

Historic properties: Cultural resources that are eligible for listing or listed on the National Register of Historic Places.

Intake velocity: the velocity of incoming water flow at the trashrack.

Littoral zone: Nearshore habitat where photosynthetically active radiation penetrates to the lake bottom in sufficient quantities to support photosynthesis. A subclass of lacustrine wetlands.

National Register of Historic Places: A catalog of America's significant districts, sites, buildings, structures, and objects related to architecture, archeology, engineering, and culture.

Nationwide Rivers Inventory: A listing of river segments in the United States that are believed to possess one or more "outstandingly remarkable" natural or cultural values judged to be at least regionally significant. NRI river segments are potential candidates for inclusion in the National Wild and Scenic River System.

Palustrine wetlands: Wetlands or deep-water habitat that have areas of open water greater than 8 hectares (Cowardin et al., 1979).

Riverine wetlands: Wetlands or deep-water habitats that occur within a channel (Cowardin et al., 1979).

Species of special concern: Species about which some problem of abundance or distribution is suspected but not yet proved.

Subsequent License: license for a water power project that is issued under Part I of the FPA after the expiration of a minor license that is not subject to sections 14 and 15 of the FPA. 18 C.F.R. § 16(2)(d) (2020).

Undertaking: A project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a federal agency, including those carried out by or on behalf of a federal agency; those carried out with federal financial assistance; and those requiring a federal permit, license, or approval." 36 C.F.R. § 800.16 (y) (2022). For purposes of this NEPA document, the undertaking is the potential issuance of a subsequent license for the project.

White-nose syndrome: 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.

White-nose syndrome buffer zone: 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.

Wisconsin Historic Preservation Database: Repository of recorded cultural resources, cultural resource surveys, state, and National Register listed and eligible properties.

APPENDIX B

FIGURES

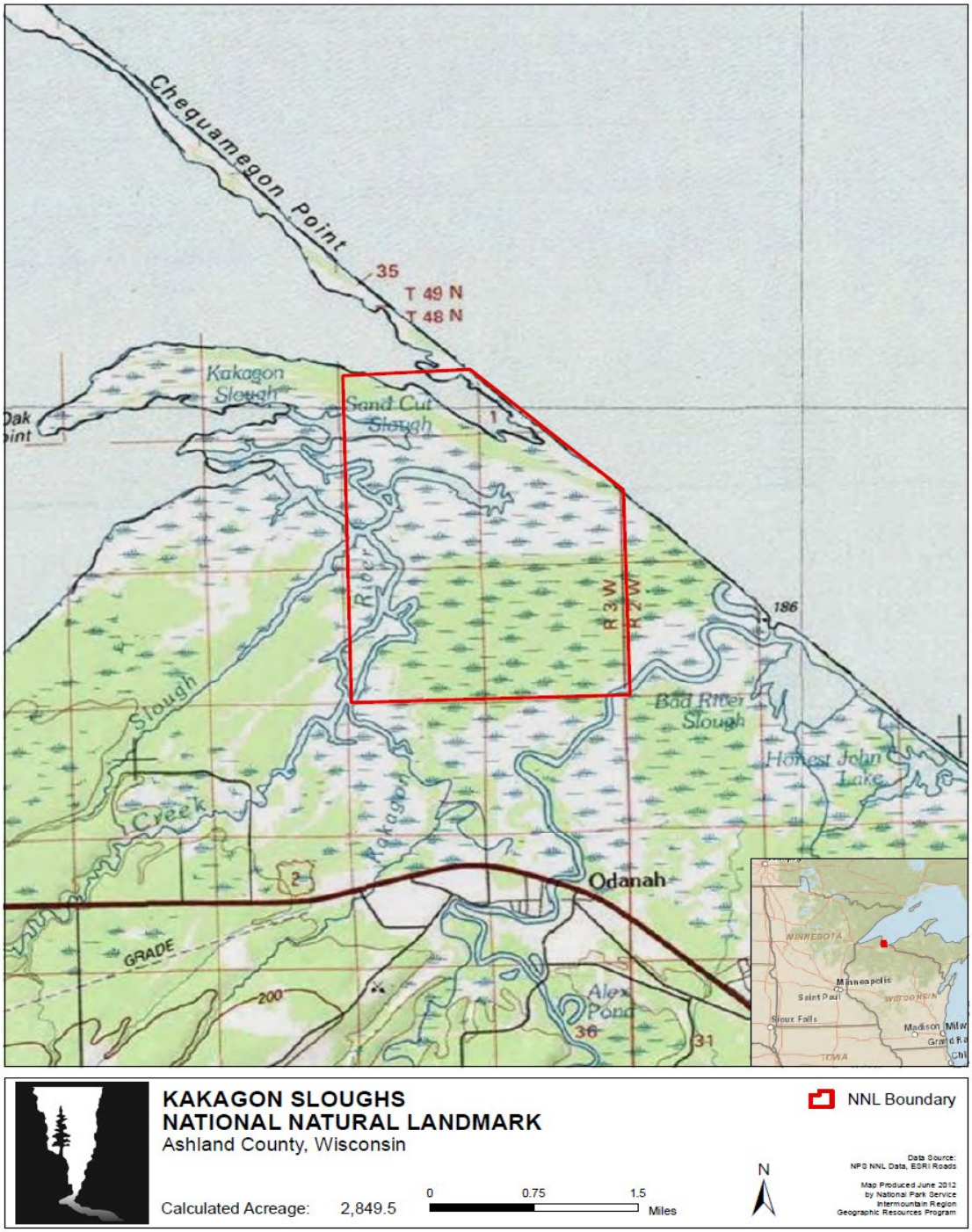

Figure B-1. Location of Kakagon Sloughs National Natural Landmark(Source: Northern States, 2024b).

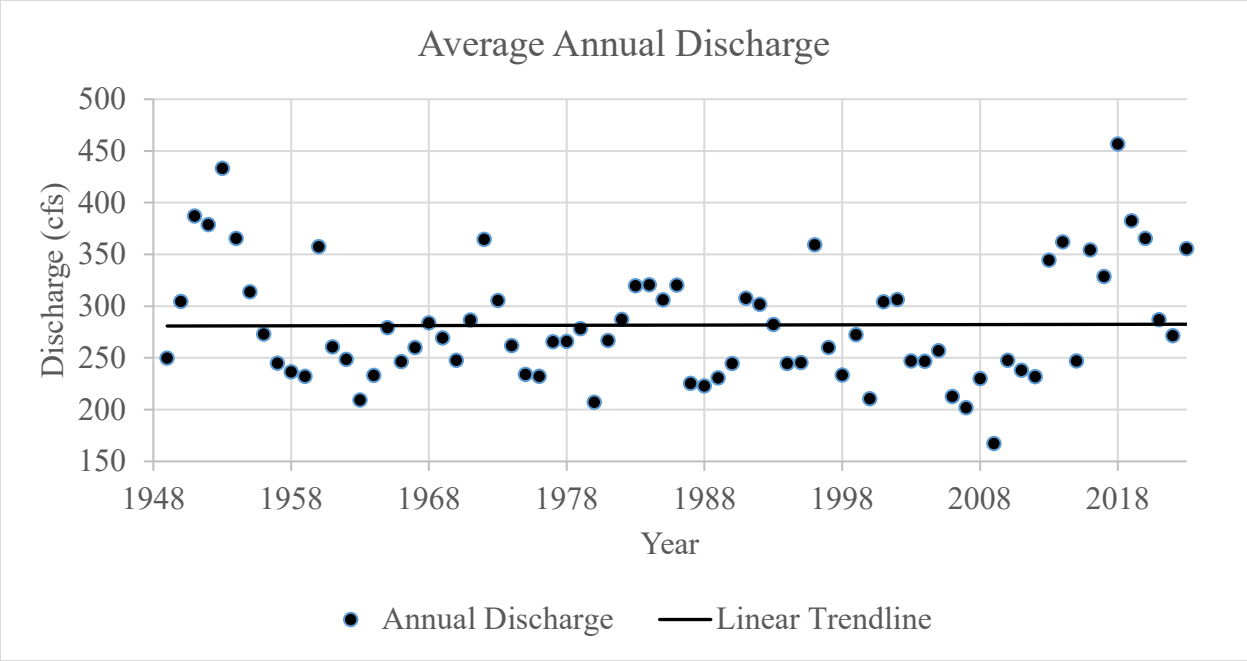

Figure B-2. Average annual discharge from 1949 through 2023 at USGS gage 04027500 located in the tailrace. (Source: USGS, 2025; Staff).

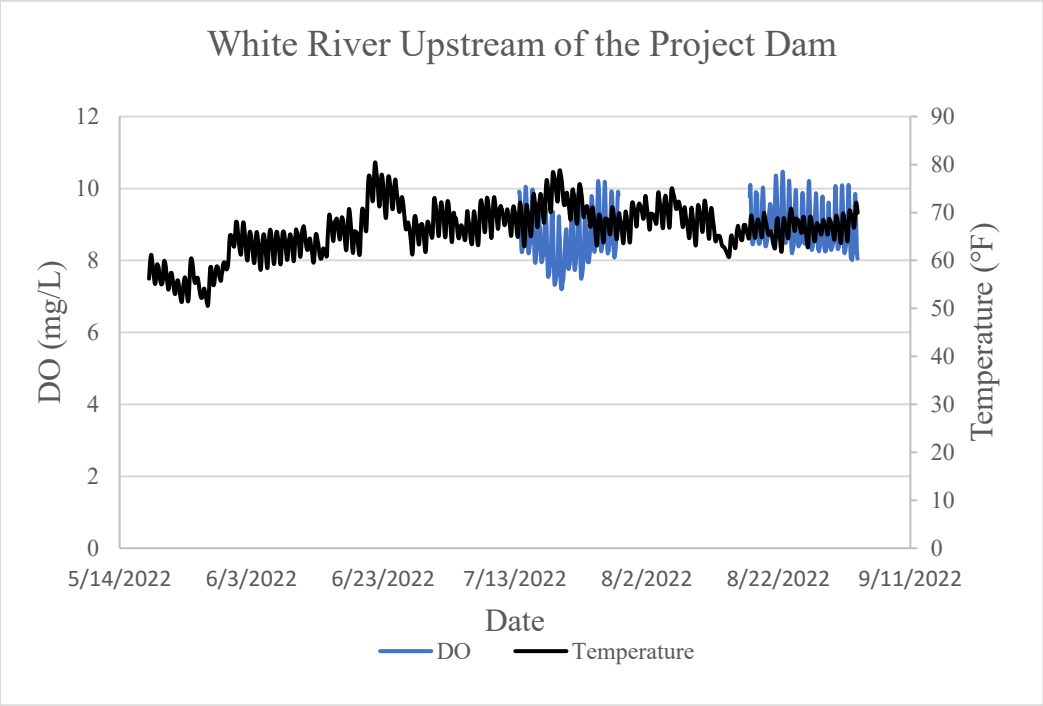

Figure B-3. Hourly DO and water temperature upstream of the project(Source: Northern States, 2024a; Staff).

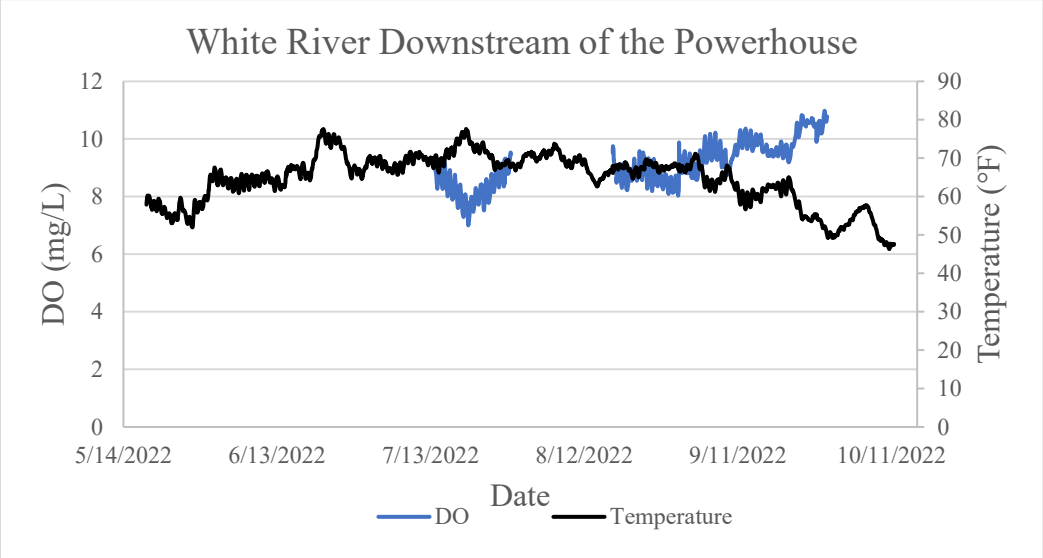

Figure B-4. Hourly DO and water temperature downstream of the powerhouse(Source: Northern States, 2024a; Staff).

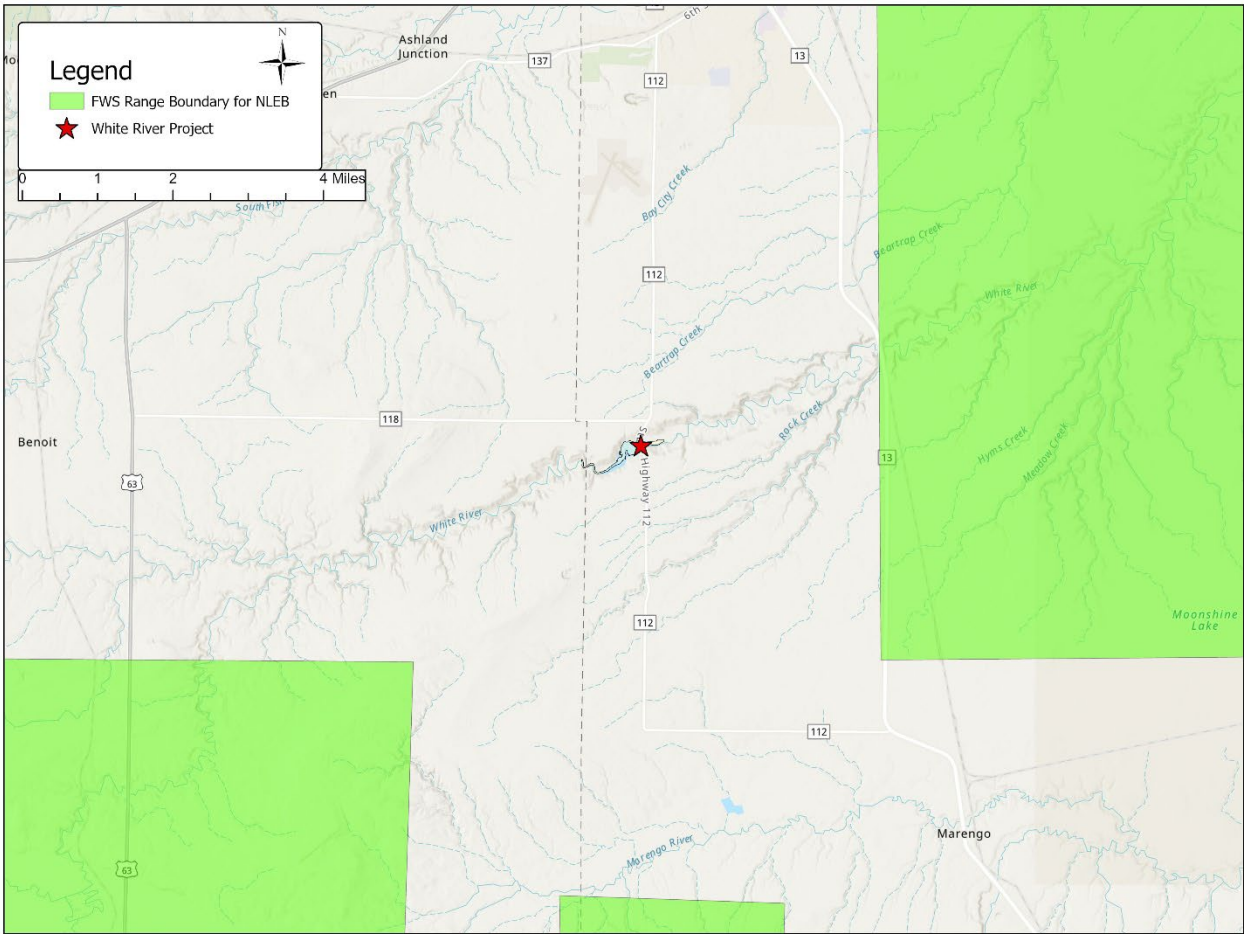

Figure B-5. FWS range boundary for northern long-eared bat in the project vicinity(Source: FWS, 2024d, as modified by Staff).

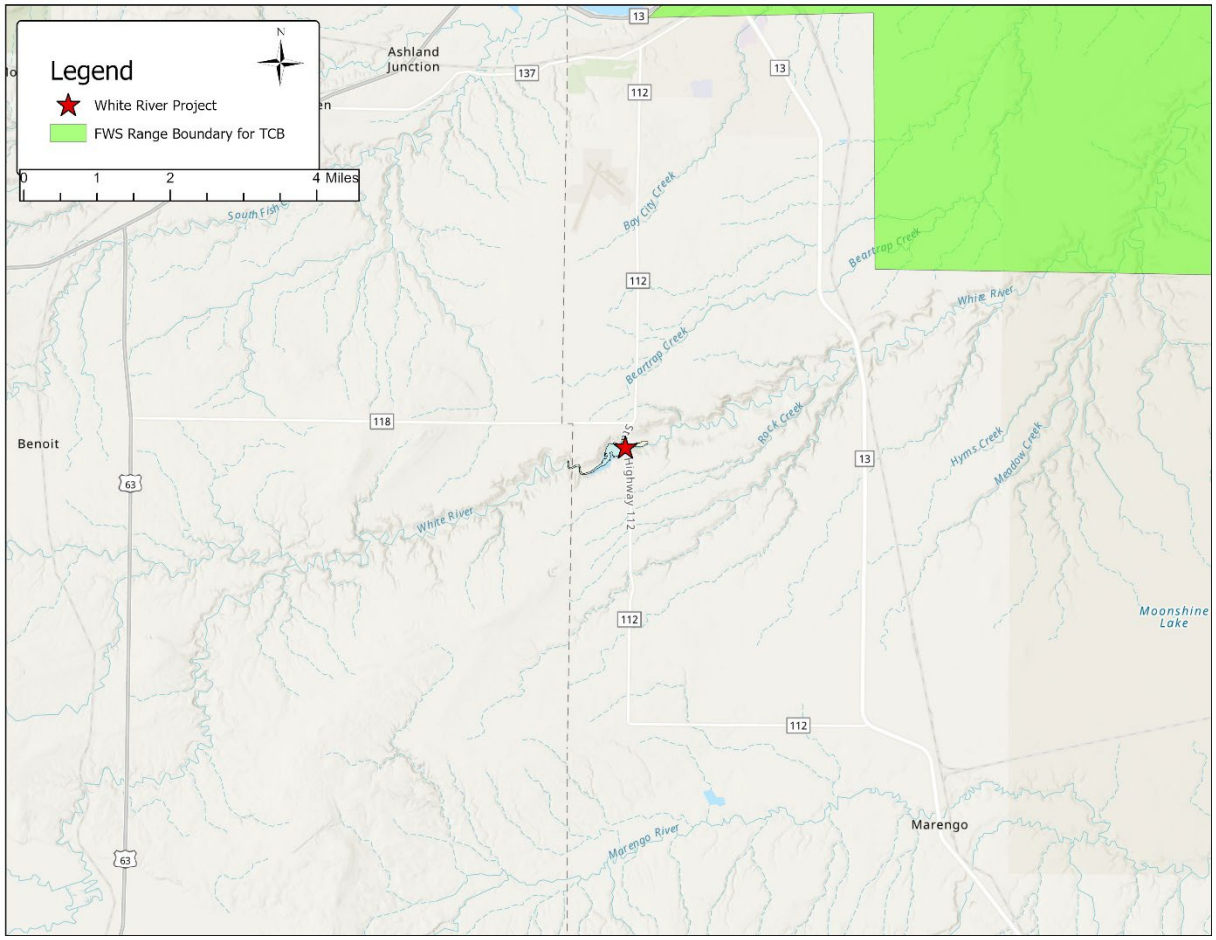

Figure B-6. FWS range boundary for tricolored bat in the project vicinity(Source: FWS, 2024e, as modified by Staff).

APPENDIX C

TABLES

Table C-1. River flows (in cubic feet per second) by month for the White River Project based on USGS Gage No. 04027500, on the White River near Ashland, Wisconsin, from 1948 through 2021(Source: Northern States, 2023, as modified by Staff).

Month	Flow (cfs)				
	Minimum	90% Exceedance	Median	10% Exceedance	Maximum
January	89	146	180	235	551
February	94	150	185	236	883
March	76	170	225	608	3,110
April	103	222	427	1,100	3,590
May	120	187	268	675	3,050
June	96	164	228	475	6,390
July	100	149	198	373	3,940
August	71	152	186	307	4,100
September	61	150	193	330	2,800
October	134	160	204	365	2,500
November	65	162	215	345	1,710
December	70	138	193	270	954
Annual	61	156	210	463	6,390

Table C-2. Daily maximum temperatures for Class II trout streams(Source: Wisconsin State Legislature, 2024).

Month	Daily Maximum Water Temperature (°F)
January	68
February	68
March	69
April	70
May	72
June	72
July	73
August	73
September	72
October	70
November	69
December	69

Table C-3. Fish species located in the White River during the fisheries survey conducted in May through September 2022(Source Northern States, 2023, as modified by Staff).

Common Name	Scientific Name	Total Collected	Relative Abundance
Black bullhead	*Ameiurus melas*	1	0.04
Blacknose darter	*Notropis heterolepis*	9	0.38
Bluntnose minnow	*Pimephales notatus*	44	1.84
Brown trout	*Salmo trutta*	28	1.17
Central stoneroller	*Campostoma anomalum*	1	0.04
Chestnut lamprey	*Ichthyomyzon castaneus*	1	0.04
Common shiner	*Luxilus cornutus*	964	40.35
Creek chub	*Semotilus atromaculatus*	76	3.18
Fathead minnow	*Pimephales promelas*	10	0.42
Golden redhorse	*Moxostoma erythrurum*	1	0.04
Hornyhead chub	*Nocomis biguttatus*	127	5.32
Johnny darter	*Etheostoma nigrum*	42	1.76
Largemouth bass	*Micropterus salmoides*	4	0.17
Logperch	*Percina caprodes*	27	1.13
Longnose dace	*Rhinichthys cataractae*	256	10.72
Northern pike	*Esox lucius*	3	0.13
Pumpkinseed	*Lepomis gibbosus*	5	0.21
Rainbow trout	*Oncorhynchus mykiss*	1	0.04
Rock bass	*Ambloplites rupestris*	14	0.59
Ruffe	*Gymnocephalus cernuus*	1	0.04
Shorthead redhorse	*Moxostoma macrolepidotum*	351	14.69
Smallmouth bass	*Micropterus dolomieu*	118	4.94
Trout-perch	*Percopsis omiscomaycus*	208	8.71
Walleye	*Sander vitreus*	4	0.17
White sucker	*Catostomus commersonii*	85	3.56
Yellow perch	*Perca flavescens*	8	0.33

APPENDIX D

STATUTORY AND REGULATORY REQUIREMENTS

Federal Power Act

Section 18 Fishway Prescriptions

Section 18 of the Federal Power Act (FPA), 16 U.S.C. § 811, states that the Commission must 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 August 13, 2024, Interior requested that the Commission include a reservation of authority to prescribe fishways for the project.

Section 10(a) Recommendations

Under section 10(a) of the FPA, 16 U.S.C. § 803(a)(1), each hydroelectric license issued by the Commission must be best adapted to a comprehensive plan for improving or developing a waterway or waterways for the use or benefit of interstate or foreign commerce; for the improvement and utilization of waterpower development; for the adequate protection, mitigation, and enhancement of fish and wildlife; and for other beneficial public uses, including irrigation, flood control, water supply, recreation, and other purposes.

On August 13, 2024, Interior filed six recommendations under section 10(a), pertaining to maintenance releases and drawdowns, protection of culturally significant species, protection of historic properties, Tribal access to project lands, and post-licensing consultation with the Tribes. On the same day, the Bad River Tribe filed ten recommendations under section 10(a) pertaining to consultation during impoundment drawdowns, operation compliance monitoring, the use of cinders to seal project gates, lake sturgeon monitoring, management of woody debris, invasive species monitoring, historic properties management, access to culturally significant sites, consultation with the Tribal Historic Preservation Officer, and protection of treaty rights and cultural uses.

We discuss these section 10(a) recommendations in section 3.3, *Proposed Action and Action Alternatives*, and Appendix I, *Comprehensive Development*.

Section 10(j) Recommendations

Under section 10(j) of the FPA, 16 U.S.C. § 803(j)(1), 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 in any subsequent license 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 August 13, 2024, Interior timely filed 12 recommendations pursuant to section 10(j) for the project. These recommendations are summarized in Appendix J, *Fish and Wildlife Agency Section 10(j) Recommendations* and discussed in Appendix I, *Comprehensive Development*.

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 a project would comply with applicable provisions of the CWA or a waiver of certification by the appropriate state agency. The failure to act on a request for certification within a reasonable period of time, not to exceed 1 year, after receipt of such request constitutes a waiver.

On August 6, 2024, Northern States applied to the Wisconsin Department of Natural Resources (Wisconsin DNR) for a section 401 certification for the project. Wisconsin DNR received the application on the same day. On August 21, 2024, Commission staff issued a notice pursuant to 40 C.F.R. § 121.6 and section 4.34(b)(5) of the Commission's regulations, notifying the Wisconsin DNR that the reasonable period of time to act on the certification request is 1 year, and if Wisconsin DNR failed or refused to act on the request by Augst 6, 2025, then the agency's certifying authority would be deemed waived pursuant to section 401 of the CWA. Wisconsin DNR has yet to act on the certification request.

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. According to the U.S. Fish and Wildlife Service's (FWS) Information for Planning and Consultation (IPaC) system, the federally listed endangered gray wolf (*Canis lupus*), threatened Canada lynx (*Lynx canadensis*), and threatened Fassett's locoweed (*Oxytropis campestris var. chartacea*) have the potential to occur at the project.[78] Also, according to the IPaC system, the proposed threatened monarch butterfly (*Danaus plexippus)* has the potential to occur at the project. No critical habitat for these species occurs within lands affected by the project.

Although IPaC initially stated that the federally listed endangered NLEB (*Myotis septentrionalis*) and the proposed endangered TCB (*Perimyotis subflavus*) have the potential to occur at the project,[79] the most recent IPaC list does not include the species.[80] Commission staff reviewed the FWS's range maps for these species and conclude that the bats do not have the

[78] *See* Commission staff's May 14, 2025 Memorandum on Endangered Species Act List.

[79] *See* Commission staff's August 14, 2023 Memorandum on Endangered Species Act List.

[80] *See* Commission staff's May 14, 2025 Memorandum on Endangered Species Act List.

potential to occur at the project (Figures B-5 and B-6, respectively). Our analyses of project effects on the federally listed and proposed species are presented in Appendix E, *Biological Assessment.* Based on the available information, we conclude that relicensing the project would: (1) have no effect on the NLEB, gray wolf, Canada lynx, and Fawcett's locoweed; and (2) not likely jeopardize the continued existence of the TCB or monarch butterfly.

Coastal Zone Management Act

Under section 307(c)(3)(A) of the Coastal Zone Management Act (CZMA), 16 U.S.C. § 1456(3)(A), the Commission cannot issue a license for a project within or affecting a state's coastal zone unless the state CZMA agency concurs with the license applicant's certification of consistency with the state's CZMA program, or the agency's concurrence is conclusively presumed by its failure to act within 6 months of its receipt of the applicant's certification.

The Wisconsin Department of Administration (Wisconsin DOA) is the state agency responsible for administering the state's CZMA program. On February 23, 2023, Northern States submitted a request to Wisconsin DOA's Coastal Management Program to determine whether the White River Project is consistent with the state's CZMA program.[81] Wisconsin DOA did not respond to Northern States. Because Wisconsin DOA did not respond within 180 days of its receipt of the consistency certification, Wisconsin DOA's concurrence with Northern States' CZMA certification is presumed.

National Historic Preservation Act

Section 106 of the National Historic Preservation Act (NHPA), 54 U.S.C. § 306108, requires that every federal agency "take into account" how each of 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).

By letter issued on July 19, 2019, the Commission initiated consultation with the Bad River Tribe, Leech Lake Band of Ojibwe, Little Traverse Bay Bands of Odawa Indians, Miami Tribe of Oklahoma, Fond du Lac Band of Lake Superior Chippewa, Fort Belknap Indian Community, Grand Portage Band of Lake Superior Chippewa, Keweenaw Bay Indian Community, Lac Courte Oreilles Band of Lake Superior Chippewa Indians, Lac Vieux Desert Band of Lake Superior Chippewa Indians, Lac du Flambeau Band of Lake Superior Chippewa Indians, Menominee Indian Tribe, Red Cliff Band of Lake Superior Chippewa, Sokaogon Chippewa Community, Mille Lacs Band of Ojibwe, Minnesota Chippewa Tribe, St. Croix Chippewa Indians of Wisconsin, and White Earth Nation. Commission staff followed up with

[81] A copy of the request is available in Northern States' July 21, 2023, Final License Application at Volume 4, CZMA Coordination.

each tribe by telephone on August 30, 2019, and by email on September 3, 2019.[82] The Bad River Tribe, Miami Tribe of Oklahoma, Leech Lake Band of Ojibwe, and Little Traverse Bay Bands of Odawa Indians responded to Commission staff with interest in consulting on the project. The remining Tribes did not respond to staff with interest in consulting on the project.

In a notice issued on September 16, 2020,[83] Commission staff designated Northern States as its non-federal representative for the purposes of conducting section 106 consultation under the NHPA. Pursuant to section 106, and as the Commission's designated non-federal representative, Northern States consulted with the Wisconsin State Historic Preservation Office (Wisconsin SHPO), and potentially affected Tribes, to identify historic properties, determine National Register eligibility, and assess potential adverse effects on historic properties within the project's area of potential effects (APE).

On July 29, 2020, Northern States provided the pre-application document (PAD) to the Tribes that staff initially contacted on July 19, 2019, and the Stockbridge-Munsee Community Band of Mohican Indians and the Oneida Nation.

On September 4, 2020, the Wisconsin SHPO concurred that the project facilities are not eligible for listing in the National Register.[84] On February 15, 2023, the Wisconsin SHPO concurred with Northern States' December 1, 2022 Archaeological Survey Report, including that no archaeological sites were identified during a survey of the impoundment shoreline and that Northern States should continue to search all eroded areas of the impoundment shoreline for archaeological resources every 10 years.[85]

On March 6, 2023, Northern States provided the draft application to the Tribes. On July 21, 2023, Northern States provided the license application to the Tribes. The Bad River Tribe filed comments.[86] The Bad River Tribe also filed an additional study request, which Commission staff responded to in a letter issued on March 19, 2024. No other Tribes filed comments on the PAD, draft application, or license application.

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[82] *See* Commissions staff's March 12, 2020 Memorandum on Consultation with Tribes for the White River Hydroelectric Project No. 2444.

[83] See *Notice of Intent to File License Application and Request to Use the Traditional Licensing Process.* Available at: https://elibrary.ferc.gov/eLibrary/filedownload?fileid=0209FFA5-66E2-5005-8110-C31FAFC91712

[84] *See* Northern States' July 21, 2023, Final License Application at Volume 4, *Documentation of Consultation.*

[85] *Id.* at Appendix B-228.

[86] The Bad River Tribe filed comments with the Commission on December 28, 2020, June 2, 2023, July 31, 2023, September 8, and 19, 2023 and December 13, 2023.

On August 10, 2023, Commission staff issued a letter to the Bad River Tribe, Miami Tribe of Oklahoma, Leech Lake Band of Ojibwe, and Little Traverse Bay Bands of Odawa Indians, to determine if any of the consulting Tribes had an interest in participating in a consultation meeting for the project. Commission staff emailed the letter to the Tribes on August 10, 2023, and contacted the Tribes by telephone on September 5, 2023. As part of this outreach, Commission staff also established contact with the Red Cliff Band of Lake Superior Chippewa Indians of Wisconsin, who expressed interest in consulting on the project. However, the Miami Tribe indicated that it is no longer interested in consulting on the project's relicensing.[87] Although the Bad River Tribe initially expressed interest in a consultation meeting with Commission staff, the Tribe did not respond to subsequent requests from Commission staff to schedule the meeting.[88] Also, although the Tribe initially expressed interest in cooperating with Commission staff in the preparation of the EA, the Tribe did not respond to subsequent requests from Commission staff about the cooperating agency request.[89]

On July 2, 2024, the Fond du Lac Band of Lake Superior Chippewa contacted staff by electronic mail to request archaeological reports associated with the project's relicensing. The same day staff reached the Tribe by telephone to provide information on how to obtain the requested documents.[90]

Our analysis presented in section 3.3.6.2, *Environmental Effects*, concludes that relicensing the project would not adversely affect any historic properties. Therefore, the Commission's requirements pertaining to section 106 of the NHPA have been satisfied.

[87] *See* Commission staff's October 16, 2023 Memorandum on Tribal Outreach.

[88] *See* Commission staff's April 8, 2024 Memorandum on Tribal Outreach.

[89] *See* Commission staff's April 25, 2024 Letter on Request for Cooperating Agency Status.

[90] Archaeological reports were filed as privileged in compliance with 18 C.F.R. § 388.112. See Commission Staff's July 5, 2024 Memorandum on Tribal Outreach.

APPENDIX E

BIOLOGICAL ASSESSMENT

Affected Environment

Northern Long-Eared Bat

The northern long-eared bat (NLEB) was listed as threatened by the U.S. Fish and Wildlife Service (FWS) on May 4, 2015,[91] and reclassified as endangered on November 29, 2022,[92] with an effective date of March 31, 2023.[93] No critical habitat has been designated for this species.

The NLEB is a medium-sized bat species with a body length of 3 to 3.7 inches, wingspan of 9 to 10 inches, and longer ears than other species in the *Myotis* genus (FWS, 2023). The species ranges across 37 states, including most of the central and eastern United States, as well as the southern and central provinces of Canada, coinciding with the greatest abundance of forested areas.

The NLEB is insectivorous and found in a variety of forested habitats in the summer season. During this time, bats roost singly or in colonies underneath bark, in cavities, or in crevices of both live and dead trees that are equal to or greater than 3 inches in diameter at breast height. In the fall season, NLEBs leave their forest habitats to hibernate in caves, mines, and other similar habitat. The bats arrive at hibernacula between August and September, enter hibernation between October and November, and emerge between March and April. During the winter, small groups typically hibernate in cracks and crevices in the walls or ceilings of caves or abandoned mines with high humidity, cool temperatures, and no air currents, although hibernation has also been observed in buildings, railroad tunnels, and other man-made structures.

Hibernacula and surrounding forest habitats play important roles in the life cycle of the species, beyond the time when bats are overwintering, including for fall-swarming[94] and spring-staging[95] activities. Reproduction is limited to one pup per year in late spring and, therefore,

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[91] 80 Fed. Reg. 17,974 (Apr. 2, 2015).

[92] 87 Fed. Reg. 73,488 (Nov. 30, 2022).

[93] 88 Fed. Reg. 4,908 (Jan. 26, 2023).

[94] Fall-swarming occurs between summer and winter hibernation and provides opportunities for the introduction of juveniles to potential hibernacula, copulation, and gathering at stop-over sites on migratory pathways between summer and winter regions.

[95] Spring-staging occurs between winter hibernation and migration to summer habitat and allows bats to gradually emerge from hibernation and exit hibernacula to feed and then re-enter the same or alternative hibernacula to resume daily bouts of torpor (i.e., a state of mental or physical inactivity).

populations can be slow to rebound from anthropogenic and naturally occurring mortality events. The primary threat to this species is white-nose syndrome,[96] which was first observed in New York state in 2006 and has since spread beyond the Northeast and into the Midwest and Southeast (FWS, 2023). Other threats include impacts to hibernacula and loss or degradation of summer habitat.

The project is located within the white-nose syndrome buffer zone for this species (FWS, 2020).

Gray Wolf

The gray wolf is federally listed as endangered in most of the lower 48 contiguous states.[97] The gray wolf is listed as threatened in Wisconsin and endangered in all or part of 44 other states. The gray wolf was delisted by FWS, effective January 4, 2021,[98] but the delisting rule was vacated by federal court on February 10, 2022. Gray wolves are the largest member of the canid family with adults weighing 40-80 pounds. They are predominantly gray or black and have a broader muzzle than coyotes. Gray wolves have a narrow chest and typically measure 5 to 6 feet in length (Wisconsin DNR, 2024a).

This highly adaptable species can exist in a variety of habitats provided they have access to sufficient prey. Gray wolves can thrive in range habitats from temperate forests to grasslands and deserts, which reflects their adaptability as a species. Prey includes medium and large hooved mammals, such as white-tailed deer. Once established, packs are very resilient barring human-caused mortality. Gray wolves are endangered mostly due to negative human encounters that lead to mortality, injury, and disease. Habitat loss and fragmentation create a greater likelihood that wolves will encounter humans, domestic animals, and various human infrastructure (Wisconsin DNR, 2024a). These encounters can result in wolves being shot intentionally by unauthorized individuals, hit by vehicles, being controlled by government agents after becoming involved in depredations on domestic animals, being trapped or shot accidentally, or contracting diseases from domestic dogs. Fragmentation of habitat, with resulting areas becoming too small for populations with long-term viability, is a threat in areas around human population centers.

No critical habitat for this species has been designated within the project vicinity (FWS, 2024c).

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[96] White-nose syndrome is the main threat to the northern long-eared bat and has caused precipitous declines in bat numbers (in many cases, 90 to 100%) where the disease occurs.

[97] 43 Fed. Reg. 9,607 (Mar. 9, 1978).

[98] 85 Fed. Reg. 69778 (Nov. 3, 2020).

Canada Lynx

The Canada lynx was listed as threatened on March 24, 2000.[99] 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 uncommon in Wisconsin. There are no known established populations of lynx in Wisconsin, although lynx are thought to cross into Wisconsin from Canada periodically.[100] 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 abundant 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 (FWS, 2024a).

Fassett's Locoweed

Fassett's locoweed was listed as threatened on September 28, 1988.[101] Fassett's locoweed is an herbaceous perennial and member of the legume family. Fassett's locoweed grows along the shorelines of landlocked, hardwater lakes where the Cambrian sandstone bedrock is overlain by sandy glacial drift. Nearly all lakes with historical populations of the species are less than 37 acres in size and occur at approximately 1,148 feet elevation. Dependent upon groundwater seepage for their water supply, most are shallow (maximum depth of less than 10 feet) and subject to frequent, large fluctuations in water level. Fassett's locoweed is found along open shoreline and, to a lesser extent, on higher ground under the partial shade of adjacent vegetation. It grows on gentle, sand-gravel slopes and is absent from flat, low, mucky shorelines. In all cases, Fassett's locoweed occurs in areas that are completely exposed to sunlight or receive only partial shade from other species (FWS, 1991).

Tricolored Bat

On September 14, 2022, FWS proposed to list the tricolored bat (TCB) as endangered,[102] based on the range-wide impacts of white-nose syndrome that have caused estimated declines of more than 90% in affected colonies. TCBs are known to occur in 39 states, including Wisconsin (FWS, 2024d). No critical habitat is being designated because current or threatened destruction,

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[99] 65 Fed. Reg. 16,053 (Mar. 24, 2000).

[100] *See* Wisconsin DNR's Furbearers webpage (https://dnr.wi.gov/topic/wildlifehabitat/furbearers.html), last accessed by staff on October 23, 2024.

[101] 53 Fed. Reg. 37,970 (Sept. 28, 1988).

[102] 87 Fed. Reg. 56,381 (Sept. 14, 2022).

modification, or curtailment of the species' habitat or range is not having large range-wide effects on the species.

Male and female TCBs converge at cave and mine entrances between mid-August and mid-October to swarm and mate. During the winter, TCBs hibernate in caves and mines, although in some areas where caves are sparse, TCBs may hibernate in road-associated culverts and sometimes in tree cavities and abandoned water wells.

During the spring, summer, and fall (i.e., non-hibernating seasons), TCBs disperse and primarily roost in foliage of live or recently dead deciduous hardwood trees. Female TCBs exhibit high site fidelity, returning year after year to the same summer roosting locations. Female TCBs form maternity colonies and switch roost trees regularly (e.g., between 1.2 days and 7 days at roost trees in Indiana). Females typically give birth to two pups between late June and early July. Limited reproductive potential severely limits the ability of bat populations to respond quickly to perturbations. Wooded uplands within the project boundary contain suitable habitat for tricolored bat summer roosting and foraging activities.

Monarch Butterfly

FWS proposed to list the monarch butterfly as a threatened species on December 12, 2024.[103] Adult monarch butterflies rely on diverse food sources during breeding and migration, including milkweed species (genus Asclepias) and nectar-rich flowers. Monarch butterflies are also dependent on milkweed species as host plants during egg-laying and larval development. In eastern North America, the monarch butterfly migrates between Mexico and Canada over a period of two to three successive generations. In Wisconsin, the monarch butterfly may be present during the summer months (FWS, 2021a).

The project is located within the range of the monarch butterfly. Although there is no documentation of the monarch butterfly at the project, milkweed plants that provide suitable habitat for monarch butterfly reproduction and foraging could potentially occur within the project boundary. Swamp milkweed (*Asclepias incarnata*), a native wetland plant used by monarch butterflies, was observed at the project during the Invasive Species Study.

Environmental Effects

Northern Long-Eared Bat and Tricolored Bat

To protect the NLEB and TCB, Northern States proposes to implement the Wisconsin DNR's Broad Incidental Take Permit and Broad Incidental Take Authorization (BITP/A) for Wisconsin Cave Bats, filed as Appendix E-23 of the application. The BITP/A includes measures for excluding/removing bats from structures and restricting tree cutting during maintenance of project facilities.

[103] 89 Fed. Reg. 100,662 (Dec. 12, 2024).

Our Analysis

Although IPaC initially stated that NLEB and TCB have the potential to occur at the project,[104] the most recent IPaC list does not include the species. [105] There is no documentation of NLEB or TCB at the project. According to the FWS's range maps for these species, the project is at least 3 miles away from the furthest extent of the known range of the species (Figures B-5 and B-6). Because NLEB and TCB do not occur at the project, relicensing the project would have no effect on NLEB and would not jeopardize the continued existence of the TCB. Therefore, Northern States' proposal to implement the Wisconsin DNR's BITP/A for Wisconsin Cave Bats would not benefit NLEB or TCB.

Gray Wolf

Northern States does not propose any measures for gray wolf, and no agency recommendations were received for gray wolf.

Our Analysis

Wisconsin DNR actively monitors gray wolf populations in the state and reported that in 2022-2023, there were 23 confirmed gray wolf sightings and an estimated 360 individuals in zone 1 of the state, which includes portions of the 8 northwestern-most Wisconsin counties and all of Bayfield and Ashland counties (Wisconsin DNR, 2024b). There is no documentation of gray wolf at the project. Forested areas that could provide suitable habitat for the gray wolf are present at the project and prey species are common to the area. However, there is no indication that project operation and maintenance are affecting the gray wolf or its habitat. Also, Northern States is not proposing any land-disturbing activities, construction, or changes to project facilities operation that would affect gray wolf, or its habitat and food availability. Because Northern States is not proposing any land-disturbing activities or modifications to project facilities or operation that would affect gray wolf, and there are no known occurrences of gray wolf at the project, relicensing the project would have no effect on the gray wolf.

Canada Lynx

Northern States does not propose any measures for Canada Lynx, and no agency recommendations were received for Canada Lynx.

Our Analysis

There is no documentation of Canada lynx at the project, and there is no suitable habitat characterized by deep snow and dense horizontal forest cover that support adequate densities of snowshoe hares. Lynx may be transients in the project area during mass dispersal events following cyclic decreases in snowshoe hare abundance in more northern home territories.

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[104] *See* Commission staff's August 14, 2023 Memorandum on Endangered Species Act List.

[105] *See* Commission staff's May 14, 2025 Memorandum on Endangered Species Act List.

Northern States is not proposing any land-disturbing activities, construction, or changes to project facilities or operation that would affect Canada lynx, or its habitat and food availability. Because Northern States is not proposing any land-disturbing activities or modifications to project facilities or operation that would affect Canda lynx, and there are no known occurrences of Canada lynx at the project, relicensing the project would have no effect on the Canada lynx.

Fawcett's Locoweed

Northern States does not propose any measures for Fawcett's locoweed, and no agency recommendations were received for Fawcett's locoweed.

Our Analysis

Fawcett's locoweed is not known to occur within the project boundary and was not observed during the Invasive Species Study. The project area lacks the hardwater, spring-fed hydrologic system with large water level fluctuations and gentle, sand-gravel slopes that the species prefers. Northern States is not proposing any land-disturbing activities, construction, or changes to project facilities or operation that would affect Fawcett's locoweed. Because the project does not include suitable habitat for Fawcett's locoweed and Northern States is not proposing any land-disturbing activities or modifications to project facilities or operation that would affect Fawcett's locoweed, relicensing the project would have no effect on the Fawcett's locoweed.

Monarch Butterfly

Northern States is not proposing any ground-disturbing activities, but does conduct vegetation mowing, trimming, and spot herbicide treatment as needed to maintain project facilities and access to project recreation areas. Northern States does not propose any measures for the protection of the monarch butterfly, and no stakeholders filed comments, recommendations, terms, or conditions regarding the monarch butterfly.

Our Analysis

Current maintenance activities at the project are conducted on a routine basis during the growing season. Therefore, it is unlikely that extensive stands of milkweed species are present for monarch butterfly reproduction or foraging within managed areas of the project. In areas within the project boundary where routine vegetation maintenance does not occur, potential monarch butterfly habitat including known patches of swamp milkweed, would not likely be disturbed during the growing season. Therefore, we conclude that any project effects on the monarch butterfly or its habitat would likely be incidental and minor, and would not jeopardize the continued existence of the monarch butterfly.

APPENDIX F

ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

Project Retirement

The Commission has previously held that decommissioning is not a reasonable alternative to relicensing a project in most cases, when appropriate protection, mitigation, and enhancement measures are available.[106] Decommissioning can be accomplished in different ways depending on the project, its environment, and the particular resource needs.[107] For these reasons, the 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 a participant in a relicensing proceeding demonstrates that there are serious resource concerns that cannot be addressed with appropriate license measures and make decommissioning a reasonable alternative.[108]

Northern States does not propose decommissioning, nor does the record to date demonstrate there are serious resource concerns that cannot be mitigated if the project is relicensed. Accordingly, there is no reason, at this time, to include decommissioning as a reasonable alternative to be evaluated and studied as part of staff's NEPA analysis.

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[106] *See, e.g.*, *Eagle Crest Energy Co.*, 153 FERC ¶ 61,058, at P 67 (2015); *Pub. 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).

[107] In the event that the Commission denies relicensing 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 (2024). 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.

[108] *See generally Project Decommissioning at Relicensing*; Policy Statement, FERC Stats. & Regs., Regulations Preambles (1991-1996), ¶ 31,011 (1994) (*Decommissioning Policy Statement*); *see also City of Tacoma, Wash.*, 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).

APPENDIX G

DEVELOPMENTAL RESOURCES

Power and Economic Benefits

Table G-1 summarizes the assumptions and economic information used in the analysis. Most of this information is provided by the applicant in its license application. Some is developed by Commission staff. The values provided by the applicant are typically reasonable for the purposes of our analysis. If they are not, it is noted below. Cost items common to all alternatives include: taxes and insurance; estimated capital investment required for major modifications for relicensing; licensing costs; normal operation and maintenance cost; and Commission fees. All costs are adjusted to current year dollars.

Table G-1. Parameters for the economic analysis of the White River Project(Source: Northern States and Staff).

Parameter	Value
Installed capacity	1.2 MW
Average annual generation [a]	4,927 MWh
Period of analysis	30 years
Federal income tax rate	Included in the operation and maintenance cost
Local tax rate	Included in the operation and maintenance cost
Insurance rate	Included in the operation and maintenance cost
Interest rate	8%
Construction cost	$0
Application cost [b]	$399,551
Operation and maintenance	$250,660 [c]
Estimated Commission annual charges	$4,090/year
Alternative source of power's cost (2024) [d]	
1) Energy cost	$17.53/MWh
2) Capacity benefit cost	$128.53/kW-year

[a] This is the estimated average annual energy production of the project from 2017 through 2022.

[b] Cost escalated to 2024 dollars.

[c] Table A-3 of Exhibit A of the license application includes the depreciation cost in the reported average annual operation and maintenance cost. Staff excluded the depreciation in the economic analysis to maintain consistency with other NEPA documents.

[d] The alternative source of power cost is based on the current cost of providing the same amount of generation and capacity from a natural gas-fired combined cycle plant, as reported by the U.S. Energy Information Administration (EIA), Annual Energy Outlook 2025, for the Division 3, East North Central Region (EIA, 2025). The alternative source of power cost reported in Table G-2 is a combination of the cost of energy and capacity benefit.

Comparison of Alternatives

Table G-2 summarizes the installed capacity, annual generation, capacity benefit, alternative source of power's cost, estimated total project cost, and difference between the alternative source of power's cost and total project cost for each of the alternatives considered in this EA: No-Action Alternative, Proposed Action, and the Staff Alternative.

Table G-2. Summary of the annual cost of alternative power and annual project cost for the three alternatives for the White River Project (Source: Staff).

	No-Action Alternative	Proposed Action	Staff Alternative
Installed capacity	1,200 kW	1,200 kW	1,200 kW
Annual generation	4,927 MWh	4,927 MWh	4,927 MWh
Capacity benefit [a]	900 kW	900 kW	900 kW
Current alternative source of power cost [b]	$202,047	$202,047	$202,047
Total annual project cost [c]	$497,025	$521,695	$499,740
Difference between the alternative source of power cost and total annual project cost [d]	($294,978)	($319,648)	($297,693)

[a] Staff estimated the capacity benefit based on the ratio of the median flow available for generation for each of 12 months, and the hydraulic capacity of the project. This ratio is multiplied by the authorized installed capacity to determine the capacity benefit.

[b] The alternative source of power's cost for the project is based on the alternative source of power's cost in the East North Central Region, as identified in Table G-1 above.

[c] The project costs include the cost of environmental measures listed in Appendix H and the costs identified in Table G-1. All project costs were adjusted to 2024 dollars.

[d] A number in parentheses denotes that the difference between the alternative source of power's cost and the total project cost is negative; thus, the project's cost to produce power is greater than the alternative source of power cost.

No-Action Alternative

Under the No-Action Alternative, the project would have an installed capacity of 1,200 kW, a capacity benefit of 900 kW, and an average annual generation of 4,927 MWh. The alternative source of power's current cost to produce the same amount of energy and provide the same capacity benefit is $202,047. The total annual project cost is $497,025. Subtracting the total annual project cost from the alternative source of power's current cost, the project's cost to produce 4,927 MWh of power and provide 900 kW of capacity is $294,978 more than that of the alternative source of power's cost.

Applicant's Proposal

Under the Proposed Action, the project would have a total installed capacity of 1,200 kW, a capacity benefit of 900 kW, and an average annual generation of 4,927 MWh. The alternative source of power's current cost to produce the same amount of energy and provide the same capacity benefit would be $202,047. The total annual project cost would be $521,695. Subtracting the total annual project cost from the alternative source of power's current cost, the project's cost to produce 4,927 MWh of power and provide 900 kW of capacity would be $319,648 more than that of the alternative source of power's cost.

Staff Alternative

Under the Staff Alternative, the project would have a total installed capacity of 1,200 kW, a capacity benefit of 900 kW, and an average annual generation of 4,927 MWh. The alternative source of power's current cost to produce the same amount of energy and provide the same capacity benefit would be $202,047. The total annual project cost would be $499,740. Subtracting the total annual project cost from the alternative source of power's current cost, the project's cost to produce 4,927 MWh of power and provide 900 kW of capacity would be $297,693 more than that of the alternative source of power's cost.

Costs of Environmental Measures

Appendix H, *Costs of Environmental Measures*, presents the cost of each environmental enhancement measure considered in our analysis for the project. All costs are in 2024 dollars. We convert all costs to equal annual (levelized) values over a 30-year period of analysis to give a uniform basis for comparing the benefits of a measure to its cost.

APPENDIX H

COSTS OF ENVIRONMENTAL MEASURES

Table H-1. The cost of environmental measures considered in assessing the environmental effects of operating the White River Project(Source: Northern States and Staff).

Enhancement/Mitigation Measure	Entity	Capital Cost (2024$)	Annual Cost[a] (2024$)	Levelized Annual Cost[b] (2024$)
Project Operation				
To protect aquatic resources, continue operating the project in a run-of-river mode such that outflow from the project approximates inflow to the impoundment at any given time and the surface elevation of the impoundment is maintained between 710.4 and 711.6 feet.	Northern States, Interior,[c] Staff	$0	$0	$0
To protect aquatic resources, continue releasing a minimum bypassed reach flow of 16 cfs or inflow, whichever is less.	Northern States, Staff	$0	$0	$0
Notify the Commission, resource agencies, and the Bad River Tribe of planned and unplanned deviations (e.g., impoundment drawdowns), and only modify project operation for short periods of time of up to 3 weeks, after mutual agreement with the FWS, Wisconsin DNR, and the Bad River Tribe.	Northern States, Interior, Bad River Tribe, Staff	$0	$0	$0
To protect aquatic resources, implement an impoundment refill procedure following planned and unplanned drawdowns, whereby 90% of inflow is passed downstream and 10% of inflow is used to refill the impoundment.	Staff	$0	$0	$0

Enhancement/Mitigation Measure	Entity	Capital Cost (2024$)	Annual Cost[a] (2024$)	Levelized Annual Cost[b] (2024$)
Develop an operation compliance monitoring plan to document compliance with the operational requirements of any license, including the following provisions: (1) locations of headwater monitoring gages; (2) frequency of monitoring; (3) procedures for maintaining and calibrating monitoring equipment; (4) standard operating procedures to be implemented outside of normal operating conditions, such as scheduled or emergency facility shutdowns or maintenance activities; (5) schedule for installing and operating the monitoring equipment, including a staff gage that displays the normal operating range of the impoundment (i.e., 710.4 to 711.6 feet); and (6) procedures to remove ice from the spillway as a planned deviation.	Northern States, Bad River Tribe, Staff	$5,300[d]	$0	$471
Develop an operation compliance monitoring plan that includes the following provisions: (1) mechanisms for documenting inflow and outflow from the project; (2) installation of staff gages that show the operating band of the impoundment; (3) installation of automatic water level recorders for impoundment and tailrace elevations; and (4) recording daily turbine operation, impoundment and tailrace elevations, and flow releases through the powerhouse and spillway.	Interior[c]	$6,300	$1,000	$1,560[e]

Enhancement/Mitigation Measure	Entity	Capital Cost (2024$)	Annual Cost[a] (2024$)	Levelized Annual Cost[b] (2024$)
Modify the proposed operation compliance monitoring plan to include the following measures: (1) a detailed description of how Northern States will maintain, monitor, and document compliance with run-of-river operation, impoundment elevation limits, and minimum bypassed reach flows, including: (a) the monitoring and recording frequency for each gage and/or measuring device; and (b) a provision to maintain a log of project operation; (2) a description of the gages and other measuring devices that will be used to monitor compliance with license requirements, including the locations of the measuring devices; (3) a description of the procedures for maintaining and calibrating monitoring equipment; (4) a description of standard operating procedures to be implemented outside of normal operating conditions, including during: (a) scheduled facility shutdowns and maintenance, including ice removal from the spillway; and (b) emergency conditions such as unscheduled facility shutdowns and maintenance; and (5) a schedule for installing any monitoring equipment needed to document compliance with the operational requirements of the license, including a staff gage that displays the normal operating range of the impoundment (i.e., 710.4 to 711.6 feet).	Staff	$0	$0	$0[f]

Enhancement/Mitigation Measure	Entity	Capital Cost (2024$)	Annual Cost[a] (2024$)	Levelized Annual Cost[b] (2024$)
Continue using cinders to seal the spillway gates.	Northern States, Staff	$0	$0	$0
Prohibit/discontinue the use of cinders to seal the spillway gates.	Interior,[c] Bad River Tribe	$0	$0	$0
Geology and Soils				
Conduct shoreline erosion surveys within the project boundary every 10 years and file a report with the Commission, Tribes, and resource agencies that includes the results of the erosion survey and recommendations on whether mitigation of any erosion sites is warranted.	Northern States	$0	$3,782[g]	$3,782
Aquatic Resources				
Identify ways to avoid and mitigate impacts to the NRI segments and the Kakagon Sloughs NNL.	Interior	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
Monitor DO and water temperature downstream of the dam in sturgeon spawning areas every two weeks between March 15 to May 15 throughout the term of any license issued.	Interior[c]	$0	$2,500	$2,500

Enhancement/Mitigation Measure	Entity	Capital Cost (2024$)	Annual Cost[a] (2024$)	Levelized Annual Cost[b] (2024$)
To protect aquatic resources from heavy metal contamination when using cinders to seal the spillway gates, continue implementing the Fly Ash/Cinders Monitoring Plan and file contaminant testing results for any new sources of cinders with the Commission for review at least 90 days prior to using the new cinders, including documentation of consultation with FWS, Wisconsin DNR, the Bad River Tribe, and the Great Lakes Indian Fish and Wildlife Commission.	Staff	$0	$0	$0
Replace the existing trashrack with a trashrack that has 1-inch clear bar spacing and maintain average intake velocities no greater than 2 feet per second.	Interior[c]	$105,000	$0	$9,327
Provide a means to facilitate the safe, timely, and effective upstream and downstream movement of lake sturgeon around the project and take measures to create an environment where sturgeon thrive in the reach of the river below the project.	Interior[c]	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
Develop a sturgeon management plan to: (1) determine if any changes in operational/maintenance releases from the impoundment are needed prior to and during the typical sturgeon spawning season; and (2) describe details on managing the lake sturgeon population to ensure that the number and age classes of spawning sturgeon continue to increase.	Interior[c]	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

Enhancement/Mitigation Measure	Entity	Capital Cost (2024$)	Annual Cost[a] (2024$)	Levelized Annual Cost[b] (2024$)
Monitor the lake sturgeon population and assess how flows through the project affect sturgeon every 3 years to ensure that the population is improving and retaining a viable reproductive population.	Interior[c]	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
Develop a monitoring plan for lake sturgeon and other fish of tribal significance to monitor key species that utilize the river within the project area.	Bad River Tribe	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
Remove trash and woody debris from the trashrack and dispose of it in an upland location outside of the White River.	Northern States, Bad River Tribe, Staff	$0	$0	$0
Develop a debris management plan that includes measures for debris management, including but not limited to restrictions on the timing of debris sluicing and fluctuations in the water surface elevation downstream of the dam during debris sluicing.	Interior[c]	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

Enhancement/Mitigation Measure	Entity	Capital Cost (2024$)	Annual Cost[a] (2024$)	Levelized Annual Cost[b] (2024$)
To protect aquatic resources, develop a debris management plan with the following provisions: (1) methods, procedures, and schedules for collecting trash and debris that accumulate on the project trashrack; (2) a provision to dispose of trash and debris at suitable facilities or locations other than the White River, during normal operating conditions; (3) a description of operating conditions where debris sluicing is necessary for project safety; (4) standard operating procedures to be implemented in the event debris cannot be safely removed and debris sluicing is necessary, including consultation with the Bad River Tribe, FWS, and Wisconsin DNR prior to any debris sluicing, including the need for any protection measures during debris sluicing; and (5) file a report with the Commission, Bad River Tribe, and resource agencies no later than 14 calendar days after any debris sluicing, including the reason why debris sluicing was necessary, any comments from the Tribe or resource agencies, documentation of any observed or reported environmental effects, and where applicable, a description of measures implemented to prevent debris sluicing in the future.	Staff	$5,000	$0[h]	$444
Continue to maintain the existing invasive species sign at the impoundment access site to inform boaters on how to prevent the spread of invasive species at the project.	Northern States, Staff	$0	$0	$0

Enhancement/Mitigation Measure	Entity	Capital Cost (2024$)	Annual Cost[a] (2024$)	Levelized Annual Cost[b] (2024$)
Install signage to educate recreational users of the potential spread and impacts of invasive species, and install boat washing stations to prevent the spread of invasive species.	Interior[c]	$60,100[i]	$2,000	$7,339
Consult with FWS, Bureau of Indian Affairs, Wisconsin DNR, and Tribes on matters affecting fish and wildlife resources during the term of any subsequent license and consult with the National Park Service and Wisconsin DNR on recreational use throughout the license term, including consultation if Nationwide Rivers Inventory segments are impacted by project operation or maintenance.	Interior[c]	$0	$0	$0
Terrestrial Resources				
Protect plant and animal species of cultural importance to Tribes when performing maintenance activities, including: (1) identify the spatial extent of culturally important species at the project; (2) control invasive species that could displace culturally important species; (3) restrict foliar application of herbicides in proximity to known locations of culturally important species; (4) reduce woody growth as necessary to maintain the level of canopy closure; and (5) protect critical life stages (e.g., flowering) of culturally important species from mowing or other activities that could reduce population viability.	Interior	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

Enhancement/Mitigation Measure	Entity	Capital Cost (2024$)	Annual Cost[a] (2024$)	Levelized Annual Cost[b] (2024$)
Develop an invasive species monitoring plan that includes a provision for conducting invasive species surveys every other year.	Northern States, Interior,[c] Bad River Tribe	$5,000	$18,173[j]	$18,617
Continue to implement the Land Management Plan.	Northern States, Staff	$0	$0	$0
To protect the northern long-eared bat (NLEB) and tricolored bat (TCB), implement the Wisconsin DNR's Broad Incidental Take Permit and Broad Incidental Take Authorization (BITP/A) for Wisconsin Cave Bats, filed as Appendix E-23 of the application.	Northern States	$0	$0	$0
To protect the wood turtle, implement the Wisconsin DNR's BITP/A for wood turtles, filed as Appendix E-24 of the application.	Northern States, Staff	$0	$1,000	$1,000
To protect wood turtles, restrict grading on gravel access roads and parking areas during the wood turtle nesting season (May 20 through September 18).	Staff	$0	$0	$0
To protect bald eagles at the project, review the Wisconsin Natural Heritage Inventory (NHI) to determine the location of bald eagle nests and avoid vegetation management and construction activities within 660 feet of any bald eagle nests during the nesting season.	Northern States, Staff	$0	$0	$0

Enhancement/Mitigation Measure	Entity	Capital Cost (2024$)	Annual Cost[a] (2024$)	Levelized Annual Cost[b] (2024$)
Implement the following measures to protect bald eagles that occur in the project boundary: (1) prior to clearing trees within the project boundary, survey the area to be cleared for bald eagle nests; and (2) if such nests are discovered, then: (a) consult with Interior and Wisconsin DNR on measures to be implemented prior to tree-clearing activities, if any; and (b) perform tree-clearing activities in accordance with FWS's National Bald Eagle Management Guidelines (FWS, 2007), including avoiding any tree clearing within 660 feet of any known eagle nests, as proposed by Northern States and any ground-disturbing activities within 0.25 mile of any known eagle nests during the nesting season (December 1 through August 31).	Staff	$5,000[k]	$0	$444
Recreation Resources				
Continue to maintain the existing project recreation facilities.	Northern States, Staff	$0	$0	$0
To improve recreation safety and access, update recreation signage to comply with Part 8 of the Commission's regulations at the impoundment access site and portage route, for a total of two signs.	Northern States, Staff	$4,000	$0	$355

Enhancement/Mitigation Measure	Entity	Capital Cost (2024$)	Annual Cost[a] (2024$)	Levelized Annual Cost[b] (2024$)
Cultural Resources				
Develop an historic properties management plan (HPMP) in consultation with the Wisconsin State Historic Preservation Officer (SHPO), Bad River Tribe, and other interested Tribes, to protect historic properties that are eligible for or listed on the National Register of Historic Places (National Register).	Northern States, Interior, Bad River Tribe	$5,000	$0	$444
Allow Tribes access to land in the project boundary that is culturally significant to the Tribes and consult with the Tribes to identify specific dates and locations for access.	Bad River Tribe, Interior	$0	$0	$0
Include the Tribes as part of the consultation process during the post-licensing planning and implementation phases of any license articles related to natural resource protection, including but not limited to articles related to bald eagles, sturgeon, fishery habitat restoration, maintenance drawdowns, soil erosion, and the removal of invasive aquatic and terrestrial plants	Interior	$0	$0	$0
Consult with the Tribal Historic Preservation Officer to identify measures to avoid, minimize, and/or mitigate impacts to historic properties and cultural resources.	Bad River Tribe	$0	$0	$0

Enhancement/Mitigation Measure	Entity	Capital Cost (2024$)	Annual Cost[a] (2024$)	Levelized Annual Cost[b] (2024$)
Consult with the Tribe to ensure that maintenance activities, deviations from run-of-river operation, the operation compliance monitoring plan, invasive species monitoring plan, and HPMP are protective of the Tribe's treaty rights, historic properties, water quality, and the cultural use of downstream waters for fishing and other harvesting.	Bad River Tribe	$0	$0	$0
To protect previously unidentified cultural resources that are discovered during project operation, maintenance, or other project-related work involving land-disturbing activities, stop all land-clearing and land-disturbing activities in the vicinity of the resources and consult with the Wisconsin SHPO, Bad River Tribe, and other interested Tribes, to determine the need for any cultural resource studies or measures.	Staff	$0	$0	$0
To protect cultural resources from any project modifications not specifically authorized by any subsequent license, consult with the Wisconsin SHPO, Bad River Tribe, and other interested Tribes, prior to implementing such project modifications, to determine the effects of the activities and the need for any cultural resource studies or measures.	Staff	$0	$0	$0

(Source: Northern States and Staff).

[a] Annual costs typically include operational and maintenance costs and any other costs that occur on a yearly basis.
[b] All capital and annual costs are converted to equal annual costs over a 30-year period to give a uniform basis for comparing costs.
[c] Recommendation filed under section 10(j) of the FPA.
[d] The cost includes $5,000 associated with developing the plan and $300 associated with installing a new staff gage.
[e] The capital cost includes $5,000 associated with developing the plan, $1,000 associated with installing 2 automatic water level recorders, and $300 associated with installing a staff gage. The annual cost of $1,000 is associated with increased maintenance and recordkeeping costs associated with the water level recorders.
[f] Costs are included in Northern States' proposed operation compliance monitoring plan.
[g] The cost of conducting a shoreline erosion survey would be $25,000 per event. However, the cost is discounted to account for the implementation schedule.
[h] Northern States currently collects trash and woody debris that accumulates on the project trashrack. Staff assumes that the annual cost that would be associated with implementing the plan is already included in the annual operation and maintenance cost reported in Table G-1.
[i] The cost includes $60,000 associated with installing a boat washing station and $100 associated with installing a new sign.
[j] The cost of monitoring for invasive species would be $35,000 per event. However, the cost is discounted to account for the implementation schedule.
[k] Staff assumes a single survey for bald eagle nests would be conducted to determine if bald eagle are present.

APPENDIX I

COMPREHENSIVE DEVELOPMENT

This appendix discusses the basis for the measures listed in section 5.1.2, *Additional Measures Recommended by Staff*, including the additional measures and modifications to Northern States' proposal recommended by Commission staff.[109] In addition, this section discusses the basis for measures that are not recommended by staff.

Additional Measures Recommended by Staff

Project Boundary

The Exhibit G approved on August 29, 1995,[110] includes a project boundary that encloses approximately 125.1 acres as described in section 2.1.2, *Current Project Boundary*. Northern States Power Company (Northern States) proposes to modify the project boundary to include the following land and water, which would decrease the acreage enclosed by the project boundary from 125.1 to 52.7 acres: (1) a 39.9-acre impoundment at the normal maximum surface elevation of 711.6 feet, including the addition of 0.1 acre of water; (2) 10.1 acres of land underlying the project facilities, including the addition of 0.3 acre associated with the south earthen embankment, 0.3 acre associated with the transmission line and transformer, and 0.6 acre associated with the access road and concrete pipe that conveys water from the dam to the surge tank; (3) 2.4 acres of the bypassed reach, which would add 1.2 acres of water associated with the bypassed reach; and (4) 0.3 acre of the tailrace, which would add 0.1 acre of water associated with the tailrace. Northern States also proposes to modify the current project boundary by removing 29.7 acres of land adjacent to the impoundment, 34.5 acres of land north of the project's access road, and 10.6 acres of land northeast of the powerhouse.

According to the Commission's regulations, project boundaries should enclose "only those lands necessary for operation and maintenance of the project and for other project purposes, such as recreation, shoreline control, or protection of environmental resources."[111]

Northern States' proposal to revise the project boundary around the impoundment to follow the contour of the normal maximum surface elevation of 711.6 feet would result in removal of 29.7 acres of land adjacent to the impoundment and addition of 0.1 acre of water at the upstream limit of the impoundment that is not included in the current project boundary

[109] *See* section 5.1.1, *Measures Proposed by the Applicant*, for the list of applicant-proposed measures recommended by staff based on the environmental analyses in section 3.0 and the costs in section 4.0.

[110] *See Northern States Power Company*, 72 FERC ¶ 62,182 at Ordering Paragraph (C) (1995).

[111] 18 C.F.R. § 4.41(h)(2).

around the impoundment. The 29.7 acres of land is not necessary for operation, maintenance, or other project purposes, and should be removed from the project boundary as proposed. Removal of this land from the project boundary would not affect project uses or substantially affect land use. The entire 39.9-acre impoundment is necessary for project operation and should be included in the project boundary, as proposed.

The following land and water that Northern States proposes to add to the project boundary includes project facilities that are necessary for project operation and should be included in the project boundary, as proposed: (1) 0.3 acre of land associated with the project's transmission line and transformer; (2) 0.6 acre of land associated with the access road and concrete pipe; (3) 0.1 acre of water associated with the tailrace; and (4) 0.3 acre of land associated with the south earthen embankment.

The following land that Northern States proposes to remove from the project boundary does not include project facilities or appear to be necessary for project operation, maintenance, or other project purposes, such as recreation, shoreline control, or protection of environmental resources, and removal of these lands from the project boundary would not affect project uses or substantially affect land use: 34.5 acres of land north of the access road and 10.6 acres of land northeast of the powerhouse.

Section 11.4 of Exhibit E of the application states that the current project boundary includes 2.9 acres of the bypassed reach. Based on a review of the Exhibit G map approved on August 29, 1995, and aerial photographs, staff concludes that the current project boundary includes approximately 1.2 acres of the bypassed reach. Northern States proposes to modify the current project boundary to include 2.4 acres of the bypassed reach, which would add 1.2 acres of water associated with the bypassed reach.[112] The bypassed reach does 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. Therefore, inclusion of the 2.4 acres of land and water in the project boundary is not warranted.

Based on the conclusions reached above, the total land needed for project purposes includes 50.3 acres, which is 74.8 acres less than the current project boundary, and 2.4 acres less than the proposed project boundary.

Impoundment Refill Procedure

As discussed in section 3.3.2.2, *Impoundment Drawdown and Refill*, maintenance and emergencies could result in planned and unplanned drawdowns that temporarily reduce the impoundment surface elevation and interrupt run-of-river operation. Retaining all inflow to refill the impoundment after an impoundment drawdown would adversely affect aquatic resources by dewatering aquatic habitat in the bypassed and downstream reaches, potentially stranding fish,

[112] Section 11.4 of Exhibit E of the application states that Northern States is proposing to include 2.4 acres of the bypassed reach in the project boundary, which is 1.2 acres more than the 1.2 acres in the current project boundary.

mussels, and other aquatic organisms. On the other hand, releasing all flows to the downstream reach would adversely affect aquatic life in the impoundment by sustaining dewatered conditions. Implementing an impoundment refill procedure following planned and unplanned impoundment drawdowns, whereby the impoundment is refilled by passing approximately 90% of the inflow downstream and retaining the remaining 10% of inflow to refill the impoundment (90/10 refill procedure), would protect aquatic resources in the impoundment and downstream reach by ensuring that flows downstream of the project are kept near project inflow levels and that the impoundment is refilled in a timely manner following drawdowns. Minimizing the length of time that the impoundment is drawn down and that flows are reduced downstream of the project, would help maintain the existing aquatic habitat for fish and other aquatic species. Implementing this procedure would have no cost and we recommend that it be included in any subsequent license issued for the project.

Operation Compliance Monitoring Plan

Northern States proposes to develop an operation compliance monitoring plan, in consultation with Wisconsin DNR and the Bad River Band of the Lake Superior Tribe of Chippewa Indians (Bad River Tribe), to document compliance with the operational requirements of any license, including the following provisions: (1) locations of headwater monitoring gages; (2) frequency of monitoring; (3) procedures for maintaining and calibrating monitoring equipment; (4) standard operating procedures to be implemented outside of normal operating conditions, such as scheduled or emergency facility shutdowns or maintenance activities; (5) schedule for installing and operating the monitoring equipment, including a staff gage that displays the normal operating range of the impoundment (i.e., 710.4 to 711.6 feet); and (6) procedures to remove ice from the spillway as a planned deviation. Northern States also proposes to notify the Commission, resource agencies, and the Bad River Tribe of planned and unplanned deviations, and only modify project operation for short periods of time of up to 3 weeks, after mutual agreement with U.S. Fish and Wildlife Service (FWS), Wisconsin DNR, and the Bad River Tribe. We estimate that the levelized annual cost of Northern States' proposed operation compliance monitoring plan would be $471.

The U.S. Department of Interior (Interior) recommends that Northern States develop an operation compliance monitoring plan that includes the following provisions: (1) mechanisms for documenting inflow and outflow from the project; (2) installation of staff gages that show the operating band of the impoundment; (3) installation of automatic water level recorders for impoundment and tailrace elevations; and (4) recording daily turbine operation, impoundment and tailrace elevations, and flow releases through the powerhouse and spillway. The Bad River Tribe recommends that Northern States develop an operation compliance monitoring plan in consultation with the Tribe. We estimate that the levelized annual cost of Interior's recommended operation compliance monitoring plan would be $1,560.

As discussed in section 3.3.2.2, *Operation Compliance Monitoring*, developing an operation compliance monitoring plan with the following provisions would help the Commission verify that the project is maintaining compliance with impoundment elevation limits, run-of-river operation, and minimum flow releases, thereby facilitating administration of the license and

avoiding misunderstandings: (1) a detailed description of how Northern States will maintain, monitor, and document compliance with run-of-river operation, impoundment elevation limits, and minimum bypassed reach flows, including: (a) the monitoring and recording frequency for each gage and/or measuring device; and (b) a provision to maintain a log of project operation; (2) a description of the gages and other measuring devices that will be used to monitor compliance with license requirements, including the locations of the measuring devices; (3) a description of the procedures for maintaining and calibrating monitoring equipment; (4) a description of standard operating procedures to be implemented outside of normal operating conditions, including during: (a) scheduled facility shutdowns and maintenance, including ice removal from the spillway; and (b) emergency conditions such as unscheduled facility shutdowns and maintenance; and (5) a schedule for installing any monitoring equipment needed to document compliance with the operational requirements of the license, including a staff gage that displays the normal operating range of the impoundment (i.e., 710.4 to 711.6 feet).

We estimate that the levelized annual cost of developing an operation compliance monitoring plan with these measures would be the same as Northern States' proposed plan (i.e., $471). Because developing an operation compliance monitoring plan with these additional measures would provide greater benefits and have the same levelized annual cost, we recommend including it in any subsequent license issued for the project.

Interior's recommendation to document inflow and outflow from the project would provide a mechanism for assessing compliance with run-of-river operation. However, Northern States proposes to continue to monitor and record the water surface elevation of the impoundment, and automatically adjust flow releases from the powerhouse and spillway gates to maintain a consistent impoundment elevation and run-of-river operation. With these measures in place, Interior's recommendation to monitor inflow and outflow would not provide a compliance benefit over that of Northern State's proposal. As to Interior's recommendation to install an automatic water level recorder for tailrace elevations, the United States Geological Survey (USGS) maintains gage no. 04027500 in the tailrace immediately downstream of the powerhouse, which provides continuous flow and water elevation data. Because a USGS gage is already located in the tailrace and there is no indication that USGS would discontinue maintenance of the gage during the term of any subsequent license, there would be no compliance benefit associated with installing a gage to monitor tailrace elevations. Further, Interior's recommendation to record daily turbine operation would not result in benefits beyond those provided by monitoring the impoundment elevation.

Although Interior's recommended operation compliance monitoring plan could be used to assess compliance with the operational requirements of any subsequent license, it would cost more than the staff-recommended operational compliance monitoring plan (i.e., $1,560 instead of $471), without providing any additional benefits for operation compliance during the term of any subsequent license. Therefore, staff does not recommend Interior's operation compliance monitoring plan.

Cinders Monitoring Plan

The current license requires Northern States to implement a Fly Ash/Cinders Monitoring Plan to ensure that cinders used to seal the spillway gates do not introduce significant levels of contaminants to the White River. The plan includes the following measures: (1) obtain three separate samples from the main cinder stockpile and combine the sample into a composite sample; (2) test the composite sample for heavy metals at a lab certified by the State of Wisconsin; (3) submit the results of the analysis to Wisconsin DNR, the Bad River Tribe, and the Great Lakes Indian Fish and Wildlife Commission (GLIFWC) for review and comment; and (4) do not use cinders that contain any contaminants in concentrations that are known to be environmentally harmful and instead either use an alternative supply of cinders or an alternative to cindering to seal the gates. Northern States proposes to continue the use of cinders to seal the project's gated spillway as needed, typically during the winter months. However, Northern States does not specifically propose to continue implementing the Fly Ash/Cinders Monitoring Plan.

Interior recommends that the Commission prohibit the use of cinders to seal the spillway gates. The Bad River Tribe also recommends that Northern States discontinue the use of cinders to seal the project's gates.

As discussed in section 3.3.2.2, *Cinder Use*, cinders are a waste product of coal combustion that are commonly used as a sealant to stop leaks and prevent water loss through dam gates, limit erosion/damage to gates, and reduce ice buildup in the winter so that normal gate operation can be maintained. The use of cinders to seal gates is a common practice at more than 20 of Northern States' projects in Wisconsin, including the White River Project. The current sources of cinders used at the project have low levels of contaminants and there is no information that indicates the continued use of these cinders would significantly affect water quality or aquatic resources downstream of the project.

Prohibiting the use of cinders at the project, as recommended by Interior and the Bad River Tribe, could affect Northern States' ability to maintain the operational integrity of the gates. Because the use of cinders maintains the operational integrity of the gates and does not significantly affect aquatic resources, staff does not recommend a license condition requiring discontinuing the use of cinders at the project.

Continuing to implement the Fly Ash/Cinders Monitoring Plan during the term of any subsequent license would protect aquatic resources and the public by ensuring that cinders used to seal the spillway gates do not introduce significant levels of contaminants to the White River. Filing the contaminant testing results for any new sources of cinders with the Commission for review at least 90 days prior to using the new cinders, including documentation of consultation with the FWS, Wisconsin DNR, the Bad River Tribe, and the GLIFWC, would allow the Commission to verify that the new cinders do not contain contaminants in concentrations that are known to be environmentally harmful. There would be no additional cost associated with continuing to implement the plan and filing contaminant testing results with the Commission, and staff recommends it to protect aquatic resources and the public.

Debris Management Plan

Northern States proposes to remove trash and woody debris from the trashrack and dispose of woody debris in an upland location, unless debris cannot be removed safely. If woody debris cannot be removed from the river, Northern States proposes to sluice debris through the Tainter gates into the bypassed reach.

To protect sturgeon during spawning periods, Interior recommends that Northern States develop a debris management plan that includes measures for debris management, including but not limited to restrictions on the timing of debris sluicing and fluctuations in the water surface elevation downstream of the dam during debris sluicing. The Bad River Tribe recommends a restriction on passing woody debris from the impoundment to the bypassed reach.

As discussed in section 3.3.2.2, *Debris Management*, there is an abundance of woody debris at and downstream of the project. Although passing woody debris downstream of a dam can increase habitat complexity in the downstream reach, there is already a large influx of woody vegetation from forested shorelines downstream of the project and there would be no substantial benefit associated with passing woody debris downstream of the project dam.

Northern States is proposing to only sluice woody debris through the Tainter gates if debris cannot be safely removed by project operators. Northern States does not identify the safety conditions that could require debris sluicing, but presumably, sluicing would be infrequent during the term of any subsequent license. However, when needed, debris sluicing could release large woody debris that could injure adult sturgeon and rapidly alter water levels and flows downstream of the dam, which could alter spawning behavior and injure eggs and juvenile sturgeon, if present. Sturgeon typically spawn between mid-April and mid-May in the White River (Schloesser and Quinlan, 2019), and sturgeon larvae could be present as late as mid-June depending on when sturgeon larvae enter the drift (Smith and King, 2005). Separately, debris sluicing could result in log jams as observed by Northern States and the Bad River Tribe, which could affect aquatic habitat, fish, and other aquatic organisms.

Interior's recommendation for a debris management plan does not include sufficient detail for staff to assess the benefits and costs of Interior's recommended restrictions under the FPA. However, developing a debris management plan with the following provisions would protect sturgeon and other aquatic resources: (1) methods, procedures, and schedules for collecting trash and debris that accumulate on the project trashrack; (2) a provision to dispose of trash and debris at suitable facilities or locations other than the White River, during normal operating conditions; (3) a description of operating conditions where debris sluicing is necessary for project safety; (4) standard operating procedures to be implemented in the event debris cannot be safely removed and debris sluicing is necessary, including consultation with the Bad River Tribe, FWS, and Wisconsin DNR prior to any debris sluicing, including the need for any protection measures during debris sluicing; and (5) file a report with the Commission, Bad River Tribe, and resource agencies no later than 14 calendar days after any debris sluicing, including the reason why debris sluicing was necessary, any comments from the Tribe or resource agencies, documentation of any observed or reported environmental effects, and where applicable, a description of measures implemented to prevent debris sluicing in the future. We

estimate that the levelized annual cost of developing the debris management plan would be $444 and conclude that the benefits to aquatic resources outweigh the costs. Therefore, we recommend including it in any subsequent license issued for the project.

Wood Turtle Protection

According to Wisconsin's Natural Heritage Inventory (NHI), the state-listed threatened wood turtle may occur in the project vicinity. As discussed in section 3.3.3.1, a study conducted in 2022, identified wood turtle nesting habitat along the gravel access road to the powerhouse and the gravel area at the impoundment access site. As part of its proposal to continue maintaining project facilities, Northern States would continue grading the project access road and parking areas annually.

Northern States' proposal to continue grading the gravel access road and parking areas could affect wood turtles nesting in these areas. Restricting grading on gravel access roads and parking areas during the wood turtle nesting season (May 20 through September 18) would protect nesting habitat and any turtles that might be present. There would be no cost associated with restricting grading during the nesting season, and staff recommends it.

Bald Eagle Protection

The project is located within the range of bald eagles. To protect bald eagles, Northern States proposes to review the Wisconsin NHI to determine the location of bald eagle nests and avoid vegetation management and construction activities within 660 feet of any bald eagle nests during the nesting season.

As discussed in section 3.3.3.2, *Special Status Species*, project maintenance could result in limited tree removal in the project boundary that could disturb bald eagles during the nest building, incubation, and fledging phases of their life cycle. Avoiding vegetation management and construction activities within 660 feet of any bald eagle nests during the nesting season, as proposed, would protect bald eagles from tree removal activities. However, the Wisconsin NHI might not be an accurate and up-to-date source for determining the location of new bald eagle nests. Relying solely on the Wisconsin NHI to determine the location of nests could result in tree cutting that disturbs bald eagle nest building, incubation, and fledging. Surveying for bald eagle nests prior to any tree clearing during the nesting season would ensure bald eagle nests are identified prior to tree clearing. Also, Northern States does not identify the dates for the nesting season. According to FWS's Information for Planning and Consultation (IPaC) system, the breeding season for the bald eagle in the project area is December 1 through August 31.[113]

Implementing the following measures would protect bald eagles at the project: (1) prior to clearing trees within the project boundary, survey the area to be cleared for bald eagle nests; and (2) if such nests are discovered, then: (a) consult with Interior and Wisconsin DNR on

[113] *See* Commission staff's January 24, 2025 Memorandum on Endangered Species Act List.

measures to be implemented prior to tree-clearing activities, if any; and (b) perform tree-clearing activities in accordance with FWS's National Bald Eagle Management Guidelines (FWS, 2007), including avoiding any tree clearing within 660 feet of any known eagle nests, as proposed by Northern States, and any ground-disturbing activities within 0.25 mile of any known eagle nests during the nesting season (December 1 through August 31). Staff estimates that the levelized annual cost of these measures would be $444. Staff concludes that the benefits of protecting bald eagles would outweigh the cost of the measures, and recommends them.

Cultural Resources Protection

Northern States is not proposing any construction, modifications to project facilities, or project-related land-clearing or land-disturbing activities within the area of potential effects (APE) that would adversely affect cultural resources or historic properties. However, during the term of any subsequent license, Northern States would occasionally need to conduct maintenance activities at the project that could include ground-disturbing activities that have the potential to affect undiscovered historic and archaeological resources.

To protect previously unidentified cultural resources that are discovered during project operation, maintenance, or other project-related work involving land-disturbing activities, Northern States could stop all land-clearing and land-disturbing activities in the vicinity of the resource and consult with the Wisconsin State Historic Preservation Officer (Wisconsin SHPO), Bad River Tribe, and any other interested Tribes, to determine the need for any cultural resource studies or measures. In addition, to protect cultural resources from any project modifications not specifically authorized by any subsequent license, Northern States could consult with the Wisconsin SHPO, Bad River Tribe, and any other interested Tribes, prior to implementing such project modifications, to determine the effects of the activities and the need for any cultural resource studies or measures. Implementing these measures would have no cost and we recommend that they be included in any subsequent license issued for the project.

Measures Not Recommended

Shoreline Erosion Surveys

Northern States proposes to conduct shoreline erosion surveys within the project boundary every 10 years during the term of any license issued by the Commission; review the status of previously identified erosion sites; develop a report that would include erosion mitigation measures, if warranted; and submit the report to the Commission, the Bad River Tribe, FWS, and Wisconsin DNR.

As discussed in section 3.3.1.1, *Affected Environment*, the archaeological shoreline survey conducted by Northern States in 2022, found small areas of erosion (bank undercutting) and exposed bedrock along the impoundment shoreline and riverbank downstream of the dam.

Northern States currently operates the project in a run-of-river mode and maintains the surface elevation of the impoundment between 710.4 and 711.6 feet, which minimizes the degree of water level fluctuations in the impoundment and, in turn, minimizes project effects on

shoreline erosion. The erosion identified during the archaeological shoreline survey is likely caused by wind-driven wave action, erodible soils, and loss of vegetation due to natural causes (e.g., flooding, ice), not project operation.

There is an abundance of riparian and littoral vegetation along the impoundment shoreline and riverbank and no indication that the existing erosion is adversely affecting the environment, such as aquatic, terrestrial, or cultural resources. Riparian and littoral vegetation along the impoundment shoreline would continue to maintain stable soils and protect the shoreline from erosion associated with natural events, such as flooding and freezing.

Northern States is not proposing any land-disturbing activities, construction, or modifications to project facilities or operation that would adversely affect geology and soil resources. Continuing to operate the project in a run-of-river mode, as proposed, would continue to minimize erosion of the impoundment shoreline and riverbank downstream of the dam by reducing the exposure of these areas to periodic inundation and dewatering.

Although Northern States' proposal could reduce the extent of erosion at the project, the proposal would not likely significantly benefit environmental resources at the project because the erosion only occurs in limited areas, continuing to operate the project in a run-of-river mode would not materially contribute to shoreline erosion, and riparian and littoral vegetation along the shoreline would continue to protect the shoreline from erosion associated with natural events. Because Northern States' proposal would not significantly benefit environmental resources, it would not be worth the levelized annual cost of $3,782 and staff does not recommend it.

Measures for NRI Segments and Kakagon Sloughs

As discussed in section 3.1, the Kakagon Sloughs National Natural Landmark (NNL) is approximately 25 miles downstream of the project. In addition, the Nationwide Rivers Inventory (NRI) includes: (1) a 43-mile-long segment of the White River that stretches from the headwaters of the White River in Bayfield County downstream to the project dam; and (2) a 51-mile-long segment of the Bad River from Mellen, Wisconsin to Lake Superior. Approximately 1.1 miles of the White River NRI segment occurs in the project impoundment. The Bad River NRI segment is located approximately 23.5 miles downstream of the project.

Interior recommends that Commission staff evaluate the potential project effects on the White River and Bad River NRI segments and Kakagon Sloughs and identify ways to avoid and mitigate impacts to the NRI segments and the Kakagon Sloughs NNL.

As discussed in section 3.3.2.2, *Effects on NRI Segments and Kakagon Sloughs*, continuing to operate the project in run-of-river mode would maintain stable impoundment elevations and minimize erosion along the impoundment shoreline. Therefore, normal project operation would not affect the flow, water quality, or outstandingly remarkable values (ORVs) associated with the White River NRI segment. Also, continuing to operate the project in run-of-river mode would minimize the effects of project operation on water quantity and quality downstream of the project. Therefore, normal project operation would not affect the flow, water

quality, or ORVs associated with the Black River NRI segment and would not affect the Kakagon Sloughs NNL.

Project maintenance and emergencies could result in deviations from normal project operation, including planned and unplanned drawdowns and subsequent refills of the impoundment as discussed in section 3.3.2.2, *Impoundment Drawdown and Refill*, which could temporarily affect flow/water levels, sediment transport, and turbidity within the NRI segments and the sloughs downstream of the project. Northern States' proposal to only modify project operation for short periods of time of up to 3 weeks after mutual agreement with the resource agencies and the Tribe and to file an application for a temporary amendment of the license for planned deviations exceeding 3 weeks, would help protect aquatic resources at and downstream of the project, including the NRI segments and Kakagon Sloughs NNL. Also, filing reports following unplanned deviations, including documentation of any observed or reported environmental effects, a description of measures implemented to prevent similar deviations in the future, and any comments or correspondence received from the resource agencies and the Tribe, as proposed, would help mitigate adverse effects after drawdowns. Finally, implementing a 90/10 refill procedure would minimize project effects on the NRI segments and Kakagon Sloughs NNL because it would ensure that flows downstream of the project are kept near project inflow levels and that the impoundment is refilled in a timely manner following drawdowns. Staff recommends these measures as discussed in sections 5.1.1 and 5.1.2, respectively.

Interior's recommendation to identify ways to avoid and mitigate impacts to the NRI segments does not identify any specific measures. Without specific measures to analyze and consider under the FPA, we cannot assess the benefits and costs of this recommendation and do not recommend it.

Water Quality Monitoring

Interior recommends that Northern States monitor dissolved oxygen (DO) and water temperature downstream of the dam in sturgeon spawning areas every two weeks between March 15 to May 15 throughout the term of any license issued.

As discussed in section 3.3.2.1, *Water Quantity and Quality*, the results of the 2022 water quality study show that DO concentrations upstream and downstream of the dam were at or above 7.0 milligrams per liter (mg/L), which is adequate to sustain aquatic life. In addition, water temperatures did not significantly differ between the riverine reach in the upper impoundment and downstream of the dam.

Lake sturgeon are not riverine residents but are known to spawn downstream of the powerhouse from April 11 through May 19 (Schloesser and Quinlan, 2019). Larval sturgeon could be present in the White River from late April through mid-June based on the time that larvae typically enter the drift after spawning (13 to 24 days) (Smith and King, 2005). Optimal growth of sturgeon larvae occurs at DO concentrations greater than 7.5 mg/L (Kerr et al., 2011), while juvenile and adult sturgeon are tolerant of lower DO concentrations (~ 4.0 mg/L; Altenritter et al., 2013; Damstra and Galarowicz, 2013). Northern States did not collect

continuous DO data earlier than July 13, but DO concentration would be greater than 7.5 mg/L during the lake sturgeon spawning and larval development period, based on the DO concentrations observed in September when water temperatures were similar to those observed in May (Figure B-4).

Interior's recommendation to monitor DO and temperature downstream of the dam in sturgeon spawning areas between March 15 to May 15, could provide information about DO concentrations during the license term. However, the likelihood of any project-induced change in DO levels is low, because the project would continue to operate in a run-of-river mode. Continuing to operate the project in run-of-river mode as proposed by Northern States would minimize the length of time water is retained in the impoundment and maintain DO and temperature conditions that sustain aquatic life and protect fish downstream of the project, including all life stages of lake sturgeon. Also, no stakeholders have provided any measures to enhance water quality, and monitoring itself would not provide any benefits to water quality during the term of a license.

Since run-of-river operation would continue to minimize project effects on water quality and monitoring itself would not enhance water quality, Interior's recommendation to monitor water quality would not benefit lake sturgeon or other aquatic resources and would not be worth the levelized annual cost of $2,500. Therefore, staff does not recommend it.

Installation of a Trashrack with 1-inch Bar Spacing

Northern States proposes to maintain the existing trashrack with 1.25-inch clear bar spacing at the intake.

Interior recommends that Northern States replace the existing trashrack with a trashrack that has 1-inch clear bar spacing. Interior also recommends that Northern States maintain average intake velocities no greater than 2 feet per second (fps) immediately upstream of the trashrack to protect fish from impingement and entrainment.

As discussed in section 3.3.2.2, *Fish Impingement and Entrainment,* the resident fish species in the project's impoundment do not require downstream passage from the impoundment to complete their life history requirements. Although fish could encounter the project intake when foraging, fish are likely to behaviorally avoid entrainment and could escape entrainment if their burst speed is greater than the water velocity at the intake.

Shorthead redhorse, white sucker, bluegill, and northern pike less than 9.6, 8.6, 9.4, and 16 inches, respectively, would be able to physically pass through the 1.25-inch spacing between the existing trashrack bars. Comparatively, shorthead redhorse, white sucker, bluegill, and northern pike less than 7.7, 6.9, 7.5 and 12.8 inches, respectively, would be able to physically pass through the 1-inch spacing between the bars of Interior's recommended trashrack. Fish that are equal to or larger than the lengths specified above for each trashrack would be physically excluded from passing through the trashrack, but smaller fish would still be able to pass through the trashracks.

Operating the project with the current trashrack would maintain intake velocities at 1.2 fps or less, and Interior's recommendation would increase the intake velocities to 1.7 fps or less. Based on the proportional measurements described in section 3.3.2.2, *Fish Impingement and Entrainment,* all shorthead redhorse, white sucker, bluegill, and northern pike that are too large to pass through the 1-inch or 1.25-inch bar spacing have burst swim speeds that are higher than the intake velocities associated with either the 1-inch or 1.25-inch trashrack and would be able to escape from impingement on the trashrack. However, some small size classes and small species of fish would be susceptible to entrainment because they could fit through the clear bar spacing of the trashrack and their burst speeds do not exceed the maximum intake velocity at the trashrack. For example, some small northern pike (3 inches or less) would have burst swimming speeds approximately equal to or less than the maximum intake velocity (1.2 fps) at the current 1.25-inch trashrack. Slightly larger northern pike (5.3 inches or less) would have burst swimming speeds approximately equal to or less than the maximum intake velocity (1.7 fps) at Interior's recommended 1-inch trashrack. Accordingly, some larger size classes of fish could not avoid entrainment at Interior's recommended 1-inch trashrack relative to the current trashrack.

Regardless of the trashrack spacing (1 inch or 1.25 inches), most fish species in the impoundment have burst swim speeds that exceed the intake velocity and would be able to behaviorally avoid becoming impinged or entrained at the project. Based on the low potential for entrainment and expected survival rate for any fish that are entrained through turbines or pass downstream through the minimum flow pipe and Tainter gates, continuing to operate the project with the 1.25-inch trashrack would continue to protect fish populations in the impoundment.

While the 1-inch trashrack recommended by Interior would physically exclude some additional fish from entrainment, the intake velocity through a 1-inch trashrack would be 0.5 fps higher than the current trashrack and could increase entrainment of some fish that have burst swim speeds less than 1.7 fps. For these reasons, installing a new trashrack with 1-inch spacing would not significantly benefit resident fish population in the impoundment relative to the current trashrack. Because a trashrack with 1-inch clear bar spacing would not significantly benefit fish at the project, we conclude that installing the 1-inch trashrack would not be worth the estimated levelized annual cost of $9,327, and do not recommend it. Rather, staff recommends the continued use of the current trashrack with 1.25-inch clear bar spacing, as discussed in section 5.1.1, *Measures Proposed by the Applicant.*

Lake Sturgeon Passage and Habitat Enhancement

Interior recommends that Northern States "provide a means to facilitate the safe, timely, and effective upstream and downstream movement of lake sturgeon around project developments and take measures to create an environment where sturgeon thrive in the reach of the river below the project."

As discussed in section 3.3.2.2, *Lake Sturgeon*, the Bad River spawning population is relatively large, stable or slightly increasing, and self-sustaining. Relicensing the project as proposed would not result in new barriers to upstream movement or change current conditions for lake sturgeon in the White River. Continuing to operate the project in run-of-river mode

would minimize project effects on water quantity and water quality downstream of the project, which would continue to protect aquatic resources, including lake sturgeon in the White River.

There is no information in the record to indicate that sturgeon move upstream in the White River to the project dam. Available literature indicates that sturgeon spawn downstream of the powerhouse and not in the 1,400-foot-long bypassed reach between the project's dam and powerhouse (Mattes and Nelson, 2001; Schloesser and Quinlan, 2010; Schloesser and Quinlan, 2019). Sturgeon likely select spawning habitats downstream of the powerhouse and do not pass upstream of natural bedrock ledges in the bypassed reach. Therefore, the project does not likely restrict the range of sturgeon and Interior's recommendation to provide a means to facilitate upstream and downstream movement of sturgeon around the project would not provide additional access to spawning habitat or otherwise benefit sturgeon. Accordingly, there is no foreseeable benefit to facilitating sturgeon passage upstream and downstream of the project, and we do not recommend a license condition for it.

Interior's recommendation to create an environment where sturgeon thrive downstream of the project does not identify any specific measures. Without specific measures to analyze and consider under the FPA, staff cannot assess the benefits or costs of this recommendation for sturgeon; therefore, we do not recommend it. However, as discussed in section 3.3.2.2, *Lake Sturgeon,* suitable spawning habitat for sturgeon is present between 0.3 and 1 mile downstream of the powerhouse and the current sturgeon population is successfully spawning in this area. As recommended by staff in section 5.1.1, *Measures Proposed by the Applicant*, continuing to operate in run-of-river mode would minimize project effects on flow and water temperature and protect the sturgeon spawning area downstream of the powerhouse.

Lake Sturgeon Management and Monitoring

Interior recommends that Northern States develop a sturgeon management plan to: (1) determine if any changes in operational/maintenance releases from the impoundment are needed prior to and during the typical sturgeon spawning season; and (2) describe details on managing the lake sturgeon population to ensure that the number and age classes of spawning sturgeon continue to increase. Interior also recommends that every 3 years, Northern States monitor the lake sturgeon population and assess how flows through the project affect sturgeon to ensure that the population is improving and retaining a viable reproductive population. The Bad River Tribe recommends that Northern States develop a monitoring plan for lake sturgeon and other fish of tribal significance to monitor key species that utilize the river within the project area.

As discussed in section 3.3.2.2, *Lake Sturgeon*, Northern States' proposal to continue run-of-river operation would provide stable downstream flow releases that are similar in magnitude and timing to natural river flows, which would minimize project effects on water quantity, water quality, and aquatic habitat downstream of the project to the greatest extent

possible. Therefore, run-of-river operation would continue to protect sturgeon downstream of the powerhouse.[114]

Interior has not provided any specific information about how alternative flow releases or sturgeon monitoring/management would protect sturgeon from project effects. Also, monitoring itself would not provide any benefits to lake sturgeon or other fish. Therefore, staff does not have sufficient information to assess the benefits or costs of a sturgeon management plan or sturgeon monitoring plan.

Based on the long-term sturgeon monitoring information (Schloesser and Quinlan, 2019), the Bad River spawning population is in good condition, recruitment is high enough to maintain or slightly increase the population, and sturgeon successfully spawn downstream of the project. Continuing to operate the project in run-of-river mode would ensure that conditions for lake sturgeon and other fish remain unchanged in the White River. Therefore, additional management and monitoring measures would not likely result in any project-related benefits for lake sturgeon or other fish; and we do not recommend these measures.

Invasive Species Signage and Boat Washing Stations

Northern States proposes to continue maintaining the existing invasive species sign at the impoundment access site to inform boaters on how to prevent the spread of invasive species at the project, which staff recommends in section 5.1.1, *Measures Proposed by the Applicant*.

Interior recommends that Northern States install signage to educate recreational users of the potential spread and impacts of invasive species, and install boat washing stations to prevent the spread of invasive species. Interior states that boat washing stations would remove invasive mollusk species that would otherwise be transported between the project and other lakes/reservoirs.

Northern States is not proposing any land-disturbing activities, construction, or modifications to project facilities or operation that would result in the introduction or spread of aquatic invasive species. The project provides water access for boating and other uses at the impoundment access site and the portage put-in site. If invasive species are present, recreational users can inadvertently spread invasive plants and animals that cling to boats, fishing equipment,

[114] As discussed above in Appendix I, *Additional Measures Recommended by Staff*, staff recommends that Northern States develop an operation compliance monitoring plan to ensure compliance with run-of-river operation, impoundment elevation limits, and minimum flows. As discussed in section 5.1.1, *Measures Proposed by the Applicant*, staff also recommends Northern States' proposals to notify the Commission, resource agencies, and the Bad River Tribe of planned and unplanned deviations, (e.g., including impoundment drawdowns), and only modify project operation for short periods of time of up to 3 weeks, after mutual agreement with FWS, Wisconsin DNR, and the Bad River Tribe, which would minimize project effects during project maintenance and emergencies.

or other gear. Northern States currently maintains a sign that informs users how to prevent the spread of invasive species at the impoundment access site.[115]

As discussed in section 3.3.2.2, *Aquatic Invasive Species*, no invasive mollusks occur at the project. The only two aquatic invasive species that do occur at the project, narrow-leaf cattail and aquatic forget-me-not, can easily spread and are widely distributed in Wisconsin including areas downstream of the project. Considering the wide distribution of the aquatic invasive species known to occur at the project and their propensity to disperse naturally, the potential for project-related recreational use to spread these invasive species to a new area is very low and inconsequential. Some seeds of these plants could cling to boats, but seeds are much more likely to spread naturally via the wind or flowing water. Northern States' proposal to maintain the current invasive species sign at the impoundment access site would continue to provide information to users that would help prevent the spread of invasive plants at the project. Because educational signage about invasive species is already present at the project, Interior's recommendation to install educational signage would not provide any benefits for reducing the spread of invasive species. Therefore, staff does not recommend it.

Boat washing stations can be used to remove invasive species from watercraft, but may not be effective at reducing the spread of invasive species if: (1) boaters choose not to use the boat washing station; (2) boaters are not trained to properly use the boat washing station; or (3) invasive species are located in areas where they cannot be removed by the boat washing station, such as residual water systems, gear, and bait containers (Bleitz et al., 2024).

Because the invasive plants at the project are common in the project vicinity and would continue to spread naturally, a boat washing station may not effectively reduce the spread of invasive species and the potential benefits to aquatic species do not outweigh the cost of $7,330.[116] Therefore, staff does not recommend installing a boat washing station.

Invasive Species Monitoring

Northern States proposes to develop an invasive species monitoring plan in consultation with Wisconsin DNR and the Bad River Tribe that includes provisions for biennial surveys for invasive species and "rapid response" measures to limit the dispersal of established species. Interior and the Bad River Tribe recommend that Northern States develop an invasive species monitoring plan.

[115] *See* the Commission's *Environmental Inspection Report* issued on August 4, 2017, for a description of the current invasive species sign. Available at: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20170804-3043&optimized=false&sid=1385af24-4702-4edc-82f5-3d27a164d506.

[116] Staff estimated the cost of installing and operating a single boat washing station based on the costs of stationary washing stations provided in Bleitz et al. (2024).

As discussed in section 3.3.3.2, *Invasive Species*, the 2022 Invasive Species Study identified 9 species of aquatic and terrestrial invasive plants that are prevalent throughout the region and the State of Wisconsin. There is no available information indicating that that project operation and maintenance activities have caused the spread or proliferation of invasive plants at the project. Northern States is not proposing any land-disturbing activities, construction, or modifications to project facilities or operation that would facilitate the spread of invasive plant species. Continuing to operate the project in a run-of-river mode would not affect terrestrial habitat along the shoreline of the impoundment, would minimize water level fluctuations in the impoundment, and would minimize erosion. Therefore, it is unlikely that the proposed operation and maintenance of the project would result in the expansion of invasive plants.

While Northern States' proposal to monitor invasive species could help determine if an invasive species is proliferating at the project, no stakeholders have recommended specific measures for controlling invasive species. Without specific measures, it is unclear whether control measures would be effective for invasive species at the project, especially for invasive species such as narrow-leaf cattail that are already prevalent throughout the region and the State of Wisconsin. Because there is no information indicating that continued project operation would contribute to the spread of invasive plant species and we cannot assess the benefits of an invasive species monitoring plan for environmental resources at the project, we do not recommend the measure as a license condition.

Bat Protection

To protect the NLEB and TCB, Northern States proposes to implement the Wisconsin DNR's Broad Incidental Take Permit and Broad Incidental Take Authorization (BITP/A) for Wisconsin Cave Bats, filed as Appendix E-23 of the application. The BITP/A includes measures for excluding/removing bats from structures and restricting tree cutting during maintenance of project facilities. As discussed in Appendix E, *Biological Assessment*, NLEB and TCB do not occur at the project and relicensing the project would have no effect on these species. Therefore, Northern States' proposal would not benefit bats and we do not recommend it.

Protection of Culturally Significant Species

Interior recommends that Northern States protect plant and animal species of cultural importance to Tribes when performing maintenance activities, including: (1) identify the spatial extent of culturally important species at the project; (2) control invasive species that could displace culturally important species; (3) restrict foliar application of herbicides in proximity to known locations of culturally important species; (4) reduce woody growth as necessary to maintain the level of canopy closure; and (5) protect critical life stages (e.g., flowering) of culturally important species from mowing or other activities that could reduce population viability. However, Interior has not specified any culturally important plant species that could occur at the project or where such species could be located. Therefore, staff cannot assess the benefits or costs of the recommended measures for any such species, and does not recommend it. As discussed in section 3.3.3.2, *Special Status Species*, there are no anticipated changes in project operation or maintenance that would materially affect vegetation, wildlife, or wildlife habitat relative to current conditions.

Access to Culturally Significant Sites

Interior and the Bad River Tribe recommend that the license include a condition for Northern States to allow Tribes access to land in the project boundary that is culturally significant to the Tribes. Interior recommends that the Commission and Northern States consult with Tribes to identify specific dates and locations for access.

As discussed in section 3.3.6.2, *Access to Culturally Significant Sites*, outside of the fences and gates that ensure public safety (e.g., barriers to the dam's gated spillway, substation, transmission line, and powerhouse), there are no barriers at the project that restrict access to project land or water.[117] Any member of the public can access the shoreline of the impoundment that is adjacent to the dam from State Highway 112 and by accessing the impoundment access site located at the north embankment of the dam. Because Tribes would continue to have unrestricted access to the impoundment and project recreation facilities, there is no benefit associated with Interior's and the Bad River Tribe's recommendation to include a license condition to provide the Tribes with access to project land. Therefore, we do not recommend it.

Historic Properties Management Plan

Northern States proposes to develop and implement an Historic Properties Management Plan (HPMP). Interior recommends that Northern States consult with Tribes and all other potential stakeholders to develop a comprehensive HPMP. The Bad River Tribe requests that the Commission consult with the Tribal Historic Preservation Officer to identify measures to avoid, minimize, and/or mitigate impacts to historic properties and cultural resources. The Bad River Tribe also recommends that Northern States develop an HPMP in consultation with the Tribe to ensure these activities are protective of the Tribe's treaty rights, historic properties, water quality, and downstream uses, including cultural uses of waters downstream of the project, such as fishing and other harvesting.

An HPMP is only needed to mitigate for adverse effects to historic properties within a project's APE. If there are no historic properties or no adverse effects to historic properties, then an HPMP is not needed. As discussed in section 3.3.6, *Cultural Resources*, there are no known historic properties within the APE for the White River Project and no foreseeable project effects on historic properties outside of the APE. Therefore, the proposed HPMP is not needed to protect any historic properties during the term of any subsequent license. However, the staff-recommended cultural resource protection measures, discussed above in *Additional Measures Recommended by Staff*, require Northern States to consult with the Wisconsin SHPO, the Bad

[117] Standard license Article 13 requires a licensee to allow the public free access, to a reasonable extent, to project waters and adjacent project lands owned by the Licensee for the purpose of full public utilization of such lands and waters for navigation and for outdoor recreational purposes. *See Standardized Conditions for Inclusion in Preliminary Permits and Licenses Issued Under Part I of the Federal Power Act*, Order No. 540, 54 F.P.C. 1792 (1975) (providing Form L-9, Article 13).

River Tribe, and any interested Tribes, in the event of an unanticipated discovery of cultural resources and prior to implementing project modifications, to determine the effects of the activities and the need for any cultural resource studies or measures. Because an HPMP would not benefit any historic properties at the project, it is not worth the levelized annual cost of $444 and staff does not recommend it.

Post-Licensing Consultation

Interior states that issues frequently arise throughout the term of a license, such as power outages, low flows, and unexpected emergencies, that may pose a threat to fish and wildlife resources in the project vicinity. Interior recommends that Northern States consult with FWS, the U.S. Bureau of Indian Affairs, Wisconsin DNR, and Tribes on matters affecting fish and wildlife resources during the term of any subsequent license. Interior recommends that Northern States consult with the National Park Service and Wisconsin DNR on recreational use throughout the license term, including consultation if NRI segments are impacted by project operation or maintenance. Interior also recommends the Commission include the Tribes as part of the consultation process during the post-licensing planning and implementation phases of any license articles related to natural resource protection, including but not limited to articles related to bald eagles, sturgeon, fishery habitat restoration, maintenance drawdowns, soil erosion, and the removal of invasive aquatic and terrestrial plants. The Bad River Tribe also recommends that Northern States consult with the Tribe to ensure that maintenance activities, deviations from run-of-river operation, the operation compliance monitoring plan, invasive species monitoring plan, and HPMP are protective of the Tribe's treaty rights, historic properties, water quality, and the cultural use of downstream waters for fishing and other harvesting.

Consultation alone is an administrative measure and would not result in any foreseeable environmental benefit for fish, wildlife, or recreation resources (including NRI segments).[118] However, Northern States proposes and Commission staff recommends developing an operation compliance monitoring plan in consultation with resource agencies and the Bad River Tribe. Northern States also proposes and staff also recommends notifying the Commission, resource agencies, and the Bad River Tribe of planned and unplanned deviations, including impoundment drawdowns, and only modify project operation for short periods of time of up to 3 weeks, after mutual agreement with the FWS, Wisconsin DNR, and the Bad River Tribe. Staff also recommends that Northern States develop the debris management plan in consultation with the Bad River Tribe and resource agencies.

[118] Staff discuss potential project effects on tribal resources in section 3.3.6.2, *Hunting, Fishing, and Gathering*.

In addition to the staff-recommended operation compliance monitoring plan, standard license Article 11[119] provides that the licensee shall, for the conservation and development of fish and wildlife resources, construct, maintain, and operate the project works, and comply with modifications required by the Commission upon its own motion or upon the recommendation of the Secretary of the Interior or state fish and wildlife agencies, after notice and opportunity for hearing. In addition, standard article 3 states that no substantial changes to project works or operation will be permitted without prior Commission approval.[120] Article 3 only permits minor changes in project works or in uses of project land if such changes will not result in an adverse environmental impact. A licensee must file an application to amend the license and receive Commission authorization before substantially modifying project works or operation.[121] Further, before filing an amendment application, the licensee must consult with any resource agency whose interests would be affected by the amendment,[122] such as FWS if fish and wildlife species would be affected by the amendment.

Because the staff-recommended operation compliance monitoring plan, deviation procedures, debris management plan, and the Commission's standard license articles and regulations already provide post-license notification and consultation procedures, Interior's recommendations for consultation are unnecessary, and staff does not recommend them.

[119] *See Standardized Conditions for Inclusion in Preliminary Permits and Licenses Issued Under Part I of the Fed. Power Act*, Order No. 540, 54 FPC 1792 (1975) (providing Form L-9, Article 11).

[120] *Id.*

[121] *See id.* at Article 3.

[122] *See* 18 C.F.R. §§ 4.38(a) and 4.200 (2024).

APPENDIX J

FISH AND WILDLIFE AGENCY SECTION 10(J) RECOMMENDATIONS

Table J-1. Analysis of Interior's fish and wildlife recommendations for the White River Project(Source: Staff).

Recommendation	Within the Scope of Section 10(j)?	Levelized Annual Cost	Recommend Adopting?
Continue to operate the project in a run-of-river mode.	Yes	$0	Yes
Develop an operation compliance monitoring plan that includes the following provisions: (1) mechanisms for documenting inflow and outflow from the project; (2) installation of staff gages that show the operating band of the impoundment; (3) installation of automatic water level recorders for impoundment and tailrace elevations; and (4) recording daily turbine operation, impoundment and tailrace elevations, and flow releases through the powerhouse and spillway.	Yes	$1,560	Adopted in Part. Staff recommends that Northern States develop an operation compliance monitoring plan to document compliance with run-of-river operation, impoundment levels, and minimum flows. However, staff does not recommend Interior's 3rd and 4th provisions. These measures are inconsistent with sections 4(e) and 10(a) of the FPA because the benefits would not be worth the cost.

Recommendation	Within the Scope of Section 10(j)?	Levelized Annual Cost	Recommend Adopting?
Prohibit the use of cinders to seal the spillway gates.	Yes	$0	No. Measure is inconsistent with sections 4(e) and 10(a) of the FPA because the use of cinders in necessary for the operational integrity of the hydropower development, namely, the spillway gates. Staff recommends that Northern States continue to implement the Fly Ash/Cinders Monitoring Plan.
Monitor DO and water temperature downstream of the dam in sturgeon spawning areas every two weeks between March 15 to May 15 throughout the term of any license issued.	Yes	$2,500	No. Measure is inconsistent with sections 4(e) and 10(a) of the FPA because the benefits do not outweigh the costs. Run-of-river operation would continue to minimize project effects on water quality and monitoring itself would not benefit water quality.
Replace the existing trashrack with a trashrack that has 1-inch clear bar spacing and maintain average intake velocities no greater than 2 feet per second (fps).	Yes	$9,327	No. Measure is inconsistent with sections 4(e) and 10(a) of the FPA because the benefits do not outweigh the costs. Staff recommends the continued use of the current trashrack with 1.25-inch clear bar spacing.

Recommendation	Within the Scope of Section 10(j)?	Levelized Annual Cost	Recommend Adopting?
Provide a means to facilitate the safe, timely, and effective upstream and downstream movement of lake sturgeon around project developments and take measures to create an environment where sturgeon thrive in the reach of the river below the project.	Yes	Unknown – recommendation lacks specificity needed to estimate a cost	No. Measure is inconsistent with sections 4(e) and 10(a) of the FPA because there are no foreseeable benefits to outweigh costs associated with sturgeon passage and habitat measures.
Develop a sturgeon management plan to: (1) determine if any changes in operational/maintenance releases from the impoundment are needed prior to and during the typical sturgeon spawning season; and (2) describe details on managing the lake sturgeon population to ensure that the number and age classes of spawning sturgeon continue to increase.	Yes	Unknown – recommendation lacks specificity needed to estimate a cost	No. Measure is inconsistent with sections 4(e) and 10(a) of the FPA because there are no foreseeable benefits to outweigh costs associated with developing the plan. Interior did not provide any specific information about how alternative flow releases or sturgeon monitoring/management would protect sturgeon from project effects. Continuing to operate the project in run-of-river mode would ensure that conditions for lake sturgeon and other fish remain unchanged in the White River.
Monitor the lake sturgeon population and assess how flows through the project affect sturgeon every 3 years to ensure that the population is improving and retaining a viable reproductive population.	Yes	Unknown – recommendation lacks specificity needed to estimate a cost	No. Measure is inconsistent with sections 4(e) and 10(a) of the FPA because there are no foreseeable benefits to outweigh costs associated with monitoring.

Recommendation	Within the Scope of Section 10(j)?	Levelized Annual Cost	Recommend Adopting?
Develop a debris management plan that includes measures for debris management, including but not limited to restrictions on the timing of debris sluicing and fluctuations in the water surface elevation downstream of the dam during debris sluicing.	Yes	Unknown – recommendation lacks specificity needed to estimate a cost	Adopted in part. Interior's recommendation does not include sufficient detail for staff to assess the benefits and costs of Interior's recommended restrictions under the FPA. Staff recommends developing a debris management plan that includes standard operating procedures and reporting requirements for debris sluicing.
Install signage to educate recreational users of the potential spread and impacts of invasive species, and install boat washing stations to prevent the spread of invasive species.	Yes	$7,339	No. Measure is inconsistent with sections 4(e) and 10(a) of the FPA because the benefits do not outweigh the costs. Staff recommends that Northern States continue to maintain the existing invasive species sign at the impoundment access site to inform boaters on how to prevent the spread of invasive species at the project.

Recommendation	Within the Scope of Section 10(j)?	Levelized Annual Cost	Recommend Adopting?
Consult with FWS, Bureau of Indian Affairs, Wisconsin DNR, and Tribes on matters affecting fish and wildlife resources during the term of any subsequent license and consult with the National Park Service and Wisconsin DNR on recreational use throughout the license term, including consultation if Nationwide Rivers Inventory segments are impacted by project operation or maintenance.	No, consultation is an administrative matter, not a specific fish and wildlife measure.	$0	No. Measure is inconsistent with sections 4(e) and 10(a) of the FPA because there are no benefits to fish and wildlife species associated with Interior's recommendation because the Commission's standard license articles and regulations already provide post-license consultation procedures.
Develop an invasive species monitoring plan that includes a provision for conducting invasive species surveys every other year.	Yes	$18,617	No. Measure is inconsistent with sections 4(e) and 10(a) of the FPA because the benefits do not outweigh the costs.

APPENDIX K

COMPREHENSIVE PLANS

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APPENDIX M

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