ENVIRONMENTAL ASSESSMENT

FOR NEW HYDROPOWER LICENSE

Menominee and Park Mill Hydroelectric Project
FERC Project No. 2744-043

Michigan and Wisconsin

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

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ACRONYMS AND ABBREVIATIONS

2013 Settlement Agreement	2013 Menominee / Park Mill FERC Project No. 2744 Fish Passage Operations Settlement Agreement
APE	area of potential effect
B.P.	Before Present
certification	water quality certification
cfs	cubic feet per second
Corps	U. S. Army Corps of Engineers
Commission	Federal Energy Regulatory Commission
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DO	dissolved oxygen
EA	environmental assessment
EPRI	Electric Power Research Institute
ESA	Endangered Species Act
°F	degrees Fahrenheit
FERC	Federal Energy Regulatory Commission
FERC Form-80	Licensed Hydropower Development Recreation Report
FPA	Federal Power Act
FWS	U.S. Fish and Wildlife Service
HP	horsepower
HPMP	Historic Properties Management Plan
Interior	U.S. Department of the Interior
IPaC	Information for Planning and Conservation
kV	kilovolt
kVA	kilovolt ampere
Menominee and Park Mill Project	Menominee and Park Mill Hydroelectric Project
Michigan DEQ	Michigan Department of Environmental Quality
Michigan DNR	Michigan Department of Natural Resources
Michigan HRC	Michigan Hydropower Reform Coalition
Michigan SHPO	Michigan State Historic Preservation Office
MISO	Midcontinent Independent System Operator, Inc.
mg/l	milligrams per liter
mL	milliliters
MOU	Memorandum of Understanding
MRO	Midwest Reliability Organization
MW	megawatts
MWh	megawatt-hour
NGVD 29	National Geodetic Vertical Datum of 1929
National Register	National Register of Historic Places

NERC	North American Electric Reliability Council
NHPA	National Historic Preservation Act
NEW Hydro	North East Wisconsin Hydro, LLC
PA	programmatic agreement
Park Service	National Park Service
PCBs	polychlorinated biphenyls
PLC	programmable logic controller
project	Menominee and Park Mill Hydroelectric Project
RM	river mile
River Alliance	River Alliance of Wisconsin
USGS	United States Geological Survey
V	volt
Wisconsin DNR	Wisconsin Department of Natural Resources
Wisconsin SHPO	Wisconsin State Historic Preservation Office

EXECUTIVE SUMMARY

Proposed Action

On February 28, 2013, North East Wisconsin Hydro, LLC (NEW Hydro) filed an application for a new license with the Federal Energy Regulatory Commission (Commission) to continue to operate and maintain the Menominee and Park Mill Hydroelectric Project No. 2744 (Menominee and Park Mill Project or project). The project, which has a total installed capacity of 4.348 megawatts (MW),[1] is located on the Menominee River, in Menominee County, Michigan, and Marinette County, Wisconsin.[2] NEW Hydro does not propose any changes to project operation and proposes only minor new construction to upgrade and improve existing recreation facilities. The existing project produces an average annual generation of 28,000 megawatt-hours (MWh). The project does not occupy federal land.

Project Facilities

Park Mill Development

The Park Mill development consists of a reservoir known as the Upper Scott Flowage,[3] a concrete gravity dam, a power canal, a powerhouse, a downstream fish passage facility, a transmission line, and a substation. The reservoir has a surface area of 539 acres and a gross storage capacity of 3,788 acre-feet at a normal maximum water surface elevation of 610.43 feet National Geodetic Vertical Datum of 1929 (NGVD 29). The concrete gravity dam is 538.58 feet long and 22 feet high consisting of, from north to south: (1) an overflow spillway section; (2) a Tainter gate-controlled spillway; (3) an abandoned fishway; and (4) a second overflow spillway section. A second Tainter gate-controlled spillway is located at the entrance to the 2,300-foot-long power canal, which creates a 2,200-foot-long bypassed reach that terminates at the powerhouse.

The powerhouse, which is located within a paper manufacturing building owned by Kimberly Clark Corporation, contains: (1) one 0.225-MW vertical-axis Kaplan turbine,[4] coupled to a 0.225-MW generator; (2) two 0.600-MW horizontal-axis Francis

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[1] Consistent with section 11.1(i) of the Commission's regulations, we define the total installed capacity in the environmental assessment (EA) as the sum of the lesser of the capacity rating of the generator and turbine of each generating unit.

[2] The Menominee River defines the border between Michigan and Wisconsin.

[3] The EA refers to the Upper Scott Flowage as the Park Mill reservoir.

[4] Section 11.1(i) of the Commission's regulations defines the rating of a turbine as the product of the turbine's capacity in horsepower (HP) times a conversion factor of 0.75 kilowatt/HP.

turbines, each coupled to a 0.420-MW generator; (3) two 0.525-MW vertical-axis Kaplan turbines, each coupled to a 0.430-MW generator; and (4) one 0.349-MW vertical-axis Kaplan turbine, coupled to a 0.450-MW generator, for a total installed capacity of 2.274 MW. A 4,630-foot-long, 24.9-kilovolt (kV) overhead transmission line connects to the project substation that supplies power to NEW Hydro's distribution lines.

The fish passage facility provides downstream fish passage for lake sturgeon from the Park Mill reservoir to the Menominee reservoir, and is located at the downstream end of the power canal adjacent to the Park Mill powerhouse. The fish passage facility includes a fish guidance rack, guidance ramp, and fish bypass structure.

Recreation facilities associated with the Park Mill development include three boat launches (Mason Park, 18th Avenue, and Cox Landing), and the Park Mill canoe portage.

Menominee Development

The Menominee development consists of a reservoir known as the Lower Scott Flowage,[5] an earthen and concrete gravity dam, a powerhouse, upstream and downstream fish passage facilities, a transmission line, and a substation. The reservoir has a surface area of 143 acres and a gross storage capacity of 350 acre-feet at a normal maximum water surface elevation of 593.53 feet NGVD 29. The earthen and concrete gravity dam is 486.5 feet long and 24 feet high consisting of, from north to south: (1) a concrete gravity overflow spillway; (2) a Tainter gate-controlled concrete gravity spillway; (3) a concrete gravity non-overflow section; and (4) an earthen embankment with a concrete core.

The 204-foot-long concrete and brick structure integral to the north end of the dam includes a powerhouse that contains: (1) two 0.848-MW vertical-axis Kaplan turbines, each coupled to a 0.662-MW generator; and (2) two 0.375-MW vertical-axis Kaplan turbines, each coupled to a 0.458-MW generator, for a total installed capacity of 2.074 MW. A 568-foot-long, 24.9-kV underground transmission line connects to the project substation that supplies power to NEW Hydro's distribution lines.

The upstream fish passage facility consists of a fish lift (or elevator) located at the north end of the Menominee powerhouse adjacent to the north bank of the Menominee River. The fish lift includes attraction flow equipment, a guidance ramp, a lift section (the elevator), and fish sorting and holding tanks. The entrance to the fish lift is located immediately downstream of the powerhouse. Fish collected at the fish lift are sorted, transported upstream by truck and trailer past the Menominee reservoir and Park Mill dam, and then released into Park Mill reservoir.

The downstream fish passage facility provides fish passage from the Menominee reservoir to the Menominee River downstream of the dam. The entrance to the facility is

[5] The EA refers to the Lower Scott Flowage as the Menominee reservoir.

located adjacent to, and south of, the Menominee powerhouse. The fish passage facility includes a guidance ramp and a fish bypass structure.

Recreation facilities associated with the Menominee development include the Menominee canoe portage, Menominee dam tailrace fishing site, 11th Avenue boat launch, and NEW Hydro Fisherman's Park and tailrace fishing site.

Project Operation

NEW Hydro operates the Menominee and Park Mill Project in a run-of-river mode, such that outflow from the project approximates inflow. To achieve run-of-river, NEW Hydro maintains the Park Mill reservoir water surface elevation at 610.43 feet NGVD 29 ±0.3 foot and maintains the Menominee reservoir water surface elevation at 593.53 feet NGVD 29 ±0.3 foot. Tainter gates and turbines are brought on line or taken off line as necessary to maintain the normal reservoir operating water surface elevation. As noted above, no changes to the project's current mode of operation are proposed.

Proposed Environmental Measures

NEW Hydro proposes the following measures to protect or enhance environmental resources at the project:

- develop a drought operation plan to protect aquatic resources located in the Menominee reservoir and downstream of the Menominee dam when flows in the Menominee River are less than 138 cfs, and when flows measured at the Menominee development are less than 350 cfs;
- continue to implement the 2013 Menominee / Park Mill Hydroelectric Project FERC Project No. 2744 Fish Passage Operations Settlement Agreement (2013 Settlement Agreement) which defines the responsibilities of signatories to the settlement, funding for the fish passage facilities, and guidance for operation and maintenance of the fish passage facilities at the project (i.e., a Fish Passage Operation Plan);
- continue to remove woody debris and trash collected from trashracks at the Park Mill and Menominee developments;
- develop a water quality monitoring plan to monitor dissolved oxygen and temperature during the summer months in the bypassed reach of the Menominee reservoir and downstream of the Menominee dam near the exit of the fish lift;
- develop a reservoir drawdown plan to protect fishery resources in the Park Mill and Menominee developments' reservoirs during drawdowns;

- continue to implement the Memorandum of Understanding (MOU) of 2012 that requires NEW Hydro to design, install, operate, and maintain fish passage facilities at the project to safely pass lake sturgeon past the project;[6]
- develop an operation compliance monitoring plan to ensure that run-of-river project operation is met;
- install a staff gage at the reservoir side of the dam for each development to provide public awareness of reservoir elevations;
- develop an invasive species monitoring plan to manage Eurasian water-milfoil and other invasive aquatic species located in the Menominee and Park Mill reservoirs;
- implement bald eagle protection measures to minimize adverse effects to nesting bald eagles in the project boundary that may result from project maintenance;
- implement the Recreation Plan, which includes measures to: (1) maintain the recreation facilities owned by NEW Hydro; (2) maintain the 18th Avenue boat launch, Mason Park, Cox Landing, and the Menominee dam tailrace fishing site; (3) provide garbage bags at the boat launches; (4) at the 11th Avenue boat launch, improve the existing boat ramp and install a new boat dock and a seasonal portable toilet; (5) at the 18th Avenue boat launch, improve the boat dock and install a picnic table and a seasonal portable toilet; (6) install picnic tables and a seasonal portable toilet at Mason Park; (7) install signage about the history of the Fisherman's Park and tailrace fishing site; (8) install interpretive signage at the recreation facilities and (9) develop and distribute a recreation brochure to provide information on recreation facilities in the project boundary; and
- implement the statewide programmatic agreement (PA) for Wisconsin and adjacent portions of Michigan, executed in 1993,[7] and an historic properties management plan (HPMP) to protect cultural resources.[8]

[6] The 2012 MOU does not identify the parties financially responsible for construction of the fish passage facilities.

[7] The full name of the PA is "Programmatic Agreement Among the Federal Energy Regulatory Commission, the Advisory Council on Historic Preservation, the State of Wisconsin, State Historic Preservation Officer, and the State of Michigan, State Historic Preservation Officer, for managing Historic Properties that May Be Affected by New and Amended Licenses Issuing for the Continued Operation of Existing Hydroelectric Projects in the State of Wisconsin and Adjacent Portions of the State of Michigan."

[8] The HPMP includes NEW Hydro's proposal to develop an erosion control plan to monitor the shoreline at four archaeological sites.

Public Involvement

Before filing its license application with the Commission, NEW Hydro conducted pre-filing consultation under the traditional licensing process. The intent of the Commission's pre-filing process is to initiate public involvement early in the project planning process and to encourage citizens, governmental entities, tribes, and other interested parties to identify and resolve issues prior to an application being formally filed with the Commission.

After the license application was filed, we conducted scoping to determine what issues and alternatives should be addressed. We issued a scoping document for the Menominee and Park Mill Project on June 23, 2014. We did not hold public or agency scoping meetings, but instead we conducted paper scoping for the project. On June 12, 2015, we issued a notice that the application was ready for environmental analysis and requested terms and conditions, comments, and recommendations for the project.

Alternatives Considered

This environmental assessment considers the following alternatives: (1) NEW Hydro's proposal, as outlined above; (2) NEW Hydro's proposal with some staff modifications and additions (staff alternative); and (3) no action, meaning that NEW Hydro would continue to operate the project with no changes.

Staff Alternative

The staff alternative includes New Hydro's proposed measures, except for the following: (1) the drought operation plan; (2) the water quality monitoring plan; (3) the 2012 MOU; and (4) the 2013 Settlement Agreement (with the exception of the Fish Passage Operation Plan component). The staff alternative also includes modifications of and additions to New Hydro's proposed measures as follows.

- Modify the proposed reservoir drawdown plan to include: (1) protocols for drawdowns of the project reservoirs and for the power canal for the Park Mill development, such as identification of the drawdown(s) purpose, the drawdown frequency and duration, and any measures to minimize effects on fish migration and spawning; (2) measures to protect aquatic and wildlife resources from the effects of drawdowns, such as monitoring for stranded fish and removal, salvage, and disposition of fish; and (3) a provision to notify resource agencies and the Commission of any emergency reservoir or power canal drawdowns.
- Modify the proposed operation compliance monitoring plan to include measures to verify run-of-river operation by using automatic level recorders in both reservoirs and to verify flows needed to operate the fish passage facilities.
- Modify the proposed invasive species monitoring plan to include: (1) a description of the proposed monitoring methods; (2) the proposed frequency of

monitoring; and (3) the proposed criteria to be used to determine when control measures would be implemented.

- Avoid cutting trees between April 1 and October 31 to protect roosting northern long-eared bats.
- Modify the proposed Recreation Plan to remove the provision to develop and distribute a recreation brochure to the public, and include: (1) conceptual drawings for the boat dock, handrail, and interpretive signage; and (2) a provision to review the Recreation Plan every other FERC Form-80 cycle to determine if facility improvements or modifications are necessary.

No-action Alternative

Under the no-action alternative, NEW Hydro would continue to operate the project with no changes. No new environmental protection, mitigation, or enhancement measures would be implemented.

Environmental Effects of the Staff Alternative

The primary issue associated with relicensing the Menominee and Park Mill Project is the effectiveness of the upstream and downstream fish passage facilities at providing passage for lake sturgeon. The environmental effects of the staff alternative are described below.

Geologic and Soils Resources

With run-of-river project operation resulting in minimal fluctuations of the water surface of the two reservoirs, the shorelines at both developments have remained at a constant level for several decades. Continuing to operate the project in a run-of-river mode would maintain the water level in both reservoirs at their existing level. Therefore, proposed project operation would not alter the erosion potential of the shorelines of the project reservoirs.

Aquatic Resources

Continuing to operate the project in a run-of-river mode would result in no changes to prevailing reservoir water levels or downstream flows, and would maintain existing habitat for aquatic resources. Implementing the proposed operation compliance monitoring plan, with staff's modifications, would provide a means for verifying that the project operates in accordance with the operational requirements of the license. The adverse effects of infrequent planned and emergency drawdowns, including the stranding of fish in the intake power canal for the Park Mill development, would be reduced under the staff alternative because New Hydro, in coordination with resource agencies, would monitor and salvage any fish stranded in the Park Mill power canal.

New Hydro proposes to continue to implement a Fish Passage Operation Plan, which sets the operational protocols for fish passage facilities at the project. Upstream

and downstream fish passage for lake sturgeon at the project would continue under the staff alternative.

Since the upstream and downstream fish passage facilities began operating in 2015, 68 lake sturgeon have been transferred to the Park Mill reservoir. It is estimated that the fish passage facilities have reduced habitat fragmentation and increased potential spawning habitat potential from 26 to 58 acres for lake sturgeon and increased rearing habitat for juvenile lake sturgeon from 212 acres to 1,610 acres.

Terrestrial Resources

Continuing to operate the project in run-of-river mode would maintain the existing shoreline habitat along the two reservoirs. Therefore, proposed project operation would not affect shoreline habitat.

Aquatic invasive plant species, including Eurasian water-milfoil, occur within the project boundary. The invasive species can displace native plant species, obstruct public access to recreational facilities, and interfere with recreational activities such as boating and fishing. Modifying the proposed invasive species monitoring plan to include staff's recommended measures for monitoring invasive species would help maintain public access to the project's recreational facilities.

Threatened and Endangered Species

Seven federally listed species (Kirtland's warbler, rufa red knot, dwarf lake iris, Hine's emerald dragonfly, Canada lynx, gray wolf and northern long-eared bat) have been known to occur in the project's counties. Continued operation of the project would have no effect on the federally listed Kirtland's warbler, rufa red knot, dwarf lake iris, Hine's emerald dragonfly, or Canada lynx because each species requires specialized habitat that does not exist within the project boundary or areas potentially affected by the project. Additionally, continued operation of the project would have no effect on the gray wolf because favorable habitat is not present within the project boundary and project operation would not otherwise affect the species.

There is some forest within the project boundary that could provide seasonal roosting habitat for the northern long-eared bat, and NEW Hydro's proposal to maintain the canoe portage at the Park Mill dam could affect this habitat. However, any tree removal that would result from New Hydro's maintenance does not occur within 0.25 miles of known bat hibernacula, or within 150 feet of a known maternity roost. With the staff-recommended measure to avoid cutting trees between April 1 and October 31, we conclude that relicensing the project may affect the northern long-eared bat, but any incidental take that may result is not prohibited by the final 4(d) rule.

Recreation and Land Use

NEW Hydro's proposed Recreation Plan includes measures for maintaining and modifying existing recreation facilities; however, recreational use at the project has increased substantially since 2008 and could continue to increase over a new license

term. Reviewing the recreation plan in prior to filing every other FERC Form-80 would help NEW Hydro determine if facility improvements or modifications to the Recreation Plan are necessary.

The proposed recreation brochure would appear to be redundant with the proposed interpretive signage, and would not provide any other necessary information to recreationists. Further, litter is a known issue at the recreation facilities and the proposed Recreation Plan may become another item discarded at the recreation facilities. Therefore, modifying the proposed Recreation Plan to remove the proposed recreation brochure would prevent it from contributing to the litter issue at the recreation facilities.

Lastly, the plan does not contain conceptual drawings for the proposed dock and handrail proposed at the 11th Avenue boat launch, or the proposed interpretive signage. Modifying the Recreation Plan to include a provision for conceptual drawings of the proposed dock, handrail, and interpretive signage, after consultation with resource agencies, would help ensure that the facilities would be suitably constructed and maintained.

Cultural Resources

The Mill No. 2 and Menominee Dam are eligible for listing on the National Register of Historic Places (National Register). In addition, there is one archaeological site within the project's area of potential effects that is listed on the National Register. Future maintenance of the project could alter the National Register-eligibility of the eligible properties.

Any effects on the National Register-eligible properties would be taken into account by the statewide PA for Wisconsin and adjacent portions of Michigan and the proposed HPMP. The PA requires the implementation of the HPMP, which would include measures to lessen, avoid, or mitigate for unavoidable adverse effects if future project maintenance would result in Mill No. 2 and Menominee Dam being altered or the archaeological site being disturbed.

No-Action Alternative

Under the no-action alternative, the Menominee and Park Mill Project would continue to be operated by NEW Hydro under the terms and conditions of the existing license, and no additional generation capacity or new environmental protection, mitigation, or enhancement measures would be implemented.

Conclusions

Based on our analysis, we recommend licensing the project under the staff alternative.

In section 4.2, *Comparison of Alternatives*, we estimate the likely cost of alternative power under the no-action alternative, NEW Hydro's proposal, and the staff

alternative. Our analysis shows that during the first year of operation under the no-action alternative, project power would cost $654,920 or $23.39/MWh less than the likely alternative cost of power. Under NEW Hydro's proposal, project power would cost $606,760 or $21.67/MWh less than the likely alternative cost of power. Under the staff alternative, project power would cost $629,720 or $22.49/MWh less than the likely alternative cost of power.

We chose the staff alternative as the preferred alternative because: (1) the project would provide a dependable source of electrical energy for the region (28,000 MWh annually); (2) the 4.348-MW of electric capacity would come from a renewable resource that does not contribute to atmospheric pollution, including greenhouse gases; and (3) the recommended environmental measures proposed by NEW Hydro, with our modifications, would adequately protect and enhance environmental resources affected by the project. The overall benefits of the staff alternative would be worth the cost of the proposed and recommended environmental measures.

We conclude that issuing a new license for the project, with the environmental measures we recommend, would not be a major federal action significantly affecting the quality of the human environment.

ENVIRONMENTAL ASSESSMENT

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

Menominee and Park Mill Hydroelectric Project
FERC Project No. 2744-043

1.0 INTRODUCTION

1.1 APPLICATION

On February 28, 2013, North East Wisconsin Hydro, LLC (NEW Hydro) filed an application for a new license with the Federal Energy Regulatory Commission (Commission) to continue to operate and maintain the existing Menominee and Park Mill Hydroelectric Project No. 2744 (Menominee and Park Mill Project or project). The 4.348-megawatt[9] (MW) project is located on the Menominee River in Menominee County, Michigan, and Marinette County, Wisconsin (figure 1 and figure 2). The project does not occupy any federal lands. The project generates an average of about 28,000 megawatt-hours (MWh) of energy annually. NEW Hydro proposes no new capacity and only minor new construction relating to upgrading and improving existing recreation facilities.

[9] Although the license application states that the project has a total installed capacity of 4.615 MW, consistent with section 11.1(i) of the Commission's regulations, we define the total installed capacity in this environmental assessment (EA) as the sum of the lesser of the capacity rating of the generator and turbine of each generating unit. Therefore, the total installed capacity of the project is 4.348 MW.

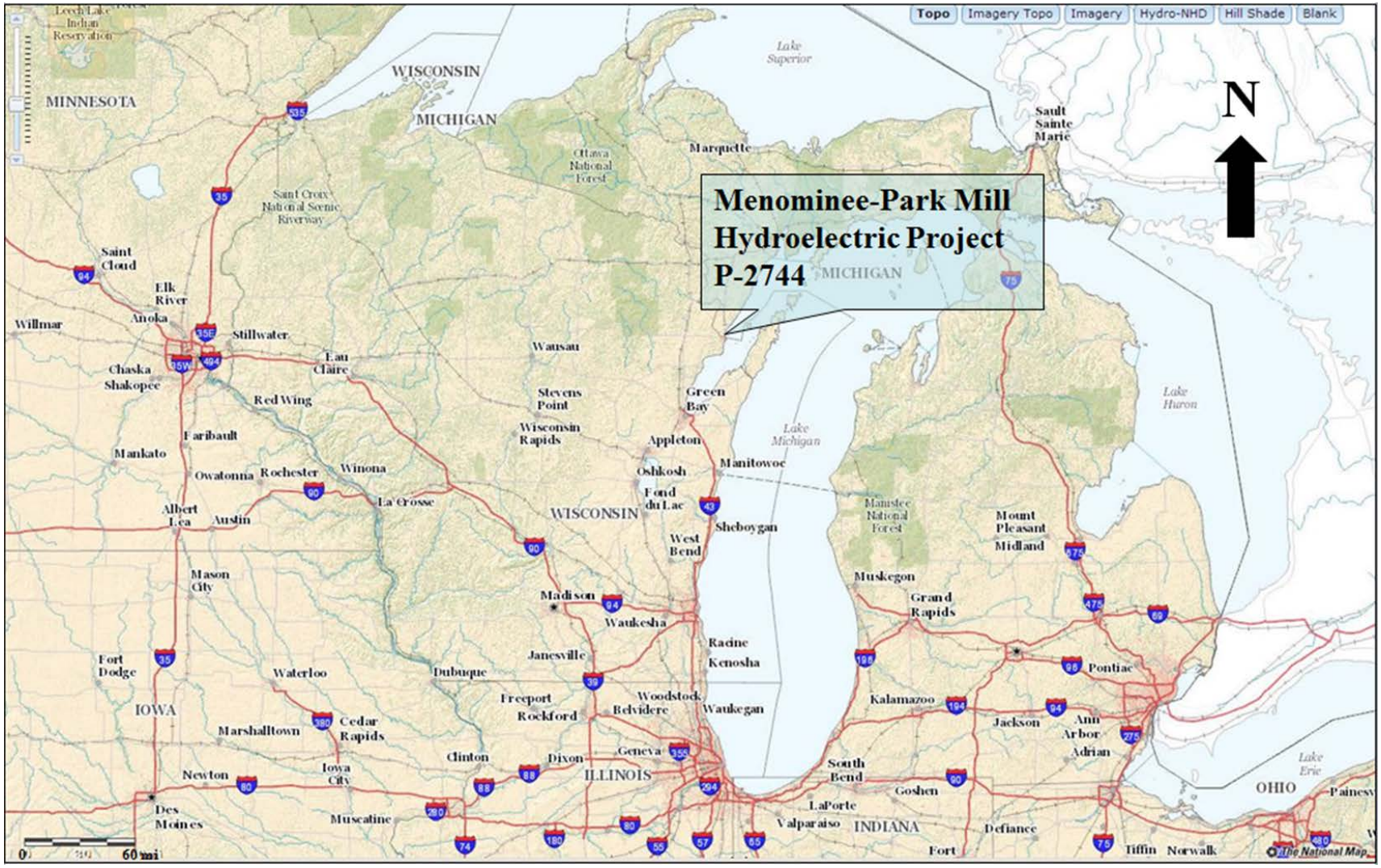

Figure 1. General location of the Menominee and Park Mill Project, Menominee County, Michigan, and Marinette County, Wisconsin (Source: U.S. Geological Survey, 2016, as modified by staff).

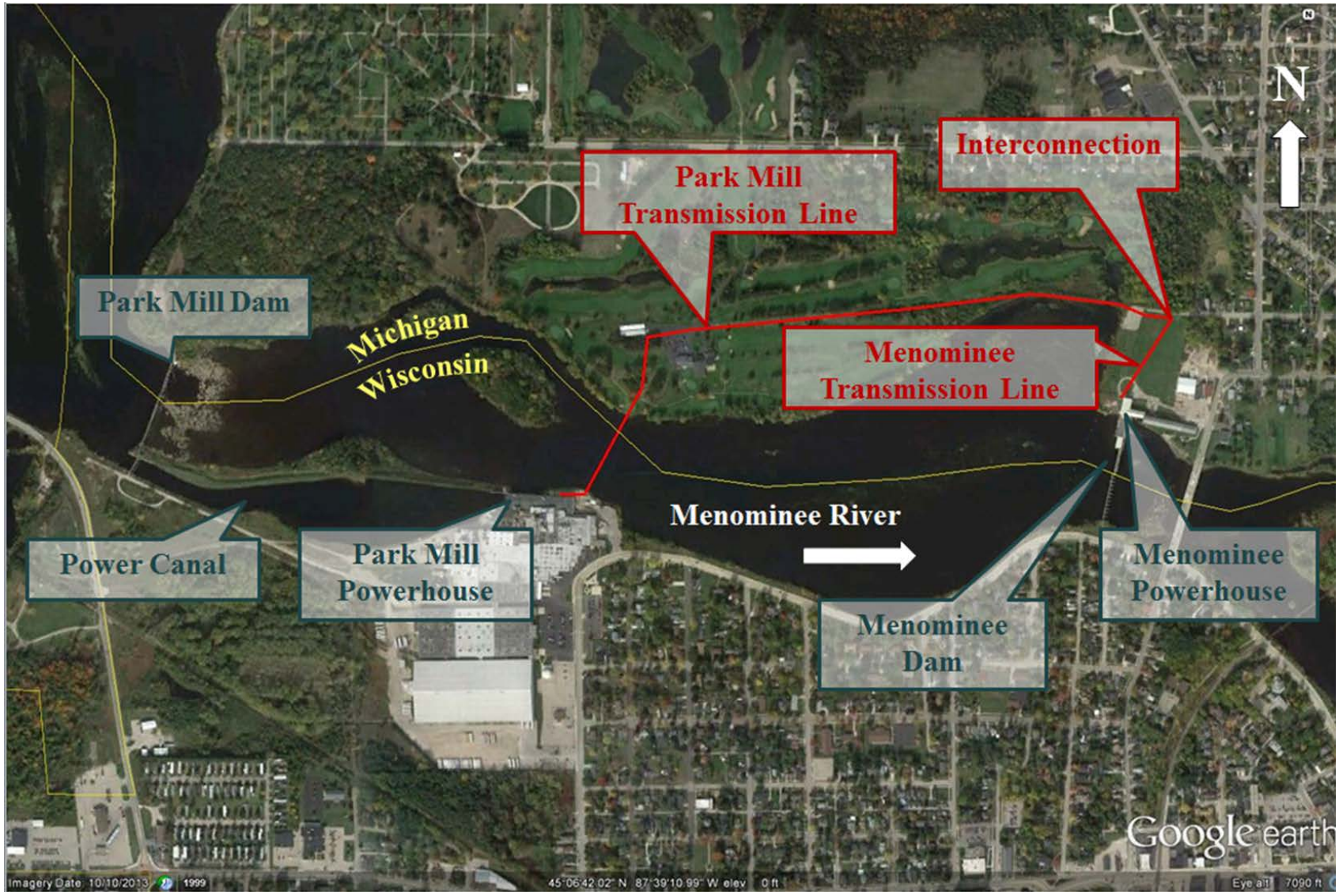

Figure 2. Project location and facilities for the Menominee and Park Mill developments (Source: Google Earth, 2016, as modified by staff).

1.2 PURPOSE OF ACTION AND NEED FOR POWER

1.2.1 Purpose of Action

The purpose of the Menominee and Park Mill Project is to continue to provide a source of hydroelectric power to meet the region's power needs. Therefore, under the provisions of the Federal Power Act (FPA), the Commission must decide whether to issue a license to NEW Hydro for the Menominee and Park Mill 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 a waterway. In addition to the power and developmental purposes for which licenses are issued (such as flood control, irrigation, or 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 new license for the Menominee and Park Mill Project would allow NEW Hydro to generate electricity at the project for the term of a new license, making electric power from a renewable resource available to NEW Hydro.

This EA has been prepared in compliance with the National Environmental Policy Act of 1969 to assess the environmental and economic effects associated with operation of the project, alternatives to the proposed project, and makes recommendations to the Commission on whether to issue a new license, and if so, recommends terms and conditions to become part of any license issued.

In this EA, we assess the environmental and economic effects of continuing to operate the project: (1) as proposed by NEW Hydro and (2) with our recommended measures (staff alternative). We also consider the effects of the no-action alternative. Important issues that are addressed include fish passage and the management and enhancement of existing recreation facilities.

1.2.2 Need for Power

The Menominee and Park Mill Project provides hydroelectric generation to meet part of the region's power requirements, resource diversity, and capacity needs. The project has an installed capacity of 4.348 MW and generates approximately 28,000 MWh per year.

The North American Electric Reliability Council (NERC) annually forecasts electricity supply and demand nationally and regionally for a 10-year period. The Menominee and Park Mill Project is located in the Midwest Reliability Organization (MRO) region and the Midcontinent Independent System Operator, Inc. (MISO) assessment area of the NERC. NERC's 2016 Long-Term Reliability Assessment

designates summer as the peak season for the reserve margin in the MISO assessment area. The anticipated reserve margin is forecasted to range from 18.09 percent in 2017 to 9.07 percent in 2026. The MISO assessment area is forecast to meet MISO's reference margin level of 15.2 percent through the year 2021, but fall below the reference margin level beginning in 2022 and continuing through 2026 (NERC 2016).

We conclude that power from the Menominee and Park Mill Project would help meet a need for power in the MRO region in both the short- and long-term. The project provides low-cost power that displaces generation from non-renewable sources. Displacing the operation of non-renewable facilities may avoid some power plant emissions, thus creating an environmental benefit.

1.3 STATUTORY AND REGULATORY REQUIREMENTS

A license for the Menominee and Park Mill Project is subject to numerous requirements under the FPA and other applicable statutes. The major regulatory and statutory requirements are described below.

1.3.1 Federal Power Act

1.3.1.1 Section 18 Fishway Prescriptions

Section 18 of the FPA states that the Commission is to require construction, operation, and maintenance by a licensee of such fishways as may be prescribed by the Secretaries of Commerce or the Department of the Interior (Interior). Neither agency filed fishway prescriptions, or a reservation of authority to prescribe fishways, under section 18 of the FPA.

1.3.1.2 Section 10(j) Recommendations

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

The Interior timely filed on August 7, 2015, recommendations under section 10(j). In section 5.4, *Fish and Wildlife Agency Recommendations*, we discuss how we address the agency recommendations and how they comply with section 10(j).

1.3.2 Clean Water Act

Under section 401 of the Clean Water Act (CWA), a license applicant must obtain water quality certification (certification) from the appropriate state pollution control agency verifying compliance with the CWA. On February 3, 2015, NEW Hydro applied to the Wisconsin Department of Natural Resources (Wisconsin DNR) for certification for the project. The request for certification was received by the Wisconsin DNR on February 9, 2015, and Wisconsin DNR issued a certification for the project on June 17, 2016. The certification from Wisconsin DNR is considered waived because it was not filed within 1 year of receiving the request for certification.

On March 28, 2013, NEW Hydro requested certification from the Michigan Department of Environmental Quality (Michigan DEQ) for the project. NEW Hydro filed a copy of its request on April 2, 2013. In a letter filed on March 17, 2015, Michigan DEQ stated that although it received the request,[10] it does not act on that request within 1 year. Therefore, certification for the project by Michigan DEQ is considered to be waived.

1.3.3 Endangered Species Act

Section 7 of the Endangered Species Act (ESA) 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. Review of the FWS's Information for Planning and Conservation (IPaC) system in July 2017 indicated that seven federally listed species have the potential to occur within Marinette and Menominee Counties, including the Kirtland's warbler, rufa red knot, dwarf lake iris, Hine's emerald dragonfly, Canada lynx, gray wolf, and northern long-eared bat. Our analysis of project effects on threatened and endangered species is presented in section 3.3.4, *Threatened and Endangered Species*, and our recommendations are included in section 5.1, *Comprehensive Development and Recommended Alternative*.

We conclude that relicensing the project, as proposed with staff-recommended measures, would have no effect on the Kirtland's warbler, rufa red knot, dwarf lake iris, Hine's emerald dragonfly, Canada lynx, and gray wolf.

FWS's IPaC system indicates the federally listed northern long-eared bat has the potential to occur within the counties of the project. The proposed maintenance of the canoe portage would require the periodic clearing of encroaching vegetation, which may include trees. Clearing trees has the potential to disturb roosting northern long-eared bats. However, tree removal that may result as part of New Hydro's maintenance does not occur within 0.25 miles of hibernacula, or within 150 feet of a known maternity roost.

[10] In its filing, Michigan DEQ did not indicate the date it received the request.

Therefore, we conclude that relicensing the project may affect the northern long-eared bat, but any incidental take that may result is not prohibited by the final 4(d) rule.

1.3.4 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's coastal zone management agency concurs with the license applicant's certification of consistency with the state's CZMA program, or the agency's concurrence is conclusively presumed by its failure to act within 180 days of its receipt of the applicant's certification.

In a letter filed March 7, 2013, Michigan DEQ stated that the Menominee and Park Mill Project is within Michigan's coastal management boundary. Michigan DEQ further stated that, provided all permit conditions and Commission requirements of any new license are maintained, no adverse effects to coastal resources are anticipated from licensing the project. Therefore, Michigan DEQ states that the project is consistent with Michigan's Coastal Management Program. In a letter filed April 2, 2013, the Wisconsin Coastal Management Program stated that it had no comments on the project and issued a waiver for the state's CZMA requirements.

1.3.5 National Historic Preservation Act

Section 106 of the National Historic Preservation Act (NHPA) 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).

Pursuant to section 106 of the NHPA, NEW Hydro consulted with the Wisconsin State Historic Preservation Officer (Wisconsin SHPO) and Michigan State Historic Preservation Officer (Michigan SHPO) to identify historic properties, determine the National Register-eligibility of the project, and assess potential adverse effects on historic properties within the project's area of potential effects (APE). These consultations and other investigations concluded that there is one previously-discovered archaeological site listed on, and two historical sites eligible for, the National Register.

To meet the requirements of section 106 of the NHPA, on December 16, 1993, Commission staff executed a programmatic agreement (PA) with the Wisconsin SHPO and Michigan SHPO. The PA contains principals and procedures for the protection of historic properties from the effects of the operation of the hydroelectric project in the state of Wisconsin and adjacent portions of the Upper Peninsula of Michigan. The terms of the PA ensure that NEW Hydro address and treat all historic properties identified

within the project's APE through implementation of an historic properties management plan (HPMP) for the project.

1.4 PUBLIC REVIEW AND COMMENT

The Commission's regulations (18 CFR, section 16.8) require that applicants 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, ESA, NHPA, and other federal statutes. Pre-filing consultation must be completed and documented according to the Commission's regulations.

1.4.1 Scoping

Before preparing this EA, we conducted scoping to determine what issues and alternatives should be addressed. A scoping document was distributed to interested agencies and others on June 23, 2014. It was noticed in the Federal Register on June 27, 2014. We did not hold public or agency scoping meetings; instead, we conducted paper scoping for the project. The following entities provided written comments:

Commenting Entity	**Date Filed**
Wisconsin DNR	August 27, 2014
Wisconsin SHPO	July 31, 2014

1.4.2 Interventions

On June 12, 2015, the Commission issued a notice accepting NEW Hydro's application for a new license for the Menominee and Park Mill Project. This notice set August 11, 2015, as the deadline for filing protests and motions to intervene. In response to the notice, the following entities filed motions to intervene:

Intervenor	Date Filed
Wisconsin DNR	June 18, 2015 and August 3, 2015
Michigan Department of Natural Resources (Michigan DNR)	June 19, 2015
Michigan DEQ	July 13, 2015
Interior	July 17, 2015
Anglers of the Au Sable, Inc.; Great Lakes Council, Inc. of the Federation of Fly Fishers, Inc.; Michigan United Conservation Clubs; Michigan Council of Trout Unlimited, collectively known as the Michigan Hydropower Reform Coalition (Michigan HRC)	July 31, 2015

1.4.3 Comments on the Application

The June 12, 2015 notice also stated the application was ready for environmental analysis, and requested that comments, recommendations, terms, and conditions be filed. The following entities commented:

Intervenor	Date Filed
Michigan HRC	July 31, 2015
Interior	August 7, 2015
Wisconsin DNR	August 11, 2015
Michigan DNR	August 11, 2015
Michigan DEQ	August 26, 2015

2.0 PROPOSED ACTION AND ALTERNATIVES

2.1 NO-ACTION ALTERNATIVE

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

2.1.1 Existing Project Facilities

The Menominee and Park Mill Project is located on the Menominee River and consists of the Park Mill development and the Menominee development. The Park Mill dam is located at river mile (RM) 3.6, about 1.1 miles upstream of the Menominee dam. The Menominee dam is located at RM 2.5, about 2.5 miles upstream of the Menominee River confluence with Green Bay (Lake Michigan). Descriptions of the facilities at the two developments follow.

2.1.1.1 Park Mill Development

The Park Mill development consists of the following existing facilities: (1) a 539-acre reservoir, known as Upper Scott Flowage,[11] having a gross storage capacity of 3,788 acre-feet at a normal maximum water surface elevation of 610.43 feet National Geodetic Vertical Datum of 1929 (NGVD 29); (2) a 538.58-foot-long, 22-foot-high concrete gravity dam consisting of, from north to south: (a) a 48.5-foot-long overflow spillway with a crest elevation of 607.93 feet NGVD 29 that is topped with 3-foot-high flashboards; (b) a 168.58-foot-long spillway that is composed of seven 20-foot-wide, 13-foot-high Tainter gates with a sill elevation of 597.93 feet NGVD 29; (c) an 18-foot-long abandoned fishway with a crest elevation of 610.93 feet NGVD 29; and (d) a 303.5-foot-long overflow spillway with a crest elevation of 607.93 feet NGVD 29 that is topped with 3-foot-high flashboards; (3) a 100-foot-long, 22-foot-high concrete gravity dam consisting of five 16-foot-wide, 16-foot-high Tainter gates with a sill elevation of 595.23 feet NGVD 29 located at the entrance to the power canal; (4) a 2,300-foot-long power canal formed by a 2,400-foot-long, 22-foot-high earthen embankment with a 16-foot top width; (5) a 58.5-foot-long side overflow spillway with a crest elevation of 610.13 feet NGVD 29 and topped with 1-foot-high flashboards, located at the downstream end of the power canal; (6) 19.85-foot-high intake trashracks inclined 82.9 degrees from the horizontal with a 1-inch clear opening; (7) a 159-foot-long, 74.5-foot-wide powerhouse area, which is located within a paper manufacturing building owned by Kimberly Clark Corporation, with an operating head of 16 feet; (8) one 0.225 MW vertical-axis Kaplan turbine, coupled to a 0.225-MW generator; two

[11] This EA refers to the Upper Scott Flowage as the Park Mill reservoir.

0.600 MW horizontal-axis Francis turbines, each coupled to a 0.420-MW generator; two 0.525 MW vertical-axis Kaplan turbines, each coupled to a 0.430-MW generator; and one 0.349 MW vertical-axis Kaplan turbine, coupled to a 0.450-MW generator; for a total installed capacity of 2.274 MW; (9) a 2,200-foot-long bypassed reach; (10) a three phase 3,000 kilovolt ampere (kVA) 480 / 24,900 volt (V) step-up transformer; (11) a 4,630-foot-long, 24.9-kilovolt (kV) overhead transmission line to connect the project transformer to NEW Hydro's distribution lines; (12) the Park Mill canoe portage; and (13) appurtenant facilities.

2.1.1.2 Menominee Development

The Menominee development consists of the following existing facilities: (1) a 143-acre reservoir, known as Lower Scott Flowage,[12] having a gross storage capacity of 350 acre-feet at a normal maximum water surface elevation of 593.53 feet NGVD 29; (2) a 486.5-foot-long, 24-foot-high dam consisting of, from north to south: (a) a 150.5-foot-long concrete gravity overflow spillway with a crest elevation of 593.93 feet NGVD 29; (b) a 293-foot-long concrete gravity spillway that is composed of twelve 20-foot-wide, 12-foot-high Tainter gates with a sill elevation of 582.43 feet NGVD 29; (c) a 15-foot-long concrete gravity non-overflow section with a top elevation of 598.43 feet NGVD 29; and (d) a 20-foot-long earthen embankment with a concrete core; (3) 25-foot-high intake trashracks inclined 37 degrees from the horizontal with 2-inch clear bar spacing at units #8 and #9 (north) and 17-foot-high intake trashracks inclined 71.6 degrees from the horizontal with 1-inch clear bar spacing at units #4 and #5 (south); (4) a 204-foot-long concrete and brick structure integral to the north end of the dam that includes a 85-foot-long, 50.5-foot-wide powerhouse (north) and a 68-foot-long, 34-foot-wide powerhouse (south), with an operating head of 12 feet; (5) two 0.848 MW vertical-axis Kaplan turbines, each coupled to a 0.662-MW generator (north), and two 0.375 MW vertical-axis Kaplan turbines (south), each coupled to a 0.458-MW generator; for a total installed capacity of 2.074 MW; (6) a three phase 3,000-kVA 4,160 / 24,900 V step-up transformer; (7) a 568-foot-long, 24.9-kV underground transmission line to connect the project transformer to NEW Hydro's distribution lines; (8) three recreation sites, including the Menominee canoe portage, 11th Avenue boat launch, and NEW Hydro Fisherman's Park and tailrace fishing site; and (8) appurtenant facilities.

2.1.1.3 Fish Passage Facilities

The project has operating upstream and downstream fish passage facilities as described below.

[12] This EA refers to the Lower Scott Flowage as the Menominee reservoir.

Downstream Fish Passage Facility at the Park Mill Development

The Park Mill development's downstream fish passage facility provides downstream fish passage from the Park Mill reservoir to the Menominee reservoir, and is located at the downstream end of the power canal adjacent to the Park Mill powerhouse. The fish passage facility includes a fish guidance rack, guidance ramp, and a fish bypass structure.

The fish guidance rack is 105.17 feet long, 19.85 feet high, is inclined 82.9 degrees from the horizontal, and has a 1-inch clear bar spacing. The fish guidance rack, which spans the power canal, is angled 45 degrees to the flow in the power canal. The fish guidance rack directs fish downstream towards the fish bypass structure, which is located on the left (north) bank of the power canal.

The riprap guidance ramp extends upward from the bottom of the power canal to the fish bypass structure, which has its entrance about 14 feet above the bottom of the power canal. The guidance ramp directs fish towards the water surface and to the entrance of the fish bypass structure, which has its bottom crest about 3.5 feet below the normal water surface in the power canal.

The downstream fish passage facility includes a rectangular concrete structure that has a length of 4 feet perpendicular to the flow, a length of 17 feet along the flow. A 4-foot-wide by 6.5-foot-high steel slide gate allows flow to enter the downstream fish facility. An adjustable flow control weir ("moveable floor") is used to maintain a depth of flow in the downstream fish passage facility. The downstream fish passage facility contains a variable cross-sectional shape that transitions the flow from the power canal at its entrance to the discharge pipe at its exit. The high density polyethylene discharge pipe is 51.34 feet long and has an outside diameter of 48 inches. There is a 3-foot nominal drop between the pipe invert and the Menominee reservoir. The downstream fish passage facility contains cameras for recording fish passage and a gage for recording water temperature.

Downstream Fish Passage Facility at the Menominee Development

The Menominee development's downstream fish passage facility provides downstream fish passage from the Menominee reservoir to the Menominee tailwater, and is located adjacent to, and south of, the Menominee powerhouse. The fish passage facility includes a guidance ramp and a fish bypass structure.

The riprap guidance ramp directs fish upward from the bottom of the Menominee reservoir to the water surface towards the entrance of the fish bypass structure. The guidance ramp, which has a top elevation of 587.8 feet NGVD 29, extends about 18 feet upstream from the entrance to the fish passage facility to intersect with bottom of the Menominee reservoir that varies in elevation from 581.1 feet NGVD 29 to 587.8 feet NGVD 29. The maximum slope of the fish guidance ramp is 2:1 (horizontal:vertical).

The fish bypass structure includes a rectangular concrete structure that has a length of 4 feet perpendicular to the flow, and a length of 17.5 feet along the flow. The entrance to the fish bypass structure has a fixed floor elevation that is 1.5 feet above the top of the guidance ramp structure. A 4-foot-wide by 5-foot-high stainless steel slide gate allows flow to enter the fish bypass structure. An adjustable flow control weir ("moveable floor") is used to maintain a depth of flow in the downstream fish passage facility. The stainless steel fish passage facility is 32.42 feet long, 4 feet wide and 4 feet high. There is a 4-foot nominal drop between the stainless steel fish passage facility pipe invert and the Menominee tailwater. The downstream fish passage facility contains cameras for recording fish passage and a gage for recording water temperature.

Upstream Fish Passage Facility at the Menominee Development

The Menominee development's upstream fish passage facility is a fish lift (or fish elevator) that provides upstream fish passage past the Menominee reservoir into the Park Mill reservoir for lake sturgeon. The fish lift is located at the north end of the Menominee powerhouse, adjacent to the left (north) bank of the Menominee River. The entrance to the fish lift facility is located immediately downstream of the powerhouse. The fish lift facility includes an attraction flow facility, a guidance ramp, a fish lift (a fish elevator), and fish sorting and holding tanks. Fish that are captured in the fish lift are deposited in the primary sorting tank where the selected target species (lake sturgeon of suitable size, sex, and health) are translocated upstream of the Park Mill dam. All other by-catch (including non-target native species, non-native or invasive species; and lake sturgeon that don't meet target species standards of size, sex, and health) are safely returned to the tailwater of the Menominee powerhouse. Undesirable species may be destroyed as authorized by state resource agencies and sea lampreys are handled in accordance with FWS sea lamprey control guidelines (the lamprey may be destroyed or are collected for use by personnel from the Hammond Bay Biological Station, at Millersburg, Michigan, a field station of US Geological Survey's Great Lakes Science Center in Ann Arbor, Michigan).

The attraction flow facility, located in flume #4,[13] directs flow to the fish lift, which is located in flume #5. The upstream entrance to the attraction flow facility has a trash rack with a ¾-inch clear bar spacing and a flow control gate that allows attraction flow velocities to be adjusted as needed. Other components of the attraction flow facility include a turning vane, a flow diffuser, and a blocking screen.

The guidance ramp is on the downstream side of flume #5 in a concrete entrance channel. The guidance ramp is constructed of riprap at a 2:1 (horizontal:vertical) slope that extends from an entrance channel to the entrance to the fish lift. The guidance ramp

[13] Flumes #4 and #5 are unused turbine bays in the north end of the Menominee powerhouse that have been converted for fish passage. Flume #5 is north of, and adjacent to, Flume #4.

directs fish towards the entrance to the fish lift, which is about 3 feet above the concrete entrance channel.

The fish lift contains a removable fiberglass-covered false floor under a rectangular steel fish lift hopper that is 9.83 feet wide and 15.83 feet long. The elevator raises the hopper about 23 feet to the first floor of flume #5, which also houses a 11-foot-diameter aluminum sorting tank, a 6-foot-diameter sea lamprey holding tank, a fish return tank, and two 12-foot-diameter aluminum holding tanks. The fish return tank is connected to a 72-foot-long, 36-inch outside diameter, high density polyethylene discharge sluice that returns fish to the Menominee powerhouse tailwater. At the exit of the tank discharge sluice there is a 2-foot nominal drop between the pipe invert and the Menominee powerhouse tailwater. One 12-foot-diameter holding tank is connected to a 3-foot-wide discharge sluice that leads to the fish transport tank that is towed by a transport vehicle. The fish lift facility contains cameras for recording fish passage and a gage for recording water temperature.

2.1.2 Existing Project Boundary

The existing project boundary fully encloses all permanent project features, including the powerhouses, dams, reservoirs and transmission lines. The Park Mill reservoir follows elevation 613.11 feet NGVD 29, extending approximately 3.5 miles upstream of the Park Mill dam. The Menominee reservoir follows elevation 596.11 feet NGVD 29, extending approximately 1.2 miles upstream of the Menominee dam.

2.1.3 Project Safety

The project has been operating for more than 31 years under the existing license, and during this time, Commission staff has conducted operational inspections focusing on the continued safety of the structures, identification of unauthorized modifications, efficiency and safety of operations, compliance with the terms of the license, and proper maintenance.

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

2.1.4 Existing Project Operation

NEW Hydro operates the project in a run-of-river mode, whereby the fluctuations of the water surfaces in the Menominee and Park Mill reservoirs are within ±0.3 foot of

the normal water surface.[14] In addition, each development has a minimum reservoir level that limits the drawdown during normal operation. To respond to larger flow rates, each reservoir is equipped with a high water-level trigger that initiates the automatic operation of a Tainter gate. This high water-level trigger elevation can be adjusted from the host computer when necessary to respond to changing flow conditions in the Menominee River. The water surface elevations related to operation of each development are presented in table 1. The project does not have a minimum flow requirement for either development.

Table 1. Existing operation water surface levels as they relate to the normal reservoir water surface. (Source: NEW Hydro, 2013, with staff modifications)

	Park Mill		Menominee	
Operation Condition	Elevation (feet, NGVD)	Distance from normal water surface (feet)	Elevation (feet, NGVD)	Distance from normal water surface (feet)
Spillway crest	610.93	0.50	593.93	0.40
Tainter gate trigger level[1]	610.83	0.40	593.90	0.37
Upper operational limit	610.73	0.30	593.83	0.30
Normal water surface	610.43	0.00	593.53	0.00
Lower operational limit	610.13	-0.30	593.23	-0.30
Minimum operational limit	609.83	-0.60	593.03	-0.50

1 - The high water-level trigger elevation can be adjusted from the host computer when necessary to respond to changing flow conditions in the Menominee River.

The project is manually operated by NEW Hydro's personnel who are on site from 7:00 AM through 3:00 PM, Monday through Friday. All critical systems are set with trigger-point alarms to alert personnel of unusual conditions or when the reservoir water surface approaches either the upper or lower normal limits. When the reservoir water surface approaches either the upper or lower normal limits, NEW Hydro's personnel adjust the turbine or Tainter gate setting to bring the reservoir water surface back to the normal water surface. When no personnel are scheduled to be on site, the project is staffed by an on-call operator who can receive trigger-point alarms, as well as remotely monitor and control project operation. The on-call operator is responsible for acknowledging the alarm and restoring the project to a normal operating mode. A standby operator is available in case the on-call operator cannot acknowledge the alarm

[14] Run-of-river operation is required by Article 37 of the existing license. *See* 30 FERC ¶62,264 (1985).

or the on-call operator needs assistance. The operating personnel are able to remotely check the status of generating units, make adjustments to wicket gate position, view unit temperatures, and adjust the Tainter gates at each development.

Project operation is based, in part, on flow data obtained from two U.S. Geological Survey (USGS) gages located on the Menominee River upstream of the project. The upstream gage is located at the White Rapids Dam Project (P-2357) near Banat, Michigan, at RM 54.2 (gage 04066030). The downstream gage is located near McAllister, Wisconsin, at RM 22.6 (gage 04067500), which is 2.8 miles downstream of the Grand Rapids Project (P-2433). On average, the travel time for flow releases from the White Rapids Dam gage to reach the project is 24 hours and the travel time for the flow releases from the McAllister gage to reach the project is 12 hours. The USGS McAllister gage (gage 04067500) is checked a minimum of three times per day by NEW Hydro's personnel.

2.1.4.1 Park Mill Development

Normal project operation occurs when flows in the Menominee River are between the minimum flow capacity of one turbine, 138 cubic feet per second (cfs), and the maximum flow capacity of all six turbines, 2,309 cfs. During normal operation, NEW Hydro's personnel select turbine combinations based on their known water use characteristics that allow wicket gate positions to be automatically monitored and adjusted by the programmable logic controller[15] (PLC) to maximize generation and to maintain the normal reservoir water surface elevation of 610.43 feet NGVD 29.

Flood operation occurs when flows in the Menominee River exceed the maximum flow capacity of all six turbines, 2,309 cfs. Tainter gate number 1, the southernmost gate, contains a permanently-fixed automated hoist, which is PLC-controlled to automatically open to convey the flood discharge. The use of the PLC-controlled Tainter gate is initiated when the reservoir water surface level reaches 610.83 feet NGVD 29, which is 0.10 foot below the spillway crest. If additional discharge capacity is needed in excess of that provided by the PLC-controlled Tainter gate, NEW Hydro's personnel can manually operate the six remaining Tainter gates. Reservoir water surface elevations greater than 610.93 feet NGVD 29 result in flow over three spillway sections. Two spillway sections are topped with flashboards and have a combined length of 352.0 feet. The third spillway section is the 18-foot-long abandoned fishway.

Drought operation occurs when flows in the Menominee River are less than the minimum flow capacity of one turbine, 138 cfs. When Menominee River flows are less than 138 cfs, all turbines are taken off line and the PLC-controlled Tainter gate is used

[15] The project's programmable logic controller is a computer control system that continuously monitors the reservoir stage and makes adjustments to the Tainter gates and turbine wicket gates based upon a custom program to maintain run-of-river operation.

convey flows in the river required to maintain the normal reservoir water surface elevation of 610.43 feet NGVD 29.

NEW Hydro's personnel operate the project to reduce effects of ice at the intake trashracks and Tainter gates. During freezing conditions, the intake trashracks are susceptible to blockage from ice accumulation. The preferred method to minimize ice blockage of the intake trashracks is to allow continuous flow to pass through the intake trashrack bars. The Park Mill development has an electrically-operated gate heating system on Tainter gate number 1. The heated gate system, which is embedded in the concrete, prevents ice buildup on the side seals and bottom sills of the Tainter gate. If the use of additional Tainter gates is required during freezing conditions, NEW Hydro's personnel use a portable, diesel-powered, steam-producing apparatus to remove ice accumulation to allow the Tainter gates to be operated. The steam-producing apparatus is stored in a building located at the middle of the dam. In addition, aerators are used to prevent ice formation upstream of the spillway sections that are topped with flashboards and upstream of two Tainter gates.

At the entrance to the power canal leading to the Park Mill powerhouse, the middle three Tainter gates are normally maintained in the open position to allow flow from the reservoir to enter the power canal. The end gates typically remain closed to reduce the potential for bank erosion along the power canal.

The side overflow spillway in the canal embankment is located immediately upstream of the intake trashracks. The purpose of the spillway is to discharge any surge in the power canal in the event that a generating unit trips off-line that would create an upstream rejection surge.[16] Also, the side spillway provides a safety outlet if the water level in the power canal were to increase, which would allow time for the Tainter gates at the entrance to the power canal to be closed.

2.1.4.2 Menominee Development

Normal operation occurs when flows in the Menominee River are between the minimum flow capacity of one turbine, 350 cfs, and the maximum flow capacity of all four turbines, 2,622 cfs. During normal operation, NEW Hydro's personnel select turbine combinations based on their known water use characteristics that allow wicket gate positions to be automatically adjusted by the PLC to maximize generation and to maintain the normal reservoir water surface elevation of 593.53 feet NGVD 29.

Flood operation occurs when flows in the Menominee River exceed the maximum flow capacity of all four turbines, 2,622 cfs. Tainter gate number 1, the northernmost gate, contains a permanently-fixed automated hoist, which is PLC-controlled to automatically open to convey the flood discharge. The use of the PLC-controlled Tainter

[16] A rejection surge is a wave of water that moves upstream and is caused by a sudden closing of a gate.

gate is initiated when the reservoir water surface level reaches 593.90 feet NGVD 29, which is 0.03 foot below the spillway crest. If additional discharge capacity is needed in excess of that provided by the PLC-controlled Tainter gate, NEW Hydro's personnel can manually operate the 11 remaining Tainter gates. Reservoir water surface elevations greater than 593.93 feet NGVD 29 result in flow over the 150.5-foot-long overflow spillway.

Drought operation occurs when flows in the Menominee River are less than the minimum flow capacity of one turbine, 350 cfs. When Menominee River flows are less than 350 cfs, all turbines are taken off line and the PLC-controlled Tainter gate is used to discharge water over the spillway at a rate required to maintain the normal reservoir water surface elevation of 593.53 feet NGVD 29.

NEW Hydro's personnel operate the project to reduce effects of ice at the intake trashracks and Tainter gates. During freezing conditions, the intake trashracks are susceptible to blockage from ice accumulation. The preferred method to minimize ice blockage of the intake trashracks is to allow continuous flow to pass through the trashrack bars. The Menominee development has Tainter gate number 1 is equipped with stainless steel side seal plates with a fluid loop heating system to ensure operability during the freezing conditions. A special housing enclosure is located on the spillway deck to house a hot water heater and control valves for spillway Tainter gate number 1. If the use of additional Tainter gates is required during freezing conditions, NEW Hydro's personnel use a portable, diesel-powered, steam-producing apparatus to remove ice accumulation to allow the Tainter gates to be operated. The steam-producing apparatus is stored inside the powerhouse. In addition, aerators are used to prevent ice formation upstream of three Tainter gates.

2.1.4.3 Operation of Fish Passage Facilities

Downstream Fish Passage Facility at the Park Mill Development

While seasonal operating times can vary, the downstream fish passage facility at the Park Mill development is typically operated from March 15 (ice-out in the spring) to November 30 (freeze-up in the fall) to facilitate the downstream movements of lake sturgeon. NEW Hydro consults with the Implementation Team[17] regarding the shut-down and start-up dates each year, and refers to the 2016 Fish Passage Operation Plan for guidance (Menominee and Park Mill Fish Passage Implementation Team, 2016). The Implementation Team is identified in the 2013 Menominee / Park Mill Hydroelectric Project FERC Project No. 2744 Fish Passage Operations Settlement Agreement (2013 Settlement Agreement) as being responsible for developing and approving a Fish Passage Operation Plan by December 30 of each year. NEW Hydro coordinates with the

[17] The Implementation Team is composed of the FWS, Wisconsin DNR, Michigan DNR, Michigan HRC, and the River Alliance of Wisconsin.

Implementation Team in the development of the Fish Passage Operation Plan each year. The Implementation Team also develops operational dates for the downstream fish passage facility based on weather conditions over the years and current and previous seasons' operation of the facility. The flow needed to operate the downstream fish passage facility at the Park Mill development is estimated to be a minimum of 50 cfs, but can vary as needed within the design parameters of the structure. Cameras and temperature sensors at the site help to record lake sturgeon use and passage at the site, so personnel need not be present to operate it.

Downstream Fish Passage Facility at the Menominee Development

The downstream fish passage facility operates continuously during ice-out conditions, from March 15 through November 30, annually. The downstream fish passage facility at the Menominee development is designed to operate under a minimum flow of 70 cfs and can be increased to 120 cfs, depending on the availability of water. Like the downstream fish passage facility at the Park Mill development, the operational dates for the Menominee downstream fish passage would be based on historic weather conditions and data collected from the operational record at the facility. The downstream fish passage facility is a volitional system so personnel need not be present to operate it. Cameras and temperature sensors at the site help to provide data on when and how successfully lake sturgeon use the fish bypass structure.

Upstream Fish Passage Facility at the Menominee Development

The Menominee fish lift is operated from March through May, for 8 weeks, and from October through November, for 4 weeks. The timing of the normal 12-week schedule for operating the fish lift may vary depending on water temperatures and the timing of the relevant fish spawning migrations for lake sturgeon. The attraction flow needed for operating the fish lift is estimated to be 75 cfs, but is not to exceed 120 cfs. Personnel from the Michigan DNR operate the facility on behalf of NEW Hydro. Like the two downstream fish passage facilities, the fish lift is operated according to a Fish Passage Operation Plan. The Implementation Team develops and refines the Fish Passage Operation Plan by December 30, annually.[18] All sorting, selection, and handling, or similar activities at the fish lift are conducted by personnel and or contractors on behalf of NEW Hydro. All lake sturgeon collected in the fish lift that are healthy, meet size parameters, and meet the male to female sex ratio, are tagged with PIT tags[19] and transported for release in the Park Mill reservoir.

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[18] The Fish Passage Operation Plan is modified annually based on data collected from the previous lake sturgeon passage season.

[19] A passive integrated transponder tag (PIT tag) is a very small electronic tag that can be automatically detected and decoded (by a PIT tag reader) in situ, eliminating the need to sacrifice, anesthetize, handle or restrain fish during data retrieval.

On the first floor of flume #5, the contents of the fish lift hopper are emptied into an 11-foot-diameter aluminum sorting tank. From the sorting tank, fish are sent to either a fish return tank, an isolated 6-foot-diameter sea lamprey holding tank or to two 12-foot-diameter aluminum holding tanks. Small lake sturgeon and other fish not acceptable for upstream passage are placed in the discharge pipe that returns the fish to the Menominee River downstream of the Menominee dam. Lake sturgeon selected for upstream passage are sent via a pipe to a truck with a tank for transport and relocation to the Park Mill reservoir for release.

2.2 NEW HYDRO'S PROPOSAL

2.2.1 Proposed Project Facilities

NEW Hydro proposes to upgrade Cox Landing, Mason Park, the 18th Avenue and 11th Avenue boat launches, the Menominee dam tailrace fishing site, and the Fisherman's Park and tailrace fishing site. No other changes to the project facilities are proposed.

2.2.2 Proposed Project Operation

NEW Hydro proposes to operate the project in a run-of-river mode, maintaining the Park Mill reservoir water surface elevation at 610.43 feet NGVD 29 ±0.3 foot and maintaining the Menominee reservoir water surface elevation at 593.53 feet NGVD 29 ±0.3 foot, as it has been operated under the existing license.

2.2.3 Proposed Environmental Measures

NEW Hydro proposes the following measures to protect or enhance environmental resources at the project:

- develop a drought operation plan to protect aquatic resources located in the Menominee reservoir and downstream of the Menominee dam when flows in the Menominee River are less than 138 cfs, and when flows measured at the Menominee development are less than 350 cfs;
- continue to implement the 2013 Settlement Agreement which defines the responsibilities of signatories to the settlement, funding for the fish passage facilities, and guidance for operation and maintenance of the fish passage facilities at the project (i.e., a Fish Passage Operation Plan);
- continue to remove woody debris and trash collected from trashracks at the Park Mill and Menominee developments;
- develop a water quality monitoring plan to monitor dissolved oxygen (DO) and temperature during the summer months in the bypassed reach of the Menominee Reservoir and downstream of the Menominee dam near the exit of the fish lift;

- develop a reservoir drawdown plan to protect fishery resources in the Park Mill and Menominee developments' reservoirs during drawdowns;
- continue to implement the Memorandum of Understanding (MOU) of 2012 that requires NEW Hydro to design, install, operate, and maintain fish passage facilities at the project to safely pass lake sturgeon;[20]
- develop an operation compliance monitoring plan to ensure that run-of-river project operation is met;
- install a staff gage at the reservoir side of the dam for each development to provide public awareness of reservoir elevations;
- develop an invasive species monitoring plan to manage Eurasian water-milfoil and other invasive aquatic species located in the Menominee and Park Mill reservoirs;
- implement bald eagle protection measures to minimize adverse effects to nesting bald eagles in the project boundary that may result from project maintenance;
- implement the Recreation Plan, which includes measures to: (1) maintain the recreation facilities owned by NEW Hydro; (2) maintain the 18th Avenue boat launch, Mason Park, Cox Landing, and the Menominee dam tailrace fishing site; (3) provide garbage bags at the boat launches; (4) at the 11th Avenue boat launch, improve the existing boat ramp and install a new boat dock and a seasonal portable toilet; (5) at the 18th Avenue boat launch, improve the boat dock and install a picnic table and a seasonal portable toilet; (6) install picnic tables and a seasonal portable toilet at Mason Park; (7) install signage about the history of the Fisherman's Park and tailrace fishing site; (8) install interpretive signage at the recreation facilities; and (9) develop and distribute a recreation brochure to provide information on recreation facilities in the project boundary; and
- implement the statewide PA for Wisconsin and adjacent portions of Michigan, executed in 1993,[21] and an HPMP to protect cultural resources.[22]

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[20] The 2012 MOU does not identify the parties financially responsible for construction of the fish passage facilities.

[21] The full name of the PA is "Programmatic Agreement Among the Federal Energy Regulatory Commission, the Advisory Council on Historic Preservation, the State of Wisconsin, State Historic Preservation Officer, and the State of Michigan, State Historic Preservation Officer, for managing Historic Properties that May Be Affected by New and Amended Licenses Issuing for the Continued Operation of Existing Hydroelectric Projects in the State of Wisconsin and Adjacent Portions of the State of Michigan."

[22] The HPMP includes NEW Hydro's proposal to develop an erosion control plan to monitor the shoreline at four archaeological sites.

2.3 STAFF ALTERNATIVE

The staff alternative includes most of NEW Hydro's proposed measures with some modifications and additional staff-recommended measures. However, we do not recommend NEW Hydro's proposed drought operation plan, water quality monitoring plan, the 2012 MOU, and the 2013 Settlement Agreement (with the exception of the Fish Passage Operation Plan component) as part of the staff alternative.

- Modify the proposed reservoir drawdown plan to include: (1) protocols for drawdowns of the project reservoirs and for the power canal for the Park Mill development, such as identification of drawdown(s) purpose, the drawdown frequency and duration, and any measures to minimize effects on fish migration and spawning; (2) measures to protect aquatic and wildlife resources from the effects of drawdowns, such as monitoring for stranded fish and removal, salvage, and disposition of fish; and (3) a provision to notify resource agencies and the Commission of any emergency reservoir or power canal drawdowns.
- Modify the proposed operation compliance monitoring plan to include measures to verify run-of-river operation by using automatic level recorders in both reservoirs and to verify flows needed to operate the fish passage facilities.
- Modify the proposed invasive species monitoring plan to include: (1) a description of the proposed monitoring methods for Eurasian water-milfoil and other invasive aquatic plants within the project boundary; (2) the proposed frequency of monitoring; and (3) the proposed criteria to be used to determine when control measures would be implemented.
- Avoid cutting trees between April 1 and October 31 to protect roosting northern long-eared bats.
- Modify the proposed Recreation Plan to remove the provision to develop and distribute a recreation brochure to the public, and include: (1) conceptual drawings for the proposed boat dock, handrail, and interpretive signage; and (2) a provision to review the Recreation Plan every other FERC Form-80 cycle to determine if facility improvements or modifications are necessary.

2.4 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

We considered several alternatives to NEW Hydro's proposals, but eliminated them from further analysis because they are not reasonable in the circumstances of this case. They are: (1) issuing a non-power license; (2) Federal Government takeover of the project; and (3) retiring the project.

2.4.1 Issuing a Non-power License

A non-power license is a temporary license that the Commission will terminate when it determines that another governmental agency will assume regulatory authority and supervision over the lands and facilities covered by the non-power license. At this point, no agency has suggested a willingness or ability to do so. No party has sought a non-power license, and we have no basis for concluding that the project should no longer be used to produce power. Thus, we do not consider issuing a non-power license a realistic alternative to relicensing in this circumstance.

2.4.2 Federal Government Takeover of the Project

We do not consider federal takeover to be a reasonable alternative. Federal takeover and operation of the Menominee and Park Mill Project would require Congressional approval. Although that fact alone would not preclude further consideration of this alternative, there is no evidence to indicate that federal takeover should be recommended to Congress. No party has suggested federal takeover would be appropriate, and no federal agency has expressed an interest in operating the project.

2.4.3 Retiring the Project

Project retirement could be accomplished with or without removal of the dams. Either alterative would involve denial of the license application and surrender or termination of the existing license with appropriate conditions. No participant has suggested that dam or powerhouse removals would be appropriate in this case, and we have no basis for recommending it. The reservoirs formed by the dams serve other important purposes, such as use for recreational activities. Thus, dam removals are not a reasonable alternative to relicensing the project with appropriate protection, mitigation, and enhancement measures.

The second project retirement alternative would involve retaining the dams and disabling or removing equipment used to generate power. Project works would remain in place and could be used for historic or other purposes. This would require us to identify another government agency with authority to assume regulatory control and supervision of the remaining facilities. No agency has stepped forward, and no participant has advocated this alternative. Nor have we any basis for recommending it. Because the power supplied by the project is needed, a source of replacement power would have to be identified. In these circumstances, we don't consider removal of the electric generating equipment to be a reasonable alternative.

3.0 ENVIRONMENTAL ANALYSIS

In this section, we present: (1) a general description of the project vicinity; (2) an explanation of the scope of our cumulative effects analysis; and (3) our analysis of the proposed action and other recommended environmental measures. Sections are organized by resource area (aquatic, recreation, etc.). Under each resource area, historic and current conditions are first described. The existing condition is the baseline against which the environmental effects of the proposed action and alternatives are compared, including an assessment of the effects of proposed protection, mitigation, and enhancement measures, and any potential cumulative effects of the proposed action and alternatives. Our conclusions and recommended measures are discussed in section 5.2, *Comprehensive Development and Recommended Alternative*.[23]

3.1 GENERAL DESCRIPTION OF THE RIVER BASIN

The Menominee River Basin, as shown in figure 3, has an area of about 4,070 square miles with 2,618 square miles located in the state of Michigan and 1,453 square miles located in the state of Wisconsin (Wisconsin DNR, 2000a). The nearly 116-mile-long Menominee River forms the boundary between Wisconsin and the Upper Peninsula of Michigan in Marinette, Florence, Forest, Vilas, Menominee, Dickinson, and Iron Counties before draining into the Green Bay portion of Lake Michigan. The Menominee River originates in Florence County, Michigan, about 10 miles northeast of the City of Iron Mountain, Michigan, at the confluence of the Michigamme and Brule Rivers (Wisconsin DNR, 2000a). About 84 miles of the river is within the state of Wisconsin (Les, 1976). The Menominee River is comprised of over 100 large and small tributaries that enter the river before it discharges into Green Bay. The major tributaries include the Michigamme, Brule, Pine, Paint, Iron, and Sturgeon Rivers (Lake Michigan LaMP, 2006).

The drainage area of the basin is composed mainly of rural forested areas of northern Wisconsin and the Upper Peninsula of Michigan (Michigan DNR, 2015b). About 67 percent of the land area in the basin is public and private forests, 17 percent is agricultural, 2 percent is urban development, and the remainder is land that includes lakes, streams, wetlands, and various county-owned land parcels (Utrup et al., 2011).

[23] Unless noted otherwise, the sources of our information are the license application (NEW Hydro, 2013), and additional information filed by NEW Hydro (2014a, 2014b, 2014c; 2015a and 2016a).

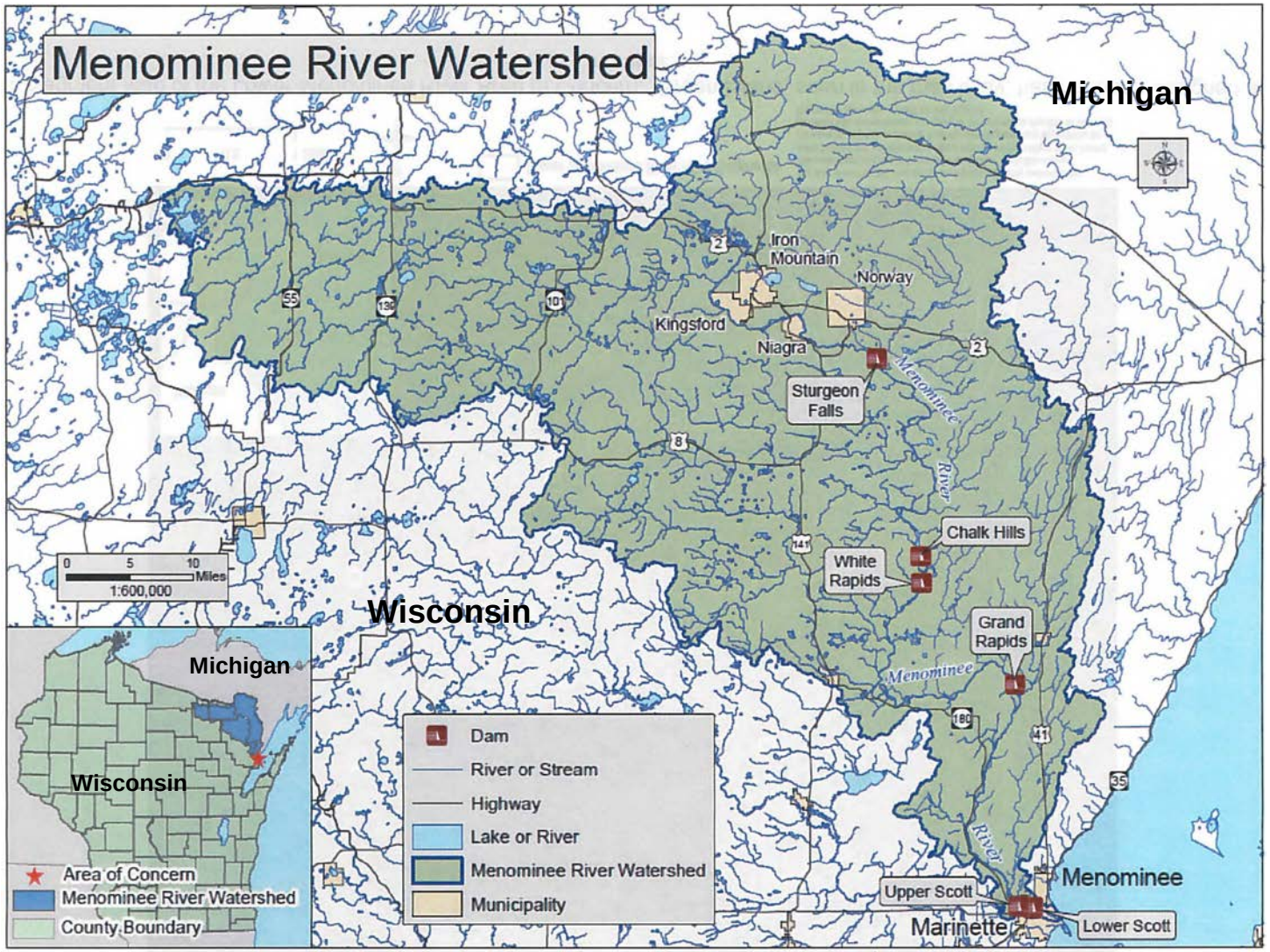

Figure 3. Menominee River Watershed with location of Park Mill development (labelled as Upper Scott) and Menominee development (labelled as Lower Scott) and other dams related to the lake sturgeon passage project (Source: NEW Hydro, 2013, as modified by staff).

Major economic activities in the basin are logging, paper making, tourism, and potato farming (Lake Michigan LaMP, 2006). Sport fishing is also an important recreational activity in most of the river as is whitewater boating and rafting in the upper reaches of the basin (Wisconsin DNR and Michigan DNR, 1990; and Wisconsin DNR, 2016).

The climate of the region is continental, characterized by extremes in temperature, relatively long, cold winters and short, warm summers. There are distinct differences in climate between the upper and lower portions of the basin. Lake Michigan and Lake Superior exert a modifying influence on summer and winter weather conditions resulting in abundant snowfall in the winter and cool, moist summers. Most of the precipitation occurs during the late winter and spring, and there are often drought periods during each growing season (Wisconsin DNR and Michigan DNR, 1990). Up near Iron Mountain, Michigan, the area is much cooler and receives more snow than near Menominee, Michigan, located at the southern end of the basin. The average summer temperature is 67.8 degrees Fahrenheit (°F). The average winter temperature is 18.5°F. The mean annual temperature is 44.2°F. The ground is normally snow covered from late November to early April (FERC, 1996). Menominee, Michigan receives around 52 inches of snowfall and 32 inches of rainfall annually (Graphiq, 2016).

There are currently nine FERC-licensed projects[24] on the Menominee River (Priegel, 1973). The last dam on the river before it enters Green Bay is the Menominee dam. The lowermost five dams on the river, including the Menominee and Park Mill dams, have historically prevented lake sturgeon from migrating up the river from Lake Michigan to their prime spawning and rearing habitats (Wisconsin DNR, 2010a). The completion of fish passage facilities for lake sturgeon at the Menominee and Park Mill Project in 2016 eliminates the barriers created by the project's dams.

In addition to the nine FERC-licensed projects on the Menominee River, there are eight FERC-licensed projects on tributaries to the Menominee River. These FERC-licensed projects include one project on the Pine River (Pine Hydroelectric Project, P-2486), one project on the Brule River (Brule Hydroelectric Project, P-2431), two projects on the Paint River (Crystal Falls Hydroelectric Project, P-11402 and Lower Paint Hydroelectric Project, P-2072) and four projects on the Michigamme River (Way Hydroelectric Project, P-1759; Hemlock Falls Hydroelectric Project, P-2074; Peavy Falls Hydroelectric Project, P-11830; and Michigamme Falls Hydroelectric Project, P-2073).

[24] FERC-licensed projects are listed in sequential order from upstream to downstream: Twin Falls (P-11831); Kingsford (P-2131); Quinnesec Falls (P-1980); Little Quinnesec (P-2536); Sturgeon Falls (P-2720); Chalk Hill (P-2394); White Rapids (P-2357); Grand Rapids (P-2433); and Menominee and Park Mill (P-2744).

3.2 SCOPE OF CUMULATIVE EFFECTS ANALYSIS

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

Based on our review of the license application and agency and public comments, we have identified fishery resources as having the potential to be cumulatively affected by relicensing the project.

3.2.1 Geographic Scope

The geographic scope of the cumulative analysis defines the physical limits or boundaries of the proposed action's effect on the resources. Because the proposed action can affect resources differently, the geographic scope for each resource may vary. We have identified the scope for fishery resources to include the Menominee River from the tailrace of the Sturgeon Falls Project (P-2720) downstream to the tailwater of the Menominee development.

We chose this geographic scope for fishery resources because the relicensing of the project, in concert with the operation of eight other hydropower projects on the Menominee River upstream from the Park Mill development has the potential to cumulatively affect resident fish populations through impingement and entrainment of fish. The Menominee and Park Mill Project includes the first two dams on the Menominee River that block the upstream migration of lake sturgeon. Thus, the relicensing of the project has the potential to cumulatively affect lake sturgeon's upstream and downstream movements past the project.

In section 3.3.2, *Aquatic Resources*, we discuss the cumulative effects of licensing the project on fishery resources.

3.2.2 Temporal Scope

The temporal scope of analysis includes a discussion of the past, present, and reasonably foreseeable future actions and their effects on fishery resources. Based on the potential new license term, the temporal scope looks 30 to 50 years into the future, concentrating on the effects on the resources from reasonably foreseeable future actions. The historical discussion is limited, by necessity, to the amount of available information for each resource. We identified the present resource conditions based on the license application, agency comments, and comprehensive plans.

3.3 PROPOSED ACTION AND ACTION ALTERNATIVES

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

Only the resources that would be affected, or about which comments have been received, are addressed in detail in this EA. We have determined that geology and soils, aquatic, terrestrial, threatened and endangered species, recreation, and cultural resources may be affected by the proposed action and action alternatives. We have not identified any substantive issues related to aesthetics and socioeconomics associated with the proposed action; therefore, we do not assess environmental effects on socioeconomics in the EA. We present our recommendations in section 5.2, *Comprehensive Development and Recommended Alternative*.

3.3.1 Geological and Soil Resources

3.3.1.1 Affected Environment

Bedrock that forms the bottom of the Menominee River, consists of the Galena-Decorah-Platteville dolomite formation underlain by St. Peter sandstone, Prairie du Chien dolomite, Cambrian sandstone and dolomites and, finally, Precambrian crystalline igneous and metamorphic rocks. The surface bedrock is the Galena Black River dolomite, which is gray fine to medium grained and is medium to thickly layered. The Galena Black River dolomite formation is approximately 200 feet thick under both the Park Mill and Menominee dams.

In the vicinity of both the Park Mill and Menominee dams, the bedrock is covered by approximately 25 feet of glacial drift materials. The upper 5 feet typically consists of fine silty and sandy lacustrine deposits. These deposits are underlain by silty fine sand to sandy silt basal till in an extremely dense condition. The lacustrine deposits may be considered semi-pervious while the dense till probably ranges from semi-pervious to relatively impervious.

The topography in the vicinity of the Park Mill and Menominee dams is a lacustrine plain with numerous wetland areas. Within the project boundary, the banks of the reservoir are generally underlain by silty and sandy glacial drift. The high concentration of gravels, cobbles and boulders in the soil result in a naturally-armored shoreline. Vegetation along the shoreline provides additional stability to the banks. Where the vegetation has been removed, the shoreline has been stabilized with large rocks, concrete slabs, concrete-filled erosion mats and retaining walls. The protection provided by the natural armoring, vegetation and constructed bank protection measures result in a shoreline that is generally stable.

3.3.1.2 Environmental Effects

NEW Hydro conducted a survey of the shoreline of the Park Mill development to determine the severity and extent of erosion. The surveyed area included the shoreline of the: (1) Park Mill reservoir; (2) power canal; and (3) area extending approximately 200 feet downstream of the Park Mill spillway. The survey found one area of minor erosion on the north side of the Park Mill reservoir, approximately 325 feet from the left abutment. The appearance of the site included sloughing from the top of the bank that exposed a horizon of sandy soil, and rock, gravel and sod at the toe of the slope. It was concluded that the erosion appears to have stabilized. The erosion at this location was attributed to ice shear as ice moves in the reservoir.

NEW Hydro did not conduct a comparable survey of the shoreline erosion in the Menominee development.

As part of the statewide PA for Wisconsin, NEW Hydro conducted an assessment to identify archaeological sites currently subject to erosion. Three of the archaeological locations are adjacent to the Park Mill reservoir[25] and two locations are adjacent to the Menominee reservoir.[26] The assessment concluded that the shorelines were stable at all five locations. However, the coordinates of the observed ice shear erosion was along the shoreline of archaeological site 20ME1.

As discussed in section 3.3.5, *Cultural Resources*, NEW Hydro proposes, as part of its HPMP, to develop an erosion control plan to monitor the shoreline at four of the archaeological sites to ensure that the banks remain stable. The shoreline of the fifth archaeological site, site 20ME1, is not proposed to be included in the erosion control plan.

Our Analysis

A reservoir has been present at the Park Mill development since 1862 and at the Menominee development since 1880. The existing dam at the Park Mill development was constructed in 1920 and the existing dam at the Menominee development was constructed in 1924. In the early 1960s, the water levels at both developments were increased to their current elevations. With project operation resulting in minimal fluctuations of the water surface of the two reservoirs, the present shorelines at both developments have remained at a constant level for about 50 years. NEW Hydro proposes to continue to operate the project in a run-of-river mode, which would maintain the water level in both reservoirs at their existing level. Therefore, NEW Hydro's proposed operation would not alter the erosion potential of the shorelines of the project

[25] These sites include 47MT312 (Moose Acres Campground site), 20ME135 (Nerat Island site), and 20ME1 (Kimberly Clark Cluster of the Riverside Cemetery site).

[26] These sites include 47MT311 (Blueberry Island site) and 20ME40, 20ME138 and 20ME139 (Park Mill East Cluster site).

reservoirs, which have remained stable. The only erosion found along the project shoreline was due to ice shear, which is not related to project operation.

NEW Hydro's proposal to develop an HPMP would include the methodology and proper protocol to monitor the shoreline at the archaeological sites, as discussed in section 3.3.5.2, *Cultural Resources*. Additionally, the proposed HPMP would include measures to determine the best methods for stabilizing shoreline areas if erosion would threaten archaeological sites.

Also, none of the environmental measures proposed by NEW Hydro include construction that would include ground-disturbing activities that would result in soil erosion. Therefore, soil erosion and sediment control measures would not be necessary.

3.3.2 Aquatic Resources

3.3.2.1 Affected Environment

Water Quantity

NEW Hydro uses mean daily flow rate data collected at the USGS McAllister stream gage (gage no. 04067500) to estimate the flow rates at the project. Because the USGS McAllister stream gage is located about 19 miles upstream from the Park Mill dam, the drainage area increases from 3,930 square miles at the gage to 4,065 square miles at the project. To account for the additional drainage area, the flow rates at the project are estimated by using the ratio of the two drainage areas, which is 1.034. The monthly maximum, minimum, mean, and median flow rates estimated for the project are presented in table 2. The maximum, minimum, mean, and median flow rates for the period of record are 32,881 cfs, 732 cfs, 3,222 cfs, and 2,327 cfs, respectively. The flow rate data collected at the USGS McAllister gage is not continuous, but includes the following timeframes: March 1945 to September 1961; October 1961 to September 1979, miscellaneous measurements and peaks only; October 1979 to September 1986; October 1986 to March 1987, crest-stage partial-record station; April 1988 to September 1990; April 1993 to September 1995; and October 1997 to present.

Table 2. Maximum, minimum, mean, and median flow rates for the Menominee and Park Mill Project (Source: Staff).

Month	Mean Daily Flow Rates (cfs)			
	Maximum	Minimum	Mean	Median
January	4,860	1,241	2,408	2,275
February	6,824	951	2,450	2,275
March	12,925	1,344	3,240	2,761
April	26,574	1,034	6,504	5,718
May	32,881	818	5,350	4,177
June	20,060	748	3,860	3,345
July	24,609	949	2,933	2,327
August	8,014	732	2,230	2,037
September	12,408	759	2,492	2,073
October	13,442	746	2,784	2,058
November	17,061	986	3,022	2,528
December	10,195	859	2,595	2,327
Period of record	32,881	732	3,322	2,327

Water Use

Non-consumptive uses of waters from the Menominee River include hydroelectric power production, sport fishing, canoeing, kayaking, power boating, aesthetic enjoyment, and, to a lesser extent, transportation. Consumptive uses of the river's waters include assimilation of wastewater discharges and industrial production. The Kimberly Clark paper mill is located on the south shore of the Menominee River in Marinette, Wisconsin, and is adjacent to the Park Mill powerhouse. The Kimberly Clark paper mill withdraws about 1.2 million gallons of water per day for plant-processing water from the headwater of project generating unit #10, which is located in the Park Mill powerhouse. This processed water is augmented, as necessary, with the City of Marinette using potable water from other sources. Wastewater treatment plant effluent is returned to the river in the tailrace of unit #10. There is no other known direct withdrawal of project waters for consumptive use.

The Cities of Marinette and Menominee obtain their potable water supplies from Green Bay. There are 10 National Pollution Discharge Elimination System permits issued for locations within Marinette and Menominee Counties for industrial and municipal wastewater discharges. With the exception of the Kimberly Clark paper mill wastewater treatment plant, all other discharges of wastewater occur downstream of the Menominee dam.

Wetlands in the project area are used for wildlife and for spawning by various fish species, like northern pike. The reservoirs and adjoining wetland habitats are used by

waterfowl and mammals. Recreational fishing and boating are popular activities on the river, and Menominee Harbor (located downstream of the Menominee dam) is a popular recreational water port. Recreational boats frequently use the lower river channel downstream of the Menominee dam. Menominee Harbor has been classified by the Wisconsin Department of Transportation as a diversified cargo port (Wisconsin DNR and Michigan DNR, 1990).

Water Quality

Surface water quality in the greater western Lake Michigan drainage basin is described as ranging from nearly pristine to highly contaminated (Peters, 1997). In the heavily forested and sparsely inhabited regions in the northern part of the basin where the Menominee River lies, the water quality is generally better than in the more densely inhabited regions of the southern part of the basin, where higher amounts of industrial, municipal, and agricultural runoff–both point and non-point sources–find their way into surface waters.

Pollution, first from sawmills and later from industries and municipalities, has been a serious and persistent problem in parts of the Menominee River since the mid-1800s. In the period before 1948, when water quality studies were first conducted in the Menominee River, raw or inadequately treated waste was discharged into the river by several communities. Similarly, a paper mill at Niagara, Wisconsin, and two in the cities of Menominee and Marinette, discharged wood fibers and other wastes, while a chemical company in Marinette simultaneously discharged organic chemicals. These polluting discharges created conditions unsuitable for aquatic life downstream of the discharges.

However, since the 1960s, water quality has substantially improved in most areas. Nine cities, four paper mills, and one chemical plant currently discharge treated wastes into the Menominee River. Further improvements in waste treatment have occurred in recent years, and water quality standards for Michigan and Wisconsin are currently being met by most communities and industries.

Several pollutants and pollution problems, however, continue to remain. Dioxins have been detected in fish from the Menominee River in the section of the river between Quinnesec, Michigan and the mouth of the river. Fish consumption advisories are in effect by Wisconsin DNR, Michigan Public Health Advisory, and Michigan Department of Public Health for fish caught in various sections of the Menominee River, including project-affected waters. Bottom sediments in portions of the lower Menominee River are still contaminated with arsenic and other chemicals.

Michigan and Wisconsin, with the support of EPA and the International Joint Commission,[27] are developing the Remedial Action Plan for the lower Menominee River.

[27] The International Joint Commission is an independent binational organization established by the United States and Canada under the Boundary Waters Treaty of 1909.

The purpose of the Remedial Action Plan is to identify and eventually clean up the toxic contamination problem which persists in the lower Menominee River despite considerable efforts and money that have already been spent to remedy water pollution problems. The Remedial Action Plan identifies problems and proposes remedial measures. None of the pollution and contamination problems in the lower Menominee River are caused by the project.

The Menominee River is classified as a warmwater fishery and a Great Lakes tributary. Wisconsin and Michigan have designated the Menominee River as a river requiring warmwater protection standards to support fish and aquatic life and recreation. At the mouth of the river, Wisconsin Great Lakes standards apply (Wisconsin DNR and Michigan DNR, 1990). Wisconsin and Michigan set surface water quality standards based on designated uses. Designated uses are goals or intended uses for surface waterbodies. In Wisconsin the designated uses are classified into the categories of: (1) fish and aquatic life, (2) recreation, (3) public health and welfare, and (4) wildlife. In Michigan, the designated uses are classified in the following categories: (1) agriculture, (2) navigation, (3) industrial water supply, (4) warmwater fishery, (5) other indigenous aquatic life and wildlife, (6) partial body contact, and (7) fish consumption.

Wisconsin DNR uses monitoring to assess waters and place evaluated waters into condition categories, including: (1) excellent, (2) good, (3) fair, and (4) poor. Waters assigned the condition of "excellent" are considered to be attaining applicable water quality standards and fully supporting their assessed designated uses. Waters assigned as "fair" are also meeting their designated uses, but may be in a condition that warrants additional monitoring in the future to assure water conditions are not declining. Waters assigned as "poor" may not be attaining water quality standards or assessed designated use(s). Similarly, Michigan DEQ categorizes its various designated uses, using available monitoring data, as: (1) fully supporting, (2) insufficient information (generally needing additional monitoring or information), or (3) not supporting (impaired).

Michigan has designated the Menominee River at a minimum to be protected for total and partial body contact recreation (from May 1 to October 31). Some of the water quality criteria for fish, aquatic life, and recreational use designations for Michigan and Wisconsin are listed in table 3.

Table 3. Selected water quality standards for the states of Michigan and Wisconsin (Source: NEW Hydro, 2013, with staff modifications).

Water Quality Parameter	**Michigan**	**Wisconsin**
Maximum water temperature	The natural daily and seasonal temperature fluctuations of the receiving water shall be preserved.	Shall not exceed 89°F
Dissolved oxygen	Not less than 5 milligrams per liter (mg/l) as a daily average	Not less than 5 mg/l
pH	6.5 to 9.0	6.0 to 9.0
Maximum fecal coliform	200/100 milliliters (mL)	200 to 100 mL or 400 to 100 mL[1]

[1] Must not exceed a geometric mean of 400 counts per 100 mL in more than 10 percent of all samples collected during any month.

Fishery Resources

The nearly 116-mile-long Menominee River supports diversified populations of warmwater and coolwater[28] fish species (Lyons et al., 2009). There are also seasonal migrations of stocked coldwater fish, including steelhead and chinook salmon (Burzynski 2012), that enter the lowermost portion of the river from Lake Michigan from its mouth at Green Bay upstream to the Menominee development's dam, the first of nine hydroelectric projects on the Menominee River (Les, 1976) and a seasonal sport fishery for these coldwater species. The Menominee River supports a very good sports fishery with natural reproduction of all species present in the Park Mill reservoir (Donofrio, 2006b and Donofrio, 2013a). The Menominee River is known for its excellent smallmouth bass fishery (Wisconsin DNR, 2000a). There is also a good fishery for walleye in the river and an excellent sport fishery for the species in an area immediately downstream of the Menominee dam during its spring spawning migration. Also, since around 1995 (Wisconsin DNR, 2010b), when increasing numbers of whitefish began appearing in the lowermost section of the Menominee River, a sport fishery for whitefish has developed in November when the fish enter the lowermost reaches of the Menominee River from Green Bay for spawning (Wisconsin DNR, 2010b).

[28] Coolwater streams are intermediate in character between coldwater streams and the more diverse warmwater streams and occur widely in temperate regions.

However, Wisconsin DNR has issued fish consumption advisories for several fish species, as has the Michigan Department of Health and Human Services (2016), because of the health risks posed by the presence of polychlorinated biphenyls (PCBs) and mercury levels in various sections of the river, including project-affected river reaches. For example, dioxins have been detected in fish from the Menominee River between Quinnesec, Michigan down to the mouth of the river. Although dioxin levels in game fish are generally well below both state fish consumption levels of 10 parts per trillion, large carp from the Sturgeon Falls flowage and in the Marinette-Menominee area exceed the level. However, it should be noted that the relatively recent return of whitefish to the reaches of the Menominee River located downstream of the Menominee dam (whitefish had been absent from this river reach for nearly a century) may also be an indicator of improving water quality in the lowermost portion of the Menominee River.

There continues to be concerted efforts underway to improve conditions for lake sturgeon that enter the river from Lake Michigan to spawn. These efforts include various studies (Priegel, 1973; Waldrip, 2014; Thuemler, 1997; Fossom, no date), as well as the construction of upstream and downstream fish passage facilities at the project dams to provide lake sturgeon access to additional spawning habitats upstream from dams and to protect the juvenile and adult fish moving downstream after spawning activities have ended. The fish passage facilities for lake sturgeon were completed in 2016 at the project and are successfully moving lake sturgeon upstream of the Park Mill dam. The fish passage facilities at the Menominee and Park Mill Project are the only fish passage facilities in the Great Lakes that are targeting the upstream passage of lake sturgeon.

Fish sampling conducted in the Park Mill and Menominee reservoirs over a 19-year period captured 30 fish species (Utrup et al., 2011). Our review of various fisheries reports led to the identification of 38 species in project-affected waters of the Menominee River, including spotted muskellunge for both project reservoirs (Donofrio, 2006a; Wisconsin DNR, 2012a; Donofrio, 2013b). The fish species captured reflect the mixed warmwater and coolwater conditions in the river. Some of the fish species captured include: minnows, suckers, redhorses, bullheads, catfish, darters, sunfish, carp, lake sturgeon, largemouth and smallmouth bass, rock bass, yellow perch, walleye, northern pike, muskellunge, rainbow trout, and splake.[29]

The lake sturgeon is identified as a threatened species in Michigan, a species of special concern in Wisconsin, and a federal species of concern by the FWS (Utrup et al., 2011). The Menominee River population of lake sturgeon is one of the last fishable lake sturgeon populations in Michigan and Wisconsin (Priegel, 1973). In the project area, the lake sturgeon has been adversely affected by habitat loss and fragmentation caused by the numerous dams that have been built on the Menominee River and that created barriers to lake sturgeon migrating upstream to spawning habitat. The completion of the fish passage facilities at the project is the result of a cooperative partnership effort between

[29] A splake is a hybrid cross between a male brook trout and a female lake trout.

NEW Hydro and several other parties, including the Implementation Team. Three dams upstream from the project (i.e., Grand Rapids, White Rapids, and Chalk Hill) would continue to block upstream access of lake sturgeon to its historical spawning grounds (Utrup et al., 2011) of the Menominee dam.

Freshwater Mussels

In 2011, NEW Hydro conducted qualitative mussel surveys at the Park Mill reservoir, Menominee reservoir, and lower Menominee River, downstream from the Menominee dam. Over 2,500 live mussels were collected representing 16 species. Based on the qualitative mussel surveys conducted by NEW Hydro, mussel diversity in the Menominee River was lower in comparison to other rivers in Wisconsin of similar size.

Of the species collected, four species were state-listed as either threatened, endangered, or species of special concern by Wisconsin DNR. Favorable habitat for mussels was limited because of coarse, rocky substrates (i.e., Menominee reservoir) or because of deep silt deposits and / or dredging of the stream bottom (i.e., lower Menominee River downstream of the Menominee dam). The mussel species *Elliptio dilatata* (commonly called the "spike" or "lady finger") was the most widely distributed and most abundant species observed.

3.3.2.2 Environmental Effects

Aquatic Resources

Water Quality and Monitoring

Operating a hydropower project in a run-of-river mode typically has little effect on many water quality parameters, because as the water comes into the project, it exits the project without storage in the reservoir, and thereby is not altering water quality. However, DO levels can be affected downstream of some hydropower projects if water is discharged from the lower levels of deepwater reservoirs that have less DO than surface waters, and can adversely affect fish and other aquatic organisms that need higher levels of DO.

NEW Hydro proposes to develop a water quality monitoring plan, but did not identify what components would be in the plan and does not propose any enhancement measures for water quality at the project. NEW Hydro states that data collected in 2011 from project waters does not suggest that operating the project in a run-of-river mode negatively affects water quality or quantity. In making this decision, NEW Hydro refers to several studies in the license application: (1) a 1987 FERC EA, stating that water quality in both project reservoirs was "fair"; (2) a Wisconsin DNR study of the lower Menominee River that found DO and water temperature were acceptable (Wisconsin DNR, 1996); and (3) the results of a 2011 survey conducted by NEW Hydro at sites in the Menominee Reservoir and downstream of the Menominee dam showed that

temperature, DO, and pH, most of the time, were within levels that are consistent with those specified by Michigan and Wisconsin's water quality standards. However, NEW Hydro identified that DO levels did drop below those specified by both state standards on several occasions for brief periods of time (figure 4 and figure 5). Specific areas of project collection of DO data is discussed below in *Our Analysis* section.

Wisconsin DNR recommends NEW Hydro develop, within 1 year of license issuance, a water quality monitoring plan for the project that describes periodic water quality monitoring, management, and compliance with state laws. Wisconsin DNR states that it would provide technical assistance on specific parameters, sampling methods, frequency, and reporting requirements as part of the development of a water quality monitoring plan. Wisconsin DNR also recommends that NEW Hydro develop a plan that shows operational compliance with water quality standards for both states, including standards for DO, temperature, and other water quality parameters deemed appropriate by Wisconsin DNR and Michigan DEQ.

Michigan DEQ states that NEW Hydro's 2011 water quality study (figures 4 and 5) showed there were some instances when the project waters in the Menominee reservoir and downstream of the Menominee dam did not meet Michigan's 5.0 mg/L minimum DO water quality standard. Furthermore, Michigan DEQ states that NEW Hydro's 2011 data collection occurred in the cool and wet summer of 2011, and violations of the state water quality standards for DO still occurred. Therefore, the Michigan DEQ recommends NEW Hydro develop a water quality monitoring plan to monitor DO and temperature at the project on a regular basis.

Michigan HRC recommends NEW Hydro develop a water quality monitoring plan to show project operational compliance with water quality standards of Michigan and Wisconsin.

There was some difficulty with the water sampling gages during the collection of water quality data in the Menominee reservoir. This issue is discussed further in the analysis that follows.

Our Analysis

NEW Hydro conducted a water quality study between June 1, 2011 and October 15, 2011 of project-affected waters. NEW Hydro collected water quality information on water temperature, DO, pH, and specific conductivity in the following areas: (1) in the Park Mill reservoir upstream of the Park Mill dam, (2) in the Menominee reservoir near the midway point in the bypassed reach and about 325 yards downstream from the Park Mill dam (figure 4), (3) in the Menominee reservoir upstream from the Menominee dam, and (4) downstream of the Menominee dam near the fish ladder in Michigan waters of the river (figure 5).

Data collected in the Michigan waters of the Menominee River, downstream of the Menominee dam, show values consistent with those specified by Michigan's state water

quality standards for pH and water temperature, but DO was slightly less than the 5 mg/L for nine nonconsecutive days in July 2011 (figure 5). The water samples collected downstream from the Park Mill dam, in the bypassed reach along the south shore of the Wisconsin River and adjacent to the bank of the power canal, were at levels below those specified by the state water quality standards of Wisconsin on one occasion for pH and on multiple occasions for DO. At this site in the bypassed reach (figure 4), DO levels were less than 5 mg/L for 12 nonconsecutive days between July 6 and July 31, 2011.

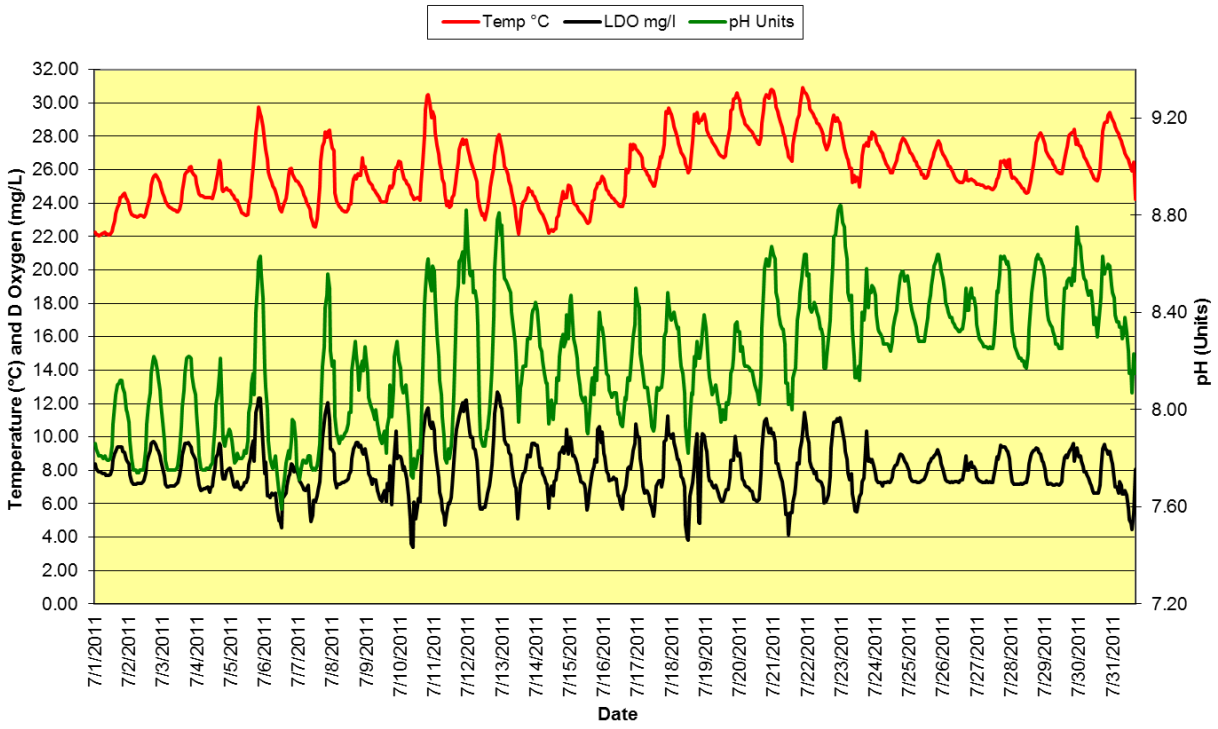

Figure 4. Temperature, DO, and pH data from the bypassed reach of the Menominee River, located in the Menominee reservoir and downstream of the Park Mill dam, from July 1 through July 31, 2011 (Source: NEW Hydro, 2013).

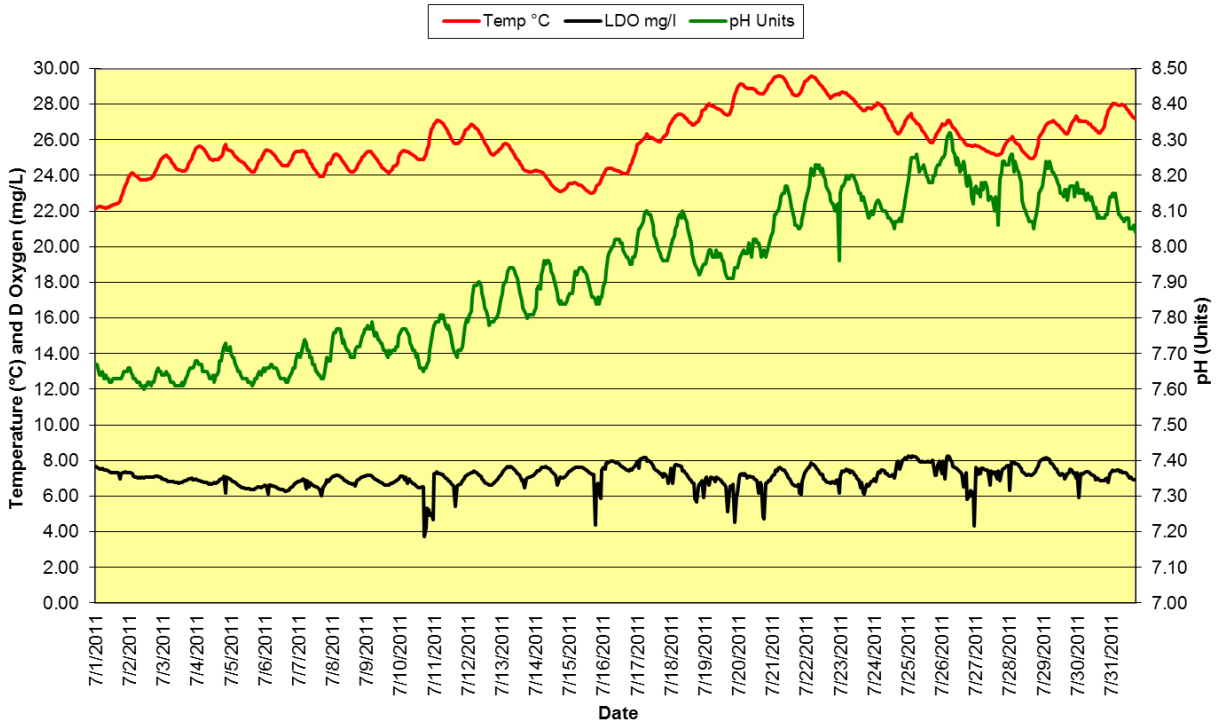

Figure 5. Temperature, Dissolved Oxygen, and pH data from the Menominee River waters downstream of the Menominee dam from July 1 through July 31, 2011 (Source: NEW Hydro, 2013).

The pH level exceeded levels specified by the Wisconsin state water quality standards on one occasion in June in a water sample collected downstream of the Park Mill dam in Wisconsin waters of the Menominee reservoir. The pH reading was almost 9.18, which is slightly above the level of 9.0 specified by the state of Wisconsin pH standard.

With the exception of 12 non-consecutive days in July 2011 in the Menominee reservoir, and nine non-consecutive days in July 2011 in the Menominee River tailwaters of the Menominee dam, DO levels in project waters were at levels specified by the state water quality standards for Michigan and Wisconsin (figure 4 and figure 5) during the sampling period between June 1 and October 15, 2011. The 21 instances in which DO levels were lower than the DO level specified by the states' standards (5.0 mg/L) were relatively short-lived, usually recovering to higher levels within 1 hour (figure 4 and figure 5), with readings ranging from 6.0 mg/L to 12 mg/L. The DO data readings in figure 4 and figure 5 also indicate that the diurnal oxygen cycle could be occurring with DO levels increasing during daylight hours when photosynthesis from plants is occurring and decreasing at night when respiration continues but photosynthesis does not. This action of plant respiration occurs normally in water bodies with abundant plant life, and the daily fluctuations in DO and levels below those specified by the state standards in the 2011were probably caused by normal plant respiration rather than by project operation.

The Menominee reservoir is relatively shallow for over half its 1-mile length with an average depth of around 8 feet. There is a large exposed rocky area about 30 yards downstream from and parallel with the Park Mill dam. There is leakage from the dam of around 115 cfs. Pools form between the Park Mill dam and the rocks parallel with the dam when there is no spill coming from the spillways. The rocky area parallel and downstream from the Park Mill Dam restricts equal flow dispersion and distribution in the Menominee River downstream of the dam in the summertime during low-flow times, when there are no flows coming from the spillway, creating an area on the south side of the river, in the 2,200-foot long bypassed reach, where flows during much of the summer are subjected only to leakage from the dam, and water depths are shallow and subjected to solar warming.

Water depths in the south side of the river in the Menominee reservoir are around 2 feet deep between the Park Mill dam and the water sampling point 325 yards downstream from the Park Mill dam. Water flows on the south side of the river between the Park Mill dam and the powerhouse tailrace are limited to leakage for most of the summer, and when spill does occur from the Park Mill dam, most of the flow is directed down the center of the Menominee River.

The shallow area where the DO data was collected, the warm summer temperatures, and difficulty with some of the data gages not working properly in the shallow waters, could have affected the DO data collected in the Menominee reservoir. Thus, there may not be a direct connection between the two sampling sites, one measured in shallow water and the in deeper water, but may simply reflect that both sites are experiencing changes in DO levels from the diurnal oxygen cycle. The timing of the DO readings at this downstream sampling point downstream the Menominee dam also showed the same potential diurnal oxygen cycle effects (plant respiration) as were shown at the sampling site in the bypassed reach of the Menominee reservoir.

Furthermore, there have been no reported fish kills in the Menominee or Park Mill reservoirs as a result of project operation. There is a diverse, self-supporting, and healthy fish population in both reservoirs with an excellent smallmouth bass sport fishery in the Park Mill reservoir. There is abundant aquatic vegetation in both reservoirs and along their shorelines.

There was one instance during the survey that the pH level was above states' water quality standards. The high level was short-lived and only slightly above the level specified by the states' standards. Therefore, it is unlikely that there were any adverse effects on fish and aquatic biota in the Menominee reservoir.

In conclusion, because: (1) there is already sufficient data to describe DO, water temperature, and pH conditions in the project waters as noted here; (2) low DO and high pH levels, relative to those levels specified by the states' standards, are relatively infrequent and short-lived; and (3) fish populations in project waters are diverse, self-sustaining, and healthy, suggesting that there are no project-related water quality issues

that are adversely affecting the fish populations, there is no need for additional water quality monitoring or measures specifically designed to protect or enhance water quality. Therefore, developing a water quality monitoring plan for the project would not provide any additional benefits.

Area of Concern

The Area of Concern[30] is defined as the area in the lower 3 miles of the Menominee River from the Park Mill dam downstream to the river mouth. The Area of Concern also includes the adjacent Green Bay shoreline from the river mouth south to Seagull Bar in Marinette, Wisconsin, and from the river mouth north to John Henes Park in Menominee, Michigan. Green Island, located in Green Bay, is also included in the Area of Concern. The Area of Concern is jointly managed by Wisconsin DNR and Michigan DEQ.

Some remediation efforts, including removal of contaminated sediments containing high levels of paint sludge and arsenic, have been completed in the Area of Concern, and water quality is improving. However, there is still a concern for coal tar, mercury, PCBs, oil, and grease that are impairing the waters in this stretch of the river downstream of the Menominee dam (Wisconsin DNR and Michigan DNR, 1990; Wisconsin DNR and Michigan DEQ, 2012 and 2014).

The river areas downstream from the Menominee dam have known degraded water quality in comparison to other sections of the Menominee River upstream of the Park Mill development. The Area of Concern receives several point source (industrial and municipal) discharges, combined sewer overflows, and nonpoint silvicultural, agricultural, and urban runoff sources of pollution (Wisconsin DNR and Michigan DNR, 1990).

The Area of Concern is on the Wisconsin and Michigan 303(d)[31] list for polycyclic aromatic hydrocarbons, and arsenic in the sediments and for mercury in fish tissues in Wisconsin and in Michigan for PCBs, DDT, and for mercury in fish. The Menominee River is used for hydropower production, waste assimilation and industrial water supply as well as fishing, recreation, aesthetic values, and stock and wildlife watering.

There were six Beneficial Use Impairments identified for corrective action within the Area of Concern: (1) restriction on the consumption of fish and wildlife,

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[30] Through the Clean Water Act, the Great Lakes Critical Programs Act of 1990 established the Great Lakes Water Quality Agreement of 1978, which led to the identification and recognition of the Area of Concern in the Menominee River.

[31] Under section 303(d) of the 1972 Clean Water Act, states, territories, and authorized Indian Tribes are required to develop lists of impaired waters that do not meet the water quality standards that states, territories, and Indian Tribes have set for them.

(2) degradation of benthos, (3) restrictions on dredging activities, (4) degradation of fish and wildlife populations, (5) loss of fish and wildlife habitat, and (6) restrictions on recreational contact (also referred to as beach closings or restrictions on total or partial body contact). In 2011, the restrictions on recreational contact were removed from the Beneficial Use Impairments list because of corrective actions taken by the Cities of Marinette and Menominee to improve water quality. The cause of the restrictions on recreational contact was primarily the result of bacterial contamination from the combined sewer overflows emanating from the Cities of Marinette and Menominee.

Our Analysis

Conditions in the Area of Concern are continually improving by joint cooperative efforts underway by Wisconsin DNR and Michigan DEQ. The project is not a contributing factor to the degradation of the Menominee River in its project-affected waters, thus continued project operation under its proposed operating mode would not affect the on-going recovery efforts in the Area of Concern.

Drought Operations

Droughts are a naturally occurring feature of climate that occur when there is a deficiency of precipitation over an extended period of time, and occur in nearly all climate zones (NOAA, 2008). Drought effects result from the interplay between the event in which less precipitation falls than expected, and the demand nature and people place on water supply. The degree of departure from the average of precipitation or some other climatic variable over some period of time determines when a drought begins. Drought evaluation is usually done by comparing the current situation to the historical average, often based on a 30-year period of record.

NEW Hydro has an existing drought operation protocol for the project, which includes a modification to project operation during times when drought conditions occur (*see* sections 2.1.4.1 and 2.1.4.2). NEW Hydro states that when flows in the Menominee River are less than 138 cfs at the Park Mill development (the minimum flow needed to operate a single turbine), it would cease project generation at the development and discharge river flows through a Tainter gate at the Park Mill dam. Similarly, when river flows reaching the Menominee development are less than 350 cfs (the minimum flow needed to operate a single turbine), the project would cease generation and all flows would be passed downstream through a Tainter gate at the Menominee dam.

As flows in the river decrease under drought conditions, NEW Hydro would remove generating units from service based on the hydraulic capacity of each unit. When the drought is over and flows in the Menominee River increase, NEW Hydro would bring the generating units back in service. NEW Hydro does not propose any changes to project operation during a drought. However, it proposes to develop a drought operations plan.

Our Analysis

NEW Hydro's current operation protocol during drought conditions would offer protection to aquatic resources, particularly in the shallow water area of the bypassed reach of the Menominee reservoir, downstream of the Park Mill dam, where flows would be reduced if water was released from the turbines at the Park Mill powerhouse, rather than from the spillways at the Park Mill dam. There would be minimal effect, if any, on fish and aquatic resources from NEW Hydro's current drought operation protocol of releasing water through the spillway gates at the Menominee dam into the Menominee River downstream from the Menominee dam, as this area below the Menominee dam is always covered with water.

The flows proposed by NEW Hydro to trigger drought project operation have never occurred. The minimum daily flow recorded in the Menominee River at the project for the 65-year period of record was 732 cfs, as shown in table 2, which is greater than the minimum flow required to operate the project.[32] Thus, it is exceedingly likely that there would be sufficient water in the river during drought conditions to allow power generation at the two project developments. Therefore, there is no need to develop a specific drought operation plan, because NEW Hydro's current project operation protocol during drought conditions does not exacerbate drought effects on aquatic resources due to an inability to store or divert water from the river.

Reservoir and Park Mill Power Canal Drawdowns

NEW Hydro proposes to develop a reservoir drawdown plan for the project, but did not identify components of the drawdown plan or if the intake power canal for the Park Mill development would be included in the proposed reservoir drawdown plan. Although NEW Hydro does not propose any specific measures to protect aquatic resources in the project reservoirs during a drawdown of the reservoirs for emergency or maintenance-related activities, it does propose to coordinate reservoir drawdowns with the Michigan DNR, Michigan DEQ, Wisconsin DNR, and FWS in advance of any reservoir drawdowns.

Michigan DNR and Michigan HRC recommend that NEW Hydro consult with Michigan DNR, Wisconsin DNR, Michigan DEQ, and FWS on all emergency and maintenance drawdowns for the Park Mill and Menominee reservoirs. Michigan DEQ recommends NEW Hydro consult with it and other agencies on any maintenance work or repair involving drawdowns of the reservoirs.

In the rationale for its recommendation, Michigan DNR explained that reservoir drawdowns can significantly affect the aquatic environment. Michigan DNR states that the timing, duration, extent, and rate of drawdowns all have varying effects. These

[32] A minimum flow of 138 cfs is required at the Park Mill development and a minimum flow of 350 cfs is required at the Menominee development.

effects can result in fish and mussel stranding, impaired movement of aquatic organisms, loss of spawning and nursery habitat, and other disruptions to the aquatic environment.

Wisconsin DNR recommends NEW Hydro develop a reservoir drawdown plan in consultation with it in advance of any drawdowns and under any emergency drawdowns, to minimize the effects on aquatic and wetland resources.

Our Analysis

Reservoir drawdowns are often necessary at hydropower projects during routine scheduled maintenance activities and during unexpected emergency situations; however, they can have adverse effects on aquatic organisms, fish and wildlife resources and their habitats. For instance, reservoir drawdowns can cause the stranding of aquatic organisms that inhabit nearshore areas of a reservoir. Also, draining the reservoir can cause rapid increases in downstream flows with the potential to flush organisms from their downstream habitats. Refilling reservoirs after drawdowns can also limit downstream flows, as inflows to the project would need to be stored for refill purposes.

There is no history of reservoir drawdowns for the Park Mill and Menominee reservoirs, and it is likely that any future drawdowns of these reservoirs would be infrequent, if at all. However, the intake power canal for the Park Mill development is typically drawn down every year or every other year for maintenance activities. NEW Hydro typically contacts resource agencies prior to any drawdowns of the intake power canal to inform them of when a drawdown is proposed for the intake power canal and at the same time requests fisheries personnel be available to help with salvaging fish that may become stranded in shallow areas of the canal.

Developing a reservoir drawdown plan would ensure that flows downstream of the project reservoirs are kept near natural flow levels and the two reservoirs if an infrequent drawdown was to occur. Also, because the intake power canal for the Park Mill development is regularly drawdown, it should be incorporated into NEW Hydro's proposed reservoir drawdown plan to ensure that the intake power canal is refilled in a timely manner. A reservoir drawdown plan would also offer protection for aquatic and wildlife resources and their habitat by limiting the time the drawdown is in effect. Coordinating the timing of drawdowns, after consultation with Michigan DNR, Michigan DEQ, Wisconsin DNR, and FWS, would help ensure that whenever drawdown activities occur, the drawdowns would occur at times when there would be minimal effects on aquatic and wildlife resources. For example, drawdown activities should not typically occur during peak spawning periods for fish, during lake sturgeon migrations, or during waterfowl nesting seasons (the waterfowl consideration would be for instances when the two reservoirs are being drawn down, rather than when there is a drawdown of the power canal for the Park Mill development). Reducing the time that a reservoir or power canal is drawn down would also help to ensure that existing aquatic habitat for fish, wildlife, and other aquatic resources is maintained during these times.

The development of an effective reservoir drawdown plan should include provisions for: (1) developing the plan after consultation with Michigan DNR, Michigan DEQ, Wisconsin DNR, and FWS; (2) a description of the circumstances that would necessitate a reservoir or intake power canal drawdown; (3) an estimate of the frequency and duration of reservoir and intake power canal drawdowns in an average year; (4) notifying Michigan DNR, Michigan DEQ, Wisconsin DNR, and FWS at the beginning of each calendar year of planned drawdowns for that year, including the estimated length of the drawdown; (5) meeting with Michigan DNR, Michigan DEQ, Wisconsin DNR, and FWS annually, if temporary reservoir or intake power canal drawdowns are anticipated for that year; (6) developing protocols to invite Michigan DNR, Michigan DEQ, Wisconsin DNR, and FWS to witness drawdowns and refills of the reservoir and intake power canal; (7) developing a plan to address any stranding, removal, and disposition of any fish from a designed salvage operation, particularly for the Park Mill intake power canal, and identifying which parties would participate in fish salvage efforts; (8) scheduling any reservoir or intake power canal drawdowns to minimize effects on sensitive aquatic species in the project area, including during fish spawning seasons, lake sturgeon migrations, waterfowl nesting activities, and during any other biologically significant periods; (9) reporting any emergency reservoir or intake power canal drawdowns to the Commission, state and federal fish and wildlife agencies, and Michigan DEQ within 24 hours; and (10) notifying the Commission, state and federal fish and wildlife agencies, and Michigan DEQ within 10 days of any deviation from the refill or drawdown protocols developed as part of this reservoir drawdown plan.

Mode of Operation

Fluctuations in reservoir levels and instream flows downstream of hydropower projects have the potential to adversely affect water quality and aquatic resources by contributing to shoreline erosion; increasing turbidity; dewatering macroinvertebrates, mussels, fish, and fish nests; and preventing the establishment of aquatic vegetation that can provide cover and forage for fish, adversely affecting wetlands, shallow water, and shoreline habitats important to fish and wildlife. The extent of such effects depends largely on the timing, magnitude, and frequency of the reservoir or instream fluctuations.

To minimize the fluctuations of water surface elevations in both project reservoirs, and to maintain stable flows and water surface levels downstream of each development, NEW Hydro proposes to continue operating both project developments in a run-of-river mode within a specified range of water surface elevations around a normal water level.

NEW Hydro proposes to operate the project in a run-of-river mode. NEW Hydro also proposes the operational headwater limits and actions for the Park Mill development in table 4, and the Menominee development in table 5.

Table 4. Park Mill development operational headwater elevations and actions (Source: Staff).

Headwater Elevation (feet, NGVD 29)	Elevation-triggered action
610.93	Spillway crest
610.73	Each occurrence when the water surface exceeds an elevation of 610.73 feet NGVD 29, the Wisconsin DNR, Michigan DNR, Michigan DEQ, and FWS must be notified in a courtesy e-mail.
610.43	Normal water surface
610.13	Each occurrence when the water surface falls below an elevation of 610.13 feet NGVD 29, the Wisconsin DNR, Michigan DNR, Michigan DEQ, and FWS must be notified in a courtesy e-mail.
609.83	Each occurrence when the water surface falls below an elevation of 609.83 feet NGVD 29, FERC must be notified within 10 days with a copy of the notification provided to the FWS, Michigan DNR, Michigan DEQ and Wisconsin DNR.

Table 5. Menominee development operational water levels and actions (Source: Staff).

Headwater Elevation (feet, NGVD 29)	Elevation-triggered action
593.93	Spillway crest
593.83	Each occurrence when the water surface exceeds an elevation of 593.83 feet NGVD 29, the Wisconsin DNR, Michigan DNR, Michigan DEQ, and FWS must be notified in a courtesy e-mail.
593.53	Normal water surface
593.23	Each occurrence when the water surface falls below an elevation of 593.23 feet NGVD 29, the Wisconsin DNR, Michigan DNR, Michigan DEQ, and FWS must be notified in a courtesy e-mail.
593.03	Each occurrence when the water surface falls below an elevation of 593.03 feet NGVD 29, FERC must be notified within 10 days with a copy of the notification provided to the FWS, Michigan DNR, Michigan DEQ and Wisconsin DNR.

Interior agrees with NEW Hydro's proposal to continue operating the project in a run-of-river mode with no peaking operations. Michigan DNR, Michigan DEQ, Wisconsin DNR, and Michigan HRC all recommend the project continue to operate in a run-of-river mode, such that inflow of water to the project approximates outflow of water from the project, with fluctuations of water levels in each reservoir not exceeding those proposed by NEW Hydro for each development. Project operation is described in section 2.1.4, *Existing Project Operation*.

Our Analysis

NEW Hydro proposes to operate the project in a run-of-river mode by maintaining the water level in each reservoir within ± 0.3 foot of the normal water surface. Maintaining the water level in each reservoir to a targeted value ensures that outflow from each development approximately equals inflow. The water level in each reservoir is maintained through the use of a PLC that, at each development, automatically adjusts one Tainter gate and the turbine wicket gates. Typically, the PLC can adjust to changing flow conditions in the Menominee River and maintain the reservoir water level close to the targeted value. However, to respond to higher flows in the Menominee River, additional Tainter gates must be manually operated. To ensure run-of-river compliance, NEW Hydro also proposes to operate the project to maintain an absolute minimum water surface in both reservoirs. The water surface would be maintained above this minimum level except when project maintenance or emergency situations require that the water level in either reservoir be drawn down. When maintenance or emergency situations require that the water levels in either or both reservoirs be drawn down below the stated absolute minimum, the drawdown would be accomplished using measures described in the proposed reservoir drawdown plan. No maximum water level is proposed or required because the uncontrolled spillway crest is only 0.50 feet above the normal water surface at the Park Mill development and 0.40 feet above the normal water surface at the Menominee development. A water surface above the uncontrolled spillway crest ensures that the outflow from each development would approximately equal the inflow to each development. The proposed operational water levels for each development are presented in table 1.

Operating the project in a run-of-river mode, whereby the fluctuations of water surface in the Menominee and Park Mill reservoirs are minimized, would maintain reservoir levels that match those experienced under existing conditions, and protect fish and other aquatic organisms that rely on nearshore habitat for feeding, spawning, and cover. Stable reservoir levels would also protect wetlands at these reservoirs that are important habitats for fish and wildlife resources. Typically, operating the project in a run-of-river mode would also not affect water quality and, therefore, NEW Hydro's proposal to continue operating the project in a run-of-river mode, as it has in the past, would not change current water quality conditions in project-affected waters.

Operation Compliance Monitoring

NEW Hydro proposes to continue operating both project developments in a run-of-river mode. NEW Hydro proposes to prepare an operation compliance monitoring plan to specify measures that would be implemented to monitor and verify its proposed run-of-river mode of operation for the project. Compliance with run-of-river operation would be assessed using reservoir elevation and turbine operation records, along with data from the reservoir staff gage. NEW Hydro proposes to install staff gages to clearly show the reservoir level, one at the Park Mill dam and one at the Menominee dam. Each staff gage would show the lower limits of the headwater variation plan. Furthermore, NEW Hydro proposes to increase public awareness of reservoir levels by color coding each staff gage and including a small sign nearby to explain the color coding.

Interior, Michigan DNR, Wisconsin DNR, and Michigan HRC all recommend installing a staff gage in the reservoir side of the dam of each development that would include the operational limits. Interior recommends that the operational compliance monitoring plan be developed in consultation with FWS. Michigan DNR recommends that the operational compliance monitoring plan be developed in consultation Michigan DNR, Wisconsin DNR, and FWS. Interior and Michigan DNR recommend that the operational compliance monitoring plan include: (1) mechanisms to accurately document inflow to and discharge from the project, including flows in and out of the fish passage facilities; (2) installation of automatic water level recorders to document headwater and tailwater elevations on an hourly basis, and records of daily turbine operations, headwater and tailrace channel elevations, and flow releases in cubic feet per second through the powerhouses and spillways; and (3) a schedule for implementation, documentation of consultation with the agencies, copies of comments and recommendations on the completed plan, and specific descriptions of how agency comments are accommodated by the plan.

Wisconsin DNR recommends NEW Hydro develop an operation and facility management plan that includes installation of staff gages to show the reservoir operating band.

Our Analysis

Installation of staff gages, one in the Park Mill reservoir and one in the Menominee reservoir, would increase public awareness of reservoir levels and project operation.

Although NEW Hydro proposes to assess compliance with run-of-river operation using reservoir elevation and turbine operation records, along with data from the reservoir staff gage, it did not state whether automatic water level recorders would be used. Installation and operation of automatic water level recorders in the reservoirs of both developments would provide continuous documentation to show if the project was operating within the headwater elevations provided in table 4 and table 5 and complying

with run-of-river requirements. However, the recommendation of Interior and Michigan DNR to install and operate automatic water level recorders downstream of each dam is not necessary to ensure the project's run-of-river compliance, which would be documented using turbine operation records and hourly stage records of the water surface elevations in both project reservoirs.

Interior and Michigan DNR recommend measuring and recording the flow releases from the powerhouse and spillways at each development along with the flow into and out of the development's fish passage facility to demonstrate run-of-river compliance. However, the recommendation of Interior and Michigan DNR to monitor flow through every component at each development is not necessary to ensure the project's run-of-river compliance. Turbine operation records would provide direct evidence that the project is not peaking. Hourly stage records of the water surface elevations in both project reservoirs would indicate if project operation is maintaining the target reservoir water surface elevation, which would adequately demonstrate run-of-river compliance.

Preparing an operation compliance monitoring plan would be beneficial by providing NEW Hydro with the procedures that it would use to demonstrate compliance requirements for its minimum flows for the fish passage facilities and for project operational restrictions. In addition, an operation compliance monitoring plan would clarify what techniques or measures NEW Hydro would employ to ensure any proposed fish passage flow and operational restrictions are met. Preparing an operation monitoring plan for the project, after consultation with the resource agencies, would enable NEW Hydro to document the procedures it would employ to demonstrate compliance requirements for operating the project, including, but not limited to, operating the project in a run-of-river mode by demonstrating reservoir level requirements are maintained. We consider the operation compliance monitoring plan equivalent to Wisconsin DNR's recommendation to develop an operation and facility management plan and therefore conclude that it is not necessary or prudent to recommend Wisconsin DNR's proposal to develop an operation and facility management plan in addition to an operation compliance monitoring plan, as proposed by the other state and federal agencies and Michigan HRC.

Including an implementation schedule as part of the compliance monitoring plan would be appropriate for determining when the plan would be initiated.

Communication and Consultation

Communication between NEW Hydro and the resource agencies is important to ensure the project would operate as proposed and agreed upon by the resource agencies. Wisconsin DNR recommends NEW Hydro establish an annual meeting with it to review license conditions and management plans for the project.

Our Analysis

As discussed above in *Mode of Operation*, NEW Hydro proposes to operate the project in a run-of-river mode as recommended by the resource agencies. Contacting the resource agencies, including Wisconsin DNR for all planned or unplanned deviations in its run-of-river operation would be a component of the operations compliance monitoring plan and would allow the resource agencies to be promptly alerted to any deviations in project operations that could potentially affect fish and wildlife resources. Additionally, NEW Hydro proposes numerous other plans for the project that would be developed in consultation with the resource agencies, such as plans to monitor invasive species, prepare reservoir drawdown plans, as well as the fish passage operation plan and drought operation plan. Moreover, plans considered under the staff alternative would be prepared after consultation with the resource agencies. Because each plan includes consultation with the resource agencies, it would allow Wisconsin DNR to develop protocols, as necessary, for communication with NEW Hydro over the term of any new license issued for the project. Therefore, there is no need for a separate license condition requiring an annual meeting among NEW Hydro and the resource agencies.

Woody Debris and Trash Management Plan

Large woody debris is an important component of riverine fish habitat; the quantity and quality of available habitat has a substantial effect on the health of fish and other aquatic communities. NEW Hydro proposes to continue its current method of handling woody debris and trash at both developments. At the Park Mill development, NEW Hydro proposes to use a combination of manual and hydraulic trash removal techniques to remove debris from the angled fish guidance trashrack. Upon removal from the river, all garbage and man-made items would be disposed of in a garbage dumpster and taken to a landfill. All large woody debris would be cut up and hauled to an offsite location along with weeds, grass, and other organic materials. No debris would be placed back into the Menominee reservoir from the Park Mill dam, as it would end up at the trashracks at the Menominee dam.

At the Menominee development, all garbage and man-made items are currently removed manually and placed in a garbage dumpster. Large woody debris is cut up and hauled off-site, while weeds, grass, and small pieces of woody debris are placed back in the river below the Menominee dam. NEW Hydro proposes to use a mechanical raking system to remove debris from the trashracks at units #4, #5, #8 and #9 at the Menominee development and man-made and woody debris disposal would be handled in the same manner as under the existing license.

The Wisconsin DNR recommends NEW Hydro develop a woody debris passage plan to include how NEW Hydro would pass woody debris downstream.

Our Analysis

Large woody debris plays a vital role in many streams and riverine ecosystems by providing cover, shelter, and feeding opportunities for aquatic organisms (Opperman et al, 2004). However, aquatic habitat does not appear to be a limiting factor affecting fish populations in the Park Mill and Menominee reservoirs. Fishery resources in those two reservoirs ranged from good to average, respectively.

The presence of relatively large areas of emergent and floating-leaf plant communities, which are an essential component of chain ecosystems, provide valuable habitat for fish and other wildlife, particularly where structural habitat, such as trees and other forms of coarse woody debris are sparse or missing.

Under its proposal, NEW Hydro would continue to dispose downstream the weeds, grass, and other organic materials that are removed from the Menominee development trashracks. However, there would continue to be some woody debris that would go through the spillway, as evidenced by large amounts of woody debris observed downstream of the Menominee dam, around the pilings of the Ogden Street Bridge, during NEW Hydro's mussel study. In addition, the July 2012 dredging in the lower Menominee River that was associated with the Ansul Fire Protection Company contaminated sediments removal efforts, encountered greater than expected amounts of large woody debris that slowed the river dredging process (Wisconsin DNR and Michigan DEQ, 2012).

There is sufficient aquatic habitat in the Menominee reservoir and there would be little benefit by adding large woody debris to the reservoir with some of this debris requiring subsequent removal from the trashracks at the Menominee dam. Aquatic habitat conditions, although improving downstream from the Menominee dam, would also not benefit from the addition of large woody debris from the Menominee dam at this time. Therefore, we conclude NEW Hydro's handling and disposal of man-made trash and woody debris is appropriate under current procedures, and a woody debris passage plan would not provide any additional benefits.

Fish Impingement and Entrainment

The operation of the project has the potential to result in some incidental fish losses caused by impingement of fish on the project trashracks and from entrainment of fish through the project turbines.

The fish guidance trashrack is part of the downstream fish bypass system that directs fish moving downstream in the Park Mill power canal to a bypass structure. The exit pipe at the fish bypass transports fish to the tailrace of the Park Mill powerhouse. The fish guidance trashrack is 105.17 feet long and 19.85 feet high and spans the entire width of the power canal near the intake to the powerhouse. Intake velocities along the fish guidance trashrack are estimated to be less than 2 feet per second.

The trashracks at the Menominee development in front of generating units 8 and 9 have a 2-inch clear bar spacing and the trashracks in front of units 4 and 5 have 1-inch clear bar spacing. The estimated intake velocities for the trashracks at units 8 and 9 are 1.68 and 1.78 feet per second, respectively. The trashracks in front of units 4 and 5 have intake velocities of less than 2 feet per second.

The upstream entrance to the attraction flow facility at the Menominee dam has a trashrack with ¾-inch clear bar spacing in front of the entrance, low intake volumes between 75 to 120 cfs, and intake velocities of less than 2 feet per second.

Our Analysis

The Electric Power Research Institute (EPRI)(1992) states the level of fish entrainment and impingement at a project is dependent upon many factors, including age, swim speeds, size, and the seasonality of entrainment and impingement patterns of fish present at the site. Although turbine passage mortality rate estimates can be relatively variable, some trends have been recognized. For example, certain species of fish typically dominate entrainment collections, and the dominant fishes entrained usually represent those species that have high reproductive rates. However, fish size, rather than species, is usually the critical factor influencing the rates of turbine-related mortality. In general, most fish entrained at hydroelectric projects tend to be smaller fish, less than 4 to 5 inches long, and are often juvenile fish or species such as minnows that never exceed a length of 3 or 4 inches (FERC, 1994; EPRI, 1997).

EPRI (1992) found that survival through hydropower facilities usually exceeds 90 percent for naturally-entrained resident fish for both Kaplan and Francis turbines, although survival is reduced as fish length increases.

The velocity of water upstream of the intake to a hydroelectric project is also an important component in determining the level of potential fish entrainment and impingement. Most resident fish species are at risk of impingement or entrainment if their burst swim speed[33] is less than the approach velocity at a trashrack or other intake screening device (Peake, 2004; Boys et al., 2013). Using fish entrainment data from Winchell et al. (2000), under NEW Hydro's 1-inch clear bar spacing of trashracks at the Menominee development, the percentage of fish that approach the trashrack and are entrained is estimated at 61.5 percent, based on the estimate that fish are between 0 to 4 inches in length. Research has shown that fish can swim about 8 to 12 body lengths per second in a burst mode that can last up to 20 seconds (Bell, 1986; Videler and Wardle, 1991; Aadland, 2010). For example, a 4-inch-long fish would have a burst speed of around 2.7 to 4.0 feet per second. Therefore, fish species greater than 4 inches in length exposed to the 1.8 to 2.0 feet per second velocity at the project are likely to escape

[33] Burst swim speeds are the highest speeds attainable by fish and can be maintained for brief periods of less than approximately 20 seconds (Beamish, 1978).

impingement and entrainment. Therefore, it is likely that fish entrainment and impingement at the project is low and limited to fish less than 4 inches.

Although impingement and turbine entrainment at the project would likely continue to cause some loss of smaller resident fish, these losses would continue to be unlikely to approach a magnitude that adversely affects fish populations at the project. The fish populations in the project-affected waters of the Menominee River are self-sustaining, healthy, and support a good sport fishery. Thus, any losses caused by impingement and entrainment would continue to not adversely affect the fish populations in the Menominee River. Further, the fish guidance trashrack at the Park Mill development would allow other fish species, beyond the target lake sturgeon, to move safely downstream and avoid impingement and entrainment at the Park Mill development.

Lake Sturgeon

The lake sturgeon is identified as a threatened species in Michigan, a species of special concern in Wisconsin, and a federal species of concern by FWS (Utrup et al., 2011). The Menominee River population of lake sturgeon is one of the last fishable lake sturgeon populations in Michigan and Wisconsin (Priegel, 1973). In the project area, the lake sturgeon has been adversely affected by habitat loss and fragmentation caused by the numerous dams that have been built on the Menominee River, including the Menominee and Park Mill Project, that created barriers to lake sturgeon migrating upstream to additional spawning habitat.

Our Analysis

The project's fish passage facilities provide sturgeon access to spawning and rearing habitat upstream of the project, and access by downstream migrating juveniles to Lake Michigan for continued growth to maturity (Utrup et al., 2011). The operation of the fish passage facilities increased lake sturgeon's potential spawning habitat from 26 to 58 acres (Dougherty, 2006; and Dougherty et al., 2007) and increase juvenile lake sturgeon rearing habitat from 212 acres to 1,610 acres (Michigan DNR, 2015b). However, three dams upstream from the project, to include the Grand Rapids, White Rapids, and Chalk Hill dams, continue to block further upstream access of lake sturgeon to its historical spawning grounds (Utrup et al., 2011).

Since 2015, there have been 68 lake sturgeon passed upstream, many of which were tagged in the process. Not all lake sturgeon captured at the fish lift are transferred by truck for release into the Park Mill Reservoir. To qualify for transfer upstream, collected lake sturgeon must meet the following parameters: (1) a 5-to-1 ratio of males to females; (2) 50 inches or longer in total length; and (3) fish must be healthy. Lake sturgeon not meeting these parameters must be released back into the Menominee River downstream of the Menominee dam. The lake sturgeon passed upstream have continued to move upstream to spawning habitats in the Park Mill reservoir, and then moved back

downstream following the spawning season via the downstream fish passage facility at the Park Mill development and open spill gates at project developments during periods of high flows.

The fish passage facilities at the project are successfully passing lake sturgeon; therefore, there is no need for modification to the facilities or implementation of additional fish passage measures at the project.

Freshwater Mussels

Freshwater mussels are considered good indicators of the health of aquatic ecosystems because of their habitat requirements, including free-flowing streams and rivers with stable substrates composed of a mixture of gravel, sand, and silt deposits (Parmalee and Bogan, 1998; Williams et al., 1993). Excess sedimentation in river systems has been shown to adversely affect mussel species, which, as filter feeders, require clean, well-oxygenated waters (Brim-Box and Mossa, 1999). The disappearance of native freshwater mussels may indicate degraded water quality and habitat. Freshwater mussels are especially sensitive to changes in hydraulic conditions. In addition, their complex life cycle and sedentary adult life stage require adequate stream flows that permanently maintain wetted habitat, buffer water quality, and provide adequate food (Gates et al., 2015). Unlike highly mobile species, such as fishes that can move rapidly in and out of microhabitats with changes in water levels, mussels move slowly and are unable to respond to sudden drawdowns in a river.

NEW Hydro's mussel study in the project-affected areas of the Menominee River, particularly in the lowermost portion of the river downstream of the Menominee dam, provides information about the species present and the relative abundance. NEW Hydro is not proposing any specific enhancement measure for mussels and would continue to operate the project in a run-or-river mode.

Our Analysis

NEW Hydro's qualitative mussel survey in project-affected waters of the Menominee River, provide updated and useful information about the presence and abundance of mussel species in the area. The information collected was especially helpful in expanding the knowledge about the presence, or lack thereof, of mussels in the lowermost portions of the river where recent data on mussels was lacking. Poor habitat conditions, such as heavy siltation, dredging activities, wastewater outflows, and contaminated sediments in the shipping canal's South Channel and Turning Basin, and debris against the pilings of the Ogden Street Bridge, all located in the river reach downstream from the Menominee dam, are not caused by project operation.

The Park Mill reservoir had the highest diversity and greatest abundance of mussels collected in a 3.5-mile-long portion of the 22.4-mile-long reservoir that was sampled. The 1.2-mile-long Menominee reservoir also showed a greater than expected diversity of mussels. The sampling results for the lower Menominee River downstream

from the Menominee dam, indicate that freshwater mussel distribution may be limited to a 1.2-mile-long reach extending downstream from the dam. No live mussels were found in the 1.5-mile-long section of a sampling site in the lowermost part of the river and upstream from the mouth of the river. Mussel habitat in the lowermost part of the river was severely degraded, with deep deposits of fine silts, and some areas of the river where flows were blocked by structures in the river.

Multiple impacts of dredging, wastewater outflows, siltation, and coldwater inflows from Green Bay, are suspected factors in limiting the presence of mussels in this lowermost reach of the river. In addition, the presence of contaminated sediments in the shipping canal's Turning Basin, and the South Channel (of the river) eliminate favorable habitat for mussels in these two areas.

Within the study area, a clear difference was evident between mussel presence downstream from the Menominee dam and the upper reaches of the river upstream of the Park Mill dam. The two project dams have prevented at least three mussel species from colonizing the upper reaches of the river by preventing freshwater drum, their fish host, from reaching upstream areas. Many of the mussels that are large river specialists rely on upstream fish migration for their distribution. Blockage of fish movements often reduces or eliminates these mussel populations above barriers. However, since the survey was conducted, fish passage facilities have been constructed at the project, and in the future, these facilities could provide passage for several fish species besides the lake sturgeon, like channel catfish, freshwater drum and smallmouth bass.[34] Therefore, the fish passage facilities would likely have an indirect beneficial effect on mussel species that rely on these host fish such as *O. olivaria*, *A. pliata*, *C. tuberculate*, *L. cardium*, *L. fragilis*, *P. alatus*, and *T. truncate*. Based on the mussel sampling study, mussel recruitment appears to be low or absent for all mussel species except *T. truncate*. It is uncertain at this time if lack of recruitment is related to recent drought conditions affecting habitat conditions or because of the lack of the availability of host fish.

NEW Hydro's proposal to continue operating the project in a run-of-river mode, would not cause any changes to mussel populations or species composition, and would maintain constant flows that mussels favor. NEW Hydro's fish passage facilities, although currently providing lake sturgeon passage (Warren, Jr. and Burr 2014),[35] could

[34] The upstream fish passage facilities currently only passes lake sturgeon.

[35] The lake sturgeon is a known host for the hickorynut mussel, which has a range that includes Lake Michigan.

benefit mussel species if host fish, such as lake sturgeon, channel catfish, freshwater drum, and smallmouth bass, transported glochidia[36] upstream to new habitat.

Fish Passage Operation Settlement Agreement (2013 Settlement Agreement)

Overview

The 2013 Settlement Agreement features the following components: (1) Background, (2) Responsibilities, (3) Fish Passage / Protection Fund, (4) Downstream Fish Passage at Park Mill and Menominee Dams, (5) Upstream Fish Passage at Menominee and Park Mill Dams, (6) Fishway Maintenance and Modifications, and (7) General Terms and Conditions.[37] NEW Hydro proposes to continue to implement a Fish Passage Operation Plan, which contains protocols to operate the fish passage facilities and would be updated annually. The Fish Passage Operation Plan is a component of the 2013 Settlement Agreement.

Fish Passage Operation Plan

The first Fish Passage Operation Plan was developed in 2015, which contained protocols to operate and maintain the fish passage facilities. The 2016 Fish Passage Operation Plan, the current plan, is basically the same as the 2015 Fish Passage Operation Plan. The 2016 Fish Passage Operation Plan requires NEW Hydro to: (1) maintain the fish passage facilities located at the Park Mill and Menominee dams and ensure that the fish lift and sorting work area are in good condition and ready for safe operation; (2) maintain sensors in the vicinity of the fish lift that provide information on water temperature, river flows (in cubic feet per second), and tailwater elevation (in feet NGVD 29); (3) conduct downstream operation and maintenance activities; (4) maintain all fish passage facility equipment and data loggers; (5) maintain PIT tag antennas and cameras to ensure that a live feed is available; (6) maintain equipment, including cameras and antennas (involved with downstream passage); and (7) conduct daily inspection of the Park Mill and Menominee fish bypass structures to ensure they are working properly, including the removal of debris that may restrict operation of the cameras and PIT tag[38]

[36] A microscopic parasitic larval stage of some freshwater bivalve mussels that attaches itself by hooks and suckers to the fins or gills of fish for transport to other stream locations.

[37] All the fish passage facilities discussed in the 2013 Settlement Agreement are built and operating, thereby rending much of the requirements of the 2013 Settlement Agreement to be moot.

[38] The continued use of PIT tag antennas is dependent upon the success of the program to date.

antennas. The 2013 Settlement Agreement requires that the Fish Passage Operation Plan be updated annually.

Wisconsin DNR recommends that NEW Hydro develop a fish passage operation plan. Interior recommends that NEW Hydro to coordinate with the Implementation Team[39] to develop a fish passage operation plan by December 30 of each year. A fish passage operation plan, as proposed by Interior, would set operational protocols for fish passage operation for the coming year, or for more than 1 year, if agreed to by the Implementation Team. Interior recommends that the fish passage operation plan include all aspects of fish passage operation, including fish passage targets, performance measures, and timeframes of operation.

In addition, NEW Hydro, Interior, Michigan DNR, and Michigan HRC recommend that the 2013 Settlement Agreement,[40] and its terms and conditions (including implementing a fish passage operation plan, updated annually), be included in any new license, if issued for the project, to form the basis for continued consultation and management of the fish passage facilities at the project.

Interior recommends that NEW Hydro fund the Fish Passage / Protection Fund, which is part of the 2013 Settlement Agreement, by contributing, on a quarterly basis, 2 percent of the gross revenue received from NEW Hydro's sale of the combined electrical energy generated by the project (which is estimated to be $7,500 quarterly). In addition, Interior recommends that when sufficient funds exist in the proposed Fish Passage / Protection Fund, Michigan DNR and / or Wisconsin DNR can use these funds for the cost of their staff to implement the Fish Passage Operation Plan, or the Implementation Team can hire contractors that would be responsible for selecting and processing fish to be transported upstream, per the requirements of the Fish Passage Operation Plan.

NEW Hydro proposes to provide $4,000 annually for operation and maintenance of the fish passage facilities, as delineated in the 2016 Fish Passage Operation Plan.

[39] As part of the 2013 Settlement Agreement, an Implementation Team was formed to guide the planning and construction of fish passage facilities at the project. Also, the annual fish passage operation plan identifies the responsibilities of the members of the Implementation Team.

[40] The 2013 Settlement Agreement was signed on July 11, 2013, and filed with the Commission on August 7, 2015, as part of Interior's 10(j) recommendations. NEW Hydro did not propose the 2013 Settlement Agreement in its license application filed on February 28, 2013, but filed a letter on April 25, 2017, requesting that the 2013 Settlement Agreement be included in any license, if issued, for the project.

Our Analysis

Fish Passage Operation Plan

Lake sturgeon is the fish species targeted for upstream passage via the fish lift.[41] Lake sturgeon passed upstream must be 50 inches or more in total length, and be healthy, with no outward indications of disease. The goal at the fish lift is to pass 90 lake sturgeon upstream annually with the composition of these fish being a 5-to-1 male to female ratio.

Lake sturgeon selected for upstream passage at the fish lift are transferred upstream of the Park Mill development to an open water boat landing in the Park Mill reservoir by truck and tank(s) trailer, with NEW Hydro personnel being required to operate the transporting truck if it is owned by them. The Implementation Team determines the scope of work and the yearly costs necessary to pass fish at the fishway facilities.

The fish lift has successfully moved 68 lake sturgeon upstream as of October 12, 2016, which bodes well for potentially increasing the numbers of lake sturgeon produced in Menominee River upstream of the Park Mill development and ultimately recruitment of the species into Lake Michigan. The Fish Passage Operation Plan is a reasonable plan for operating the Menominee and Park Mill fish passage facilities and would accomplish its goal of safely and successfully passing lake sturgeon upstream and downstream past the project in the Menominee River. NEW Hydro's proposed annual updates to the Fish Passage Operation Plan are based on data collected from ongoing operation of the fish passage facilities and from weather data. The data collected is useful in determining suitable dates for opening and closing the fish passage facilities and how future operation of the fish passage facilities can best meet fish passage needs and project generation needs.

Funding

The fish passage facilities are a project facility, and under any new license, if issued for the project, NEW Hydro would be fully responsible for ensuring the operation and maintenance of the fish passage facilities regardless of any agreement it reaches with third parties to operate the fish passage facilities on its behalf or to cap the cost of operating and maintaining the fish passage facilities. The Commission cannot be bound by cost caps in ensuring that licensed facilities, such as fish passage facilities, would be operated and maintained. NEW Hydro would be responsible for the continued operation and maintenance of the fish passage facilities for the duration of any license, if issued for the project, no matter the costs. For these reasons, any Fish Passage Operation Plan

[41] No other fish species besides the lake sturgeon are currently passed upstream. Fish other than lake sturgeon that enter the fish lift are removed and returned downstream via the fish discharge pipe located at the fish lift.

should not contain absolute caps on the costs of operating and maintaining the facility, including the $4,000 annual cost cap to operate and maintain the fish passage facilities. In addition, because NEW Hydro is fully responsible for ensuring the operation and maintenance of any licensed facility, Interior's recommendation that NEW Hydro contribute funds to a Fish Passage / Protection Fund to ensure the operation and maintenance of fish passage facilities is unnecessary. If NEW Hydro wishes to continue to arrange for a third party to operate and maintain the fish passage facilities on its behalf, NEW Hydro could certainly contribute to the Fish Passage/Protection Fund as part of its arrangement with the third party; however, this would be a private matter between NEW Hydro and the third party. Also, ancillary activities at the fish passage facilities, like tagging and monitoring to determine whether fish were successfully collected and passed upstream and downstream at the project, are not needed to operate and maintain the fish passage facilities. Therefore, NEW Hydro would not be responsible for costs associated with ancillary activities.

Memorandum of Understanding of 2012

On January 10, 2012, a MOU among NEW Hydro, resource agencies, and NGO's[42] was developed regarding the future installation and operation of upstream and downstream fish passage facilities at the Menominee and Park Mill Project. The purpose of the MOU was to design, install, operate, and maintain fish passage structures to enable lake sturgeon, and potentially other fish species in the future, to pass safely upstream and downstream of the Park Mill and Menominee developments. However, the MOU did not provide a funding mechanism to construct the fish passage facilities.

NEW Hydro proposes and Interior recommends that the MOU of 2012 remain in effect under any new license, if issued for the project.

Our Analysis

The measures in the MOU of 2012 have either been completed or implemented. Therefore, there is no need to include the provisions of the MOU in any new license, if issued, as recommended by Interior and proposed by NEW Hydro.

Fish Passage Monitoring and Testing Studies

Michigan DNR and Michigan HRC recommend that NEW Hydro cooperate with these two resource agencies to conduct studies testing the effectiveness of the angled bar rack and fish bypass facility at the Park Mill development and the fish lift at the Menominee development.

[42] The parties included in the MOU of 2012 were the same signatories to the 2013 Settlement Agreement.

The proposed 2016 Fish Passage Operation Plan stipulates that NEW Hydro maintain cameras to ensure that live feed from the cameras is available.

NEW Hydro proposes to install two cameras at the entrance to the fish lift and a water temperature sensor at the Menominee development.

The Implementation Team recommends, as part of the Fish Passage Operation Plan: (1) three cameras be installed at the entry to the Park Mill fish bypass facility, (2) three cameras be installed at the entry to the fish bypass facility at the Menominee development, and (3) two cameras be added to the existing two cameras currently installed at the entry to the fish lift.

NEW Hydro proposes that all decisions regarding cameras and water temperature sensors would be made in participation with the Implementation Team. Furthermore, NEW Hydro proposes it would be involved in installing, removing, and maintaining these cameras and water temperature sensors during each lake sturgeon spawning migration period. NEW Hydro states that the information gathered by the cameras and temperature sensors would be made available on a website maintained by the provider of the equipment and available to resource agencies.

Our Analysis

Wisconsin DNR and Michigan DNR have been closely involved in all aspects of the passage of sturgeon at the project (i.e., fish lift and downstream fish passage facilities), and are aware of the changes in trashracks, including the clear-bar spacing and reduced intake velocities at the new trashracks compared to the previous trashracks, at the Menominee development and the successful use of the guidance screen at the downstream fish passage facility at the Park Mill development. The fish lift is working properly, as it has successfully passed 68 lake sturgeon upstream since it began operating. NEW Hydro has also been cooperating with the Implementation Team to ensure the fish passage facilities are operating properly to successfully pass sturgeon past the project by following the guidance provided in the Fish Passage Operation Plan. Therefore, Michigan DNR's and Michigan HRC's recommendations for effectiveness studies would not be necessary and would have minimal project-related benefits.

The use of cameras and a water temperature sensor at the project's fish passage facilities help determine when to initiate or terminate operating the fish passage facilities each migrating season. If a new license is issued, NEW Hydro would be responsible for operation and maintenance of the fish passage facilities, including items such as cameras and temperature sensors to ensure that the fish passage facilities would properly operating.

Cumulative Effects on Fishery Resources

The project historically blocked the upstream movement of lake sturgeon to its spawning and rearing habitats; however, construction and operation of fishways at the

project has restored passage at the project. Juvenile and adult lake sturgeon moving downstream can be subject to mortality from turbine entrainment and impingement. Numerous hydropower projects located upstream from the project on the Menominee River and its tributaries collectively expose resident fish populations to entrainment and impingement mortality.

The numerous dams on the Menominee River upstream from the project have the potential to cumulatively and adversely affect resident fishery resources as fish move within the river. However, some fish can maintain populations within the large pools or reservoirs formed by the many dams on the river, and do not require moving within the river. In addition, many of the resident fish species are warmwater species that are highly fecund[43] and self-supporting.

Many entities have made efforts to improve conditions for lake sturgeon populations in the Menominee River. The fish passage facilities targeting lake sturgeon passage at the project are a positive effort to enhance lake sturgeon populations in the Menominee River and Lake Michigan. Spawning and rearing areas upstream of the project have become accessible to lake sturgeon.

Despite the numerous hydropower projects on the Menominee River and its tributaries, the resident fish populations in the Menominee River are healthy, diverse, and self-sustaining. A good sport fishery exists throughout the length of the river, and while resident fish populations are cumulatively affected by hydropower operations, including from the Menominee and Park Mill Project, the projects are not adversely affecting fish populations in the river. Based on the above information, any project-related adverse cumulative effects on resident fish populations are minimal.

3.3.3 Terrestrial Resources

3.3.3.1 Affected Environment

The Menominee River watershed is characterized by nutrient poor glacial soils, coniferous and northern hardwood forests, undulating till plains, moraine hills and broad lacustrine basins, which are distinctive of the Northern Lakes and Forests ecoregion.[44] Soils are formed primarily from sandy and loamy glacial drift material and generally lack the arability of those in adjacent ecoregions to the south. Outside of agricultural lands, vegetation in the watershed consists of oak forest and savanna, grassland prairie, and bottom hardwoods. This habitat supports a wide variety of wildlife species including wild turkey, Cooper's hawk, ovenbird, blue jay, brown snake, bull snake, gray tree frog,

[43] The ability to produce an abundance of offspring.

[44] Ecoregions are areas related by similar climate, physiography, hydrology, vegetation and wildlife potential.

white-tailed deer, gray squirrel, and gray fox. Avian species known to occur within the project area include several species of songbirds; waterfowl, such as geese, herons, and ducks; birds of prey, including hawks and owls; and other common species, such as crows and blackbirds. Additionally, Little Blueberry, Blueberry, Strawberry, and Boom Islands[45] support colonial nesting or rookery bird habitat for a number of waterbirds including the great egret, great blue heron, and black-crowned night-heron.

The broadleaf deciduous forest in the vicinity of the project includes the native silver maple, box elder, cottonwood, red oak, and green ash. Herbaceous plants include sedges, large leave aster, bristley green briar and giant goldenrod. Submersed, native vegetation is widespread throughout littoral areas in the lower Menominee River. Upstream of the Menominee dam contains fast-moving water with a riverbed substrate comprised of primarily rock and sand, and contains a moderate abundance of aquatic moss, longleaf pondweed, and water stargrass.

Wetlands

Wetlands provide a variety of ecological functions, including groundwater recharge, flood-flow alteration, fish and wildlife habitat, toxicant sequestration, and shoreline stabilization. The National Wetlands Inventory database indicates the presence of numerous wetlands within the vicinity of the project, the majority of which are located upstream of the Park Mill dam. Wetlands within the project boundary are predominantly riverine emergent wetlands; approximately 204.4 acres of persistent riverine emergent wetlands lie upstream of the Park Mill dam, with patches of palustrine forested scrub-shrub, emergent, and pond wetland types occurring within the adjacent riparian corridor.

Bald Eagle

Bald eagles (*Haliaeetus leucocephalus*) were removed from the federal list of threatened and endangered species in 2007. Bald eagles are still protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act, which prohibit the "take" of bald eagle eggs, nests, and offspring, except as permitted by regulation. Bald eagles migrate throughout North America and nest near large open bodies of water where tall trees and cliffs are available. A bald eagle nest has been identified within 1,500 meters of the Park Mill dam.

In 2011, FWS performed a contaminant risk assessment to examine the potential for contaminants, invasive species, and fish pathogens being introduced into the watershed by fish passage at the Menominee dam. More specifically, the assessment analyzed the potential for the bioaccumulation of PCBs within bald eagles upstream of the dams. FWS concluded in its report that passing lake sturgeon downstream of the

[45] Little Blueberry and Blueberry Islands are within 1,500 feet downstream of the Park Mill dam. Boom and Strawberry Islands are within 1 mile downstream of the Menominee dam.

Menominee dam to the upper reaches of the river acts as a source of PCB loading into an otherwise cleaner system and may be a potential risk to wildlife; however, the immediate risk to bald eagle reproductive success is low.

Invasive Species

The U.S. Army Corps of Engineers (Corps) identified three upland invasive plant species within the project boundary in 2012, including common buckthorn, glossy buckthorn, and bush honeysuckle (Corps, 2015). Additionally, aquatic plant surveys conducted by NEW Hydro in 2010 identified six aquatic invasive plant species within the project boundary, including Eurasian water-milfoil.

Eurasian water-milfoil is an invasive species, native to Europe, Asia and North Africa, that has spread to numerous Wisconsin and Michigan Counties. Eurasian water-milfoil propagates by shoot fragmentation rather than seed, which has supported inadvertent transportation of shoots between waterbodies via boats and other aquatic equipment. Other traits that confer a competitive advantage to Eurasian water-milfoil over native species include a comparatively earlier growing season and expansive stem growth at water surface. Eurasian water-milfoil adversely affects waterbodies by forming dense canopies within littoral habitat, reducing available sunlight to surrounding native aquatic vegetation. Beneath these canopies, milfoil can alter water quality by raising pH, decreasing dissolved oxygen, and increasing temperature (Washington Department of Ecology, 2015). Dense mats of milfoil provide abundant cover and allow for high survival rates for young fish. Consequently, larger predatory fish can become less efficient at finding their prey (Engel, 1995) and, over time, this can alter the composition of the resident fish community. Eurasian water-milfoil can adversely affect waterfowl as well; as a food source, Eurasian water-milfoil provides less value than native plants (Aiken et al., 1979). Eurasian water-milfoil dominance can also impede recreational activities such as swimming, fishing, and boating.

Curly-leaf pondweed is a European exotic first discovered in Wisconsin in the early 1900's. Curly-leaf pondweed germinates under winter ice and produces foliage early in the growing season. Like Eurasian water-milfoil, an abundance of curly-leaf pondweed can impede recreational activities and adversely affect fish populations within a waterbody. Additionally, mid-summer die-off of the plants can cause algal blooms spurred from the nutrients released during plant decomposition.

The Corps initiated several projects in 2013 to improve colonial bird nesting habitat within the Menominee River Area of Concern. Efforts centered on the mechanical and chemical control of buckthorn, honeysuckle, and riverbank grape on Blueberry, Boom, and Strawberry islands. No additional invasive plant mechanical or chemical control work has occurred on the islands since 2013 (Corps, 2015).

3.3.3.2 Environmental Effects

Wetlands

As stated in section 2.1.4, *Existing Project Operation*, the project is operated to comply with run-of-river requirements by maintaining the water surface in the Menominee and Park Mill reservoirs within ±0.3 foot of the normal water surface. NEW Hydro does not propose any changes to project operation and does not propose any new construction that would affect wetlands within project boundaries.

Our Analysis

The majority of wetlands in the vicinity of the project are located upstream of the project. Adverse effects to wetlands at the project would be primarily associated with extended drawdowns, such as maintenance drawdowns that may extend for weeks. Modification of the hydrologic regime that keeps the wetlands viable may result in the loss of obligate wetland plant species, and subsequently degrade habitat for spawning and nesting wildlife that use wetland habitat. However, NEW Hydro does not propose any extended drawdowns of the Menominee and Park Mill reservoirs. Also, there are no wetlands adjacent to the power canal. The project would continue to operate in a run-of-river mode, and water stage levels within the project boundary would not depart from existing conditions. As such, continued operation would not affect wetlands in the vicinity of the project.

Bald Eagle

As noted above, nesting bald eagles have been documented within the vicinity of the project. To prevent adverse effects on bald eagles, NEW Hydro has proposed the following measures in accordance with the National Bald Eagle Management Guidelines (FWS, 2007): (1) maintain a buffer of at least 660 feet between project activities and the nest, including active and alternate nests; (2) if the activity is closer than 660 feet, restrict all clearing, construction and / or landscaping activities to outside of the nesting season (August through January); and (3) maintain landscape buffers that screen project activity from the nest.

Our Analysis

The operation of machinery during maintenance of the project has the potential to disturb the bald eagles during nest building, incubation, and fledging phases of their reproductive cycle. Loud and disruptive activities may cause eagles engaged in nest building, incubating, or other reproductive behaviors to abandon the nest. NEW Hydro's proposal to implement the above-stated measures, in accordance with the National Bald Eagle Management Guidelines (FWS, 2007), would be sufficient to prevent project-related effects to bald eagles and ensure the protection of bald eagle nesting habitat within project-affected lands.

Invasive Species

Aquatic plant mapping surveys were conducted downstream of the Park Mill dam and lower Menominee River in 2011. The surveys identified 47 aquatic or emergent plant species, six of which are considered invasive: Eurasian water-milfoil, curly-leaf pondweed, common reed, reed canary grass, purple loosestrife, and sweetflag. Eurasian water-milfoil was the most prominent invasive plant species occurring within the project boundary, and was identified covering an estimated 47.1 acres within the Park Mill reservoir and 29.0 acres within the Menominee reservoir. Curly-leaf pondweed was identified covering 6.6 acres within the Park Mill reservoir, and in scattered locations with unquantified abundance within the Menominee reservoir. Purple loosestrife was identified in 22 locations in the Park Mill reservoir in low abundance, with the exception of two locations that contained an estimated 500 plants. No purple loosestrife was detected within the Menominee reservoir. Common reed, reed canary grass and sweetflag were identified in lower abundance along the shoreline within the project boundary.

In letters filed July 31, August 11,[46] and August 26, 2015, Michigan HRC, Michigan DNR, Wisconsin DNR, and Michigan DEQ respectively filed comments and recommendations for the project. With respect to invasive species, Michigan DNR and Michigan HRC recommended holding an annual meeting to discuss invasive species removal, and Michigan DEQ and Wisconsin DNR recommended that NEW Hydro develop measures to address invasive species within the project area.

NEW Hydro proposes to develop and implement an invasive species monitoring plan that would minimize the introduction and spread of invasive species during future operation and maintenance. NEW Hydro proposes that the plan be developed in consultation with the agencies and incorporate the relevant local agency and other stakeholder requirements for minimizing the spread of invasive plant species present in the Menominee River watershed.

Our Analysis

As noted above, six aquatic invasive plant species are known to occur within the project boundary. Invasive plants are able to out-compete and displace native species, thereby reducing biodiversity and altering compositions of existing native plant and animal communities. Eurasian water-milfoil is the most abundant aquatic invasive plant throughout the project's reservoirs. Eurasian water-milfoil can displace native plant species, adversely affect water quality, alter fish communities by providing excessive refugia to prey fish species, and interfere with recreational water activities such as

[46] Michigan DNR and Wisconsin DNR both filed letters on August 11, 2015.

boating and fishing.[47] The dense beds of Eurasian water-milfoil found at the project can restrict swimming, fishing and boating, clog water intakes, and result in decaying mats that foul shorelines. Stems can become lodged among watercraft apparatus or sports equipment and be transmitted to uncontaminated bodies of water.

An invasive species monitoring plan, as proposed by NEW Hydro, would ensure the protection of native vegetation, wildlife habitat and recreational resources by minimizing adverse effects associated with the proliferation of Eurasian water-milfoil and other invasive aquatic plants within the project boundary. However, NEW Hydro has not provided any details on specific measures of the proposed plan. Therefore, an effective invasive species monitoring plan implemented to manage the expansion of Eurasian water-milfoil and other invasive aquatic plants within project waters and limit impairments to recreation should contain: (1) a description of the proposed monitoring methods; (2) the proposed frequency of monitoring; (3) the proposed criteria to be used to determine when control measures will be implemented; and (4) a schedule for filing monitoring reports. Implementing a plan with these measures to manage Eurasian water-milfoil within project-affected waters would reduce the likelihood of adverse effects to recreation and other resources by limiting their abundance and reducing the likelihood of their transmission to other waterbodies.

3.3.4 Threatened and Endangered Species

3.3.4.1 Affected Environment

FWS's IPaC system indicates seven federally-listed threatened and endangered species known to have the potential to occur in counties of the project: the Kirtland's warbler, rufa red knot, dwarf lake iris, Hine's emerald dragonfly, Canada lynx, gray wolf and northern long-eared bat (FWS, 2017). No critical habitat for any federally listed threatened and endangered species occurs within project-affected lands.

Kirtland's Warbler

The Kirtland's warbler is an endangered songbird that only nests in stands of young jack pine that are greater than 80 acres (Michigan DNR, 2016). Until 1995, the species had only been known to populate the northern part of Michigan's Lower Peninsula; however, today they also nest in Michigan's Upper Peninsula, Wisconsin, and Canada (FWS, 2012). Factors limiting Kirtland's warbler populations include their

[47] Eurasian water-milfoil can increase boat repair and maintenance costs by clogging the intake of motors.

highly specialized habitat requirements, narrow geographic range, and cowbird nest parasitism.[48]

Rufa Red Knot

The red knot is a small shorebird, about 9 inches long with a 20-inch wingspan. Each year the *rufa* subspecies population migrates from its winter habitat in South America, the Caribbean, and the southern reaches of the United States to the northern reaches of the Canadian arctic. Though the majority of the red knot population uses the Atlantic flyway during its migration northward,[49] some migrants are known to stopover along tributaries to the Mississippi River and the Great Lakes. The rapid decline of the red knot has been associated with loss of habitat from increased coastal development, and more recently, from a loss of an important food source, horseshoe crab eggs, caused by increased commercial overharvesting of horseshoe crabs in Delaware Bay (FWS, 2005).

Hine's Emerald Dragonfly

The Hine's emerald dragonfly is an insect approximately 2.5 inches long and possessing bright emerald-green eyes and a metallic green body. The dragonfly's habitat includes calcareous,[50] spring-fed marshes and sedge meadows overlaying dolomite bedrock. The Hine's emerald dragonfly is imperiled by wetland habitat destruction and contamination of wetlands by pollutants, specifically the accumulation of pesticides (FWS, 2006).

Canada Lynx

The Canada lynx is an elusive northern forest-dwelling cat, similar in size and appearance to bobcats. The Canada lynx possesses long hind legs and large paws, and is highly adapted to hunting its primary prey, the snowshoe hare. Lynx and hares are strongly associated with boreal spruce-fir forests, which provide dense, understory vegetative cover necessary for the hare. Canada lynx populations cannot be sustained in the northern United States, as the absence of boreal forest and persistent snowfall increases predatory competition for the snowshoe hare. Threats to the Canada lynx include a reduction in habitat as a result from poor forest management and climate change (FWS, 2013).

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[48] Brood parasites are organisms that rely on a host to raise their young, to the detriment of the host's own reproductive success.

[49] About 80 percent of the North American red knot population migrates through the Delaware Bay each year (New Jersey Department of Environmental Protection, 2009).

[50] Containing calcium carbonate; chalky.

Gray Wolf

Gray wolves once ranged throughout most of the continental United States; however, by the early 20th century, government-sponsored predator control programs and declines in prey brought gray wolves to near extinction. The gray wolf has recovered since its listing as endangered in May 1974. In 2010, population estimates indicate the Wisconsin gray wolf population to be 782 individuals, and the Michigan gray wolf population to be 687 individuals. Threats to gray wolf recovery include reduced habitat and prey, human interactions, and disease (FWS, 2011).

Northern Long-Eared Bat

The northern long-eared bat is a medium-sized nocturnal bat ranging from 3 to 3.7 inches in length and possessing shades of brown fur. The northern long-eared bat's historical range includes 37 states, encompassing most of the central and eastern United States. Both dead and live trees greater than 3 inches in diameter at breast height provide a necessary reproductive component for the bat; the northern long-eared bat primarily utilizes the crawl spaces between dead and exfoliating bark for roosting in the summer months, but is also known to roost in live trees and man-made structures. Limited forest habitat occurs within lands adjacent to the Park Mill reservoir. There has been a 99-percent reduction of northern long-eared bats in recent years as a result of white-nose syndrome (FWS, 2015a).[51]

Dwarf Lake Iris

The dwarf lake iris is a miniature iris with vibrant, blue-violet flowers, approximately 1.5 inches in length. The iris only occurs on sand or in thin soil along the Great Lakes shoreline. Primary threats to the dwarf lake iris include degradation and loss of habitat as a result of shoreline development and excessive application of herbicide (FWS, 2015b).

3.3.4.2 Environmental Effects

NEW Hydro does not propose any changes to project operation, and does not propose any new construction.

As described in section 3.3.5, *Recreation and Land Use*, NEW Hydro proposes to continue maintaining a canoe portage at the Park Mill dam. Approximately 38 acres of forested habitat occur within the vicinity of the canoe portage. Maintenance of the

[51] White-nose syndrome is an emerging disease which has led to the death of more than 5.7 million bats in North America. The fungal infection agitates hibernating bats, causing them to rouse prematurely from their hibernation and to burn essential fat reserves. Mortality results as bats leave the roost during the winter when no food is available, and consequently starve or die to exposure to colder weather (FWS, 2015a).

approximately 100-foot-long canoe portage would require the periodic removal of fallen trees and other encroaching vegetation.

Our Analysis

The Kirtland's warbler nests only in young jack pine forests in sandy soils that are in excess of 80 acres with numerous patches of grass. Because this type of habitat is not present at the project, we conclude that continued operation of the project would have no effect on the Kirtland's warbler.

The rufa red knot and dwarf lake iris both require sandy coastal shoreline habitat that does not exist within the project boundary, and would not be affected by project operation. Therefore, we conclude that continued operation of the project would have no effect on the rufa red knot and dwarf lake iris.

The Hine's emerald dragonfly is restricted to sedge meadows and marshes containing abundant calcium carbonate. Wetland habitat containing these features is not present within the project boundary. Therefore, we conclude that continued operation of the project would have no effect on the Hine's emerald dragonfly.

The Canada lynx requires relatively high densities of snowshoe hare for forage, which are commonly found in northern boreal forest with persistent snow. These attributes are not found in forest adjacent to the project. Therefore, we conclude that continued operation of the project would have no effect on the Canada lynx.

Gray wolves are generally wary of human settlements and avoid interactions with humans. The lands immediately surrounding the project are primarily residential with manicured lawn. Because favorable habitat is not present within the project boundary and project operation would not otherwise affect the species, we conclude that continued operation of the project would have no effect on the gray wolf.

There is no known documentation of northern long-eared bats occurring within the project; however, FWS's IPaC system indicates the federally listed northern long-eared bat has the potential to occur within the counties of the project. Although FWS (2016) and Wisconsin DNR (2012) records indicate there are no hibernacula or maternity roosts occurring within Marinette and Menominee Counties, undocumented summer roosts may occur within the 38 acres of forest habitat occurring in the vicinity of the canoe portage. NEW Hydro's proposal to maintain the approximately 100-foot-long canoe portage located at the Park Mill dam would require the periodic clearing of vegetation and may require the removal of potential summer roosting habitat for northern long-eared bats. The spatial extent of the vegetation that would be cleared as part of routine maintenance is less than 0.1 acres. Tree removal that may result as part of New Hydro's maintenance does not occur within 0.25 miles of hibernacula, or within 150 feet of a known maternity roost. Therefore, we conclude that continued operation and maintenance of the project may affect the northern long-eared bat, but any incidental take that may result is not prohibited by the final 4(d) rule.

As stated above, potential habitat for the northern long-eared bat occurs in the vicinity of the canoe portage. Avoiding removing trees with equal or greater than 3 inches in diameter at breast height from April 1 to October 31 would reduce the likelihood of disturbing northern long-eared bats and their newly born pups in undocumented maternity roosts within 150 feet of the canoe portage. Tree removal in the cooler winter months, specifically November 1 through March 31, would coincide with the period of time when northern long-eared bats are likely utilizing cave hibernacula.[52] Implementing a seasonal clearing restriction would ensure that any negative effects resulting from vegetation removal to northern long-eared bats residing in undocumented roosts within 150 feet of the canoe portage would be minimized.

3.3.5 Recreation and Land Use

3.3.5.1 Affected Environment

Regional Recreation

Marinette County is known as the waterfalls capital of Wisconsin, and manages 11 parks, six of which have campgrounds. These parks feature hiking, picnicking, fishing, waterfall-viewing, and whitewater rafting as available recreation opportunities. Menominee County, Michigan, offers 30 parks with recreational fishing, swimming, boating, picnicking, camping, playground equipment and ballparks, hiking, and viewing wildlife.

Existing Recreation at the Project

Park Mill Development

The Park Mill development is located on the Park Mill reservoir, with a surface area of about 539 acres, on which there are four project recreation facilities, located within the project boundary, that offer boating, fishing, and picnicking.

Mason Park

Mason Park is located off of River Road in Menominee County, Michigan, and is owned and operated by Menominee County. This facility provides access to the Park Mill reservoir, and features a paved boat ramp with gravel parking lot to accommodate up to six boat trailers, picnic tables, and informational signage.

18th Avenue Boat Launch

The 18th Avenue boat launch is owned and operated by the City of Menominee, Michigan, where 18th Avenue intersects US-41, and provides access to the Park Mill

[52] Hibernacula provide bats shelter during the colder winter months and are typically found in cool, humid caves or abandoned mines in temperate climate zones.

reservoir. Amenities include a paved boat ramp and dock, a paved parking lot to accommodate up to six vehicles and boat trailers, an undeveloped grass parking area to accommodate up to six vehicles, and informational signage with a map.

Cox Landing Boat Launch

Cox Landing is located off of state highway 180 in the City of Marinette, Wisconsin, and is owned and operated by the City of Marinette. This facility provides access to the Park Mill reservoir and offers a 24-foot-wide boat ramp and dock, a paved parking lot to accommodate up to 22 vehicles and boat trailers, a vault toilet, and informational signage.

Park Mill Canoe Portage

The Park Mill canoe portage is located on the north side of the Park Mill dam, and provides access to the Park Mill reservoir, with the take out situated immediately upstream of the dam and the put-in immediately downstream from the dam. A trail with steps and directional signage are the amenities that comprise the Park Mill canoe portage, which is owned and operated by NEW Hydro.

Menominee Development

The Menominee development is located on the Menominee reservoir, with a surface area of about 539 acres, on which there are four recreation facilities. These facilities offer boating, fishing, and picnicking.

Menominee Canoe Portage

The Menominee canoe portage is located in the City of Marinette, Wisconsin, immediately upstream of the Menominee dam. This canoe portage features directional signage and a map, a picnic table, and put-in steps. NEW Hydro owns and operates the Menominee Hydro canoe portage.

Menominee Dam Tailrace Fishing

The Menominee dam tailrace fishing site is located immediately downstream of the Menominee dam on the Wisconsin side of the Menominee River, and is owned by the City of Marinette and maintained by NEW Hydro. This is an informal facility, featuring a picnic table, project sign and map, and signage directing recreationists to other boat launches and fishing opportunities along the Menominee River.

11th Avenue Boat Launch

Owned and operated by NEW Hydro, the 11th Avenue boat launch is located at the west end of 11th Avenue in the City of Menominee, Michigan and provides access to the Menominee reservoir. Amenities at the site include a boat ramp and dock, paved parking area, signage and a map.

NEW Hydro Fisherman's Park and Tailrace Fishing

Owned and operated by NEW Hydro, the NEW Hydro Fisherman's Park and tailrace fishing site is located off Hattie Street at the northwest side of the Hattie Street Bridge in the City of Menominee, Michigan. This recreation site provides a concrete walkway, fishing pier, two picnic tables, and general signage and a map.

Recreation Use

NEW Hydro conducted a recreation use survey on May 23, 2012 and utilized the FERC Form-80[53] to provide recreation use data for the project recreation facilities.

Based on the FERC Form-80 from 2008 and 2014, the Menominee and Park Mill Project received 812 daytime recreation visits in 2008 and 2,379 in 2014; 348 nighttime recreation visits in 2008 and 793 in 2014. On peak weekends, average daytime visits totaled 40 in 2008 and jumped to 414 in 2014. Average nighttime visits during peak weekends totaled 17 in 2008 and 138 in 2014. The total recreation visits to the Park Mill development is estimated to be 347 visitors per day and 155 visitors per day at the Menominee development. However, both FERC Form-80's filed for the recreation seasons in 2008 and 2014 claimed a capacity of 10 to 15 percent for each facility, despite the significant increase in recreation visits between the filing years.

Land Use

The project is located in a small urban setting. Project lands are dominated by industrial, urban, and suburban space. There also are some private residential developments on the waterfront, interspersed with tracks of undeveloped land. Lands adjacent to the project boundary are mostly urban.

3.3.4.2 Environmental Effects

To enhance recreation resources and operate and maintain recreation facilities, NEW Hydro proposes to implement a Recreation Plan for the Menominee and Park Mill Project.[54] The proposed Recreation Plan was based on the results of the recreation survey, and in collaboration with the National Park Service (Park Service), Wisconsin DNR, and River Alliance of Wisconsin (River Alliance) / Michigan HRC, which made several suggestions for each recreation facility based upon a tour of the facilities taken on May 23, 2012. As part of the Recreation Plan, NEW Hydro proposes to:

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[53] To evaluate recreation resources at the project, the Commission requires the licensee to prepare and submit a FERC Form-80 every 6 years (*see* 18 C.F.R. § 8.11). Each FERC Form-80 must identify the project's recreation facilities and the level of public use of these facilities.

[54] NEW Hydro included its proposed Recreation Plan as Appendix 1 of its final license application, filed on February 28, 2013.

(1) continue operating and maintaining the recreation facilities owned by NEW Hydro, including the NEW Hydro Fisherman's Park and tailrace fishing site, 11th Avenue boat launch, Park Mill canoe portage, and Menominee canoe portage;

(2) maintain the 18th Avenue boat launch, owned and currently maintained by the City of Menominee; Mason Park, owned and currently maintained by Menominee County; and Cox Landing and the Menominee dam tailrace fishing site, owned and currently maintained by the City of Marinette;

(3) install "carry-in / carry-out" signs and provide garbage bags at the 18th Avenue and 11th Avenue boat launches, Cox Landing, and Mason Park;

(4) (a) re-set the concrete launch ramp, (b) install a new floating boat dock to replace the existing one, (c) install one picnic table, (d) install one seasonal portable toilet, and (c) relocate the invasive species sign to the left of the ramp to improve visibility at the 11th Avenue boat launch;

(5) install a handrail for public safety on the platform below the steps at the Menominee dam tailrace fishing site;

(6) conduct vegetation clearing at the Menominee canoe portage;

(7) at the 18th Avenue boat launch: (a) straighten and maintain the boat dock, (b) install and anchor one picnic table, and (c) install one seasonal portable toilet;

(8) install and anchor two picnic tables and install one seasonal portable toilet with a hardened trail at Mason Park;

(9) repair or replace the Plexiglas on the sign board and add the history of the project to the sign board at the Fisherman's Park and tailrace fishing site;

(10) install interpretive signage at all of the recreation facilities within the project boundary, with the exception of the canoe portages; and

(11) develop and distribute a recreation brochure.

The proposed Recreation Plan also contains an implementation schedule for the proposed improvements and upgrades.

Our Analysis

Operation and Maintenance of Facilities

NEW Hydro's proposed enhancements of existing recreation facilities would improve recreationists' experiences at each recreation site at the Menominee and Park Mill Project. The proposed Recreation Plan for the project would provide a framework and schedule by which NEW Hydro would implement the recreation enhancements.

Continuing to operate and maintain all existing and proposed recreation sites and facilities owned by NEW Hydro as well as the facilities at the project that are owned by the local governmental authorities would help to ensure that the recreation facilities are

operated and maintained throughout the term of any new license, if issued for the project. NEW Hydro would not need to obtain property rights to maintain the city and county-owned facilities.

Trimming the vegetation at the Menominee and Park Mill canoe portages, as proposed in the Recreation Plan, would facilitate use with clear visibility and access for boaters at the portages.

Litter

Responses to the recreation survey confirmed the presence of litter at the recreation facilities and the need to address the issue. NEW Hydro states that there has been a history of problems with refuse containers along the stretch of river where the project is located. Therefore, installing "carry-in / carry-out" signs and providing garbage bags from dispensers at the 18th Avenue and 11th Avenue boat launches, Cox Landing, and Mason Park, as proposed in the Recreation Plan, would mitigate and avoid recreation-related effects at some of the project's most popularly visited and heavily used recreation facilities, where litter is reported to be a significant problem.

Recreation Amenities

Ice-shoving during the winter can move the sections of concrete that compose the 11th Avenue boat launch. While re-setting the launch ramp, which involves repairing or replacing sections of concrete that have been moved during the winter, is routine maintenance, the launch ramp is usable but has not been maintained and is in poor condition. Therefore, re-setting the launch ramp, would improve the boater experience by allowing boaters to continue accessing the launch ramp with ease throughout each recreation season.

Input from the consulting stakeholder groups identified the need for a new floating dock at the 11th Avenue boat launch because the existing floating dock, while it is usable, is in poor condition. Replacing the old dock with a new and larger floating dock would improve the ability to use the dock by anglers and boaters, while allowing more space for fishing and docking boats, thereby enhancing recreation access and opportunity at the site.

Surveyed users and input from the consulting stakeholder groups identified the need for a restroom and picnic area at the 11th Avenue boat launch, 18th Avenue boat launch, or Mason Park, where there are currently no picnic tables or restroom facilities available, and the addition of these facilities would enhance the recreation sites. Furthermore, vandalism is an issue at the project's recreation areas, so anchoring any movable amenities, as proposed by NEW Hydro, would discourage theft and the movement of recreation amenities to inappropriate and unintended locations.

Informal tailrace fishing occurs downstream of the Menominee dam in the project's tailrace. The proposed handrail on the platform below the steps at the

Menominee dam tailrace fishing site would improve safety at the Menominee dam tailrace fishing site.

The existing boat dock at the 18th Avenue boat launch is removed from the water for the winter and replaced each spring. As part of routine maintenance, the dock has to be straightened and moved out as it settles during the recreation season. Moving and straightening the dock, and ensuring the dock is reset, as necessary, would ensure that the dock is operational during the recreation season.

Interpretative Signage and Recreation Brochure

The proposed content of the proposed interpretive signage would include information on the history of the project, relative to the side of the river on which each recreation facility is located. On the other side of the sign, NEW Hydro's proposal to feature information on local fishing, fishing regulations, and the fish lift would enable the public to become aware of its local history and the project area, along with familiarizing them with important fishing regulations.

The content of the proposed recreation brochure is currently undefined and a recreation brochure would be redundant with the proposed interpretive signage and, consequently, would not provide any other necessary information to recreationists. Further, there is a known issue with litter at the recreation sites, and the recreation brochure may become another item discarded inappropriately rather than serving as an educational tool. Instead of developing and distributing the recreation brochure, interpretive signs, developed after consultation with Park Service, Wisconsin DNR, Michigan DNR, River Alliance, and Michigan HRC, would provide information on the project and its recreation sites, and increase the public's understanding of regional history, the project, and applicable fishing laws.

Recreation Plan

As discussed above, implementation of the proposed Recreation Plan for the project would provide a framework for NEW Hydro to implement the proposed recreation enhancements. However, the plan does not contain conceptual drawings for the proposed floating boat dock and handrail proposed at the 11th Avenue boat launch. Modifying the Recreation Plan to include a provision for conceptual drawings of the proposed dock, handrail, and interpretive signage, after consultation Wisconsin DNR, Michigan DNR, Michigan DEQ, Park Service, River Alliance, Michigan HRC, would help ensure that the facilities would be suitably constructed and installed.

Even though the recreation facilities have a low to moderate capacity, there has been a 300 percent increase of use since 2008, and recreation use and needs may continue to evolve over the period of any license, if issued for the project. Modifying the Recreation Plan to include consultation with Wisconsin DNR, Michigan DNR, Park Service, River Alliance, and Michigan HRC prior to filing the FERC Form-80, and reviewing the Recreation Plan, after consultation with the agencies every other FERC

Form-80 cycle, would help NEW Hydro determine if facility improvements or modifications to the Recreation Plan are necessary.

3.3.5 Cultural Resources

3.3.5.1 Affected Environment

Area of Potential Effects

Under section 106 of the NHPA of 1966, as amended, the Commission must take into account whether any historic property within the project's APE could be affected by the project. The Advisory Council on Historic Preservation defines an APE as the geographic area or areas in which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE for the project includes lands enclosed by the project boundary, in addition to the entire paper mill complex for the Park Mill development, which is owned by the Kimberly-Clark Co.

Regional History

The earliest evidence of Native American occupation in Michigan and Wisconsin occurred during the Paleoindian period (12,000 to10,000 Before Present (B.P.)). While there is limited archaeological data from this time period, from erosion and the inundation of Lake Michigan, the discovery of fluted projectile Clovis and Folsom points south of the Menominee River Basin indicate that inhabitants existed as nomadic hunters and gatherers, seeking large mammals. There is also evidence that their diet included native plant foods and a variety of small mammals, reptiles, birds, and fish (Gregory and Rognsvoog, 2004). During the Archaic period (10,000 to 2,800 B.P.), indigenous peoples diversified their use of stone spearpoints for fishing, harvesting, and grinding tools, and settled along rivers and streams. There is also the arrival of hammered copper artifacts dating from this period. More semi-permanent settlements occurred in the Menominee River Basin during the Woodland and Mississippian periods (2,800 to 350 B.P.), which exhibit evidence of horticultural and trade practices, as well as the use of pottery, with people still heavily relying upon hunting and gathering. Varying styles of burial mounds also serve as evidence of spiritual or religious practices existing during the Woodland period. During the later Mississippian period, there is indication of an established fur trade and economic system that carried into indigenous societies in existence during European contact.

European settlement in the area occurred in the early 17th century with the arrival of French explorer, Jean Nicolet. The first Euro-American settler was Louis Chappee, a French-Canadian, who established a fur-trading post at the mouth of the Menominee River from 1795 to 1824. Chappee was displaced by William Farnsworth and his wife, Marinette Chevalier, who was half Menominee. In 1832, Farnsworth left his wife to manage the trading post while he partnered with Charles Brush to construct a water-

powered sawmill on the Wisconsin side of the Menominee River. Ownership of the mill transferred numerous times with transportation challenges inhibiting the mill's financial success and was abandoned in 1845 when the dam washed out in 1845. At the time, the mill had been owned by Dr. J.C. Hall and Horace Jerome, who constructed a mill on the Michigan side of the river the same year. However, that mill was not profitable either and was not rebuilt after it burned down in 1856. While the earliest sawmills in the region were not profitable, they marked the birth of the lumber industry and the arrival of entrepreneurs from Chicago, Milwaukee, and New York in the 1850s. Between 1857 and 1867, four sawmills were built on the Wisconsin side of the Menominee River, and two on the Michigan side, and the companies that erected these facilities would dominate the lumber industry in Marinette and Menominee throughout the 19th century.

As timber resources vanished at the turn of the 19th century, Marinette and Menominee diversified into manufacturing textiles and agricultural products. Marinette had a flour mill, the Marinette Knitting Mills, and the Boreal Manufacturing Company. Menominee housed the Menominee River Sugar Company, the third largest sugar beet factory in the United States. The paper industry, however, became the backbone of the local economy and remains such today. The Marinette and Menominee Paper Company constructed the first paper mill on the Menominee River.

The Marinette and Menominee Paper Company leased the wooden dam just north of the present Menominee dam from the Menominee River Boom Company and constructed a water-powered pulp mill on the site of the present Mill No. 2, which began operating in 1881. Then the company erected a two-story, gabled, frame paper mill in Marinette, across the river from the Menominee mill, which became known as Mill No. 1. The Marinette and Menominee Paper Company was led by several local businessmen, namely president Augustus Spies, from 1895 to 1911, who became influential in the social and economic development of Menominee, serving as mayor and on the school board, and establishing the Spies Public Library in Menominee. Under Spies' direction, the Marinette and Menominee Paper Company plants expanded, and in 1891, the company established the Park Mills plant at its current site, along with adding free-standing brick buildings and an office building to the Mill No. 1 and 2 sites. Pulp continued to be conveyed form Mill No 2 to Mill No 1 through at least 1910, with the company producing newsprint and manila paper, adding fiber to the product line circa 1906.

A fire destroyed most of Mill No. 2 in 1905, and a new pulp and paper mill, Mill No. 2 in Menominee and Mill No. 1 and Park Mills on the Marinette side of the Menominee River, replaced the old in 1906. Little changed with the mills until they were sold in 1919 to the Continental Paper and Bag Company, and an additional paper mill was erected at the mouth of the Menominee River in 1920. The enterprise was then renamed the Hoskin-Morainville Paper Company, currently known as the Menominee Paper Company. Since the 1919 sale, the factory has experienced a number of modifications and additions, as well as modifications in name and purpose with multiple

transfers of ownership over the years. The Park Mill and Menominee dams were converted to produce hydroelectric power in 1917, and the Continental Paper and Bag Company sold the business to the Scott Paper Company in 1941, when it started producing toilet and facial tissues, in addition to its existing pulpwood production.

In 1977, the Park Mills paper complex was modified to accommodate additional hydroelectric generators, and in 1995, the Scott Paper Company sold Mill No. 2 and the Menominee dam to NEW Hydro, Inc., and the Kimberly-Clark Corporation bought the Park Mill complex and the Park Mill dam. Mill No. 2 and the Menominee dam have experienced little change since 1977.

Archaeological and Historic Resources

In association with relicensing efforts, a cultural resources study and a Phase I archaeological survey of the project's shoreline was conducted. The cultural resources study, developed in consultation with the Michigan and Wisconsin SHPOs, identified archaeological sites within the APE and assessed the complete Park Mill facility for National Register-eligibility.

The Phase I archaeological survey surveyed for archaeological resources within a 3.1-meter-wide corridor, extending from the edge of the bank and inward toward the Menominee River, and consisted of a shovel test survey of the shoreline of the entire project. Table 6 provides the conclusions and recommendation of the examined sites. NEW Hydro concluded that there was no erosion at any of the sites, and proposed that as a stipulation of an HPMP, each site would be examined during periodic shoreline monitoring. The Wisconsin and Michigan SHPOs concurred with the conclusions and recommendations in letters dated November 5, 2014 and December 16, 2014, respectively.[55]

Table 6. Conclusions and determinations on archaeological sites in the APE (Source: NEW Hydro, 2014, as modified by staff).

Site Name	Site Number	State	Erosion Level	Recommendation
Moose Acres Campground Site	47MT312	WI	No erosion	No evaluation necessary, but site should be examined during periodic shoreline monitoring as specified in the HPMP.

[55] These letters were filed into the Commission's record on June 14, 2016.

Blueberry Island Site	47MT311	WI	No erosion	No evaluation necessary, but site should be examined during periodic shoreline monitoring as defined in the HPMP
Nerat Island	20ME135	MI	No erosion	No evaluation necessary, but site should be examined during periodic shoreline monitoring as specified in the HPMP
Kimberly Clark Cluster	20ME1	MI	No erosion	The site is already listed on the National Register and is not necessary to evaluate.
Park Mill East Cluster	20ME138, 20MR139, 20ME40	MI	No erosion	No evaluation necessary, but site should be examined during periodic shoreline monitoring as specified in the HPMP

NEW Hydro determined the Park Mills Plant and Dam to be ineligible for listing on the National Register on the registration form for the National Register. However, NEW Hydro determined the Mill No. 2 and the Menominee dam to be eligible for listing on the National Register under *Criterion A: Industry*. In response, the Wisconsin SHPO concluded that the Park Mills Plant and Dam was ineligible for listing on the National Register. The Michigan SHPO concluded that the Mill No. 2 and Menominee Dam Paper Mill Complex were eligible for listing on the National Register under *Criterion A: Industry*.

3.3.5.2 Environmental Effects

Continued operation and maintenance of the project may affect unknown historic properties within the APE. Future maintenance of the Menominee and Park Mill Project may adversely affect the historic Mill No. 2 and the Menominee Dam. The executed statewide PA for Wisconsin and adjacent portions of Michigan requires that every proposed hydroelectric project in Wisconsin develop an HPMP to avoid, lessen, or mitigate for any adverse effects on both identified and unidentified historic properties within the APE. To address any potential adverse effects on both identified and unidentified historic properties, NEW Hydro proposes to implement the statewide PA and develop an HPMP.[56] As part of its HPMP, NEW Hydro proposes to develop an erosion control plan to monitor the shoreline at four of the archaeological sites to ensure that the banks remain stable.

Our Analysis

Continued operation of the Menominee and Park Mill Project would ensure that the historic facilities at the Mill No. 2 and Menominee Dam would be used as they were originally designed and built for, and would, therefore, be beneficial. However, operating the project under the protection afforded by section 106 does not ensure that there would be no adverse effects. Adverse effects may occur to historic project features due to repairs and modifications that, while necessary for the continued safe and efficient operation, are not in keeping with the project's historic character. Further, future maintenance may adversely affect the Mill No. 2 and Menominee Dam, or emergency situations could potentially affect the Mill No. 2 and Menominee Dam at the Menominee and Park Mill Project. The proposed HPMP would contain procedures to avoid, less, or mitigate for any adverse effects.

As discussed in section 3.3.1.2, *Geological and Soil Resources*, the HPMP would contain a provision for monitoring known archaeological sites during periodic shoreline surveys every 5 years. Conducting periodic shoreline surveys would identify any project-related erosion, and the HPMP would contain protocols to avoid, less, or mitigate for any adverse effects.

There may be unknown archaeological resources that could be adversely affected by future operation and maintenance of the project. To ensure that any unanticipated discoveries are adequately addressed, the proposed HPMP, contains procedures and requirements for: (1) the treatment of unanticipated archaeological resource discoveries, historic properties, traditional cultural properties, or human remains; and (2) future reviews and revisions of the HPMP. The HPMP would to protect historic properties

[56] Pursuant to section II.B., *Historic Resources Management Plan*, of the executed PA, if the Wisconsin SHPO agrees with the HPMPs, then NEW Hydro would implement the HPMP, if a license is issued for the project.

resources in the APE, as well as any cultural resources inadvertently discovered during the term of any license, if issued for the project.

3.4 NO-ACTION ALTERNATIVE

Under the no action alternative, the Menominee and Park Mill Project would continue to operate in its current manner. There would be no changes to the physical, biological, or cultural resources of the area.

4.0 DEVELOPMENTAL ANALYSIS

In this section, we look at the project's use of the Menominee River for hydropower purposes to see what effects various environmental measures would have on the project's costs and power generation. Under the Commission's approach to evaluating the economics of hydropower projects, as articulated in *Mead Corp.*,[57] the Commission compares the current project cost to an estimate of the cost of obtaining the same amount of energy and capacity using a likely alternative source of power for the region (cost of alternative power). In keeping with Commission policy as described in *Mead Corp.*, our economic analysis is based on current electric power cost conditions and does not consider future escalation of fuel prices in valuing the hydropower project's power benefits.

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

4.1 POWER AND ECONOMIC BENEFITS OF THE PROJECT

Table 7 summarizes the assumptions and economic information we use in our analysis. NEW Hydro provided this information in its license application and subsequent submittals. We find that the values provided by NEW Hydro are reasonable for the purposes of our analysis. Cost items common to all alternatives include: (1) taxes and insurance costs; (2) estimated future capital investment required to maintain and extend the life of plant equipment and facilities; (3) licensing costs; and (4) normal operation and maintenance cost. All dollars in table 7 are year 2017. Values provided by NEW Hydro

[57] *See Mead Corporation, Publishing Paper Division*, 72 FERC ¶ 61,027 (July 13, 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.

in its license application and subsequent submittals were indexed to 2017 dollars using rates obtained from http://www.usbr.gov/tsc/techreferences/mands/cct.html.

Table 7. Parameters used for the economic analysis of the Menominee and Park Mill Project (Source: NEW Hydro, 2013, as modified by staff).

Economic Parameter	Value	Source
Installed capacity	4.348 MW[a]	Applicant
Average annual generation	28,000 MWh	Applicant
Annual O&M cost	$351,900[b]	Applicant
Cost to prepare license application	$509,100[c]	Applicant
Net investment	$3,068,100[d]	Applicant
Period of economic analysis	30 years	Staff
Term of financing	20 years	Staff
Cost of capital (Long-term interest rate)	5.50 percent[e]	Applicant
Short-term interest rate (during construction)	5.50 percent	Applicant
Insurance rate	0.25 percent	Staff
Energy rate	$31.45/MWh[f]	Staff
Capacity rate	$192.00 kilowatt-year[f]	Staff

a Installed capacity is computed as the lesser of the ratings of the generator or turbine units.

b Value was provided by NEW Hydro in the application in $2011. Cost was indexed to $2017.

c Value was provided by NEW Hydro in the application in $2015. Cost was indexed to $2017.

d Value was provided by NEW Hydro in the application in $2012. Cost was indexed to $2017.

e Staff assumed NEW Hydro's long-term interest rate was the same as their short-term interest rate.

f Source: Energy Information Administration using rates obtained from Annual Energy Outlook 2017 at http://www.eia.gov/outlooks/aeo/index.cfm.

4.2 COMPARISON OF ALTERNATIVES

Table 8 summarizes the installed capacity, annual generation, cost of alternative power, estimated total project cost, and difference between the cost of alternative power and total project cost for each of the alternatives considered in this EA: the no-action alternative, NEW Hydro's proposal, and the staff alternative.

Table 8. Summary of the annual cost of alternative power and annual cost for alternatives for the Menominee and Park Mill Project (Source: Staff).

	No-Action Alternative	NEW Hydro's Proposal	Staff Alternative
Installed capacity	4.348 MW	4.348 MW	4.348 MW
Annual generation	28,000 MWh	28,000 MWh	28,000 MWh
Annual cost of alternative power	$1,715,280 $61.26/MWh	$1,715,280 $61.26/MWh	$1,715,280 $61.26/MWh
Annual project cost	$1,060,360 $37.87/MWh	$1,108,520 $39.59/MWh	$1,085,560 $38.77/MWh
Difference between cost of alternative power and project power	$654,920 $23.39/MWh	$606,760 $21.67/MWh	$629,720 $22.49/MWh

4.2.1 No-Action Alternative

Under the no-action alternative, NEW Hydro would operate the Menominee and Park Mill Project as it does now. With an installed capacity of 4.348 MW, the project generates an average of 28,000 MWh of electricity annually. The average annual cost of alternative power would be about $1,715,280 or $61.26/MWh. The average annual cost of producing this power, including depreciation, operation and maintenance costs, and taxes would be about $1,060,360 or $37.87/MWh. Overall, the project would produce power at a cost that is $654,920 or $23.39/MWh, less than the cost of alternative power. There are no other costs associated with this alternative, other than NEW Hydro's cost for preparing its license application ($509,100).

4.2.2 NEW Hydro's Proposal

Under NEW Hydro's proposal, the project would continue to operate in its current mode with an installed capacity of 4.348 MW, and generate an average of 28,000 MWh of electricity annually. The average annual cost of alternative power would be $1,715,280 or $61.26/MWh. The average annual project cost would be $1,108,520 or $39.59/MWh. Overall, the project would produce power at a cost which is $606,760, or $21.67/MWh, less than the cost of alternative power.

4.2.3 Staff Alternative

Under the staff alternative, the project would continue to operate in its current mode with an installed capacity of 4.348 MW, and generate an average of 28,000 MWh of electricity annually. Table 9 shows the staff-recommended additions and modifications to NEW Hydro's proposed environmental protection, mitigation and enhancement measures and the estimated costs of each.

Based on an installed capacity of 4.348 MW and an average annual generation of 28,000 MWh, the cost of alternative power would be $1,715,280 or $61.26/MWh. The average annual project cost would be $1,085,560 or $38.77/MWh. Overall, the project would produce power at a cost which is $629,720, or $22.49/MWh, less than the cost of alternative power.

4.3 COST OF ENVIRONMENTAL MEASURES

Table 9 gives the cost of each of the environmental enhancement measures considered in our analysis. All dollars in table 9 are year 2017. 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.

Table 9. Cost of environmental mitigation and enhancement measures considered in assessing the environmental effects of the Menominee and Park Mill Project (Source: Staff).

Enhancement / Mitigation Measure	Entity	Capital Cost	Annual Cost	Levelized Annual Cost	Notes
Aquatic Resources					
1. Operate the project in a run-of-river mode	NEW Hydro, Michigan DNR, Wisconsin DNR, Michigan DEQ, Michigan HRC, Interior, Staff	$0	$0	$0	a
2. Develop and implement a drought operation plan	NEW Hydro	$1,000	$947 ($3,000 every 3 years)	$690	b
3. Continue to remove woody debris and trash according to current practices	NEW Hydro, Staff	$0	$10,000	$6,600	
4. Develop and implement a woody debris plan	Wisconsin DNR	$10,000	$10,000	$7,260	c
5. Develop and implement a water quality monitoring plan	NEW Hydro, Michigan DNR, Wisconsin DNR, Michigan DEQ, Michigan HRC	$10,000	$1,000	$1,320	

Enhancement / Mitigation Measure	Entity	Capital Cost	Annual Cost	Levelized Annual Cost	Notes
6. Establish annual meetings to review license conditions and management plans	Wisconsin DNR	$0	$0	$0	a
7. Develop a reservoir drawdown plan	NEW Hydro, Wisconsin DNR	$1,000	$0	$70	a
8. Consult with agencies on maintenance or repair requiring a reservoir drawdown, including emergency drawdowns	Michigan DNR, Michigan DEQ, Michigan HRC	$0	$0	$0	a
9. Develop and implement a reservoir drawdown plan after consultation with the resource agencies and include: (1) drawdowns of the power canal for the Park Mill development as well as for the project reservoirs; and (2) a provision to notify resource agencies and the Commission of any emergency reservoir or intake canal drawdowns	Staff	$1,000	$0	$70	a
10. Implement fish passage operation settlement agreement dated July 11, 2013 (2013 Settlement Agreement)	NEW Hydro Michigan DNR, Michigan HRC, Interior	$0	$30,000	$19,800	

Enhancement / Mitigation Measure	Entity	Capital Cost	Annual Cost	Levelized Annual Cost	Notes
11. Implement a Fish Passage Operation Plan	NEW Hydro, Staff	$0	$4,000	$2,640	d
12. Cooperate with resource agencies to conduct studies to test efficacy of the angled bar rack and fish bypass	Michigan DNR, Michigan HRC	$0	$0	$0	a
13. Install a staff gage on the upstream wall of the dam for each development showing the operational limits of reservoir water levels	NEW Hydro, Michigan DNR, Wisconsin DNR, Michigan HRC, Interior, Staff	$3,000	$233 ($3,000 every 10 years)	$350	a, e
14. Maintain a target water surface elevation of 610.43 feet NGVD 29 ±0.3 foot 70 percent of the time and within ±0.5 feet 100 percent of the time for the Park Mill reservoir with headwater elevations not exceeding 610.83 feet NGVD 29 or falling below 609.83 feet NGVD 29; maintain a target water surface elevation of 593.53 NGVD 29 ±0.3 foot 70 percent of the time and within ±0.5 feet 100 percent of the time for the Menominee reservoir with headwater elevations not exceeding 594.03 feet NGVD 29 or	Michigan DNR	$0	$0	$0	a

Enhancement / Mitigation Measure	Entity	Capital Cost	Annual Cost	Levelized Annual Cost	Notes
falling below 593.03 feet NGVD 29; without consultation with Michigan DNR, Wisconsin DNR, Michigan DEQ, and FWS					
15. Develop an operation and facility management plan	Wisconsin DNR	$1,500	$0	$100	a
16. Develop and implement an operation compliance monitoring plan	NEW Hydro	$5,000	$500	$660	
17. Develop and implement an operation compliance monitoring plan, including flows through the fish passage facilities and automatic water level recorders in both reservoirs and in the tailraces at both developments	Michigan DNR, Michigan HRC, Interior	$9,000	$1,100	$1,320	a
18. Develop and implement an operation compliance monitoring plan including automatic water level recorders in both reservoirs and excluding an automatic level recorder in the tailwater of each development and including measures to ensure adequate flows through the fish passage facilities	Staff	$7,000	$800	$990	a

Enhancement / Mitigation Measure	Entity	Capital Cost	Annual Cost	Levelized Annual Cost	Notes
Terrestrial Resources					
19. Develop and implement an invasive species monitoring and control plan in consultation with resource agencies	NEW Hydro, Michigan DNR, Wisconsin DNR, Michigan DEQ, Michigan HRC	$8,000	$1,500	$1,520	
20. Modify the proposed invasive species monitoring plan to include: (1) a description of the proposed monitoring methods; (2) the proposed frequency of monitoring; (3) the proposed criteria to be used to determine when control measures will be implemented; and (4) a schedule for filing monitoring reports.	Staff	$8,000	$1,500	$1,520	
21. Implement bald eagle protection measures	NEW Hydro, Staff	$0	$0	$0	a

Enhancement / Mitigation Measure	Entity	Capital Cost	Annual Cost	Levelized Annual Cost	Notes
Threatened and Endangered Species					
22. Implement a northern long-eared bat protection measure	Staff	$0	$0	$0	a
Recreation and Land Use					
23. Implement the proposed Recreation Plan, which includes measures to: (1) continue operating and maintaining the NEW Hydro Fisherman's Park and tailrace fishing site, 11th Avenue boat launch, Park Mill canoe portage, and Menominee canoe portage; (2) maintain the 18th Avenue boat launch; Mason Park; and Cox Landing and the Menominee dam tailrace fishing site; (3) install "carry-in / carry-out" signs and provide garbage bags at the 18th Avenue and 11th Avenue boat launches, Cox Landing, and Mason Park; (4) at the 11th Avenue boat launch (a) re-set the concrete launch ramps, (b) install a new boat dock to replace the existing boat dock, (c) install and anchor one picnic	NEW Hydro, Michigan DNR, Wisconsin DNR, Michigan HRC	$35,300	$15,800	$12,770	

Enhancement / Mitigation Measure	Entity	Capital Cost	Annual Cost	Levelized Annual Cost	Notes
table, and (d) install one seasonal portable toilet, and (e) relocate the invasive species sign; (5) install a handrail for public safety on the platform below the steps at the Menominee dam tailrace fishing site; (6) at the 18th Avenue boat launch (a) straighten and maintain the boat dock, (b) install and anchor one picnic table, and (c) install one seasonal portable toilet at the 18th Avenue boat launch; (7) at Mason Park install and anchor two picnic tables and install one seasonal portable toilet with a hardened trail at Mason Park; (8) install interpretive signage about the history of the project to the sign board at the Fisherman's Park and tailrace fishing site; (9) install interpretive signage at all of the recreation facilities within the project boundary, with the exception of the canoe portages; and (10) develop and distribute the recreation brochure					

Enhancement / Mitigation Measure	Entity	Capital Cost	Annual Cost	Levelized Annual Cost	Notes
24. Modify the proposed Recreation Plan to remove the provision to develop and distribute a recreation brochure to the public, presumably at the project's recreation sites, and include: (1) conceptual drawings for the boat dock, handrail, and interpretive signage; and (2) a provision to review the Recreation Plan every other FERC Form-80 cycle to determine if facility improvements or modifications are necessary.	Staff	$28,300	$14,300	$11,320	
Cultural Resources					
25. Implement an HPMP	NEW Hydro, Staff	$6,400	$1,000	$1,090	f
26. Execute the statewide Wisconsin PA	NEW Hydro, Staff	$0	$800	$530	

a Cost was estimated by staff.

b Staff assumed that the plan would need to be implemented, on the average, once every 3 years.

c Staff estimated capital and annual costs based on woody debris and trash removal costs provided by NEW Hydro.

d Includes installation of cameras and water temperature sensors at the project fish passage facilities.

e Staff assumed that the staff gages would need to be replaced every 10 years, which would occur in years 10, 20, and 30.

f The HPMP includes NEW Hydro's proposal to develop an erosion control plan to monitor the shoreline at four archaeological sites.

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 COMPREHENSIVE DEVELOPMENT AND RECOMMENDED ALTERNATIVE

Sections 4(e) and 10(a) of the FPA require the Commission to give equal consideration to all uses of the waterway on which a project is located. When we review a hydropower project, we consider water quality, fish and wildlife, recreation, cultural, and other non-developmental values of the involved waterway equally with its electric energy and other developmental values. In deciding whether, and under what conditions, a hydropower project should be licensed, the Commission must determine that the project would be best adapted to a comprehensive plan for improving or developing the waterway. We weigh the costs and benefits of our recommended alternative against other proposed measures. This section contains the basis for, and a summary of, our recommendations for relicensing the Menominee and Park Mill Project.

Based on our independent review and 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 Menominee and Park Mill Project. We recommend this alternative because: (1) issuing a new license would allow NEW Hydro to continue operating the project as a beneficial and dependable source of electrical energy; (2) the 4.348 MW of electric capacity comes from a renewable resource that does not contribute to atmospheric pollution; and (3) the recommended environmental measures would protect and enhance environmental resources affected by the proposed project.

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

5.1.1 Measures Proposed by NEW Hydro

Based on our environmental analysis of NEW Hydro's proposal, as discussed in section 3, *Environmental Analysis*, and the costs present in section 4, *Developmental Analysis*, we conclude that the following environmental measures proposed by NEW Hydro would protect and enhance environmental resources and would be worth the cost. Therefore, we recommend the following proposed measures:

- operate the project in a run-of-river mode, maintaining the Park Mill development reservoir water surface elevation at 610.43 feet NGVD 29 ±0.3 foot and

maintaining the Menominee development reservoir water surface elevation at 593.53 feet NGVD 29 ±0.3 foot;

- implement an annual Fish Passage Operation Plan to guide operation and maintenance of the fish passage facilities at the project;
- continue to remove woody debris and trash collected from trashracks at the Park Mill and Menominee developments;
- develop a reservoir drawdown plan to protect fishery resources in the Park Mill and Menominee developments' reservoirs during drawdowns;
- develop an operation compliance monitoring plan to ensure that run-of-river project operation is met;
- install a staff gage at the reservoir side of the dam for each development to provide public awareness of reservoir elevations;
- develop an invasive species monitoring plan to manage Eurasian water-milfoil and other invasive aquatic species located in the Menominee and Park Mill reservoirs;
- implement bald eagle protection measures to minimize adverse effects to nesting bald eagles in the project boundary that may result from project maintenance;
- implement the Recreation Plan, excluding the proposed recreation brochure, and including measures to: (1) maintain the recreation facilities owned by NEW Hydro; (2) maintain the 18th Avenue boat launch, Mason Park, Cox Landing, and the Menominee dam tailrace fishing site; (3) provide garbage bags at the boat launches; (4) at the 11th Avenue boat launch, improve the existing boat ramp and install a new boat dock and a seasonal portable toilet; (5) at the 18th Avenue boat launch, improve the boat dock and install a picnic table and a seasonal portable toilet; (6) install picnic tables and a seasonal portable toilet at Mason Park; (7) install signage about the history of the Fisherman's Park and tailrace fishing site; and (8) install interpretive signage at the recreation facilities; and
- implement the statewide PA for Wisconsin and adjacent portions of Michigan, executed in 1993, and an HPMP to protect cultural resources.[58]

5.1.2 Additional Measures Recommended by Staff

In addition to NEW Hydro's proposed measures noted above, we recommend including the following measures in any license issued for NEW Hydro.

- Modify the proposed reservoir drawdown plan to include: (1) protocols for drawdowns of the project reservoirs and for the power canal for the Park Mill development, such as identification of drawdown(s) purpose, the drawdown

[58] The HPMP would include NEW Hydro's proposal to develop an erosion control plan to monitor the shoreline at four archaeological sites.

frequency and duration, and any measures to minimize effects on fish migration and spawning; (2) measures to protect aquatic and wildlife resources from the effects of drawdowns, such as monitoring for stranded fish and removal, salvage, and disposition of fish; and (3) a provision to notify resource agencies and the Commission of any emergency reservoir or power canal drawdowns.

- Modify the proposed operation compliance monitoring plan to include measures to verify run-of-river operation by using automatic level recorders in both reservoirs and to verify flows needed to operate the fish passage facilities.
- Modify the proposed invasive species monitoring plan to include: (1) a description of the proposed monitoring methods for Eurasian water-milfoil and other invasive aquatic plants within the project boundary; (2) the proposed frequency of monitoring; and (3) the proposed criteria to be used to determine when control measures would be implemented.
- Avoid cutting trees between April 1 and October 31 to protect roosting northern long-eared bats.
- Modify the proposed Recreation Plan to remove the provision to develop and distribute a recreation brochure to the public, and include: (1) conceptual drawings for the proposed boat dock, handrail, and interpretive signage; and (2) a provision to review the Recreation Plan every other FERC Form-80 cycle to determine if facility improvements or modifications are necessary.

Below, we discuss the rationale for modifying NEW Hydro's proposal and the basis for our additional staff-recommended measures.

5.1.2.1 Operation Compliance Monitoring

As discussed in section 3.3.2.2, *Aquatic Resources*, NEW Hydro proposes to develop an operation compliance monitoring plan to monitor and verify its proposed run-of-river mode of operation for the project. Under NEW Hydro's proposal, run-of-river operation would be assessed using reservoir elevation and turbine operation data, along with staff gages that would be installed in the reservoir at each of its project developments.

Installation and operation of automatic water level recorders in the reservoirs of both developments would provide continuous documentation that the project is operating within the headwater elevations, as provided in table 4 and table 5, and complying with run-of-river requirements. However, the recommendation of Interior and Michigan DNR to install and operate automatic water level recorders downstream of each dam is not necessary to ensure the project's run-of-river compliance, which would be documented using turbine operation records and hourly stage records of the water surface elevations in both project reservoirs.

Interior and Michigan DNR recommend measuring and recording the flow releases from the powerhouse and spillways at each development along with the flow into

and out of the development's fish passage facility to demonstrate run-of-river compliance. However, the recommendation is not necessary because turbine operation records would provide direct evidence that the project is not peaking. Hourly stage records of the water surface elevations in both project reservoirs would indicate if project operation is maintaining the target reservoir water surface elevation, which would adequately demonstrate run-of-river compliance.

Preparing an operation compliance monitoring plan would be beneficial because it would provide NEW Hydro with the procedures that it would use to demonstrate compliance requirements for its minimum flows for the fish passage facilities and for project operational restrictions. We conclude that modification of the operation compliance monitoring plan to include only the reservoir automatic water level recorders would result in an annualized cost of $990 versus an annualized cost of $1,320 for installing automatic water level recorders in the reservoirs and at the tailraces of both developments. Our modification of the operation compliance monitoring plan to include installation and operation of the automatic water level recorders in the project reservoirs would verify that the project is operating in a run-of-river mode, which is beneficial to fish and wildlife resources in the Menominee River.

5.1.2.2 Staff Gages

As discussed in section 3.3.2.2, *Aquatic Resources*, NEW Hydro proposes to install staff gages at each development's dam. The installation of staff gages would clearly show the water levels in the reservoirs and the lower limits of the headwater variation plan. The staff gages would also be visible to the public and would increase public awareness of reservoir elevations and project operation. The annual cost of $350 would be worth the cost in showing the public that the project is being operated in compliance with its license.

5.1.2.3 Fish Passage Operation Plan

As discussed in section 3.3.2, *Aquatic Resources*, a Fish Passage Operation Plan sets operational protocols for fish passage facilities at the project each year with annual adjustments to the plan. After a year of operating the fish passage facilities, the NEW Hydro has a better understanding of the existing monitoring devices that are needed to indicate if the fish passage facilities are operating successfully in passing lake sturgeon past the project, and therefore proposes to replace the former cameras and temperature sensors as follows: (1) three cameras would be installed at the entry to the Park Mill fish bypass facility; (2) three cameras would be installed at the entry to the fish bypass facility at the Menominee development; and (3) two cameras would be added to the two existing cameras currently installed at the entry to the fish lift. There would be one temperature sensor located at the intake to the attraction flow release site near the fish lift. The cameras and temperature sensor are important components to determine whether the fish passage facilities are working properly and in gathering additional information about lake

sturgeon use of the facilities, and informing the best timeframes to operate the fish passage facilities in the future. PIT tag antennas and cameras at the downstream fish passage facilities would be maintained to ensure that a live feed is available to report fish passing the two downstream fish passage facilities.

The information collected from these devices, including temperature sensors, cameras, and antennas, would also help inform the annual development of the Fish Passage Operation Plan; therefore, we recommend New Hydro install and maintain the equipment as part of the Fish Passage Operation Plan. The Fish Passage Operation Plan provides the guidance needed to operate the fish passage facilities. The levelized annual cost of $2,640 to implement the Fish Passage Operation Plan would be worth the cost to ensure the fish passage facilities are maintained and operating successfully and improve the conditions for populations of lake sturgeon using the Menominee River.

5.1.2.4 Reservoir and Power Canal Drawdown Plan

As discussed in section 3.3.2.2, *Aquatic Resources*, NEW Hydro proposes to develop a reservoir drawdown plan for the project prior to conducting any maintenance work or repair that would involve drawdown of the reservoirs, including developing procedures for consulting with state agencies in advance of reservoir drawdowns. However, the drawdown plan does not include the power canal for the Park Mill development, which is subject to more frequent drawdowns than are the two project reservoirs. Including the power canal in the plan would help reduce the amount of fish that may become stranded in shallow areas of the canal. Therefore, we recommend that the plan be modified to include Park Mill intake power canal. We conclude that the reservoir drawdown plan with our measures would be worth the levelized annual cost of $70 to protect fish, aquatic biota, and wildlife resources in project-affected waters of the Menominee River.

5.1.2.5 Invasive Species Monitoring Plan

As discussed in section 3.3.3, *Terrestrial Resources*, there are at least six aquatic invasive plant species in the project reservoirs, with Eurasian water-milfoil being the most abundant. Invasive plants can displace native plant species, adversely affect water quality and interfere with access to recreation facilities.

NEW Hydro proposes to develop an invasive species monitoring plan but has not provided any specifics on the proposed plan's specific measures. Therefore, we recommend that the monitoring plan be modified to include the following measures: (1) a description of the proposed monitoring methods; (2) the proposed frequency of monitoring; (3) the proposed criteria to be used to determine when control measures would be implemented; and (4) a schedule for filing monitoring reports. The development and implementation of a plan with these measures would be worth the levelized annual cost of $1,520.

5.1.2.6 Northern Long-Eared Bat Protection Measure

As discussed in section 3.3.4, *Threatened and Endangered Species*, NEW Hydro's proposal to maintain the canoe portage at the Park Mill dam may require scheduled removal of vegetation, including trees. Trees provide roosting habitat for the northern long-eared bat, and their removal in the summer months may disturb northern long-eared bats and their pups during a sensitive period of their life cycle. Implementing a seasonal clearing restriction in the vicinity of the canoe portage for trees greater than 3 inches in width at breast height, between April 1 and October 31, would avoid the time period when northern long-eared bats may be occupying nearby roosting trees. Implementing this measure would remove the potential for northern long-eared bats to be directly affected by tree cutting in the project area, and would come at no additional cost to NEW Hydro.

5.1.2.7 Recreation Plan

As discussed in section 3.3.4, *Recreation and Land Use*, NEW Hydro's proposed Recreation Plan would enhance recreation facilities and opportunities at the project. Implementing the proposed Recreation Plan for the project would provide a framework and schedule by which NEW Hydro would implement the proposed recreation enhancements. However, the plan does not contain conceptual drawings for the proposed dock and handrail proposed at the 11th Avenue boat launch, or the proposed interpretive signage. Modifying the Recreation Plan to include a provision for conceptual drawings of the proposed dock, handrail, and interpretive signage, after consultation Wisconsin DNR, Michigan DNR, Michigan DEQ, Park Service, River Alliance, Michigan HRC, would help ensure that the facilities would be suitably constructed and maintained.

Also, even though the recreation facilities have a low to moderate capacity, there has been a 300 percent increase of use since 2008. Recreation needs may change with an increase in use. Consulting with Wisconsin DNR, Michigan DNR, Michigan DEQ, Park Service, River Alliance, Michigan HRC prior to filing the FERC Form-80 every 6 years and reviewing the Recreation Plan after consultation with the agencies every other FERC Form-80 cycle, starting with the second cycle following any new license, if issued for the project, would help NEW Hydro determine if facility improvements or modifications to the Recreation Plan are necessary.

NEW Hydro proposes to implement a recreation brochure; however, a recreation brochure would be redundant with the proposed interpretive signage, and would not provide any other necessary information to recreationists. Further, there is a problem with litter at the recreation facilities, and the recreation brochure may become another item inappropriately discarded. For these reasons, we recommend that NEW Hydro's proposal to implement a recreation brochure not be included in the Recreation Plan. Instead of developing a recreation brochure, NEW Hydro should develop the interpretive signs, after consultation with Park Service, Wisconsin DNR, Michigan DNR, River Alliance, Michigan HRC, to ensure the appropriate interpretive message, along with

information on the project and its recreation sites, would be included to facilitate the public's understanding of regional history, the project, and applicable fishing laws.

Modifying the proposed Recreation Plan with staff's recommendations would help to ensure that any facilities and amenities are suitably constructed and maintained, and would be worth the levelized annual cost of $11,320.

5.1.2.8 Cultural Resources

The Mill No. 2 and Menominee Dam Paper Mill Complex are eligible for listing on the National Register under *Criterion A: Industry*. Adverse effects may occur to historic project features due to repairs and modifications that, while necessary for the continued safe and efficient operation, are not in keeping with the project's historic character. Also, future maintenance or emergency situations may adversely affect the Mill No. 2 and Menominee Dam.

To address any potential adverse effects on both identified and unidentified historic properties, NEW Hydro proposes to implement the statewide PA for Wisconsin and adjacent portions of Michigan, and develop an HPMP, as required by the statewide PA. Any effects on unknown historic properties for the project would be taken into account through the executed PA. Further, the PA and HPMP for the Menominee and Park Mill Project would ensure that NEW Hydro implements measures to avoid, lessen, or mitigate for any adverse effect to the Mill No. 2 and Menominee dam if future project maintenance requires the modification to the Mill No. 2 and Menominee Dam or emergency situations arise.

Also, as part of its HPMP, NEW Hydro proposes to develop an erosion control plan to monitor the shoreline at four archaeological sites to ensure that the banks remain stable. The known archaeological sites would be surveyed for every 5 years to identify any project-related erosion. The HPMP would contain protocols to avoid, less, or mitigate for any adverse effects if erosion would be detected. Implementing the proposed HPMP would be worth the levelized cost of $1,090.

5.1.3 Measures Not Recommended by Staff

5.1.3.1 Communication and Consultation

Wisconsin DNR recommends that NEW Hydro establish an annual meeting to review license conditions and management plans for the project. NEW Hydro proposes numerous plans for the project to be developed in consultation with state and federal fish and wildlife resource agencies, including plans to address invasive species, reservoir drawdown, fish passage operation, and operation compliance. However, the plans recommended under the staff alternative, if required in a new license, would be prepared after consultation with the resource agencies and would allow Wisconsin DNR to develop protocols for communication with NEW Hydro over the term of any new license, if issued for the project. Also, Wisconsin DNR is an active member in assisting NEW

Hydro in operating the fish passage facilities, which keeps it abreast of lake sturgeon passage at the project and the changes to the Fish Passage Operation Plan. Therefore, requiring an annual meeting between NEW Hydro and Wisconsin DNR to discuss license conditions and various management plans for the project would be redundant and unnecessary.

5.1.3.2 Water Quality Monitoring Plan

NEW Hydro proposes to develop a water quality monitoring plan, but has not specified what actions and water quality parameters would be addressed in its proposed water quality monitoring plan. NEW Hydro states that its water quality study results at the project generally are within Michigan's and Wisconsin's water quality standards. Wisconsin DNR, Michigan DNR, Michigan DEQ, and Michigan HRC recommend that a water quality monitoring plan be developed for the project. Wisconsin DNR and Michigan DNR do not recommend any parameters for a water quality monitoring plan, while Michigan DEQ and Michigan HRC recommend that temperature and DO be monitored.

As discussed in section 3.3.2.2, *Aquatic Resources*, data collected downstream of the Menominee dam show pH and water temperature consistent with values specified by Michigan's state water quality standards. Variances in DO levels appear to be caused by normal plant respiration, not by project operation, and lasted less than 1 hour (*see* figure 4 and figure 5).

In addition, the fish population within the reservoirs and upstream and downstream of the project is diverse, self-sustaining, and healthy, suggesting that there are no project-related water quality issues. Therefore, we do not recommend a water quality monitoring plan.

5.1.3.3 Drought Operation Plan

NEW Hydro has an existing drought operation protocol for the project, which includes a modification to project operation during times when drought conditions would occur. NEW Hydro states that when flows in the Menominee River would be less than 138 cfs at the Park Mill development, the minimum flow needed to operate a single turbine, it would cease project generation at the development and discharge river flows through a Tainter gate at the Park Mill dam. Similarly, when river flows reaching the Menominee development would be less than 350 cfs, the minimum flow needed to operate a single turbine, the project would cease generation and all flows would be passed downstream through a Tainter gate at the Menominee dam. NEW Hydro does not propose any changes to project operation during a drought; however, as discussed in section 3.3.2.2, *Aquatic Resources*, it proposes to develop a drought operation plan.

In the project's 65-year period of record, the minimum daily flow recorded was 732 cfs, which greatly exceeds the minimum flow required to operate the project. The project would not be a consumptive user of the water, and would not have the ability to

exacerbate any drought effects on aquatic resources due to its inability to store or divert water from the river. Therefore, NEW Hydro's proposed operational protocol during drought conditions appears to be reasonable and we do not recommend that it develop a drought operation plan.

5.1.3.4 Woody Debris and Trash Management Plan

NEW Hydro proposes to continue disposing of trash collected on its trashracks at its two developments, as it currently does. Specifically, NEW Hydro would dispose of man-made trash items collected on the trashracks at the Park Mill dam to an off-site landfill. All large woody debris, along with weeds and grass, would be cut up and hauled to an off-site location. At the Menominee development, all garbage and man-made items would be dispose of to an off-site landfill. Large woody debris would be cut up and hauled off-site, while weeds, grass, and small pieces of woody debris would be placed back in the river downstream of the Menominee dam. Wisconsin DNR recommends that NEW Hydro develop a woody debris plan to specify how it would pass woody debris downstream.

Based on existing fish resources in the Menominee reservoir, as discussed in section 3.3.2, *Aquatic Resources*, there appears to be sufficient aquatic habitat to support fish resources in the Menominee reservoir and downstream of Menominee dam; therefore, there would not be a benefit from adding large woody debris to downstream areas of the river or the impoundment. We conclude that a woody debris and trash management plan is not needed for the project and NEW Hydro's proposed handling and disposal of large woody debris and trash at the project would be adequate.

5.1.3.5 2012 Memorandum of Understanding

NEW Hydro and Interior recommend that the 2012 MOU[59] remain in effect under a new license issued for the project. As discussed in section 3.3.2.2, *Memorandum of Understanding of 2012*, we do not recommend that the MOU of 2012 because all the components of the MOU of 2012 have been addressed and implemented.

5.3.3.6 2013 Settlement Agreement

NEW Hydro and signatories to the settlement, with the exception of Wisconsin DNR, recommend that the conditions of the proposed 2013 Settlement Agreement be required in any new license issued for the project. As discussed in section 3.3.2.2, *Fish Passage Operation Settlement Agreement,* the proposed 2013 Settlement Agreement requires NEW Hydro and other signatories to: (1) fund a Fish Passage / Protection Fund to conduct operation and maintenance activities identified in the Fish Passage Protection Plan; (2) define the responsibilities of an Implementation Team; and (3) provide specific

[59] The signatories to the 2012 MOU were the same signatories to the 2013 Settlement Agreement.

guidance and responsibilities for personnel that would be operating and maintaining the fish passage facilities at the project. Interior also recommends that NEW Hydro fund the Fish Passage / Protection Fund on a quarterly basis.

Since the 2013 Settlement Agreement was developed and signed, the fish passage facilities at the project are operating.[60] Also, as discussed in section 3.3.2, *Aquatic Resources*, the Fish Passage Operation Plan, a component of the 2013 Settlement Agreement, identifies the responsibilities of the Implementation Team and provides guidance on how to operate and maintain the fish passage facilities. Thus, most of the 2013 Settlement Agreement has been implemented. The only remaining issue under the 2013 Settlement Agreement is the continued funding of the Fish Passage / Protection Fund.

The fish passage facilities are a project facility, and under any new license, if issued for the project, NEW Hydro would be fully responsible for ensuring the operation and maintenance of the facilities. Therefore, there is no need for the continued funding of the Fish Passage / Protection Fund, as identified in the 2013 Settlement Agreement and recommended by Interior. However, if NEW Hydro wants to provide funds for the Fish Passage / Protection Fund, it could do so under an off-license agreement.

5.2 UNAVOIDABLE ADVERSE EFFECTS

Impingement and entrainment, as a result of project operation, would continue to cause the loss of some fish at the project. However, any fish losses in the past have not adversely affected fish populations in project-affected waters, and fish populations are healthy and self-sustaining.

5.3 SUMMARY OF SECTION 10(j) RECOMMENDATIONS

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

Section 10(j) of the FPA states that whenever the Commission believes 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 will attempt to resolve any such inconsistency, giving due weight to the recommendations, expertise, and statutory responsibilities of the agency. In response to our Ready for Environmental Analysis notice, Interior filed eight recommendations for the project on August 7, 2015.

[60] NEW Hydro owns and operates the fish passage facilities.

Table 10 lists the recommendations filed subject to section 10(j), and indicates whether the recommendations are included under our alternative, as well as the basis for our preliminary determinations concerning measures that we consider inconsistent with section 10(j). Environmental recommendations that we consider outside the scope of section 10(j) have been considered under section 10(a) of the FPA and are addressed in the specific resource sections of this document.

Table 10. Analysis of fish and wildlife agency recommendations for the Menominee and Park Mill Project (Source: Staff).

Recommendation	**Agency**	**Within the Scope of Section 10(j)**	**Annualized Cost**	**Recommend Adopting?**
1. Implement the Fish Passage Operations Settlement Agreement (2013 Settlement Agreement) without the funding portion of the settlement agreement.	Interior	Yes	$19,800	Yes, regarding NEW Hydro's proposal to operate and maintain the fish passage facilities at the project as defined in the Fish Passage Operation Plan component of the settlement. No, for the remaining components of the 2013 Settlement Agreement that have already been implemented as a result of the construction and operation of the fish passage facilities at the project, because the measures are no longer necessary.
2. Implement the funding portion of the Fish Passage Operations Settlement Agreement (2013 Settlement Agreement).	Interior	No. Funding and personal staffing measures of the 2013 Settlement Agreement are not specific fish and wildlife measures.	$0 – costs are accounted for in item 1.	No. We do not recommend any funding for the Fish Passage / Protection Fund component of the 2013 Settlement Agreement. NEW Hydro would be responsible for operating and maintaining the fish passage facilities at the project at whatever costs are needed to accomplish the continued use, operation, and maintenance of the fish passage facilities.

3. Develop an operation compliance monitoring plan.	Interior	Yes	$660	Yes.
4. As a provision of the operation compliance monitoring plan, employ mechanisms to accurately document inflow to and discharge from the project and flows through the fish passage facilities.	Interior	Yes	$990	Yes. We interpret Interior's recommendation of flows "in and out" of the fish passage facilities as being the same as "through" the fish passage facilities.
5. As a provision of the operation compliance monitoring plan, install staff gages on the upstream wall of the dam at each project reservoir to show the reservoir operating band stipulated in the license.	Interior	Yes	$350	Yes.
6. As a provision of the operation compliance monitoring plan, install automatic water level recorders to record headwater and tailrace elevations on an hourly basis, and records of daily turbine operations, headwater and tailrace channel elevations, and flow releases in cubic feet per second through the powerhouse and spillway.	Interior	Yes	$1,320	No. We propose automatic level recorders in the reservoirs at both developments, but not in the tailwaters of both developments. The turbine operation records, in concert with the data collected from the installation of automatic level recorders in the reservoirs, would show the developments are operating in a run-of-river mode.
7. Operate the project in a run-of-river mode.	Interior	Yes	$0	Yes.

8. The operation compliance monitoring plan for the project should include an implementation schedule that is developed in consultation with FWS.	Interior	Yes	$0	Yes.

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 the federal or state comprehensive plans for improving, developing, or conserving a waterway or waterways affected by the project. We reviewed 13 comprehensive plans that are applicable to the project.[61] No inconsistencies were found.

[61] (1) Michigan Department of Environmental Quality. 2002. Non-indigenous aquatic nuisance species, State management plan: A strategy to confront their spread in Michigan. Lansing, Michigan; (2) Michigan Department of Natural Resources. 1994. Fisheries Division strategic plan. Lansing, Michigan. June 1994; (3) Michigan Department of Natural Resources. Statewide Comprehensive Outdoor Recreation Plan: 2008-2012. Lansing, Michigan; (4) National Park Service. The Nationwide Rivers Inventory. Department of the Interior, Washington, D.C. 1993; (5) U.S. Fish and Wildlife Service. Canadian Wildlife Service. 1986. North American waterfowl management plan. Department of the Interior. Environment Canada. May 1986; (6) U.S. Fish and Wildlife Service. 1993. Upper Mississippi River & Great Lakes region joint venture implementation plan: A component of the North American waterfowl management plan. March 1993; (7) U.S. Fish and Wildlife Service. n.d. Fisheries USA: the recreational fisheries policy of the U.S. Fish and Wildlife Service. Washington, D.C.; (8) Wisconsin Department of Natural Resources. Wisconsin Statewide Comprehensive Outdoor Recreation Plan: 1991-96. Madison, Wisconsin. October 1991; (9) Wisconsin Department of Natural Resources. Michigan Department of Natural Resources. 1992. Menominee River fisheries plan. Madison, Wisconsin. Lansing, Michigan. December 1992; (10) Michigan Department of Natural Resources. 1997. Lake Sturgeon rehabilitation strategy, Special Report 18, Lansing Michigan. August 1997; (11) Wisconsin Department of Natural Resources. 1996. Lower Menominee River remedial action plan. Madison, Wisconsin. February 1996; (12) Wisconsin Department of Natural Resources. Michigan Department of Natural Resources. 1992. Menominee River Fisheries Plan. Madison, Wisconsin. Lansing, Michigan. December 1992; and (13) Wisconsin Department of Natural Resources. 1995. Wisconsin's biodiversity as a management issue. Madison, Wisconsin. May 1995.

6.0 FINDING OF NO SIGNIFICANT IMPACT

Continuing to operate the Menominee and Park Mill Project, with our recommended measures, involves minimal land-disturbing or land-clearing activities. Our recommended measures would ensure the project would continue to operate while providing enhancements to fish and wildlife resources, improvements to recreation facilities, and protection of cultural and historic resources in the project area.

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

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