

**ENVIRONMENTAL ASSESSMENT  
FOR HYDROPOWER LICENSE**

Kimberly Hydroelectric Project

FERC Project No. 10674-017

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

Advisory Council	Advisory Council on Historic Preservation
APE	area of potential effect
certification	water quality certification
C.F.R.	Code of Federal Regulations
cfs	cubic feet per second
Commerce	U.S. Department of Commerce
Commission	Federal Energy Regulatory Commission
Corps	U.S. Army Corps of Engineers
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DO	dissolved oxygen
EA	environmental assessment
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission
°F	Fahrenheit
FPA	Federal Power Act
FWS	U.S. Fish and Wildlife Service
HPMP	Historic Properties Management Plan
IGLD85	International Great Lakes Datum 1985
Interior	U.S. Department of the Interior
IPaC	Information for Planning and Consultation
Kaukauna	Kaukauna Utilities
kV	kilovolts
mg/L	milligrams per liter
MISO	Midwest Independent System Operator, Inc.
MOA	Memorandum of Agreement
MW	megawatt
MWh	megawatt-hours
National Register	National Register of Historic Places
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
PA	Programmatic Agreement
PCB	Polychlorinated biphenyls
RM	river mile
SD1	Scoping Document 1
SD2	Scoping Document 2
USGS	U.S. Geological Survey
Wisconsin DNR	Wisconsin Department of Natural Resources
Wisconsin SHPO	Wisconsin Historical Society
U.S.C.	United States Code

## ENVIRONMENTAL ASSESSMENT

Federal Energy Regulatory Commission  
Office of Energy Projects  
Division of Hydropower Licensing  
Washington, DC

### KIMBERLY HYDROELECTRIC PROJECT FERC Project No. 10674-017– Wisconsin

#### 1.0 INTRODUCTION

##### 1.1 APPLICATION

On February 14, 2019, Kaukauna Utilities (Kaukauna) filed an application with the Federal Energy Regulatory Commission (Commission or FERC) for a new license to continue to operate and maintain the Kimberly Hydroelectric Project No. 10674 (Kimberly Project or project).<sup>1</sup> The 2.17-megawatt (MW) project is located at the U.S. Army Corps of Engineers' (Corps) Cedars Dam on the Lower Fox River in the Village of Kimberly, Outagamie County, Wisconsin (figure 1).

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

###### 1.2.1 Purpose of Action

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

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<sup>1</sup> The original license for the project was issued on September 27, 1991, with an effective date of October 1, 1971, and an expiration date of September 30, 2021. Pursuant to Commission policy, the license was backdated to 1971 because the project should have been licensed as far back as 1938 when the Commission determined that the reach of the Fox River where the project is located is a navigable waterway. *Midtec Paper Corporation, Wisconsin*, 56 FERC ¶ 62,226 (1991).

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 Kimberly Project would allow Kaukauna to continue to generate electricity at the project for the term of the new license, making electric power from a renewable resource available to the regional grid.

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

In this EA, we assess the environmental and economic effects of the following alternatives: (1) operating and maintaining the project as proposed by Kaukauna; and (2) operating and maintaining the project as proposed by Kaukauna, with staff-recommended modifications (staff alternative). We also consider the effects of the no-action alternative. Under the no-action alternative, the project would continue to operate as it has under the current license, and no new environmental protection, mitigation, or enhancement measures would be implemented.

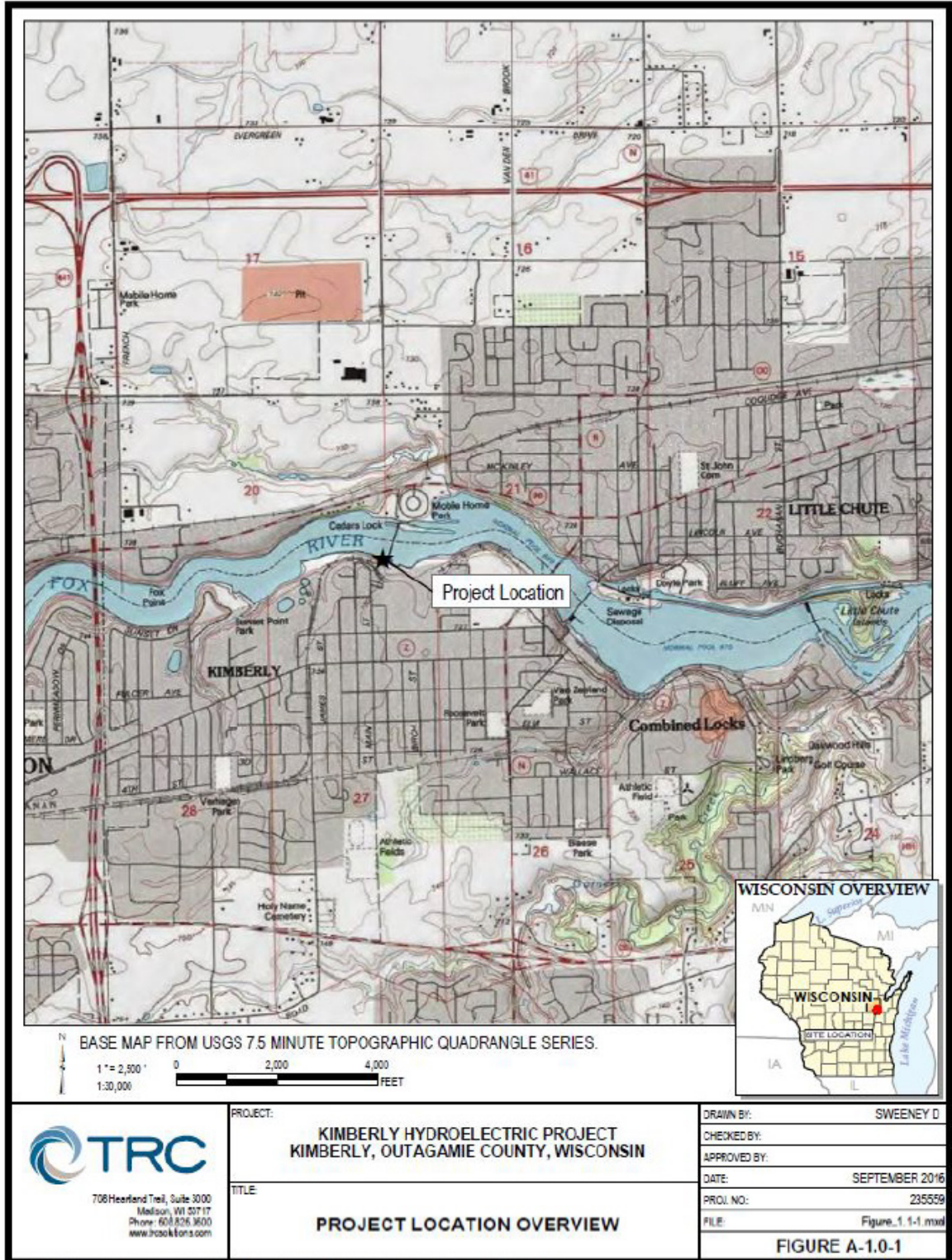


Figure 1. Location of the Kimberly Project on the Lower Fox River (Source: Kaukauna, 2019).

## **1.2.2 Need for Power**

The Kimberly Project has an installed capacity of 2.17 MW and an average annual generation of about 12,325 megawatt-hours (MWh). Project power is sold to Wisconsin Public Power, Inc., a local utility serving areas of Wisconsin, Upper Michigan, and Iowa.

To assess the need for the project's power, we looked at the North American Electric Reliability Corporation's (NERC) Midcontinent Independent System Operator (MISO) assessment area, the operating region in which the project is located. NERC annually forecasts electrical supply and demand nationally and regionally for a 10-year period. According to NERC's 2019 Long-Term Reliability Assessment forecast for the period 2020-2029, the annual peak demand for this region is projected to increase by 0.2 percent. The anticipated reserve margin<sup>2</sup> is forecasted to decrease from 22.49 percent in 2020 to 14.27 percent in 2029. The MISO assessment area is thus forecast to meet MISO's reserve margin of 16 percent through the year 2026, but fall below 16 percent beginning in 2027 and continuing through 2029.

Given that annual peak demand is projected to increase in the MISO region, we conclude that the Kimberly Project would help meet the need for power in the MISO assessment area. The project also provides power that displaces generation from non-renewable sources. Displacing the operation of non-renewable facilities may avoid some power plant emissions, thus continuing an environmental benefit.

## **1.3 STATUTORY AND REGULATORY REQUIREMENTS**

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

### **1.3.1 Federal Power Act**

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

Section 18 of the FPA states that the Commission is to require construction, operation, and maintenance by a licensee of such fishways as may be prescribed by the Secretaries of the U.S. Department of Commerce (Commerce) or the U.S. Department of the Interior (Interior). Neither Commerce nor Interior filed a preliminary fishway

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<sup>2</sup> Anticipated reserve margin is the unused electric generating capacity at the time of peak electrical demand. Expressed as a percentage, the anticipated reserve margin designates available generating capacity in excess of expected peak demand. MISO's target (reference) reserve margin is 16 percent.



prescription for the project or requested a reservation of authority to prescribe fishways for the project.

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

Under section 10(j) of the FPA, each hydroelectric license issued by the Commission must include conditions based on recommendations provided by federal and state fish and wildlife agencies for the protection, mitigation, or enhancement of fish and wildlife resources affected by the project. The Commission is required to include these conditions in any new license unless it determines that they are inconsistent with the purposes and requirements of the FPA or other applicable law. Before rejecting or modifying an agency recommendation, the Commission is required to attempt to resolve any such inconsistency with the agency, giving due weight to the recommendations, expertise, and statutory responsibilities of such agency. No recommendations were filed pursuant to section 10(j) of the FPA.

### **1.3.2 Clean Water Act**

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

On January 24, 2020, Kaukauna applied to the Wisconsin Department of Natural Resources (Wisconsin DNR) for a certification for the Kimberly Project. Wisconsin DNR received the request for certification on January 27, 2020. Wisconsin DNR has not yet acted on the application.

### **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 U.S. Fish and Wildlife Service's (FWS) Information for Planning and Consultation (IPaC) database on June 16, 2020, indicated that the federally listed northern long-eared bat could occur in Outagamie County. No critical habitat has been designated for the northern long-eared bat.

Our analysis of project effects on the northern long-eared bat is presented in section 3.3.3.2, *Threatened and Endangered Species*. We conclude that relicensing the

project would have no effect on the northern long-eared bat because there no suitable habitat for the species at the project.

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

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

On May 30, 2018, Kaukauna requested concurrence from the Wisconsin Coastal Management Program to confirm that a consistency review for the Kimberly Project is unnecessary because the project is not located in Wisconsin’s designated coastal area. Kaukauna followed up with a second request for consistency on August 31, 2018.

The state-designated coastal management zone extends to 15 counties<sup>3</sup> with frontage on Lake Michigan and Lake Superior, and includes land draining into Lakes Michigan or Superior that are within the counties bordering both lakes. Because Wisconsin Coastal Management Program did not respond within 180 days of its receipt of the applicant’s certification, a consistency certification is not required for the project.

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

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

On November 8, 2016, Commission staff designated Kaukauna as its non-federal representative for the purposes of conducting section 106 consultation under the NHPA. Pursuant to section 106, and as the Commission’s designated non-federal representative, Kaukauna initiated consultation with the Wisconsin Historical Society (Wisconsin

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<sup>3</sup> Outagamie County, where the project is located, is not included in the state-designated coastal management zone.

SHPO) and Forest County Potawatomi Community<sup>4</sup> to identify historic properties within the project's area of potential effects (APE) and determine the National Register-eligibility of, and potential adverse effects on, any historic properties located in the APE.

These consultations and other investigations concluded that two historic properties are located within the APE: (1) the Kimberly Hydroelectric Plant (project powerhouse), which is proposed for listing on the National Register as part of the Kimberly Hydroelectric Historic District; and (2) Cedars Dam, which is proposed for listing on the National Register as a contributing structure of the Kimberly Hydroelectric Historic District and is currently listed on the National Register as a contributing structure for the Cedars Lock and Dam Historic District.

Operation and maintenance of the project could adversely affect the project powerhouse. To meet the requirements of section 106 of the NHPA, on December 16, 1993, Commission staff executed a statewide programmatic agreement (PA) with the Wisconsin SHPO (FERC, *et al.*, 1993). The statewide PA contains principles and procedures for the protection of historic properties from the adverse effects of a hydroelectric project in the state of Wisconsin and provides for the implementation of an historic properties management plan (HPMP) for the project. On June 15, 2018 Kaukauna requested comments on a draft HPMP, as required by the PA. On June 28, 2018, the Wisconsin SHPO concurred with the proposed HPMP. Kaukauna filed the final HPMP on February 14, 2019, with its final license application.

## **1.4 PUBLIC REVIEW AND COMMENT**

The Commission's regulations (18 C.F.R. § 16.8) require applicants to consult with appropriate resource agencies, tribes, and other entities before filing an application for a license. This consultation is the first step in complying with the Fish and Wildlife Coordination Act (16 U.S.C. § 661, *et seq.*), ESA, NHPA, and other federal statutes. Pre-filing consultation must be completed and documented according to the Commission's regulations.

### **1.4.1 Scoping**

Before preparing this EA, staff conducted scoping to determine what issues and alternatives should be addressed. A scoping document (SD1) was distributed to interested agencies and others on August 22, 2019. The document was noticed was

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<sup>4</sup> In an email dated August 3, 2017, the Forest County Potawatomi Community concluded that the project would not affect tribal cultural resources. The tribe reserved the right to reconsider and requested it be contacted in the event of an inadvertent discovery of human or archaeological remains.

noticed in the *Federal Register* on August 22, 2019. The following entities provided timely, written comments on SD1:

<u>Commenting Entity</u>	<u>Date Filed</u>
Wisconsin SHPO	September 9, 2019
Environmental Protection Agency	September 19, 2019

A revised scoping document (SD 2) was issued on October 9, 2019.

### **1.4.2 Interventions**

On December 3, 2019, the Commission issued a notice accepting the application and setting February 1, 2020, as the deadline for filing protests and motions to intervene. No entities filed protests or motions to intervene.

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

On December 3, 2019, the Commission issued a notice setting February 1, 2020, as the deadline for filing comments, recommendations, terms and conditions, and prescriptions. On January 30, 2020, Interior filed a letter stating it had no comments.

## **2.0 PROPOSED ACTION AND ALTERNATIVES**

### **2.1 NO ACTION ALTERNATIVE**

Under the no-action alternative, the project would continue to operate under the terms and conditions of the current license, and no new 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 Current Corps and State Facilities**

The Kimberly Project is located at Cedars Dam on the Fox River in the Village of Kimberly, Wisconsin. The 654-foot-long, 13-foot-high Cedars Dam, owned and operated by the Corps, consists of a concrete dam, gated spillway, and a fixed crest overflow spillway. The dam and accompanying navigational pool extending approximately 3.5 miles upstream are not part of the Kimberly Project. The adjacent Cedars navigation lock on the north side of the dam is owned by the State of Wisconsin and operated by the Fox River Navigational System Authority and is not part of the Kimberly Project.

### **2.1.2 Current Project Facilities**

The powerhouse was originally constructed in 1889 and first used as a groundwood pulp mill. Following a fire in 1901, the site was rebuilt, and hydroelectric production was added in 1906. The current powerhouse configuration was completed in 1926 after raising the roof to accommodate a crane used in the maintenance of the turbines. The powerhouse, connected to Cedars Dam on the south side, is owned and operated by Kaukauna and is the main facility of the Kimberly Project.

Located directly upstream of the powerhouse is an irregularly shaped forebay consisting of nine 12.83-foot-wide, 11.77-foot-high concrete intakes fitted with same size trashracks with clear bar spacing of 4.5 inches.

The powerhouse is reinforced concrete and brick masonry containing three turbine-generator units rated at 723 kilowatts for a total installed capacity of 2.17 MW. The exterior of the powerhouse is 161-feet by 43-feet. The project also includes a 50-foot by 151-foot tailrace located immediately downstream of the powerhouse.

A 320-foot-long interconnection line conveys project power via a step-up transformer to a 34.5-kV local distribution line owned by We Energies. The average annual generation was 12,324,827 kilowatt-hours for the period 2011 to 2017.

There are no formal recreation sites located at or associated with the project.

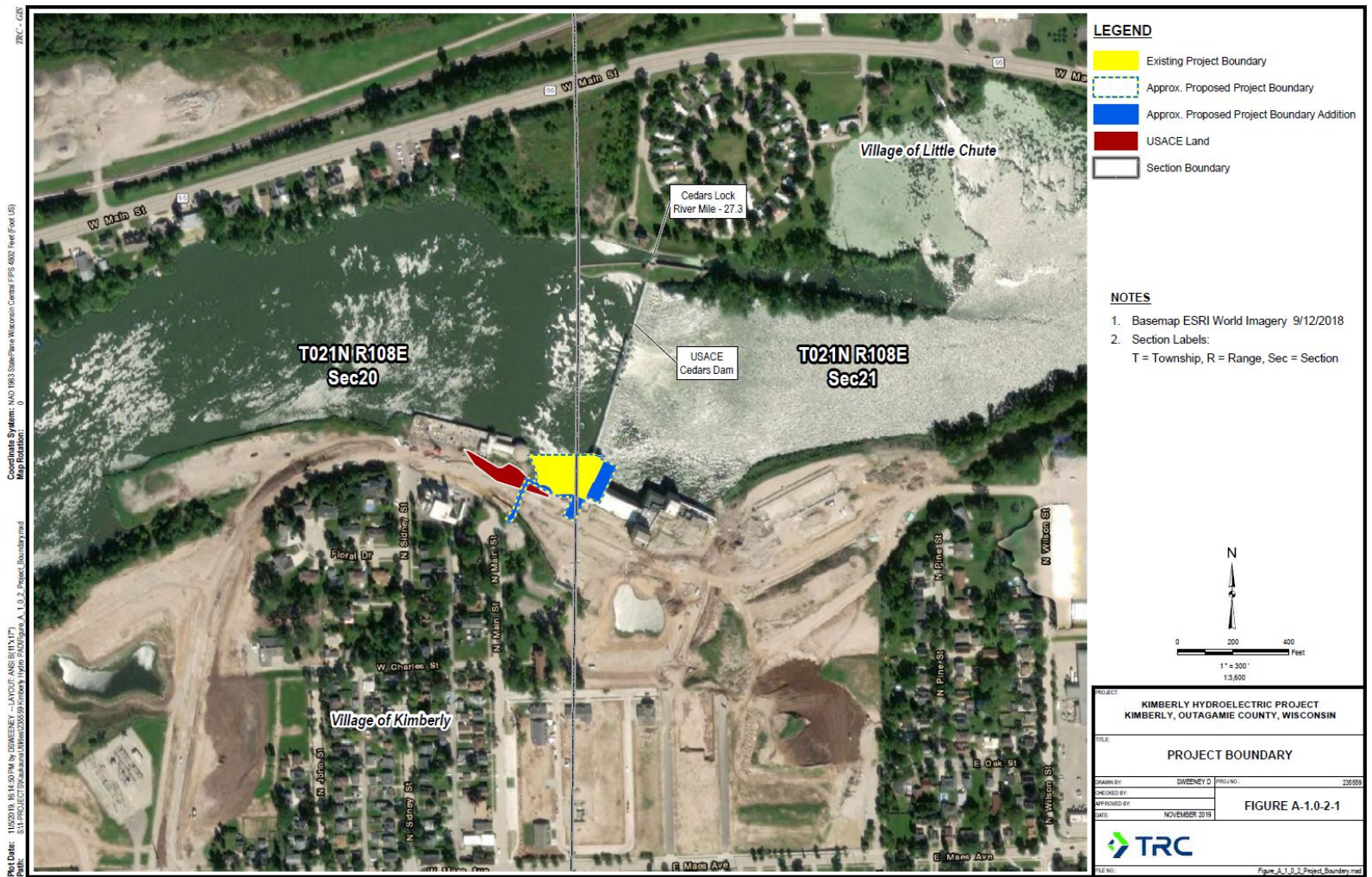


Figure 2. Kimberly Project Boundary (Source: Kaukauna, 2019).

### **2.1.3 Current and Proposed Project Boundary**

The current project boundary for the Kimberly Project includes the footprint of the powerhouse and intake/forebay area, encompassing approximately 0.697 acre, of which approximately 0.23 acre is the project powerhouse and the rest is within the forebay.

Kaukauna proposes to modify the current project boundary to include the tailrace, interconnection line, step-up transformer, and a small piece of land (0.088 acre) adjacent to the powerhouse to provide a paved access route to the powerhouse. The proposed boundary would also be modified to include 0.022 acre (980 square feet) of federal lands because a portion of the underground interconnection line crosses Corps property. The project boundary is shown in figure 2 and discussed further below.

### **2.1.4 Project Safety**

The Corps is responsible for the safety of Cedars Dam structures and Kaukauna would continue to be responsible for the integrity and safety of its powerhouse. The Kimberly Project has been operating for more than 48 years under its current license. During this time, Commission staff has conducted operational inspections focusing on the continued safety of the structures identification of unauthorized modifications, efficiency and safety of operation, compliance with the terms of the license, and proper maintenance.

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

### **2.1.5 Project Operation**

The project uses the nine-foot hydraulic head created by Cedars Dam operating in a run-of-release mode, as required by Article 401 of the current license, and in compliance with a Memorandum of Agreement (MOA) between the licensee and the Corps.<sup>5</sup> The Corps manages flows in the Lower Fox River by releasing water from Lake

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<sup>5</sup> The MOA, dated March 27, 1992, was executed between the Corps and Repap Wisconsin Incorporated, the licensee for the project at the time. The MOA was assumed by Kaukauna on March 3, 2010, with the transfer of the license. See 130 FERC ¶ 62,182 (2010).

Winnebago to keep specific water levels at each of the Corps-managed dams in the Lower Fox River.

At Cedars Dam, the Corps maintains the level of the upper pool between the top of the spillway elevation 699.13 feet International Great Lakes Datum 1985 (IGLD85) and maximum pool elevation 700.13 feet IGLD85,<sup>6</sup> or between six and seven feet, as referenced on the Cedar Dam recording gage. The upper limit is maintained by the Corps' opening of the Tainter gates. If the water level continues to rise, the Corps requests that Kaukauna removes the flashboards. The lower limit is maintained by Kaukauna backing down the hydro turbines or shutting them down one at a time to maintain elevation 699.13 feet IGLD85, or above it.

To manage these predetermined flow levels, the Corps provides notification to Kaukauna in case of any changes in discharges from Lake Winnebago, and Kaukauna closely coordinates project operation with the Corps, keeping it informed of any change in generation that has the potential to affect the flow of water through Cedars Dam. This coordination helps minimize the fluctuation of Cedars Dam reservoir, keeping water levels within the one-foot bandwidth and enabling proper operation of the navigation lock, the Corps' primary objective for Cedars Dam.

## **2.2 APPLICANT'S PROPOSAL**

### **2.2.1 Proposed Project Facilities**

Kaukauna does not propose to change current project facilities or add any new project facilities.

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

Kaukauna proposes to:

- Continue to operate the project in a run-of-release mode, such that only surplus water released from the Corps' Cedars Dam would be used to produce power.
- Implement the final HPMP, filed with the license application, to protect historic properties within the project's APE that may be adversely affected by project operation and maintenance.

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<sup>6</sup> Email correspondence dated June 12, 2020, from Kaukauna to staff.



## **2.3 STAFF ALTERNATIVE**

Under the staff alternative, the project would be operated as proposed by Kaukauna, with the following additional staff-recommended measure:

- A debris management plan.

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

The following alternatives were considered but have been eliminated from further analysis because they are not reasonable in the circumstances of this case: (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 would terminate when it determines that another governmental agency will assume regulatory authority and supervision over the land and facilities covered by the non-power license. No agency has suggested a willingness or ability to do so. No party has sought a non-power license for the project and we have no basis for concluding that the project should no longer be used to produce power.

### **2.4.2 Federal Government Takeover of the Project**

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

### **2.4.3 Retiring the Project**

As the Commission has previously held, decommissioning is not a reasonable alternative to relicensing a project in most cases, when appropriate protection, mitigation, and enhancement measures are available.<sup>7</sup> The Commission does not speculate about possible decommissioning measures at the time of relicensing, but rather waits until an

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<sup>7</sup> See, e.g., *Eagle Crest Energy Co.*, 153 FERC ¶ 61,058, at P 67 (2015); *Public Utility District No. 1 of Pend Oreille County*, 112 FERC ¶ 61,055, at P 82 (2005); *Midwest Hydro, Inc.*, 111 FERC ¶ 61,327, at PP 35-38 (2005).

applicant actually proposes to decommission a project, or there are serious resource concerns that cannot be addressed with appropriate license measures, making decommissioning a reasonable alternative to relicensing.<sup>8</sup> This is consistent with the National Environmental Policy Act (NEPA) and the Commission's obligation under section 10(a) of the FPA to issue licenses that balance developmental and environmental interests.

Project retirement would require denying the relicense application and surrender or termination of the current license with appropriate conditions.

No participant has suggested that project retirement would be appropriate in this case, and we have no basis for recommending it. The power and ancillary services provided by the Kimberly Project are important resources that would be lost if the project was retired, and there would be significant costs involved with retiring the project and or removing any project facilities. Thus, we do not consider project retirement a reasonable alternative to relicensing the project with appropriate protection, mitigation, and enhancement measures.

### 3.0 ENVIRONMENTAL ANALYSIS

This section includes: (1) a general description of the project vicinity; (2) an explanation of the scope of our cumulative effects analysis; and (3) our analysis of the proposed action and other recommended environmental measures. Sections are organized by resource area (aquatic, land use, *etc.*). Historic and existing conditions are described under each resource area. The existing conditions are the baseline against which the environmental effects of the proposed action and alternatives are compared, including an assessment of the effects of proposed protection, mitigation, and enhancement measures, and any cumulative effects of the proposed action and alternatives. Staff conclusions and recommended measures are discussed in section 5.1, *Comprehensive Development and Recommended Alternative*.<sup>9</sup>

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<sup>8</sup> See generally *Project Decommissioning at Relicensing; Policy Statement*, FERC Stats. & Regs., Regulations Preambles (1991-1996), ¶ 31,011 (1994); see also *City of Tacoma, Washington*, 110 FERC ¶ 61,140 (2005) (finding that unless and until the Commission has a specific decommissioning proposal, any further environmental analysis of the effects of project decommissioning would be both premature and speculative).

<sup>9</sup> Unless otherwise indicated, our information is taken from the application for license filed by Kaukauna on February 14, 2019, and responses to requests for additional information filed on July 25, 2019, and November 19, 2019

### **3.1 GENERAL DESCRIPTION OF THE RIVER BASIN**

The Kimberly Project is located on the Lower Fox River in the Lower Fox River Basin in northeastern Wisconsin. The topography of the basin is characterized by past glacial actions that created relatively flat glacial till plains with fertile soils, moraines, glacial lakes, poorly drained depressions, and glaciated lowland valleys. The Lower Fox River Basin has a drainage area of 638 square miles by itself and a combined total drainage area of 6,349 square miles, including the upstream Wolf River and Upper Fox River Basins. There are around 470 miles of rivers and tributaries within the Lower Fox River Basin, but no major tributaries enter the Lower Fox River.

The Lower Fox River originates from the north end of Lake Winnebago and travels northeast for 39 miles before entering Green Bay, on the western shore of Lake Michigan. The Lower Fox River has a steep grade and falls a total of 168 feet in the length of the river and has an average slope of about 4.3 feet per mile. The main stem of the Fox River in the Lower Fox River Basin is categorized as a large, non-wadeable, low transparency river that is fragmented by a series of 17 locks and 13 dams that were built in the mid-1800's to aid navigation or produce power. The Corps operates nine of the 13 dams located on the Lower Fox River, and four of dams, including Cedars Dam, have been developed for hydropower production, (FERC, 2018). The dams are also used for the purposes of navigation, recreation, water quality, and flood control. The Kimberly Project is the seventh of the nine hydropower projects (Corps, 2010) located upstream from Green Bay and is located at river mile (RM) 27.7, between the Middle Appleton Project No. 7264 at RM 30.8 and the Little Chute Project No. 2588 at RM 26.4.

Developed land use in the Lower Fox River Basin includes residential, industrial/commercial, agricultural, utility land, and recreational use. The overall largest land use in the basin is 69.8 percent agriculture, with all other land uses less than 10 percent.

The project region experiences a moderate climate with well-defined seasons. The mean monthly maximum air temperature in the region ranges from 24.9 degrees Fahrenheit (°F) in January to 81.2 °F in July while the mean monthly minimum temperatures range from 10 °F in January to 62.5 °F in July. The average annual precipitation is 31.08 inches. Over half the annual precipitation occurs from May through September. Snowfall is variable, with the mean annual snowfall for the basin of between 44 to 48 inches (Wisconsin DNR, 2001).

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

According to the Council on Environmental Quality's regulations for implementing NEPA, a cumulative effect is the impact on the environment that results from the incremental impact of the action when added to other past, present, and

reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions (40 C.F.R. § 1508.7). 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.

We took into consideration potential fish losses at the project, in conjunction with potential fish losses at other upstream hydropower projects on the Lower Fox River, and determined that there would not likely be any cumulative effects on fish population in the river from continued project operation because the rate of survival for entrained fish is expected to be high. In addition, project operation would not contribute to phosphorus loading or PCB contamination, the main pollutants in the Lower Fox River. Therefore, continued project operation would not cumulatively affect water quality in the Lower Fox River. Therefore, based on our review, the review of the license application, and agency comments, we have not identified any resources that could be cumulatively affected by the continued operation of the Kimberly Project.

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

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

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

#### **3.3.1 Aquatic Resources**

##### **3.3.1.1 Affected Environment**

###### **Water Quantity**

Based on 20 years of data using U.S. Geological Survey (USGS) gages at Appleton, Wisconsin (USGS gage no.4084445) and Green Bay, Wisconsin (USGS gage no. 40851385), the Lower Fox River has an average flow of 4,591 cubic feet per second (cfs). The hydraulic capacity of the project is 3,405 cfs.

The drainage area for the project is about 6,000 square miles. As stated above, Kaukauna closely coordinates project operation with the Corps' objective of keeping water levels in pool 4, the reservoir formed by Cedars Dam, within a 1-foot bandwidth to provide a water supply for the navigation lock.

## **Water Quality**

The Fox River Valley is the second largest urbanized area in the State of Wisconsin, with the majority of people living in the Lower Fox River Basin. Most of the basin's urban areas are near the river, and localized urban and industrial runoff has contributed to water quality problems (Wisconsin DNR, 2001). The Lower Fox River is highly industrialized, with several pulp mills and major municipal wastewater treatment facilities discharging directly into the river.

Much of the Lower Fox River is a eutrophic<sup>10</sup> river that reflects the nature of the watershed in the vicinity of the project. While agricultural activities are the dominant land use in the basin, the urban and industrial runoff have combined with the agricultural runoff and wastewater discharges to create a river that, historically, has degraded water quality and aquatic habitat. These effects are most notable in river reaches much further downstream from the project.

Under section 303(d) of the Clean Water Act, states are required to submit lists of impaired waters that are too polluted to meet water quality standards. The segment of the Lower Fox River between the De Pere Project (P-4914) and the Middle Appleton Project<sup>11</sup> is categorized by the State of Wisconsin as 303(d)-impaired waters. This stream segment is identified as impaired by two pollutants—total phosphorus and polychlorinated biphenyls (PCB). As a result, the State of Wisconsin has issued fish consumption guidelines for several fish species in the Lower Fox River.

The Lower Fox River is classified by Wisconsin DNR for fish, aquatic life, and recreational use. The State of Wisconsin has established water quality standards for this classification to protect, maintain, and enhance surface waters, including: (1) a DO minimum concentration of 5 milligrams per liter (mg/L); and (2) daily maximum water

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<sup>10</sup> A eutrophic body of water is one that is enriched with dissolved nutrients, resulting in a high production of algae and a reduction of dissolved oxygen (DO) that is unfavorable to many aquatic organisms.

<sup>11</sup> The Kimberly Project is located between these two projects.

temperatures for the warmer months, including: June 85 °F, July 87°F, August 86°F, and September 85 °F.

There is a relative abundance of water quality data in the project area of the Lower Fox River. Kaukauna conducted a desktop water quality study to evaluate DO and water temperature. The desktop analysis used water quality data collected for the Little Chute Project by Wisconsin DNR<sup>12</sup> and Kaukauna, which is also the licensee for the Little Chute Project. The Little Chute Project is located 1.3 miles downstream from the Kimberly Project. There are no contributing streams entering the river reach between the Kimberly Project and the downstream Little Chute Project, and the reservoir for the Little Chute Project backs up to the tailwaters of the Kimberly Project. Therefore, use of the Little Chute Project's water quality data is a reasonable alternative for the Kimberly Project, as any effects on DO and temperature in the river reach between the two projects would be based on similar physical characteristics.

DO and water temperature data was collected in June, July, August, and September of 2016. For the four-month sampling period, DO levels ranged from 5.19 mg/L (one time) to 9.25 mg/L, and were frequently in the 6.0+mg/L to 7.0+ mg/L range. September had levels that were 8.0+ mg/L. Water temperatures for the four-month period ranged from a high of 82 °F in August to a low of 62°F in late September. Most of the water temperature data in September was between 73.6 °F to 68 °F.

### **Fishery Resources**

The Lower Fox River has a fish assemblage consisting of warmwater and coolwater inland freshwater fish species. Warmwater fish found in the vicinity of the project include carp, bluegill, largemouth bass, longnose gar, channel catfish, and various minnow, sucker, and sunfish species. Some coolwater fish present include smallmouth bass, walleye, yellow perch, rock bass, and northern pike.

Wisconsin DNR regularly conducts fish surveys along the Lower Fox River, including in pool 4. The fish sampling results indicated that under the warmwater Index of Biotic Integrity, the fishery scores ranged from Fair to Excellent among the various survey years. The Index of Biotic Integrity scores are used to assess the overall health of the fish assemblage, and are based on the type and quantity of fish species observed during the survey period.

Length frequency data for the common sport fish collected represented various life stages, and included: black crappie ranging from 5 to 12.5 inches; northern pike ranging from 11 to 36.5 inches; smallmouth bass ranging from 3 to 18.5 inches; walleye ranging from 5 to 17 inches; and bluegill ranging 1 to 7 inches. Smallmouth bass was among the

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<sup>12</sup> Wisconsin DNR regularly collects water quality data for the Lower Fox River.

most numerous of individual fish collected during the fish sampling surveys. The abundance of smallmouth bass in the river supports the popular sport fishery for trophy size smallmouth bass occurring in the Lower Fox River.

No federal or state, threatened or endangered fish species were collected during Wisconsin DNR surveys in the project vicinity.

### **3.3.1.2 Environmental Effects**

#### **Project Operation**

Kaukauna proposes to continue operating the project in a run-of-release mode, such that only surplus water released from the Corps' Cedars Dam would be used to produce power. The continued operation of the project would be consistent with the MOA between Kaukauna and the Corps.

#### *Our Analysis*

By continuing to operate the project in a run-of-release mode there would be no change to the flow regime of the Lower Fox River downstream of the project, and aquatic habitat in the river downstream to the Little Chute Project would remain unchanged from existing conditions. Also, the flows downstream of the project would continue to mimic the seasonal variation of flows occurring in the Lower Fox River. Therefore, there would be no expected change to the abundance, suitability, or distribution of aquatic species downstream of the project.

#### **Water Quality**

The Kimberly Project is in a river reach that is impaired by PCBs and elevated levels of total phosphorus. Kaukauna is not proposing any measures to protect or enhance water quality at the project.

#### *Our Analysis*

Kaukauna is not proposing any changes that would alter the current project operation. The water quality sampling site for the Little Chute Project was located a short distance downstream of Cedars Dam and would be reflective of any Kimberly Project effects on water temperature and DO in the Lower Fox River. The water temperature and DO met or exceeded minimum levels stipulated in the existing state standards for DO (5.0 mg/L) and remains below the maximum temperature levels during

June, July, August, September.<sup>13</sup> Therefore, the existing water quality in the Lower Fox River would be unaffected by continued project operation.

The proposed mode of operation would have no effect on total phosphorus levels occurring downstream of the project, as these phosphorus levels in the river are from upstream non-point sources and there is no contribution of phosphorus from the project. While PCBs likely occur in the sediments downstream of the project as a result of past industrial discharges into the Lower Fox River, continued project operation would not affect the presence or distribution of PCBs. Kaukauna is not proposing any in-water construction activities that would disturb the sediment. Therefore, we conclude that continued operation of the Kimberly Project, as proposed, would not affect PCBs potentially occurring downstream of the project.

### **Fishery Entrainment and Impingement**

There are no designated downstream fish passage facilities at the project. Downstream fish passage occurs through Cedars Dam lock, the Tainter gates, or the project's turbines. The operation of the project has the potential to result in some fish impingement on the project trashracks and fish entrainment through the project turbines. Kaukauna does not propose any additional measures to minimize fish mortality related to entrainment or impingement.

#### *Our Analysis*

Fish entrainment studies conducted at 11 hydroelectric projects in Wisconsin indicate that several of the most common species that occur at the project, such as bluegill, channel catfish, rock bass, black crappie, smallmouth bass, and white bass, can be entrained at hydropower projects in Wisconsin (FERC, 1995). The entrainment studies conducted in Wisconsin also indicate that peak entrainment rates likely occur in summer and fall for many species when young fish are most abundant and tend to be dispersing between habitats.

Although no site-specific project entrainment or turbine mortality studies have been conducted at the Kimberly Project, based on the studies at the 11 Wisconsin projects and the fact that the project trashracks have a 4.5-inch clear bar spacing, it likely that small and young fish would be the majority of fish entrained at the Kimberly Project.

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<sup>13</sup> On November 22, 2017, the Commission issued an order for the Little Chute Project suspending the water quality monitoring article for the project. *See* 161 FERC ¶ 62,125 (2017). Wisconsin DNR concurred with the suspension of the water quality monitoring for the project as the monitoring results showed that the operation of the Little Chute Project was not affecting water temperature or DO in the Lower Fox River.



The survival of these small fish is expected to be relatively high because they are less prone to mechanical injury from turbine passage than larger fish. Turbine passage survival at hydroelectric projects with Kaplan turbines, which the project has, can be as high as 95 percent for small and moderate-sized fish and 88 percent for larger fish (EPRI, 1997).

Intake velocities at the project are estimated to be 3.4 feet per second. Based on 4.5-inch clear spacing, the trashracks at the nine intakes would physically exclude only the largest fish. However, impingement of large fish on the trashracks is not anticipated to be a major issue because larger fish have the ability to avoid the influence of the intake velocities at the trashracks. Large fish are capable of swimming at a “burst speed,” which is defined as a short, intense swimming effort, generally sustainable for about 1 second or less (Bell, 1991). For instance, Murray (1974) calculated the burst speed of channel catfish to be 4.2 body lengths per second and smallmouth bass to be 6.8 body lengths per second. Therefore, it is likely that these<sup>14</sup> and other larger fish would be able to avoid impingement on the trashracks, especially with regular cleaning of the trashracks.

Overall, there is no evidence or allegation of significant fish entrainment or impingement issues at the project. In addition, Kaukauna is not proposing any changes to project operation that would alter any on-going fish entrainment and turbine mortality that may be occurring. Fish survey data also indicates that a diverse and abundant fish population exists at the project. While entrainment of smaller, younger fish is likely occurring, especially during the summer and fall seasons, the rate of survival for these small-sized, entrained fish is expected to be high based on known turbine passage survival rates determined from other entrainment studies conducted at other hydropower projects.

### **Debris Management**

Kaukauna states that it visually inspects the trashracks a minimum of two times per week and cleans them as needed using a manually operated rake, with the removed debris being passed downstream. Kaukauna also states that during a one- to two-week period in the summer, it cleans the trashracks more frequently to remove aquatic plants. Kaukauna does not specifically propose to continue this practice as a condition of any new license, nor does it propose other measures for removing debris.

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<sup>14</sup> Channel catfish and smallmouth bass are among the fish species occurring in the Lower Fox River.

## *Our Analysis*

Debris that accumulates on the trashracks could reduce the effectiveness of the trashracks at protecting fish from entrainment or impingement. If the trashracks are covered with debris, fish may become entangled in the debris or the approach velocity at the trashracks could increase as intake water is constricted to a smaller area, which could result in a greater amount of fish impingement or entrainment, respectively.

In addition to short-time debris removal from the trashracks in the summer, Kaukauna also states that a lot of debris must be removed from the trashracks during the spring runoff and in the fall when there are a lot of leaves in the river. Proper disposal of debris that is removed from project facilities is important because organic debris sustains lower order trophic organisms, such as benthic macroinvertebrates, which in turn influences the productivity of higher order organisms, such as fish. In contrast, inorganic debris such as trash cannot be used as a food source and provides little-to-no benefit to aquatic resources. Therefore, while removal of river-borne trash from the stream is beneficial for project operation, it is more appropriate to return organic debris to the river by passing it downstream. To ensure that the trashracks protect fish from entrainment as intended, a debris management plan could be used to identify procedures for: (1) removing and sorting debris that collects on project structures; (2) passing organic debris (i.e., leaves and wood) downstream of the project; and (3) removing and disposing of trash.

### **3.3.3 Threatened and Endangered Species**

#### **3.3.3.1 Affected Environment**

FWS's IPaC indicates one federally listed species known to potentially occur in Outagamie County, the threatened northern long-eared bat (FWS, 2020). No critical habitat for the northern long-eared bat occurs within project-affected land.

#### **Northern Long-Eared Bat**

The northern long-eared bat (*Myotis septentrionalis*) is nocturnal, ranges from 3 to 3.7 inches in length, and possesses shades of brown fur. The northern long-eared bat's historical range includes 37 states, encompassing most of the forested central and eastern United States. Northern long-eared bats forage almost exclusively in the understory of mature-growth forests, feeding on moths, flies and other insects using echolocation. Both dead and live trees greater than 3 inches in diameter provide necessary habitat for reproduction. The northern long-eared bat primarily uses the crawl spaces between dead and exfoliating bark for roosting in the summer months. Northern long-eared bats will return to the same roosts seasonally and in subsequent years, if not disturbed. Pups are born mid-May through July and are able to fly 3 to 5 weeks after birth. Winter hibernation typically occurs in caves or similar habitats, and serves as a nexus for fall-

swarming<sup>15</sup> and spring-staging<sup>16</sup> (FWS, 2014). Initiation and emergence from hibernation is likely associated with ambient air temperature and insect abundance, which may seasonally vary based on latitude (Meyer et. al, 2016).

The rapid decline in northern long-eared bat populations has been attributed to the emergence of white-nose syndrome, accounting for a 99-percent reduction of northern long-eared bat populations in the last decade. Northern long-eared bats commonly share summer roosts and hibernacula and will frequently move between hibernacula in the winter (Caceres and Barclay, 2000). Bat roosting behavior facilitates the transfer of the pathogenic fungus among individuals. Consequently, white-nose syndrome is expected to continue to spread throughout the rest of United States in the foreseeable future (FWS, 2015).<sup>17</sup>

There are no known hibernacula or maternity roosts in Outagamie County (Wisconsin DNR, 2016).

### **3.3.3.2 Environmental Effects**

The proposed project area occupies less than 1 acre of land and the land cover is industrial. Kaukauna proposes to pave the proposed 0.088 acre to be brought into the project boundary to provide better access to the project.

#### *Our Analysis*

There is sparse vegetation within the project boundary and an absence of mature-growth forest or cave-like structures that could be used by the northern long-eared bat as habitat. In addition, the proposed access to the project would occur on industrial land, which provides little ecological value as habitat. There are also no records of observation

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<sup>15</sup> Fall-swarming occurs in the weeks prior to winter hibernation. The purpose of swarming behavior includes the introduction of juveniles to potential hibernacula, copulation, and gathering at stop-over sites on migratory pathways between summer and winter habitats.

<sup>16</sup> Spring-staging occurs between winter hibernation and migration to summer habitat. During this time, bats begin to gradually emerge from hibernation to feed, but will return to the same or alternative hibernacula to resume bouts of inactivity.

<sup>17</sup> 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 from bats evacuating their roosts during the winter when no food is available, and consequently starving or dying from exposure (FWS, 2015).

of the species at the project. Therefore, we conclude that continued operation and maintenance of the project would have no effect on the northern long-eared bat.

### **3.3.4 Land Use**

#### **3.3.4.1 Affected Environment**

Outagamie County is approximately 45 percent agricultural land and 18 percent wetlands. Aside from agricultural and natural areas, land within the county consists of urban, residential, industrial, or commercial development. The area immediately surrounding the Fox River has a higher percentage of land dedicated to industry and development than the rest of Outagamie County. Land use in the immediate vicinity of the project is highly developed and major land uses include industrial/commercial and residential use.

The current project boundary for the Kimberly Project encompasses approximately 0.697 acre, including only the powerhouse, intake, and forebay. The only access to the Lower Fox River within the project boundary is across the forebay, which lies within a buoyed area upstream of the spillway. There is no recreation or public access at the project.

#### **3.3.4.2 Environmental Effects**

##### **Project Boundary**

Kaukauna proposes to modify the current project boundary to include the tailrace, interconnection line, and step-up transformer, which would include 0.022 acre (980 square feet) of federal lands because a portion of the underground interconnection line crosses Corps property. Kaukauna also proposes to include a 0.088 acre of land, owned by the Village of Kimberly, to provide egress through the site for access to the project facility. The proposed access route would be paved.

##### *Our Analysis*

Commission regulations require that all lands necessary for the operation and maintenance of the project be included in the project boundary.<sup>18</sup> Because the tailrace, interconnection line, and step-up transformer are project facilities, and the proposed 0.088 acre of land provide direct access to the project, these facilities should be considered necessary for the operation and maintenance of the project and therefore included in the project boundary. Although Kaukauna proposes to pave the 0.088 acre of land to provide access to the project facility, the majority of land use in the immediate

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<sup>18</sup> See 18 C.F.R. 4.41(h)(2) (2019).

vicinity of the project is industrial and consists of heavily disturbed construction fill; therefore, paving 0.088 acre of land would not affect or change the land use in the area.

### **3.3.5 Cultural Resources**

#### **3.3.5.1 Affected Environment**

Section 106 of the NHPA requires that the Commission take into account the effects of its actions on historic properties and afford the Advisory Council on Historic Preservation (Advisory Council) a reasonable opportunity to comment on the undertaking.<sup>19</sup> Historic properties are those that are listed or eligible for listing in the National Register. The regulations implementing section 106 of the NHPA also require that the Commission seek concurrence with the SHPO on any finding involving effects or no effects on historic properties, and consult with interested Indian tribes or Native Hawaiian organizations that attach religious or cultural significance to historic properties that may be affected by an undertaking. In this document, we also use the term “cultural resources” for properties that have not been determined eligible for listing in the National Register. Cultural resources represent things, structures, places, or archaeological sites that can be either prehistoric or historic in origin. In most cases, cultural resources less than 50 years old are not considered historic.

#### **Area of Potential Effect**

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 (36 C.F.R. § 800.16(d)). The APE for the project encompasses all lands enclosed within the current and proposed project boundary; attached or associated buildings and structures extending beyond the project boundary, which contribute to the National Register eligibility; and land or properties outside the project boundary, where the project may cause changes in the character or use of historic properties.

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<sup>19</sup> An undertaking means “a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency, including those carried out by or on behalf of a Federal agency; those carried out with Federal financial assistance; and those requiring a Federal permit, license, or approval.” 36 C.F.R. § 800.16 (2019). Here, the undertaking is the potential issuance of a new license for the Kimberly Project.

## **Regional History**

The Fox River Valley boasts an archaeologically rich history, due in part to its location between two river drainages, Green Bay and the Fox River. The area's role in the copper trade during the Archaic period (8,500-1,000 B.C.) has produced some of the most singular archaeology in North America. The region also represents the northern boundary of Oneota ceramics and the cultural boundary between the people of Green Bay and the Menominee River with those of the Northern Lakes area.

Before the arrival of European explorers in the early 1600s, the Fox River Valley was home to Fox, Menominee, and Winnebago Indians who depended on hunting, fishing, gathering, and agriculture for sustenance. French exploration began in early 1634, dominating the fur trade and controlling associated waterways until their defeat by the British in 1763. After the War of 1812, Americans assumed ownership of the area, which, coupled with westward movement of the American frontier, led to accelerated settlement. Because of the availability of water-based transportation and power, small towns soon developed into commercial centers featuring woolen mills, creameries, wood products, quarries, breweries, grain mills, and sawmills.

Following the successful completion of the Erie Canal in 1825, interest in linking the Fox and Wisconsin Rivers to the Mississippi River for commercial navigation purposes began to grow among business leaders and politicians. The system was conceived as a series of locks and dams on the Fox River, a canal to connect the Fox and Wisconsin Rivers near Portage, Wisconsin, and a series of locks and dams on the Lower Wisconsin River to provide a navigable channel. By 1860, the lock and dam system, known as the Fox-Wisconsin Improvement Project, was partially complete and steamboats could travel the entire length of the Fox-Wisconsin waterway. The locks located on the Lower Fox River, including the Cedars Lock and Dam, continued to operate until the 1980s, when all but three were shut down by the federal government. The lock system is significant because it was built for passage of steamboats rather than towed vessels and is manually operated with a system of gears and valves. In 2004, ownership of the lock system from Lake Winnebago to Green Bay was transferred from the Corps to the Fox River Navigational System Authority, which is in the process of rehabilitating the lock system. (Fox River Navigational System Authority, 2020).

As transportation routes on both land and water were improved and as hydroelectric power technology advanced, development in the vicinity of the project accelerated. With a power plant placed in operation at Appleton, Wisconsin in 1882, hydroelectric power production has had a longer history in the Lower Fox River area than anywhere else in the country.

## **Archaeological and Historic Resources**

Two historic properties are located within the project's APE, the Kimberly Hydroelectric Plant (project powerhouse) and Cedars Dam. Cedars Dam is outside of the project boundary, but within the project's APE.

The project powerhouse is proposed for listing on the National Register as part of the proposed Kimberly Hydroelectric Historic District. The project powerhouse is also one of the few remaining buildings that were part of the Kimberly Hydroelectric/ Midtec Paper Mill industrial facility, which has been demolished and is not eligible for the National Register. The original structure was built in 1889 and used as a groundwood pulp mill as part of the paper mill facility. Although undamaged by a fire that destroyed many of the mill buildings in 1901, the powerhouse was remodeled in the fire's aftermath to incorporate hydroelectric production. The current project powerhouse dates to a second remodel in 1925, which raised the roof for the equipment needed to maintain the turbines.

Cedars Dam is proposed for listing on the National Register as a contributing structure of the proposed Kimberly Hydroelectric Historic District. The dam is also listed on the National Register as a contributing structure for the Cedars Lock and Dam Historic District (NRHP #93001328), along with the Cedars Lock, a canal segment, Lockkeeper's house and Lockshack, which are in the project vicinity, but outside the project APE. Cedars Dam was completed in 1934 and remains unchanged.

The shoreline adjacent to the project consists of heavily disturbed soils and construction fill; therefore, no archaeological survey was conducted. A literature search did not locate any known archaeological sites within the APE.

On June 15, 2018, Kaukauna requested comments on a draft HPMP, as required by the statewide PA. On June 28, 2018, the Wisconsin SHPO concurred with the proposed HPMP. On June 4, 2019, Kaukauna followed-up with the Wisconsin SHPO, requesting any additional comments on the final license application and final HPMP, and the Wisconsin SHPO replied that it had no additional comments.

### **3.3.5.2 Environmental Effects**

Kaukauna proposes to implement the statewide PA, executed by Commission staff and the Wisconsin SHPO on December 16, 1993 (FERC, *et al.*, 1993), which requires an HPMP be developed to avoid, lessen, or mitigate for adverse effects on both identified and unidentified historic properties within the APE.

To address any potential adverse effects on the project powerhouse, located within a portion of the Kimberly Hydroelectric Historic District, Kaukauna proposes to implement the final HPMP that was filed as part of its license application. The HPMP

includes provisions for: (1) operating and maintaining the project according to the Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings; (2) avoiding destroying, demolishing, or otherwise altering the distinguishing characteristics or environmental characteristics of National Register-eligible properties; (3) repairing features when possible or using in-kind replacement materials for project facilities during maintenance; (4) consulting with the Wisconsin SHPO and Commission on measures to be implemented to protect historic properties should any alterations to historic properties become necessary, with the exception of routine maintenance and in-kind replacement; (5) notifying the Wisconsin SHPO of any emergency repairs; (6) consulting with the Wisconsin SHPO if there are changes to the project APE or operations that would affect any archaeological sites or regarding the need for an archaeological survey during a drawdown; (7) treating and disposing of any human remains and grave-associated artifacts that may be inadvertently discovered at the project in a manner that is consistent with the Advisory Council's Policy Statement Regarding Treatment of Human Remains and Grave Goods; (8) complying with the Native American Graves Protection and Repatriation Act of 1990; and (9) ceasing any ground-disturbing activities in the event that any previously unknown historic properties are discovered as a result of ground disturbance, and develop and implement actions in consultation with the Wisconsin SHPO to take into account the effects of the undertaking on the property.

Cedars Dam is located within the APE; however, because it is owned, operated, and maintained by the Corps, Kaukauna cannot control its maintenance or preservation.

### *Our Analysis*

Kaukauna proposes to continue operating the project as a run-of-release facility and does not proposed any changes to project facilities or project operation that would disturb additional areas in the project vicinity or otherwise affect cultural resources outside of the project boundary. The 0.088 acre Kaukauna proposes to add to the project boundary for project access consists of heavily disturbed construction fill and is unlikely to contain archaeological materials.

Without protective measures in place, however, continued operation and maintenance of the Kimberly Project could have adverse effects on the project powerhouse, in the event repairs are needed to maintain the structure and function of the aging powerhouse or to fix structural damage that occurs in the course of project operation and maintenance. The final HPMP outlines procedures and requirements necessary to protect the project powerhouse from effects associated with project maintenance and repairs that could otherwise diminish the integrity of the design and materials of the structure. The HPMP also ensures that any previously undiscovered archaeological resources in the APE are not adversely affected by the project. Implementing the HPMP would ensure that continued operation and maintenance of the



project would avoid, lessen, or mitigate for adverse effect on historic properties within the APE.

#### **4.0 DEVELOPMENTAL ANALYSIS**

In this section, we look at the project's use of the Lower Fox 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 a hydropower project, as articulated in *Mead Corp.*,<sup>20</sup> the Commission compares the current project cost to an estimate of the cost of obtaining the same amount of energy and capacity using a likely alternative source of power for the region (cost of alternative power). In keeping with Commission policy as described in *Mead Corp.*, our economic analysis is based on current electric power cost conditions and does not consider future escalation of fuel prices in valuing the hydropower project's power benefits.

For each of the licensing alternatives, our analysis includes an estimate of: (1) the cost of individual measures considered in the EA for the protection, mitigation, and enhancement of environmental resources affected by the project; (2) the cost of alternative power; (3) the total project cost (*i.e.*, capital costs, operation, maintenance, and environmental measures); and (4) the difference between the cost of alternative power and total project cost for the project. If the difference between the cost of alternative power and total project cost is positive, the project helps to produce power for less than the cost of alternative power. If the difference between the cost of alternative power and total project cost is negative, then the project 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 1 summarizes the assumptions and economic information we use in our analysis for the project. This information was provided by Kaukauna in its license application and subsequent replies to additional information or estimated by staff. We find that the values provided by Kaukauna are reasonable for the purposes of our analysis. Cost items common to all alternatives include: the undepreciated value of the

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<sup>20</sup> See *Mead Corporation, Publishing Paper Division*, 72 FERC ¶ 61,027 (1995). In most cases, electricity from hydropower would displace some form of fossil-fueled generation, in which fuel cost is the largest component of the cost of electricity production.

project (net investment), operation and maintenance, insurance, relicensing cost, and Commission fees.

Table 1. Parameters for the economic analysis of the Kimberly Project (Source: Kaukauna and Staff).

<b>Parameters</b>	<b>Values (2018 dollars)</b>	<b>Source</b>
Period of analysis	30 years	Staff
Term of financing	20 years	Staff
Insurance rate	0.25 percent	Staff
Interest rate	3.026 percent	Kaukauna
Discount rate	8 percent	Staff
Federal tax rate	0 percent <sup>a</sup>	Staff
Local tax rate	0 percent <sup>a</sup>	Staff
Net investment	\$5,193,701	Kaukauna
Installed capacity	2.17 MW	Kaukauna
Dependable capacity	1.40 MW	Kaukauna
Dependable capacity value	\$159.70/kW-year <sup>b</sup>	Kaukauna
Average annual generation	12,325 MWh <sup>c</sup>	Kaukauna
Alternative energy value	\$18.08/MWh <sup>b</sup>	Kaukauna
Operation and maintenance expenses	\$125,905	Kaukauna
Commission fee	\$31,150	Kaukauna
Relicensing cost	\$450,000	Kaukauna

<sup>a</sup> Kaukauna, as a municipal utility, is exempt from federal and local taxes.

<sup>b</sup> Source: Energy Information Administration using rates obtained from Annual Energy Outlook 2020 at <http://www.eia.gov/outlooks/aeo/index.cfm>

<sup>c</sup> Average over the period 2011-2018.

## 4.2 COMPARISON OF ALTERNATIVES

Table 2 compares the alternative power values, annual costs, and net benefits of the no-action alternative, Kaukauna's proposed action, and the staff alternative. In

section 5.1, *Comprehensive Development and Recommended Alternative*, we discuss our reasons for recommending the staff alternative and explain why we conclude the environmental benefits are worth the power benefit reductions.

Table 2. Comparison of alternatives for the Kimberly Project (Source: Staff).

	<b>No-Action</b>	<b>Kaukauna's Proposal</b>	<b>Staff Alternative</b>
Installed capacity (MW)	2.17	2.17	2.17
Annual generation (MWh)	12,325	12,325	12,325
Annual cost of alternative power (\$/MWh)	382,536 31.04	382,536 31.04	382,536 31.04
Annual project cost (\$/MWh)	502,795 40.79	508,196 41.23	508,357 41.25
Net benefits (cost of alternative power minus annual project cost) (\$/MWh)	(120,259) (9.76)	(125,660) (10.20)	(125,821) (10.21)

#### **4.2.1 No-Action Alternative**

Under the no-action alternative, the project would have an installed capacity of 2.17 MW and generate an average of 12,325 MWh of electricity annually. The average annual cost of alternative power would be \$382,536, or about \$31.04/MWh. The average annual project cost would be \$502,795, or about \$40.79/MWh. Overall, the project would produce power at a cost of about \$120,259, or \$9.76/MWh, more than the cost of alternative power.

#### **4.2.2 Kaukauna's Proposal**

Under the Kaukauna's proposal, the project would have an installed capacity of 2.17 MW and generate an average of 12,325 MWh of electricity annually. The average annual cost of alternative power would be \$382,536, or about \$31.04/MWh. The average annual project cost would be \$508,196 or about \$41.23/MWh. Overall, the project would produce power at a cost of about \$125,660, or \$10.20/MWh, more than the cost of alternative power.

#### **4.2.3 Staff Alternative**

The staff alternative is based on Kaukauna's proposal with a staff addition. The staff alternative would have an installed capacity of 2.17 MW and generate an average of 12,325 MWh of electricity annually. The average annual cost of alternative power would be \$382,536, or about \$31.04/MWh. The average annual project cost would be \$508,357

or about \$41.25/MWh. Overall, the project would produce power at a cost of about \$125,821, or \$10.21/MWh, more than the cost of alternative power.

### 4.3 COST OF ENVIRONMENTAL MEASURES

Table 3 gives the cost of each of the environmental enhancement measures considered in our analysis.

Table 3. Cost of environmental mitigation and enhancement measures considered in assessing the effects of operating the Kimberly Project (Source: Kaukauna and Staff).

<b>Enhancement/Mitigation Measures</b>	<b>Entity</b>	<b>Capital cost</b>	<b>Annual cost<sup>a</sup></b>	<b>Levelized annual cost<sup>b</sup></b>
<b>General</b>				
Continue to operate the project in a run-of-release mode.	Kaukauna, Staff	\$0 <sup>c</sup>	\$0 <sup>c</sup>	\$0
<b>Aquatic Resources</b>				
Develop a debris management plan.	Staff	\$1,000 <sup>d</sup>	\$100 <sup>d</sup>	\$161
<b>Land Use</b>				
Provide 0.088 acre of paved access to the powerhouse.	Kaukauna, Staff	\$30,000	\$0	\$1,830
<b>Cultural Resources</b>				
Implement the proposed HPMP to protect historic properties within the project's APE	Kaukauna, Staff	\$0 <sup>e</sup>	\$500 <sup>d</sup>	\$500

<sup>a</sup> Annual costs typically include project operation and maintenance costs and any other costs that occur on a yearly basis.

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

<sup>c</sup> We assume no cost for this measure based on its consistency with current project operation in which the project operates in a run-of-release mode with minimal fluctuation of the impoundment water surface elevation.

<sup>d</sup> Staff estimates the cost of this measure.

- <sup>e</sup> Kaukauna estimated that this measure would have a capital cost of \$5,000. However, since Kaukauna developed an HPMP that it filed with its license application, we assume that this cost is already included in the license application cost, which is included the project's net remaining investment shown in Table 1.

## **5.0 CONCLUSION AND RECOMMENDATIONS**

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

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

Based on our independent review of agency and public comments filed on the project and our review of the environmental and economic effects of the proposed project and project alternatives, we selected the staff alternative as the preferred alternative. We recommend this alternative because: (1) issuing a major license for the project would allow Kaukauna to continue to operate its project as a dependable source of electrical energy; (2) the 2.17 MW of electric capacity comes from a renewable resource that does not contribute to atmospheric pollution; (3) the public benefits of the staff alternative would exceed those of the no-action alternative; and (4) the staff-recommended measures would protect and aquatic resources and cultural resources at the project.

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

#### **5.1.1 Measures Proposed by Kaukauna**

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

- Continue to operate the project in a run-of-release mode, such that only surplus water released from the Corps' Cedars Dam would be used to produce power.
- Modify the current project boundary to include the tailrace, interconnection line, step-up transformer, and also include 0.088 acre of land to provide a paved access route to the project facility.
- Implement the final HPMP, filed with the license application, to protect historic properties within the project's APE that may be adversely affected by project operation and maintenance.

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

In addition to Kaukauna's proposed measures listed above, we recommend including the following measure in any license that may be issued for the Kimberly Project:

- A debris management plan.

Below, we discuss the basis for our additional staff-recommended measure.

#### Debris Management Plan

Kaukauna currently inspects the project trashracks a minimum of two times per week and the trashracks are cleaned as needed based on these observations. Debris that accumulates on the trashracks reduces the effectiveness of the trashracks at protecting fish from entrainment or impingement. A debris management plan would ensure that the trashracks operate effectively for reducing fish impingement and that beneficial organic debris is passed downstream to improve aquatic habitat. Therefore, we recommend the development and implementation of a debris management plan that includes procedures for: (1) removing and sorting debris that collects on project structures; (2) passing organic debris (i.e., leaves and wood) downstream of the project; and (3) removing and disposing of trash. We conclude that the benefits of a debris management plan would be worth the estimated annual levelized cost of \$161.

### **5.1.3 Conclusion**

Based on our review of the agency and public comments filed on the project and our independent analysis pursuant to sections 4(e), 10(a)(1), and 10(a)(2) of the FPA, we conclude that licensing the Kimberly Project, as proposed by the staff alternative, would be best adapted to a plan for improving the Lower Fox River Basin.

## **5.2 UNAVOIDABLE ADVERSE IMPACTS**

Some entrainment mortality could result with continued operation of the Kimberly Project. However, there is no indication that any fish losses caused by entrainment under the current operating mode has had any significant effect on fishery resources within the project area.

## **5.3 CONSISTENCY WITH COMPREHENSIVE PLANS**

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

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

U.S. Fish and Wildlife Service. n.d. Fisheries USA: The Recreational Fisheries Policy of the U.S. Fish and Wildlife Service. Washington, D.C.

Wisconsin Department of Natural Resources. 1995. Wisconsin's Biodiversity as a Management Issue. Madison, Wisconsin. May 1995.

Wisconsin Department of Natural Resources. Wisconsin Statewide Comprehensive Outdoor Recreation Plan (SCORP): 1991-1996. Madison, Wisconsin. October 1991.

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

If the Kimberly Project is issued a new license as proposed with the additional staff-recommended measure, the project would continue to operate while protecting aquatic and cultural resources in the project area.

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

## 7.0 LITERATURE CITED

- Bell, M. 1991. Fisheries handbook of engineering requirements and biological criteria. U.S. Army Corps of Engineers Fish Passage Development and Evaluation Program, North Pacific Division. Portland, OR.
- Caceres, M. Carolina, and Robert M.R. Barclay. “Myotis septentrionalis”. Mammalian Species, Issue 634, 12 May 2000, pp. 1-4.
- Electric Power Research Institute (EPRI). 1997. Turbine entrainment and survival database – field tests. Prepared by Alden Research Laboratory, Inc., Holden, Massachusetts. EPRI Report No. TR-108630. October 1997.
- Federal Energy Regulatory Commission. 2018. Environmental Assessment for the Kaukauna Project No. 1510-018. FERC Office of Energy Projects, Washington, D.C.
- \_\_\_\_\_. 2017. Order Approving Suspension of Water Quality Monitoring, Under Article 403 for the Little Chute Project No. 2588-007. Issued November 22, 2017.
- \_\_\_\_\_. 2000. Order Approving Water Quality Monitoring Plan for the Little Chute Project No. 2588-007. Issued August 24, 2000.
- \_\_\_\_\_. 1995. Preliminary assessment of fish entrainment at hydropower projects, a report on studies and protective measures, volumes 1 and 2 (appendices). FERC Office of Hydropower Licensing, Washington, D.C. Paper No. DPR-10. June 1995 (volume 1) and December 1994 (volume 2).
- \_\_\_\_\_. 2010. Environmental Assessment for New Hydropower License: Badger-Rapide Croche Hydroelectric Project No. 2677-019. FERC Office of Energy Projects, Washington, D.C.
- Federal Energy Regulatory Commission, Advisory Council on Historic Preservation, Wisconsin State Historic Preservation Officer, and Michigan State Historic Preservation Officer. 1993. Programmatic agreement among the Federal Energy Regulatory Commission, the Advisory Council on Historic Preservation, the Wisconsin State Historic Preservation Officer, and the Michigan State Historic Preservation Officer for managing historic properties that may be affected by new and amended licenses issuing for the continued operation of existing hydroelectric projects in the State of Wisconsin and the adjacent portions of the State of Michigan. December 30, 1993.
- Fox River Navigational System Authority. 2018. Fox Locks. [Online] URL: <http://www.foxlocks.org/>. (Accessed February 6, 2020).



- Fuller, P., Benson, A., Maynard, E., Neilson, M.E., Larson, J., and Fusaro, A., 2020, *Neogobius melanostomus* (Pallas, 1814): U.S. Geological Survey, Nonindigenous Aquatic Species Database, Gainesville, FL. [Online][URL]: <https://nas.er.usgs.gov/queries/factsheet.aspx?SpeciesID=713>, Revision Date: 12/5/2019, Peer Review Date: 1/7/2016. Accessed March 11, 2020.
- Kaukauna Utilities. 2017. Desktop Water Quality Study. Kimberly Hydroelectric Project, FERC No. 10674. Prepared by TRC, October 2017.
- Murray, D.E. 1974. A review of literature dealing with the swimming speeds of fishes of the Lake Erie vicinity. The Ohio State University Center for Lake Erie Area Research, Columbus, Ohio. Available at: [http://www.ohioseagrant.osu.edu/\\_documents/publications/CTR/CTR-157.pdf](http://www.ohioseagrant.osu.edu/_documents/publications/CTR/CTR-157.pdf). Accessed July 4, 2018.
- Meyer, Gretchen A., Joseph A. Senulis, and James A. Reinartz. “Effects of temperature and availability of insect prey on bat emergence from hibernation in spring.” *Journal of Mammalogy* 97(6), 2016, pp. 1623-1633.
- North American Electric Reliability Corporation (NERC). December 13, 2017. 2017 Long-Term Reliability Assessment; April 2018.Round Goby. 2020. [Online] [URL]: [https://www.google.com/search?q=life+history+of+round+goby+in+great+lakes&rlz=1C1GCEA\\_enUS874US874&oq=life+history+of+round+goby+in+great+lakes&aqs=chrome..69i57.8350j0j7&sourceid=chrome&ie=UTF-8](https://www.google.com/search?q=life+history+of+round+goby+in+great+lakes&rlz=1C1GCEA_enUS874US874&oq=life+history+of+round+goby+in+great+lakes&aqs=chrome..69i57.8350j0j7&sourceid=chrome&ie=UTF-8). Accessed March 10, 2020.
- U.S. Army Corps of Engineers (Corps). 2010. Lake Winnebago: Fox-Wolf River Basin. Booklet. Detroit District, Public Affairs Office. October 2010. 18 pages.
- U.S. Fish and Wildlife Service (FWS). 2014. Northern Long-Eared Bat Interim Conference and Planning Guidance. [Online]. Available at: <https://www.fws.gov/northeast/virginiafield/pdf/NLEBinterimGuidance6Jan2014.pdf>. Accessed January 31, 2020.
- \_\_\_\_\_. 2015. Northern Long-Eared Bat. [Online]. Available at: <https://www.fws.gov/midwest/endangered/mammals/nleb/nlebFactSheet.html> . Accessed January 31, 2020.
- \_\_\_\_\_. 2020. Information for Planning and Conservation. [Online]. Available at: <https://ecos.fws.gov/ipac>. Accessed June 16, 2020.
- \_\_\_\_\_. 2016. Northern Long-Eared Bat: Counties with Documented Hibernacula and Maternity Roosts as of March 14, 2016. Available at

<https://dnr.wi.gov/topic/EndangeredResources/documents/NLEBMap.pdf>.

Accessed January 31, 2020.

\_\_\_\_\_.2001. Lower Fox River Basin Integrated Management Plan. PUBL WT-666-2001. August 2001.

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