



Via Electronic Filing

May 3, 2021

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, D.C. 20426

**Subject: Constantine Hydroelectric Project (FERC No. 10661)
Draft License Application**

Dear Secretary Bose:

Indiana Michigan Power Company (I&M), a unit of American Electric Power (AEP), is the Licensee, owner, and operator of the 1.2 megawatt Constantine Hydroelectric Project (Project) (FERC Project No. 10661). The Project is located along the St. Joseph River in St. Joseph County, Michigan.

I&M operates and maintains the Project under a license from the Federal Energy Regulatory Commission (FERC or Commission). The Project's existing license expires on September 30, 2023. I&M is pursuing a subsequent license for the Project using the Commission's Integrated Licensing Process (ILP) as defined in 18 Code of Federal Regulations (CFR) Part 5. In accordance with 18 CFR § 5.16(a), I&M is filing herewith the Draft License Application (DLA) for the Project.

As described in the DLA, I&M is proposing to continue the operation of the Project and does not propose the development of any new hydroelectric facilities or increased generation capacity, but provides for protection, mitigation, and enhancement (PM&E) measures related to recreation, historic properties, terrestrial, and wildlife resources associated with the Project. The proposed PM&E measures described in the DLA reflect careful consideration of available information, the results of studies conducted, and issues specific to the Project. I&M believes that the proposed PM&E measures as described in the DLA adequately take into consideration the important power and non-power values of the Project and the interests of stakeholders.

The DLA is composed of two volumes, as described below:

Volume I of II

- Table of Contents
- Initial Statement and Additional Information Required by 18 CFR §5.18(a)
- Exhibit A – Project Description
- Exhibit E – Environmental Exhibit
- Exhibit F – General Design Drawings
- Exhibit G – Project Maps
- Appendices

**Volume II of II (CRITICAL ENERGY INFRASTRUCTURE INFORMATION
[CEII])**

- Single-Line Diagram
- Exhibit F – General Design Drawings

Concurrent with this filing, I&M is making public portions of the DLA available to resource agencies, Indian Tribes, local governments, non-governmental organizations, and members of the public on the Project's distribution list. An electronic copy of the DLA can be downloaded from FERC's eLibrary system (<https://www.ferc.gov/docs-filing/elibrary.asp>) by searching under docket number P-10661 (sub docket 050). The DLA will also be available at the Project's public relicensing website at www.aephydro.com/HydroPlant/Constantine.

In accordance with 18 CFR § 5.16(e), interested parties may file comments regarding the DLA within 90 days of the date of this letter (i.e., by August 1, 2021). All comments must be eFiled with FERC or sent to FERC at the following address:

Hon. Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
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If there are any questions regarding this filing, please do not hesitate to contact me at (614) 716-2240 or jmmagalski@aep.com.

Sincerely,



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DRAFT LICENSE APPLICATION

(Volume I of II)

Constantine Hydroelectric Project
(FERC NO. 10661)

Indiana Michigan Power Company

May 3, 2021



An **AEP** Company

BOUNDLESS ENERGY™



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**CONSTANTINE HYDROELECTRIC PROJECT
DRAFT LICENSE APPLICATION**

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APPENDICES:

Appendix A - Constantine Project Single-Line Diagram (Filed as CUI/CEII)

Appendix B – Correspondence

Acronym List

°C	degrees Celsius
°F	degrees Fahrenheit
µmhos/cm	microsiemens per centimeter
ACHP	Advisory Council on Historic Preservation
ADCP	Acoustic Doppler Current Profiler
AEP	American Electric Power
APE	area of potential effects
CFR	Code of Federal Regulations
cfs	cubic feet per second
cm/s	centimeters per second
DO	dissolved oxygen
EA	Environmental Assessment
EGLE	Michigan Department of Environment, Great Lakes, and Energy
EPT taxa	Ephemeroptera [mayflies], Plecoptera [stoneflies], and Trichoptera [caddisflies]
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission or Commission
FPA	Federal Power Act
fps	feet per second
GLEC	Great Lakes Environmental Center, Inc.
HPMP	Historic Properties Management Plan
I&M	Indiana Michigan Power Company
ICI	Invertebrate Community Index
ILP	Integrated Licensing Process
IPaC	Information for Planning and Consultation (USFWS)
ISR	Initial Study Report
kV	kilovolt

kW	kilowatt
M	magnitude
MDEQ	Michigan Department of Environmental Quality
MDNR	Michigan Department of Natural Resources
mg/L	milligram per liter
MiSWIMS	Michigan Surface Water Information Management System
MNFI	Michigan Natural Features Inventory
MWh	megawatt hours
ng/kg	nanograms per kilogram
NGVD29	National Geodetic Vertical Datum of 1929
NHPA	National Historic Preservation Act of 1966, as amended
NMFS	National Marine Fisheries Service
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRHP	National Register of Historic Places
NRI	Nationwide Rivers Inventory
NWI	National Wetlands Inventory
PAD	Pre-Application Document
PCB	polychlorinated biphenyls
PM&E	protection, mitigation, and enhancement
Project	Constantine Hydroelectric Project
PSP	Proposed Study Plan
RMP	Recreation Management Plan
ROR	run-of-river
RSP	Revised Study Plan
SBEI	Stream Bank Erosion Inventory

SCORP	Statewide Comprehensive Outdoor Recreation Plan
SD1	Scoping Document 1
SD2	Scoping Document 2
SHPO	State Historic Preservation Office
SPD	Study Plan Determination
STORET	STOrage and RETrieval
SU	standard units (pH)
TCP	traditional cultural properties
THPO	Tribal Historic Preservation Officer
TMDL	Total Maximum Daily Load
ug/kg	micrograms per kilogram
USACE	U.S. Army Corps of Engineers
USC	United States Code
USCB	U.S. Census Bureau
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USR	Updated Study Report
YES	Young Energy Services

Initial Statement (18 CFR §4.61(b))

THE FEDERAL ENERGY REGULATORY COMMISSION
APPLICATION FOR A SUBSEQUENT LICENSE FOR A MINOR WATER POWER PROJECT
5 MEGAWATTS OR LESS

CONSTANTINE HYDROELECTRIC PROJECT
(FERC No. 10661)

(1) Indiana Michigan Power Company (“I&M” or “Licensee” or “Applicant”) applies to the Federal Energy Regulatory Commission (“FERC” or “Commission”) for a subsequent license for the Constantine Hydroelectric Project (Project), FERC No. 10661.

(2) The location of the Project is:

State:	Michigan
County:	St. Joseph
Township or nearby town:	Constantine
Stream or other body of water:	St. Joseph River

(3) The exact name and address of the applicant are:

Mr. Michael Zwick
Vice President, Generating Assets
Appalachian Power Company
c/o Mr. Jonathan Magalski,
Environmental Specialist Consultant
American Electric Power Service Corporation
1 Riverside Plaza
Columbus, OH 43215
(614) 716-2240
jmagalski@aep.com

(4) The exact name, address, and telephone number of each person authorized to act as agent for the applicant in this application are:

Mr. Jonathan Magalski
Environmental Specialist Consultant
American Electric Power Service Corporation
c/o Indiana Michigan Power Company
1 Riverside Plaza
Columbus, OH 43215
(614) 716-2240

Ms. Elizabeth Parcell
Process Supervisor
American Electric Power Service Corporation
c/o Indiana Michigan Power Company
40 Franklin Road SW
Roanoke, VA 24011
(540) 985-2441

- (5) The Applicant is a domestic corporation and is not claiming preference under Section 7(a) of the Federal Power Act (FPA).
- (6)(i) The statutory or regulatory requirements of Michigan that affect the Project, as proposed, with respect to bed and banks and to the appropriation, diversion, and use of water for power purposes, and with respect to the right to engage in the business of developing, transmitting, and distributing power and in any other business necessary to accomplish the purposes of the license under the FPA are:
 - a. Water Quality Certification from the Michigan Department of Environment, Great Lakes, and Energy (Michigan EGLE) to ensure compliance of section 401 of the Federal Clean Water Act.
- ii. The steps that Applicant has taken or plans to take, to comply with each of the laws cited above, are:
 - a. The applicant will apply for the 401 Water Quality Certification per 18 CFR § 5.23(b).
- (7) The existing Project has an authorized installed capacity of 1,200 kilowatts (kW). Project works consist of: (a) an uncontrolled concrete gravity overflow spillway dam with a height of about 12 feet, a total length of 241.25 feet, including an abandoned 4-foot-wide fish chute at the left abutment which is now a sluice gate, and topped with 11 -¼-inch-high flashboards; (b) a reinforced-concrete headgate structure 68 feet long and 20 feet high containing seven wooden gates about 7.75 feet wide by 15 feet high; (c) a 70-foot-long earthen embankment between the headgate structure and overflow spillway; (d) an earthen-fill reservoir impoundment dike with a maximum height of about 20 feet and a length of 650 feet located about 1,500 feet east from the left abutment of the main dam; (e) a reservoir with a surface area of 525 acres at a normal water surface elevation of 782.94 feet, National Geodetic Vertical Datum of 1929 (NGVD29); (f) a 1,270-foot-long power canal with a bottom width of 60 feet; (g) a brick powerhouse with dimensions of 140 feet by 30 feet containing four vertical-shaft Francis turbines connected to four 300-kW generating units for a total installed capacity of 1,200 kW; (h) a switchyard adjacent to the powerhouse containing three step-up transformers; (i) a 2.4-kilovolt (kV) transmission line about 50 feet long; and (j) appurtenant facilities and equipment.
- (8) The Project does not occupy any lands of the United States.
- (9) The Project is an existing constructed project.

Additional Information Required by 18 CFR § 4.32(a)(2)

- (1) *Identify every person, citizen, association of citizens, domestic corporation, municipality, or state Identify every person, citizen, association of citizens, domestic corporation, municipality, or state that has or intends to obtain and will maintain any proprietary right necessary to construct, operate, or maintain the project:*

I&M presently holds and will continue to hold the proprietary rights necessary to operate and maintain the Project.

- (2) *Identify (providing names and addresses):*

- (i) *Every county in which any part of the project, and any Federal facilities that would be used by the project would be located:*

County Name: St. Joseph County
Address: 125 W. Main St.
P.O. Box 189
Centreville, MI 49032

There are no Federal lands or facilities used by the Project

- (ii) *Every city, town, or similar local subdivision:*

- (A) *In which any part of the project, and any Federal facilities that would be used by the project, would be located:*

City/Town Name: Village of Constantine
Address: 115 White Pigeon St.
Constantine, MI 49042

There are no Federal lands of facilities associated with the Project.

- (B) *That has a population of 5,000 or more people and is located within 15 miles of the project dam:*

City of Elkhart
Charles C. Cheek
Township Trustee
106 N. 5th Street
Goshen, IN 46528

City of Goshen
Jeremy P. Stutsman
Mayor
202 S. 5th Street
Goshen, IN 46528

Town of Bristol
Mike Yoder
Town Manager
303 E Vistula Street
Bristol, IN 46507

Town of Middlebury
Ruth Eash
Township Trustee
117 North Main Street
Middlebury, IN 46540

Town of Shipshewana
Robert Shanahan
Town Manager
345 N Morton Street
Shipshewana, IN 46565

City of Sturgis
Mike Hughes
City Manager
130 North Nottawa Street
Sturgis, MI 49091

City of Three Rivers
Thomas Lowry, Mayor
53 ½ North Main Street
Three Rivers, MI 49093

(iii) *Every irrigation district, drainage district, or similar special purpose political subdivision:*

(A) *In which any part of the project, and any Federal facilities that would be used by the project, would be located, or (B) That owns, operates, maintains, or uses any project facilities or any Federal facilities that would be used by the project:*

There are no irrigation or drainage districts, or similar special purpose political subdivisions associated with or in the general area of the Project. There are no federal lands or facilities associated with the Project.

(iv) *Every other political subdivision in the general area of the project that there is reason to believe would likely be interested in, or affected by, the application.*

There are no other political subdivisions in the general area of the Project that there is reason to believe would likely be interested in, or affected by, the application.

(v) *All Indian tribes that may be affected by the project.*

Mr. Michael LaRonge
Tribal Historic Preservation Officer
Forest County Potawatomi Community
5320 Wensaut Lane
PO Box 340
Crandon, WI 54520

Ms. Kelly Curran
Pokagon Band of Potawatomi Indians
58620 Sink Road
PO Box 180
Dowagiac, MI 49047

Nottawaseppi Huron Band of the
Potawatomi
1485 Mno-Bmadzewen Way
Fulton, MI 49052

Ms. Diane Hunter
Tribal Historic Preservation Officer
Miami Tribe of Oklahoma
P.O. Box 1326
Miami, OK 74355

Exhibit A

Project Description

A.1 Project Location

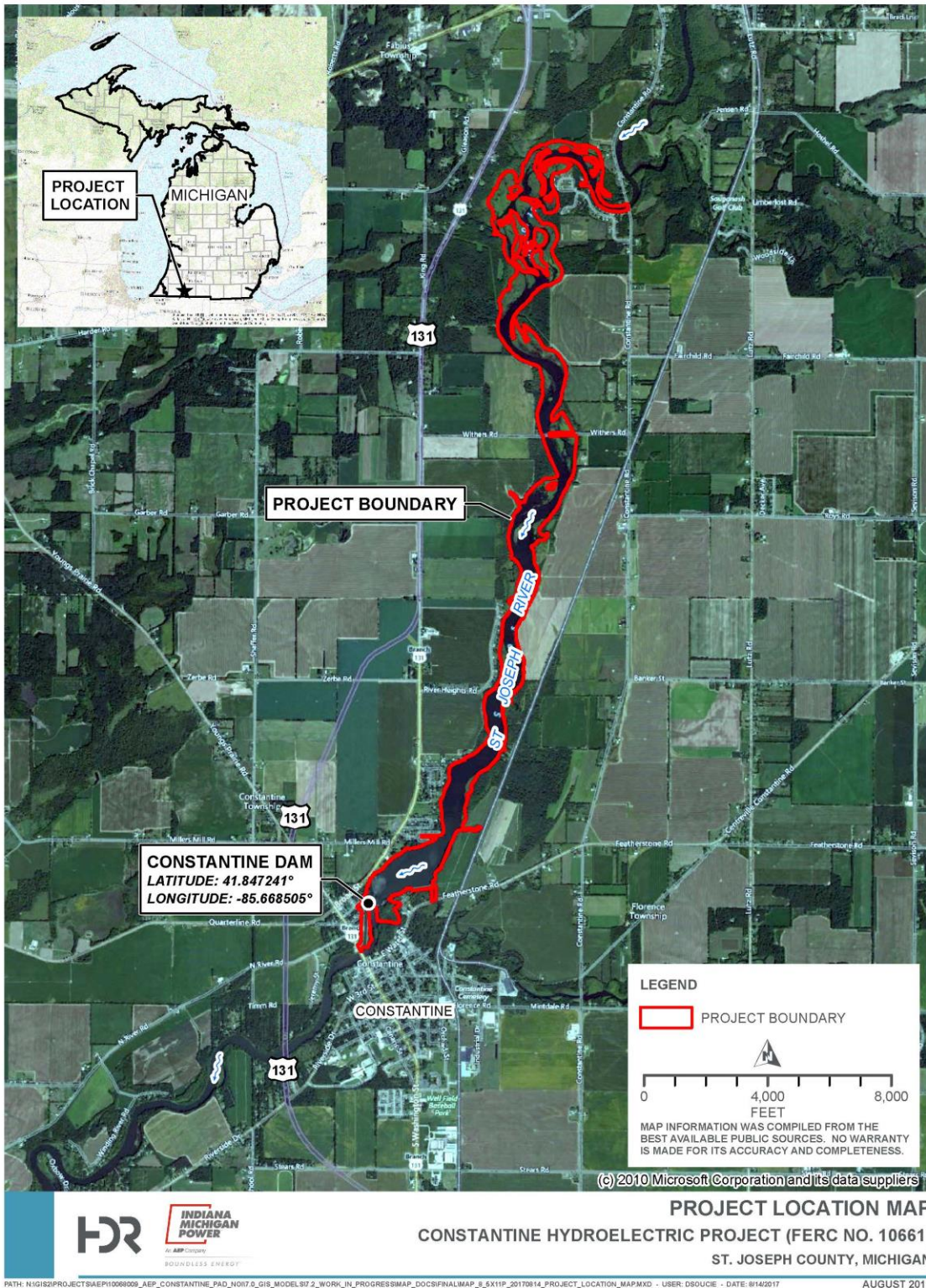
A.1.1 Project Overview and Location

Indiana Michigan Power Company (I&M or Licensee), a unit of American Electric Power (AEP), is the Licensee, owner, and operator of the run-of-river (ROR), 1,200-kilowatt (kW) Constantine Hydroelectric Project (Project) (Project No. 10661), located on the St. Joseph River in the Village of Constantine in St. Joseph County, Michigan (Figure A.1-1).

The Constantine Project consists primarily of an uncontrolled concrete gravity overflow spillway dam, a concrete headgate structure, an earthen embankment between the headgate structure and overflow spillway, an earthfill reservoir impoundment dike, a power canal, and a powerhouse. The Project was constructed in 1873 by the Constantine Hydraulic Company. The original timber crib dam and powerhouse were replaced with the existing dam and powerhouse in 1923. Today the Project is operated by I&M in a ROR manner, generating approximately 5,000 megawatt hours (MWh) annually of renewable energy.

The Project is currently licensed by the Federal Energy Regulatory Commission (FERC or Commission) under the authority granted to FERC by Congress through the Federal Power Act (FPA), 16 United States Code (USC) §791(a), et seq., to license and oversee the operation of non-federal hydroelectric projects on jurisdictional waters and/or federal land. There are no federal lands associated with the Project. The Project underwent original licensing in the early 1990s, and the current operating license for the Project expires on September 30, 2023. In accordance with FERC's regulations at 18 Code of Federal Regulations (CFR) §16.9(b), I&M must file its application for a new license with FERC no later than September 30, 2021.

Figure A.1-1
Project Location Map



A.2 Turbines and Generators

A.2.1 Generating Units

Table A.2-1 provides the number and type of existing generating units. At this time, I&M has no plans to install additional generating units at the Project.

**Table A.2-1
Generating Units**

Unit No.	Year Installed	RPM	Manufacturer	kW	kVA
1	1927	100	General Electric	300	375
2	1927	100	General Electric	300	375
3	1927	100	General Electric	300	375
4	1927	100	General Electric	300	375

A.2.2 Turbines

Table A.2-2 provides the number, type, and capacity of the existing turbines. At this time, I&M has no plans to install additional turbine units at the Project.

**Table A.2-2
Turbine Units**

Unit No.	Manufacturer	Type	Geometry	Runner Type	Horsepower	Head (ft)	Capacity (cfs)	kW
1	S. Morgan Smith	S	Vertical	Francis	426	12.5	430	300
2	S. Morgan Smith	S	Vertical	Francis	426	12.5	430	300
3	S. Morgan Smith	S	Vertical	Francis	426	12.5	430	300
4	S. Morgan Smith	S	Vertical	Francis	426	12.5	430	300

A.3 Project Operation

A.3.1 Daily Operation

The Constantine Hydroelectric Project is an unmanned, partially automated, hydroelectric generating facility located at river mile 101.4 on the St. Joseph River in the Village of Constantine in St. Joseph County, Michigan. The Project operates as a ROR facility for the purpose of generating electric power. Operations are performed both locally and remotely. The Project is not staffed full time but is tended five days per week by personnel who split their time between the Constantine Project and I&M's

Mottville Project (FERC No. 1750), located about seven miles downstream. Operations are monitored remotely by the AEP's Hydro Operation Center in Columbus, Ohio, which is staffed 24-hours per day, 365 days per year.

The generation units are operated locally through a programmable logic controller (PLC) and float controller.

The facility is operated in ROR mode whereby inflows at the dam match outflows, to the greatest extent possible. This is achieved by adjusting the water flow to the turbines to match available river flow. One or more turbines are generally capable of handling the river flow to maintain the proper pond elevation. Flows in excess of the powerhouse's hydraulic turbine capacity (382 cubic feet per second (cfs)/unit for a total of 1,528 cfs at a head of 11.3 feet; 430 cfs/unit for a total of 1,720 cfs at a head of 12.5 feet) are discharged by the uncontrolled overflow spillway.

The flashboards are usually in place on the spillway crest, thereby creating a normal reservoir elevation of 782.9 feet NGVD29. The tailwater at Constantine is controlled by the gated spillway structure at the Mottville Project approximately seven miles downstream. The normal pool elevation at Mottville is 771.0 feet NGVD29.

The Constantine Hydraulic Company operated the hydroelectric plant through 1917. The Project was purchased by Michigan Gas and Electric Company, the predecessor to I&M, in 1917 and subsequently placed under their operation. On October 20, 1993, I&M obtained a FERC license for the Project.

During high water events, the flashboards on the spillway generally fail when the water level is about elevation 785.0 feet NGVD29.

A.4 Generation and Outflow

The Project operates in a ROR mode and inflows to the Project are controlled by upstream flows. Table A.4-1 provides a summary of monthly and annual Project generation for a period of five years in gross MWh. Average annual generation at the Project from 2016 through 2020 is 4,713 MWh.

**Table A.4-1
Monthly and Annual Generation (MWh)
(January 1, 2016 to December 31, 2020)**

Period	2016	2017	2018	2019	2020	Average Monthly
January	626	614	430	369	444	497
February	705	679	462	512	539	579
March	726	520	378	94	449	433

Period	2016	2017	2018	2019	2020	Average Monthly
April	690	507	452	8	455	422
May	623	519	430	455	379	481
June	243	207	442	424	360	335
July	274	282	198	282	356	278
August	508	117	369	264	277	307
September	378	63	346	323	324	287
October	177	388	332	451	370	344
November	205	466	294	359	360	337
December	452	408	249	468	485	412
Gross Annual Generated	5,607	4,769	4,382	4,007	4,798	4,713

Monthly and annual daily average Project outflows for 2016 through 2020 are shown in Table A.4-2.

Table A.4-2
Monthly and Annual Average Project Outflows (cfs)
(January 1, 2016 to December 31, 2020)

Period	2016	2017	2018	2019	2020	Monthly Average
January	1,441	2,560	1,550	1,836	3,736	2,225
February	1,235	2,602	3,333	2,470	2,599	2,448
March	1,571	2,659	3,837	2,219	2,464	2,550
April	1,975	3,171	2,696	2,262	2,540	2,529
May	1,983	2,634	3,995	3,409	3,623	3,129
June	940	1,404	2,676	2,978	2,086	2,017
July	56	1,003	1,230	1,742	1,155	1,157
August	1,432	536	1,042	1,015	749	955
September	1,176	474	1,112	944	830	907
October	1,247	1,230	1,508	1,973	882	1,368
November	1,510	1,946	1,681	2,369	942	1,689
December	1,559	1,477	1,804	2,045	1,070	1,591
Annual Average	1,685	2,178	2,656	2,540	2,283	2,269

A.5 Estimated Average Head

Normal operating head is considered to be 12.5 feet.

A.6 Reservoir

The Prairie River converges with the St. Joseph River approximately six miles upstream of the Project dam while the Fawn River joins the St. Joseph River approximately 500 feet below the Project dam. The reservoir surface area is approximately 525 acres with a normal elevation of 782.90 feet NGVD29. Additional details are included in Table A.6-1.

**Table A.6-1
Constantine Project Reservoir Data**

Drainage area	1,554 square miles
Shoreline length	12 miles
Typical surface area	525 acres
Maximum Depth	12 feet
Permanent crest of dam elevation	790 feet mean sea level (msl)
Typical normal surface water elevation	782.90
Operations	run-of-river

A.7 Hydraulic Capacity of the Project

The range in hydraulic capacity for each unit varies from the minimum flow necessary for power generation to the flow necessary for economic operation. The flow range for Units 1-4 is about 400 cfs. Based on the maximum flow through the units, the hydraulic capacity of the plant is 1,600 cfs if all four units are operating.

Flow in excess of that required for generation is passed over dam.

The Constantine Project is located at river mile 101.4 which has a drainage area of 1,554 square miles. The average stream flow at this point is 1,374 cfs.

A.8 Project Facilities

A.8.1 Existing Project Facilities

The licensed Project work consists of: (a) an uncontrolled concrete gravity overflow spillway dam with a height of about 12 feet, a total length of 241.25 feet, including an abandoned 4-foot-wide fish chute

at the left abutment which is now a sluice gate, and topped with 11- $\frac{1}{4}$ -inch-high flashboards; (b) a reinforced-concrete headgate structure 68 feet long and 20 feet high containing seven wooden gates about 7.75 feet wide by 15 feet high; (c) a 70-foot-long earthen embankment between the headgate structure and overflow spillway; (d) an earthfill reservoir impoundment dike with a maximum height of about 20 feet and a length of 650 feet located about 1,500 feet east from the left abutment of the main dam; (e) a reservoir with a surface area of 525 acres at a normal water surface elevation of 782.90 feet, NGVD29; (f) a 1,270-foot-long power canal with a bottom width of 60 feet; (g) a brick powerhouse with dimensions of 140 feet by 30 feet containing four vertical-shaft Francis turbines connected to four 300-kW generating units for a total installed capacity of 1,200 kW; (h) a switchyard adjacent to the powerhouse containing three step-up transformers; (i) a 2.4-kilovolt (kV) transmission line about 50 feet long; and (j) appurtenant facilities and equipment (Figure A.8-1). The average annual production for the Project typically ranges between 4,574 and 5,438 MWh.

Figure A.8-1
Project Facilities



PROJECT FACILITIES
CONSTANTINE HYDROELECTRIC PROJECT (FERC NO. 10661)
ST. JOSEPH COUNTY, MICHIGAN



PATH: \\P:\MS\INFO\GIS\PROJECTS\10661\10661_AEP_CON\ANTHE_TAD_V01P_18_MODEL\17_2\WORK\10661\PROJ\RES\MAP_DOC\FINAL\MAP_11\10661_PROJECT_FACILITIES.KXD USER: DBDUSE DATE: 9/8/2017

A.8.1.1 Dam

The abutment embankment to the left of the spillway is about 250 feet in length and up to 22.5 feet in height (adjacent to the spillway). The crest elevation is at 790 feet NGVD29 at the embankment. In 2009, the low areas on the embankment were raised to elevation 790 feet NGVD29 beyond the left end of the embankment.

The concrete spillway section has a total crest length of 241.25 feet including the abandoned fish ladder which is no longer present. The actual effective spillway width is 240.25 feet if the 1-foot-wide pier between the flashboard section and the fish chute is not included. Flashboards are mounted on the crest. The flashboards are 11-¼ inches high and use wood pins to maintain the boards vertically. The crest elevation of the flashboards is 782.90 feet NGVD29. The fixed crest of the spillway structure is elevation 781.96 feet NGVD29. A steel sheet pile wall extends across the upstream side of the spillway and upstream along the spillway's abutment wall. The top elevation of this sheeting is about elevation 760 feet NGVD29, 10.5 feet below the base of the structure. During 1991, a new, 2-foot-thick, concrete cap was constructed on top of the left abutment wall of the spillway. The width of the spillway from the upstream to downstream end of its apron is about 54.5 feet, 24.5 feet of which is the width of the spillway. The spillway is a slab-and-buttress-type structure with 19 bays of 18-foot width (pier face to pier face) plus an additional short bay of 14.83 feet under the fish chute. The bays are separated by 2-foot-wide buttresses.

There is a concrete-capped, grouted rubble apron extending 30 feet downstream of the spillway. The top elevation of the apron is 775.0 feet NGVD29 at the interface with the spillway and elevation 772.5 at the downstream end. The elevation of the bottom of the apron and underlying rubble fill is elevation 770.5 feet NGVD29.

The reservoir embankment (also referred to as the reservoir dike, detached dike or embankment, or saddle dike) is approximately 650 feet long. The dike has a maximum height of about 20 feet and is constructed of sand. The reservoir embankment has undergone various modifications since 1987 for improved stability, and in 2014, the top of the embankment was raised to elevation 790 feet NGVD29.

A.8.1.2 Forebay and Intake

The canal headgate structure (also referred to as the headworks) is located at the upstream end of the power canal, adjacent to the spillway. The headworks are 73.75 feet long and 33 feet wide, with a deck elevation of 790.0 feet NGVD29. The masonry structure has seven vertical slide gates. Each gate is 7-feet, 10-inches wide, except the gate on the right side which is 6-feet, 9-inches wide. The gate sill is at elevation 770.00 feet NGVD29. The headgates are opened using a rack-and-pinion gearing system driven by a portable electric motor driver that can open two gates at a time. In May

1990, the headgates were repaired; new gates, stems, and gate guides were installed. The headgate structure is protected against piping by steel sheet piling to an elevation of about 753.5 feet under the wing walls and along the upstream and downstream toe of the structure.

A.8.1.3 Powerhouse

The two-level concrete and masonry powerhouse contains four vertical S. Morgan Francis units. Each unit has a rated capacity of 300 kW at 12.5 feet of head. Discharge at full gate and normal full reservoir level is about 400 cfs, for a total plant discharge of 1,600 cfs if all four units are operating. The powerhouse is approximately 140 feet long and 58 feet wide. The generator floor level is about elevation 787.0 feet NGVD29. The heel and toe elevations of the powerhouse are at about elevation 769.0 and 758.0 feet NGVD29, respectively. The forebay intake section is approximately 114 feet long and located directly below the upper level of the powerhouse. Each bay is faced with a continuous run of trashracks consisting of 1/2-inch-long by 4-inch, epoxy-coated steel bars. Each bar is 16 feet in length and angled toward the powerhouse at 25 degrees to vertical. The bars are spaced 3 ½ inches center-to-center and oriented to provide a clear space of 3 inches. The invert of the turbine pit (forebay) is at elevation 771.5 feet NGVD29. The draft tube invert is at about elevation 760.0 feet NGVD29.

A.8.1.4 Bypassed Reach

The bypassed reach runs parallel to the Project's power canal and is approximately 1,300 feet long. The bypassed reach is typically inundated by backwater from the Mottville Project (FERC No. 1750) located downstream. The Fawn River flows into the St. Joseph River about 500 feet downstream of the spillway, adding about 210 cfs to the bypassed reach. A small gravel bar, located at mid-channel in the bypassed reach adjacent to the mouth of the Fawn River, is exposed when the tailwater elevation drops to its lowest level.

A.8.1.5 Transmission and Switchyard

The transmission line associated with this Project is a 2.4-kV distribution line that is approximately 50 feet long.

The switchyard is adjacent to the powerhouse containing three step-up transformers.

A.9 Project Costs, Value, and Purpose

A.9.1 Estimated Cost of the Project

Information to be presented in the FLA.

A.9.2 Estimated Operations and Maintenance Cost of Proposed Environmental Measures

Table A.9-1 presented the estimated capital costs and the estimated operations and maintenance (O&M) expenses of each proposed environmental measure.

**Table A.9-1
Costs of Proposed Environmental Measures**

Proposed Environmental Measure	Estimated Capital Cost (2021 USD)	Estimated Annual O&M Expense (2021 USD)
Historic Properties Management Plan	15,000	2,500
Recreation Management Plan	15,000	5,000

A.9.3 Purpose of the Project

The electrical energy generated at this station is transformed to the proper voltage in the station switchyard and distributed into I&M's electrical grid. It is then distributed and sold to I&M's retail and wholesale customers, primarily in Southern Michigan and Northern Indiana.

A.9.4 Cost to Develop the License Application

Information to be presented in the FLA.

A.9.5 Value of Project Power

A.9.5.1 On-Peak and Off-Peak Value

The Project operates in a ROR mode. Therefore, this section is not applicable.

A.9.6 Changes in Project Generation or Operations

No changes to Project facilities, generation, or operations are proposed. The Project's annual generation is not expected to increase or decrease over the term of the new license.

A.9.7 Net Investment of the Project

The net investment in the Project (through the end of 2017) is approximately \$1,884,989. This value should not be interpreted as the fair market value of the Project.

A.9.8 Annual Operation and Maintenance Costs

The estimated annual costs of Project O&M, including insurance, administration, taxes, depreciation, and general costs will be provided in the FLA.

A.10 Single Line Diagram

The Constantine Project single-line diagram is included in Appendix A (Filed as Controlled Unclassified Information//Classified Energy/Electric Infrastructure Information [CUI//CEII]).

A.11 Measures to Ensure Safe Management of the Project

In May 1990, the headgates were repaired; new gates, stems, and gate guides were installed. During 1991, a new, 2-foot-thick, concrete cap was constructed on top of the left abutment wall of the spillway. Additionally, a major electrical upgrade was completed in the powerhouse and new static exciters were installed along with new switch gears and controls. The upgrade included automated operation of the generating equipment. The reservoir embankment has also undergone various modifications since 1987 for improved stability, and in 2014, the top of the embankment was raised to an elevation of 790 feet NGVD29. Future measures will include routine maintenance of concrete, spillway gates, and other equipment.

The Licensee has safely operated, maintained, and managed the Project since its acquisition. These same practices will be continued under the new license, subject to any new terms and conditions contained therein.

Exhibit E

Environmental Report

E.1 Introduction

Indiana Michigan Power Company (I&M or Licensee), a unit of American Electric Power (AEP), is the Licensee, owner, and operator of the run-of-river (ROR), 1,200-kilowatt (kW) Constantine Hydroelectric Project (Project) (Project No. 10661), located on the St. Joseph River in the Village of Constantine in St. Joseph County, Michigan. The location of the Project is shown in Figure E.1-1 at the end of this section.

The Constantine Project consists primarily of an uncontrolled concrete gravity overflow spillway dam, a concrete headgate structure, an earthen embankment between the headgate structure and overflow spillway, an earthfill reservoir impoundment dike, a power canal, and a powerhouse. The Project was constructed in 1873 by the Constantine Hydraulic Company. The original timber crib dam and powerhouse were replaced with the existing dam and powerhouse in 1923. Today the Project is operated by I&M in a ROR manner, generating approximately 5,000 megawatt hours (MWh) annually of renewable energy.

The Project is currently licensed by the Federal Energy Regulatory Commission (FERC or Commission) under the authority granted to FERC by Congress through the Federal Power Act (FPA), 16 United States Code (USC) §791(a), et seq., to license and oversee the operation of non-federal hydroelectric projects on jurisdictional waters and/or federal land. There are no federal lands associated with the Project. The Project underwent original licensing in the early 1990s, and the current operating license for the Project expires on September 30, 2023. In accordance with FERC's regulations at 18 Code of Federal Regulations (CFR) §16.9(b), I&M must file its application for a new license with FERC no later than September 30, 2021.

E.1.1 Consultation

In August 2017, I&M began consultation with interested parties by sending a request for information in support of the upcoming relicensing. On June 4, 2018, I&M initiated the formal relicensing process for the Project using the Commission's Integrated Licensing Process (ILP) with the filing of the Pre-Application Document (PAD) and Notice of Intent (NOI).

FERC issued Scoping Document 1 (SD1) for the Project on July 25, 2018. On August 28 and 29, 2018, the Commission held two public scoping meetings in Constantine, Michigan, to solicit comments regarding the scope of issues and analysis for FERC's Environmental Assessment (EA). Pursuant to 18 CFR §5.8(d), the Commission also held a site visit in conjunction with the scoping meetings.

Comments on SD1, the PAD, and/or study requests were filed by FERC, the U.S. Environmental Protection Agency (USEPA), Michigan Department of Natural Resources (MDNR), Pokagon Band of Potawatomi Tribe, and Friends of the St. Joe River Association, Inc. (Friends of the St. Joe River). FERC requested a Botanical Resources Study; however, no other formal study requests were received from stakeholders during the comment period. The USEPA, MDNR, Friends of the St. Joe River, and the Pokagon Band of Potawatomi Tribe filed general information, statements, and/or informal study requests related to the Project. FERC issued Scoping Document 2 (SD2) on November 13, 2018, to reflect issues or alternatives to be considered in the EA based on stakeholder comments and study requests filed in response to SD1.

Pursuant to the schedule and requirements of the ILP, I&M developed a Proposed Study Plan (PSP) to address the comments and study requests submitted by stakeholders. Comments on the PSP were received from FERC, MDNR, and Michigan Department of Environment, Great Lakes, and Energy (EGLE) [formerly Michigan Department of Environmental Quality (MDEQ)]. The PSP was filed with FERC and made available to stakeholders on November 16, 2018. In accordance with 18 CFR §5.11(e), I&M held a PSP Meeting on December 11, 2018, in Lansing, Michigan. The purpose of the PSP Meeting was to clarify the intent and contents of I&M's PSP, explain any initial information gathering needs, and address outstanding issues associated with the proposed studies.

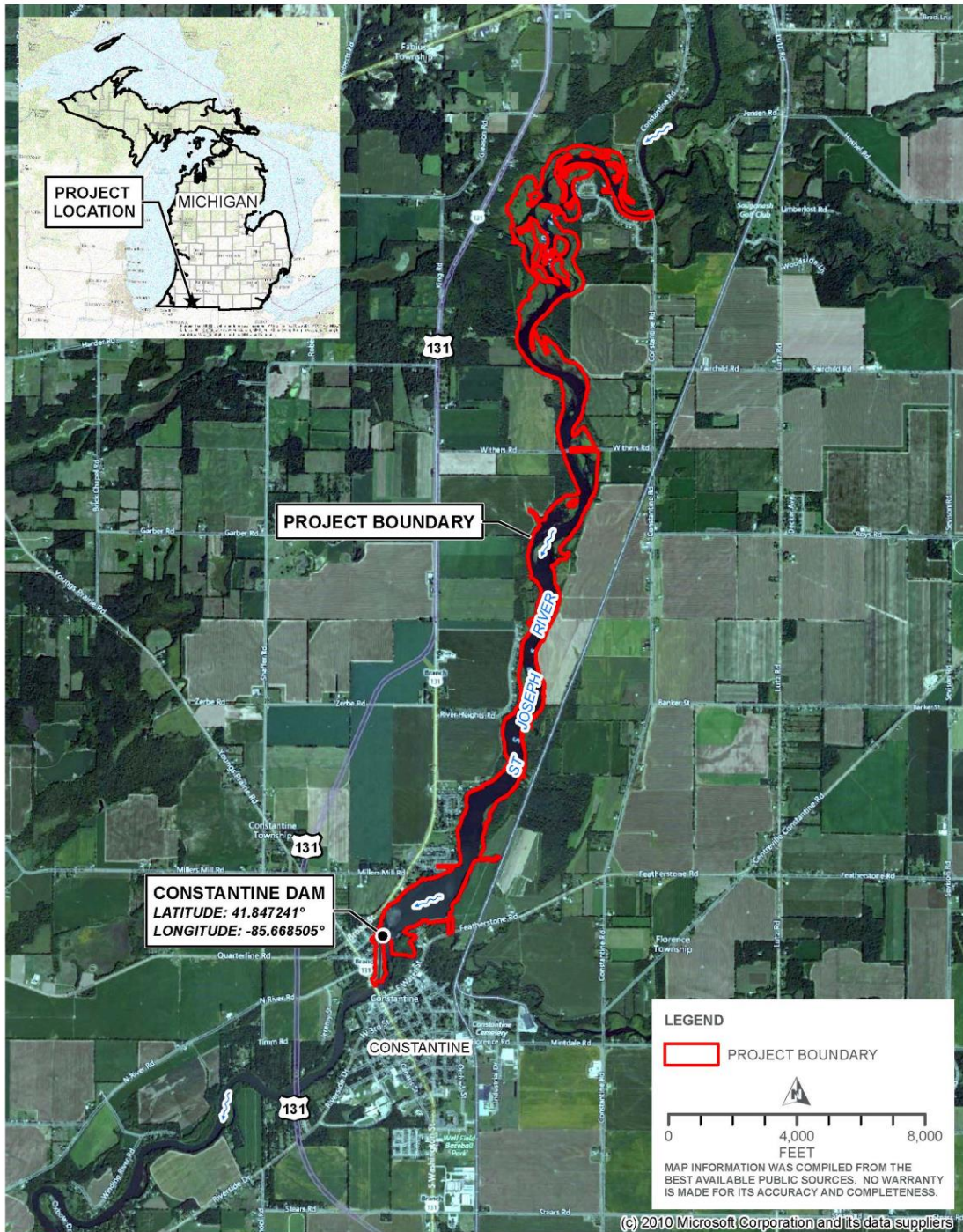
In response to the comments on the PSP, I&M developed a Revised Study Plan (RSP) that was filed with FERC and made available to stakeholders on March 15, 2019. On April 9, 2019, FERC issued a Study Plan Determination (SPD) for the Project approving the studies outlined in the RSP. The SPD directed I&M to conduct eight studies:

- Botanical Resources Study
- Shoreline Stability Assessment Study
- Water Quality Study
- Fisheries Survey
- Mussel Survey
- Wetlands Study
- Recreation Study
- Cultural Resources Study

In accordance with 18 CFR §5.15, I&M has completed the approved studies in accordance with the schedule and methods described in the RSP and FERC's SPD. I&M filed the Initial Study Report (ISR), including draft study reports for all eight of the completed studies, on April 14, 2020; conducted a virtual ISR Meeting on April 23, 2020; and filed the ISR Meeting Summary with the Commission on May 8, 2020.

FERC filed comments on the ISR and the ISR Meeting Summary by letter dated June 9, 2020. No comments or disagreements were filed by any other relicensing participants. I&M responded to FERC's comments by letters dated July 13 and July 27, 2020. In a follow-up email on August 12, 2020, FERC requested that I&M provide the continuous water temperature and dissolved oxygen (DO) data used to generate the graphs in the Water Quality Study Report. On August 13, 2020, I&M provided the Excel files including all of the raw data for the continuous water temperature and DO collected at the Project. No additional studies or modifications to the previously approved studies were required. By letter dated March 8, 2021, I&M requested concurrence from EGLE, MDNR, and the U.S. Fish and Wildlife Service (USFWS) that an Updated Study Report (USR) and USR Meeting were not warranted for the Project since all studies were completed according to the RSP and FERC's SPD and were filed with the ISR and no additional studies were conducted or required. MDNR provided their concurrence with forgoing the USR and USR Meeting via email on April 2, 2021. EGLE and USFWS did not provide a response. Copies of all correspondence to date are provided in Appendix B.

Figure E.1-1
Project Location Map



PROJECT LOCATION MAP
CONSTANTINE HYDROELECTRIC PROJECT (FERC NO. 10661)
ST. JOSEPH COUNTY, MICHIGAN

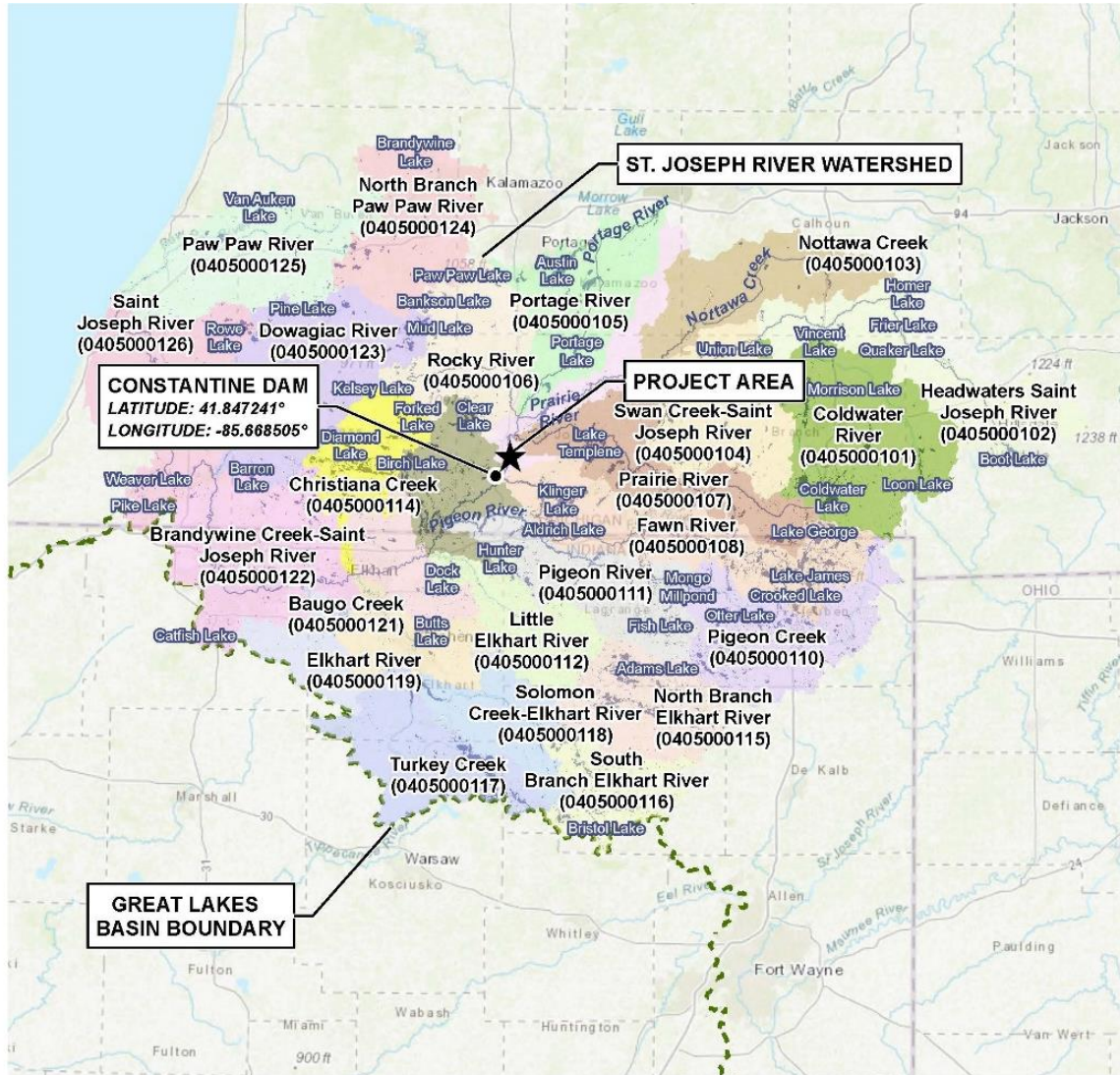
E.2 General Setting

E.2.1 St. Joseph River Watershed

The St. Joseph River watershed is located in the southwest portion of the lower peninsula of Michigan and northwestern portion of Indiana. It is the third largest river basin in Michigan and spans the Michigan-Indiana border and empties into Lake Michigan at St. Joseph, Michigan. The watershed drains 4,685 square miles from 15 counties (Berrien, Branch, Calhoun, Cass, Hillsdale, Kalamazoo, St. Joseph, and Van Buren in Michigan and De Kalb, Elkhart, Kosciusko, Lagrange, Noble, St. Joseph, and Steuben in Indiana). The watershed includes 3,742 river miles and flows through and near the Kalamazoo-Portage, the Elkhart-Goshen, the South Bend, and the St. Joseph/Benton Harbor metropolitan areas. The drainage area for the Constantine Project is 1,554 square miles (Friends of the St. Joe River Association 2005).

The St. Joseph River is approximately 206 miles long, in southern Michigan and northern Indiana, and empties into Lake Michigan (see Figure E.2-1). It drains a primarily rural farming area in the watershed of Lake Michigan (Trout Unlimited undated). The St. Joseph River is a large river and its flow can become intense during high water events. Large deep runs and pools are found throughout its length (Trout Unlimited undated).

**Figure E.2-1
St. Joseph River Basin Boundary**



Legend

- Great Lakes Basin Boundary
- Watershed Boundary
- Baugo Creek
- Brandywine Creek-St Joseph River
- Christiana Creek
- Coldwater River
- Dowagiac River
- Elkheart River
- Fawn River
- Headwaters Saint Joseph River
- Little Elkheart River
- Little Portage Creek-Saint Joseph River
- Mill Creek-Saint Joseph River
- North Branch Elkheart River
- North Branch Paw Paw River
- Nottawa Creek
- Paw Paw River
- Pigeon Creek
- Pigeon River
- Portage River
- Prairie River
- Puterbaugh Creek-Saint Joseph River
- Rocky River
- Saint Joseph River
- Solomon Creek-Elkheart River
- South Branch Elkheart River
- Swan Creek-Saint Joseph River
- Turkey Creek



MAP INFORMATION WAS COMPILED FROM THE BEST AVAILABLE PUBLIC SOURCES. NO WARRANTY IS MADE FOR ITS ACCURACY AND COMPLETENESS.



**GREAT LAKES BASIN BOUNDARY
CONSTANTINE HYDROELECTRIC PROJECT (FERC NO. 10661)
ST. JOSEPH COUNTY, MICHIGAN**

PATH: I:\P\ME-INFO\GIS\GIS2\PROJECTS\BAP\BAP\066609_AEP_CONSTANTINE_PAD_NOR1_3_GIS_MODELBIT_2_WORK_IN_PROGRESS\MAP_DOCS\FINAL\MAP_3_5X11P_2021_BASIN_WATERSHED_MAP.MXD - USER: KAUSTIN - DATE: 4/19/2021 APRIL 2021

E.2.2 Geography, Topography, and Climate

Drainage conditions are mostly well drained with variable areas from poorly to excessively well-drained. Moderately well to well-drained portions of the outwash are used for agriculture, but poorly drained outwash deposits remain as swamp or marsh (Albert et al. 1986).

E.2.3 Dams and Diversions in the Basin

Within the St. Joseph River watershed there are 190 dams registered with EGLE and the Indiana Department of Natural Resources, 17 of which are located on the main stem. The majority of these dams are classified according to their purpose: 29 for hydroelectric power generation (11 retired), 5 for irrigation, 105 for recreation, 9 for flood control, 4 for water supply, and 19 for miscellaneous reasons (private ponds, public ponds, hatchery ponds, etc.) (Friends of the St. Joe River Association 2005).

There are eight FERC-licensed hydroelectric projects located on the St. Joseph River (Table E.2-1). The Three Rivers Hydroelectric Project (FERC No. 11797) is located approximately nine miles upstream of the Constantine Project's dam. Approximately seven miles downstream of the Constantine Project is the Mottville Hydroelectric Project (FERC No. 401), which is also owned and operated by I&M. In addition to these eight facilities, there is the Berrien Springs Hydroelectric Plant, which is also owned and operated by I&M and is located downstream of Buchanan Dam. Berrien Springs was authorized by an act of Congress and, therefore, is not licensed by FERC.

**Table E.2-1
Licensed Hydroelectric Projects on the St. Joseph River**

Project No.	Project Name	Authorized Capacity (kW)	Licensee	State
P-2964	Sturgis Dam	2,720	City of Sturgis	Michigan
P-11797	Three Rivers	900	Grande Pointe Power Corporation	Michigan
P-10661	Constantine	1,200	Indiana Michigan Power Company	Michigan
P-401	Mottville	1,750	Indiana Michigan Power Company	Michigan
P-2651	Elkhart	3,440	Indiana Michigan Power Company	Indiana
P-2579	Twin Branch	4,800	Indiana Michigan Power Company	Indiana
P-10624	French Paper	1,300	French Paper Company	Michigan
P-2551	Buchanan	4,105	Indiana Michigan Power Company	Michigan

E.2.4 Tributary Rivers and Streams

Major tributaries to the St. Joseph River watershed include the Prairie, Pigeon, Fawn, Portage, Coldwater, Elkhart, Little Elkhart, Dowagiac, and Paw Paw rivers. According to the Michigan Center for Geographic Information and the U.S. Geological Survey (USGS), the St. Joseph River watershed is comprised of 217 subwatershed units (Friends of the St. Joe River Association 2005). The Prairie River converges with the St. Joseph River approximately six miles upstream of the Project dam while the Fawn River joins the St. Joseph River approximately 500 feet below the Project dam.

E.2.5 Reservoir Characteristics and Shoreline

The reservoir embankment is approximately 650 feet long. The dike has a maximum height of about 20 feet and is constructed of sand. In 2014, the top of the embankment was raised to elevation 790 feet NGVD29. The downstream side of the embankment was reshaped to the present slope in 1987 and 2004. In 2004, sheet piles were installed on the downstream right end of the embankment (the length of the line of sheeting was 150 feet). The side slopes are about 2 H to 1 V (estimated in the field) on the upstream side and 2 H to 1 V to nearly flat (flush with native ground) on the downstream side (I&M 2016).

The upstream shoreline is surrounded by forested land, with nearby residential housing with minimal-to-moderate slope. Towards the Project dam, there is a boat launch and reservoir fishing access. Canopy vegetation is present in the reservoir area, as well as groundcover layers of vegetation (shrubs, small trees, perennials) that thrive under tree canopies. Upstream of the dam, the river is flanked by farmland, residential neighborhoods, and forested land. The shoreline downstream of the Project's dam is also surrounded by forested land and residential housing and has a similar composition as lands upstream of the Project dam. The shoreline downstream of the Project can also be classified as having minimal-to-moderate sloping. In 2011, the west downstream riverbank was damaged due to erosion, which has since been repaired and is monitored (I&M 2016).

E.2.6 Downstream Reach Gradients

The topography of the St. Joseph River watershed ranges from gently to moderately sloping. Below the Constantine dam, the bypassed reach extends approximately 1,300 feet to the powerhouse, with the riverbed sloping at an average rate of approximately 76 feet per mile. For the reach 1 mile below the powerhouse, the riverbed slopes at an average rate of approximately 40 feet per mile.

E.2.7 Major Land and Water Uses

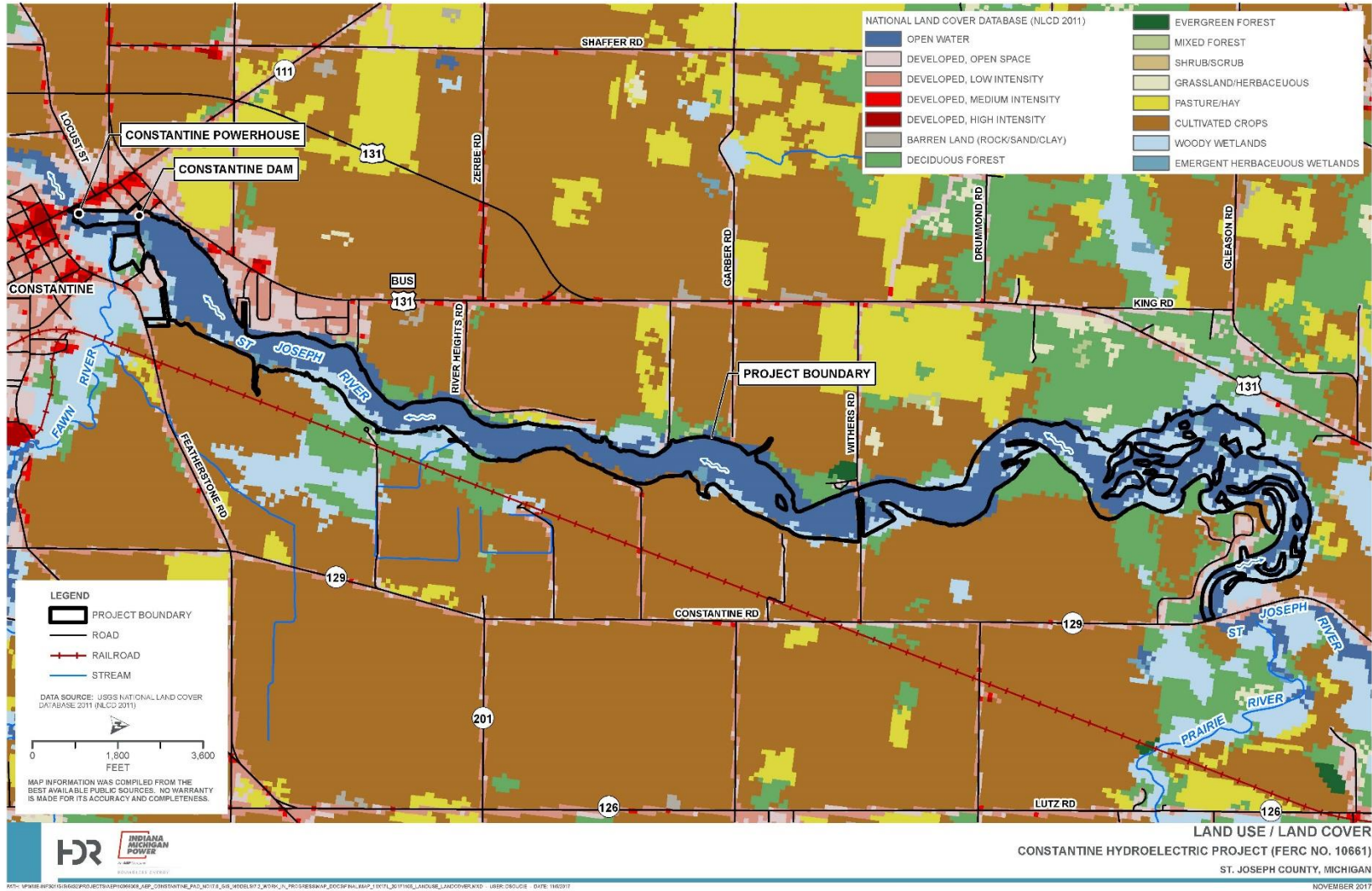
The watershed is predominantly agricultural with approximately 70 percent of the land used for crop and animal production, while 17 percent remains forested, and roughly 6 percent are wetlands. A

significant remaining portion of the watershed is comprised of residential and commercial uses, particularly along the main stem (Friends of the St. Joe River Association 2005).

The major water use category in St. Joseph County is irrigation with 88 percent of all water being withdrawn for irrigation purposes. Groundwater is the source of approximately 80 percent of all water withdrawn in St. Joseph County with approximately 20 percent from inland surface water. Groundwater is the source of all public drinking water and commercial withdrawals, 92 percent of industrial withdrawals, and 77 percent of irrigation withdrawals (EGLE 2019a).

Land use in the Project area near the dam and powerhouse along the river ranges from low- to high-intensity development with some forested wetlands along the left descending bank near the Fawn River (Figure E.2-2). The majority of land use in the general Project area is for cultivated crops but is mostly located outside of the Project boundary.

Figure E.2-2
Land Use and Cover in the Vicinity of the Project



E.3 Geology and Soils

The Project area is located in the Three Rivers Lowlands physiographic region. This physiographic region is characterized by a well-drained, upland plain with low relief, regionally sloping from northwest to southeast (Michigan State University [MSU] Department of Geography undated).

The landforms of southwest Michigan and northern Indiana are largely a result of the activities of the extensive glaciation of the Pleistocene epoch (from about 2 million years ago until 10,000 years ago). Six major ice sheets advanced across Michigan during that time, but it was the most recent ice advances during the Wisconsin event that by and large formed and sculpted the current St. Joseph River Valley. The advance and retreat of the Wisconsin ice sheet and subsequent changes to the Lake Michigan Basin caused major changes in the size, profile, and direction of the St. Joseph River and left behind a landscape dominated by moraines, till plains, and outwash plains and the heterogeneous grab bag of soils that overlay the shale and sandstone bedrock of the basin (Friends of St. Joseph River Association 2005).

E.3.1 Geology

E.3.1.1 Bedrock Geology

The Michigan Basin dominates Michigan geology, covering the entire Lower Peninsula and the eastern portion of the Upper Peninsula. The Michigan Basin is defined by the Canadian Shield to the northwest and northeast, the Wisconsin and Kankakee Arches to the southwest, and the Findlay and Algonquin Arches to the southeast. During the Paleozoic era, sedimentary rock was deposited in the Michigan Basin in layers like nested bowls with the oldest layers outcropping at the margins of the basin and buried deep near the center of the basin. The layers of sedimentary rock reach a maximum thickness of about 16,000 feet over basement terranes of Precambrian plutonic and volcanic igneous rock and metamorphic rock (Gillespie et al. 2008). Bedrock in the Project area is Mississippian age shale (MDNR 1999a). Solution-prone carbonate rocks of sedimentary origin are not present in the Project area in the vicinity of the dam (I&M 2016).

E.3.1.2 Surficial Geology

The St. Joseph River has moderately stable flows due to a thick surficial layer of coarse-textured glacial deposits and pervious soils (MDNR 1999b). The local surface geology at the Project consists of thick, sandy lacustrine and outwash deposits. Based on previous subsurface exploration programs (AEP 1987) and borings conducted at the site (Barr 1999), the foundations for the Project structures generally consist of sands, silty sands, and silts. The underlying foundation strata vary from loose to dense in relative density.

E.3.2 Soils and Sediment

Soils in the section of the St. Joseph River from Mendon, Michigan, to Elkhart, Indiana, are mainly characterized by silt loam or loam soils, but with a mixture of clay loam, silty clay loam, sandy clay, silty clay, or clay. In low-lying areas near Three Rivers, there are pockets of organic soils used for muck farming and peat mining (MDNR 1999b).

The overburden materials in the Project region are a result of past glaciation. Soils tend to be sand and gravels resulting from glacial outwash and lacustrine deposition (I&M 2016). According to the U.S. Department of Agriculture (USDA), the mapped soils in the vicinity of the Project are mainly sandy loam (Figure E.3-1).

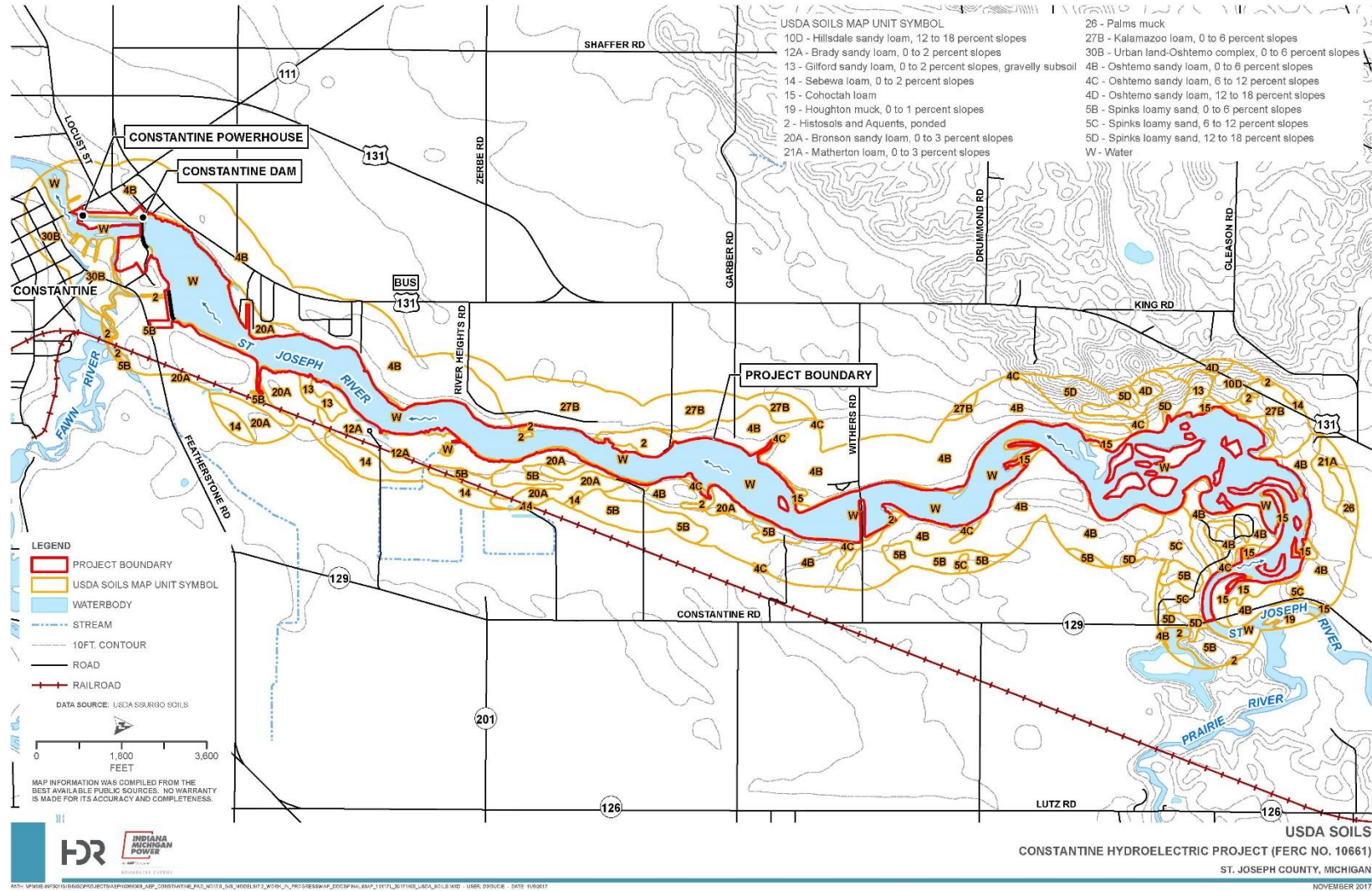
In June and September 2019, I&M performed a Shoreline Stability Assessment of the Project's reservoir, bypassed reach, and tailrace area to identify sites of erosion or shoreline instability in the Project area. I&M used the modified Bank Erosion Hazard Index (BEHI) method proposed by David Rosgen (Rosgen 2001) as the Standard Operating Procedure for assessing bank erosion and estimating erosion potential at the Project. For each area assessed, observations of vegetative cover, quantity of material, height, slope of bank, existing erosion control mechanisms, soil or rock type, composition, and thickness of various bank materials or strata, and other relevant data were recorded on standardized field forms. Other factors contributing to bank erosion in the study area were identified and recorded.

In June, modified BEHI scores in the Project area ranged from Very Low to Moderate at 57 individual sites. In the bypassed reach, sites were scored as; 5 Very Low, 1 Low, 3 Moderate, and 3 NA. In the reservoir area, sites were scored as; 2 Very Low, 20 Low, 12 Moderate, and 11 NA. In September, BEHI scores in the Project area ranged from Low to Moderate at 39 sites. In the bypassed reach, sites scored as; 5 Low, 2 Moderate, and 1 NA. In the reservoir area, sites were scored as; 19 Low and 12 Moderate.

Based on observations used to calculate the modified BEHI, three areas in the Project area were identified to have erosion issues as described below:

- 1) Site BA03 located at the downstream end of the Project. This site has an area of erosion located against concrete at the base of the bridge extending under the overhanging vegetation.
- 2) Site BA16 located at the upstream end of the bypassed reach. This isolated point has no vegetation and soil is actively falling into the bypassed reach.
- 3) In the reservoir, the area from site SJR05 to SJR12. This area is located in a more riverine section of the Project along an outside bend in the river channel. This area has had the riparian vegetation removed for home construction and maintained turf grass lawns.

**Figure E.3-1
Soils in the Vicinity of the Project**



E.3.3 Seismicity

The Project region is considered tectonically stable. Seismicity is not deterministically associated with faults in this region. An inactive fault, the Royal Center Fault in Indiana, has been mapped about 56.3 kilometers (35 miles) south of the Project area (I&M 2016). Additionally, another fault was discovered approximately 45.06 kilometers (28 miles) northeast of the Project area after a magnitude (M) 4.2 event near Scotts, Michigan (USGS 2015).

While no seismicity can be deterministically associated with known fault systems in southern Michigan and Northern Indiana, the area is subjected from time to time to randomly located earthquakes of mild to moderate strength. The most highly active seismic area associated with the region is the central Mississippi Valley area (New Madrid seismic area), located to the southwest at about 600 kilometers (372.8 miles) or more from the Project dam (I&M 2016).

The earliest record of an earthquake felt in the Project area was from the great series of shocks centered near New Madrid, Missouri, in 1811 and 1812. As many as nine tremors from the New Madrid earthquake series were reportedly felt distinctly in Detroit. The four (possibly five) New Madrid earthquakes of 1811-12 (all estimated at M 8 or greater) are the largest intra-plate earthquakes to have been recorded in the world. The Mississippi River changed its course, the land surface sunk to form new lakes, and the violent shaking snapped off trees. These seismic events were centered about 680 kilometers (422.5 miles) to the southwest of the Project. Based on the mid-continent attenuation relationship of Toro, Abrahamson and Schneider (1997), it is estimated that the peak ground acceleration of this event at the Project dam site was likely on the order of 0.01g (I&M 2016).

The closest historic event to the Project of M 4.0 or greater was a M 4.6 on August 10, 1947, and it was approximately 55 kilometers (34.2 miles) from the Project. The largest historic event within about 400 kilometers (250 miles) was a M 5.4 on September 27, 1909, and was approximately 261 kilometers from the Project. There have been 14 events over M 2.5 reported within 400 kilometers of the Project from 1999 through 2018; the largest was M 4.2. (USGS undated).

E.3.4 Mineral Resources

St. Joseph County has two mineral resources, gold and calcite (State of Michigan undated(a)). In general, gold is present in over 100 places in Michigan and has been discovered in 27 of the 68 counties in the Lower Peninsula and 6 of the 15 counties in the Upper Peninsula (MSU undated). Reported discoveries of gold within the county occur in Marcellus, St. Joseph County, and Burr Oak, St. Joseph County. However, the gold located in Burr Oak is most likely pyrite (State of Michigan 1980). The Calcite limestone/dolomite quarry, near Rogers City, Michigan, is the largest limestone

quarry in the world (State of Michigan undated(b)). The Calcite quarry has been active for over 85 years and measures approximately 7 kilometers (4.4 miles) long by 4 kilometers (2.5 miles) wide (National Aeronautics and Space Administration [NASA] 2006).

E.3.5 Project Impacts on Geology and Soils

Shoreline erosion is a naturally occurring phenomenon along shorelines of rivers and other waterbodies. In June and September 2019, I&M performed a Shoreline Stability Assessment of the Project's reservoir, bypassed reach, and tailrace area to identify sites of erosion or shoreline instability in the Project area. Based on the results of that study, three areas were identified within the Project area as described in Section E.3.2.

E.3.6 Protection, Mitigation, and Enhancement (PM&E) Measures Proposed by the Applicant, Resource Agencies, and/or Other Consulting Parties

No PM&E measures related to geology and soils have been proposed by any resource agencies or consulting parties. Three erosion sites were identified during the Shoreline Stability Assessment conducted by I&M in 2019 as described in Section E.3.2. Site BA03 is located at the base of the Business Route 131 Bridge downstream of the Project. The erosion at this site is likely caused by high flows in the river. I&M is not proposing any PM&E measures at this site because the erosion is likely occurring due to circumstances outside of I&M's control. Additionally, remediating the erosion site would likely require removing a significant area of forested riparian vegetation.¹ Site BA16 is located along the bypassed reach near the existing portage trail. As part of proposed improvements to the existing portage trail, I&M will address erosion issues at this location. The area from site SJR05 to SJR12 is located along the reservoir in an area in which the riparian vegetation has been removed for home construction and now has maintained turf grass lawns. This area is also located on a more riverine section of the Project on an outside bend in the river channel. These circumstances contributing to erosion in this area are outside the control of I&M and are not Project-related impacts and, therefore, I&M is not proposing any PM&E measures at this site.

¹ It is also worth noting that the Michigan Department of Transportation is currently making improvements to the Business Route 131 Bridge and may address the erosion area upon completing their maintenance work due to the fact that the erosion is occurring adjacent to the bridge abutment.

E.4 Water Quantity and Quality

E.4.1 Water Quantity

E.4.1.1 Drainage Area

The St. Joseph River watershed drains 4,685 square miles. The watershed includes 3,742 river miles and flows through and near the Kalamazoo-Portage, the Elkhart-Goshen, the South Bend, and the St. Joseph/Benton Harbor metropolitan areas. The drainage area for the Constantine Project is 1,554 square miles (Friends of the St. Joe River Association 2005).

E.4.1.2 River Flows

Annual and monthly flow duration curves have been developed for the Project using flow data from the downstream USGS gage 04099000 at Mottville. Flow duration curves can be found in Appendix E of the PAD.

The median stream flow for the Project is approximately 1,398 cubic feet per second (cfs). Median flow for the St. Joseph River is 1,690 cfs. Monthly daily average flows for the Project for the period of record range from 851 cfs to 2,288 cfs (Table E.4-1).

**Table E.4-1
Average Flow Data
(1987-2020)**

Period	Minimum Flow (cfs)	90% Exceedance (cfs)	Average Flow (cfs)	10% Exceedance (cfs)	Maximum Flow (cfs)
January	579	844	1,904	3,316	6,669
February	600	1,018	1,966	3,078	8,936
March	633	1,382	2,288	3,301	6,909
April	608	1,307	2,202	3,335	5,254
May	675	1,167	2,038	3,167	6,694
June	304	728	1,653	2,780	8,854
July	184	458	1,052	1,804	3,028
August	278	459	851	1,258	3,244
September	285	473	919	1,473	6,131
October	372	579	1,083	1,768	3,550
November	451	672	1,379	2,160	3,715

Period	Minimum Flow (cfs)	90% Exceedance (cfs)	Average Flow (cfs)	10% Exceedance (cfs)	Maximum Flow (cfs)
December	545	812	1,561	2,314	3,947
Annual	184	645	1,572	2,731	8,936

E.4.1.3 Water and Flow Uses

Several industries in St. Joseph County use groundwater and surface water including commercial-institutional, industrial-manufacturing, irrigation, and public water supply among others (EGLE 2019a) (Table E.4-2).

**Table E.4-2
Michigan Water Use Data – Annual Water Use Volumes
for St. Joseph County in 2019**

Sector	From Great Lakes	From Groundwater	From Inland Surface	Total All Sources
	Gallons			
Commercial-Institutional	0	88,814,876	0	88,814,876
Electric Power Generation	0	0	0	0
Industrial-Manufacturing	0	491,374,265	41,234,696	532,608,961
Irrigation	0	14,340,528,048	4,162,376,149	18,502,904,197
Livestock	0	0	0	0
Other	0	805,669,801	0	805,669,801
Public Water Supply	0	1,143,597,902	0	1,143,597,902
Total	0	16,869,984,892	4,203,610,845	21,073,595,737

Source: EGLE 2019a.

The EGLE issues National Pollutant Discharge Elimination System (NPDES) individual permits for all discharges into surface waters of the State that are not covered by general NPDES permits. A search was conducted for NPDES individual permits within the Project boundary on the Michigan Surface Water Information Management System (MiSWIMS). Results from the search identified one active NPDES-permitted facility within the Project vicinity that was issued for Michigan Milk Producers Association (Individual Permit Number MI0001414).

Existing instream flow uses of waters of the St. Joseph River within the Project boundary include various recreational activities (e.g., fishing) and hydroelectric generation.

E.4.2 Water Quality

E.4.2.1 Approved Water Quality Standards

The State of Michigan's Part 4 Rules, Water Quality Standards (of Part 3, Water Resources Protection, of Act 451 of 1994), specify water quality standards which shall be met in all waters of the state. Michigan's Part 4 Water Quality Standards require that all designated uses of the receiving water be protected (MDEQ 2017a). Designated uses are defined in R 323.1100 and include at a minimum: agriculture, navigation, industrial water supply, warm water fishery, other indigenous aquatic life and wildlife, fish consumption, and partial body contact recreation. Additional designated uses (i.e., trout stream, public water supply) may be applied to specific waters. The St. Joseph River has no additional designations (i.e., trout stream or public water supply). Water quality standards for pH, DO, and water temperature in the St. Joseph River are identified in Table E.4-3.

**Table E.4-3
Water Quality Standards for the St. Joseph River**

Parameter	Standard	
pH	The pH shall be maintained within the range of 6.5 to 9.0 S.U. in all surface waters of the state, except for those waters where the background pH lies outside the range of 6.5 to 9.0 S.U.	
Dissolved oxygen	A minimum of 5 milligrams per liter (mg/L) of dissolved oxygen shall be maintained.	
Water temperature	Rivers, streams, and impoundments naturally capable of supporting warmwater fish shall not receive a heat load which would warm the receiving water at the edge of the mixing zone more than 5 degrees Fahrenheit (°F) above the existing natural water temperature.	
	Rivers, streams, and impoundments naturally capable of supporting warmwater fish shall not receive a heat load which would warm the receiving water at the edge of the mixing zone to temperatures greater than the following monthly maximum temperatures:	
	January	50 °F
	February	50 °F
	March	55 °F
	April	65 °F
	May	75 °F
	June	85 °F
July	85 °F	

Parameter	Standard	
	August	85 °F
	September	85 °F
	October	70 °F
	November	60 °F
	December	56 °F

S.U. = standard units.

E.4.2.2 Impaired Waters

Every two years, the EGLE prepares and submits an Integrated Report to the USEPA to satisfy the requirements of Sections 303(d), 305(b), and 314 of the federal Clean Water Act. The Integrated Report describes the status of water quality in Michigan and includes a list of waterbodies that are not attaining Michigan Water Quality Standards and require the establishment of pollutant Total Maximum Daily Loads (TMDL). A TMDL is used to determine the total amount of a pollutant that a waterbody can handle without resulting in the impaired status of that waterbody (MDEQ 2017b).

Waters downstream (6.9 mile reach of the St. Joseph River from Pigeon River upstream to Fawn River [HUC 40500010904-01]) and upstream of the Project (300 acres of the impoundment at Three Rivers [HUC 40500010904-02]) are assessed separately in recent 303(d), 305(b), and 314 Integrated Reports (MDEQ 2017b and EGLE 2019b, 2020b). Total/primary body contact recreation and warm/cold water fishery uses have not been assessed (Table E.4-4). Navigation, agriculture, indigenous aquatic life and wildlife, and industrial water supply uses have been found to be fully supporting when assessed. Fish consumption has been found to be not supporting when assessed due to polychlorinated biphenyls (PCBs) (MDEQ 2017b and EGLE 2019b, 2020b). A TMDL for PCBs in fish tissue was completed in 2018 (EGLE 2019b).

**Table E.4-4
Summary of 2016, 2018, and 2020 Use Assessments in the 303(d), 305(b), and 314
Integrated Reports for HUC 40500010904-01 and HUC 40500010904-02.**

Use Support	HUC 40500010904-01			HUC 40500010904-02		
	2020	2018	2016	2020	2018	2016
Total Body Contact Recreation	Not Assessed	Not Assessed	Not Assessed	Not Assessed	Not Assessed	Not Assessed
Navigation	-	Fully Supporting	Fully Supporting	-	Fully Supporting	Fully Supporting

Use Support	HUC 40500010904-01			HUC 40500010904-02		
	2020	2018	2016	2020	2018	2016
Warm Water Fishery	Not Assessed	Not Assessed	Not Assessed	Not Assessed	Not Assessed	Not Assessed
Partial Body Contact Recreation	Not Assessed	Not Assessed	Not Assessed	Not Assessed	Not Assessed	Not Assessed
Other Indigenous Aquatic Life and Wildlife	Not Assessed	Not Assessed	Not Assessed	Fully Supporting	Fully Supporting	Not Assessed
Fish Consumption	Not Supporting	Not Supporting	Not Supporting	Not Assessed	Not Assessed	Not Supporting
Agriculture	-	Fully Supporting	Fully Supporting	-	Fully Supporting	Fully Supporting
Cold Water Fishery	Not Assessed	Not Assessed	Not Assessed	Not Assessed	Not Assessed	Not Assessed
Industrial Water Supply	-	Fully Supporting	Fully Supporting	-	Fully Supporting	Fully Supporting

*Note '-' indicates the identified use support was not included in associated report.

Source: MDEQ 2017b and EGLE 2019b, 2020b.

E.4.2.3 Historic Water Quality Data

I&M collected DO and water temperature data at the Project in the summer of 1990, prior to its licensing, as well as in 1995 and 1996 from May through October after the Project was issued its license. The lowest DO concentration recorded during monitoring efforts was recorded in June of 1996 and was 6.4 mg/L. Additionally, concentrations appeared to generally increase by approximately 1.0 mg/L downstream of the Project. Generally, it is during the summer months when the air temperature is the hottest that DO and water temperature conditions are most likely to be detrimental for fishery resources. All recorded DO concentrations were well above the state standards during all monitoring periods. Water temperature at the Project was generally well below state maximum criteria. The three years of collected water quality data were well within the state water quality standards (FERC 1997).

A search was conducted for water quality data within the Project area on the MiSWIMS. Data were collected by the MDEQ in the northern (750007 MDEQ Sampling Station Description: Saint Joseph River at Constantine Road; Lockport ship SEC31) and southern end of the Project boundary (750011 MDEQ Sampling Station Description: Saint Joseph River at Washington Street in Constantine). These data met state standards and are presented in Table E.4-5. A search for water quality data was also

conducted using the USEPA's STORage and RETrieval (STORET) data warehouse, but no relevant data was found in close proximity to the Project.

Table E.4-5
MDEQ Water Quality Data Collected at Two Sites in the Project Area

MDEQ Station No.	Date	DO (mg/L)	Specific Conductance (umho/cm)	pH (S.U.)
750007	8/11/2005	5.4	518	-
	8/17/2005	6.6	516	-
	8/23/2005	7.2	508	-
	9/1/2005	6.4	519	-
750011	8/17/2005	7.3	496	-
	8/23/2005	8.0	495*	8.2
	9/1/2005	6.4	504	-

*average calculated.
umho/cm = micromhos
Source: MiSWIMS.

On June 20, 2000, MDEQ conducted water quality sampling approximately 300 feet upstream of the Constantine dam. Water quality profile data was collected at two-foot increments from the surface to the lake bottom. Temperature, DO, conductivity, and pH data are listed in Table E.4-6. The sampling data revealed essentially no variability in temperature or DO from the surface to bottom, suggesting the reservoir was not thermally or oxygen stratified at that time.

Table E.4-6
MDEQ Water Quality Data Collected in Constantine Reservoir

Depth	Temperature	DO (mg/L)	Specific Conductance (umho/cm)	pH
Surface	73.7	8.4	491	8.0
2 feet	73.7	8.3	491	8.0
4 feet	73.7	8.3	491	8.0
6 feet	73.7	8.3	491	8.0
8 feet	73.7	8.3	491	8.0
10 feet	73.7	8.3	491	8.0
12 feet	73.7	8.3	490	8.0

Source: MDEQ 2000.

E.4.2.4 Recent Water Quality Data

In support of this relicensing, I&M conducted a Water Quality Study to gather existing and relevant baseline water quality data to determine compliance with state water quality standards and analyze sediment in the Project reservoir to determine the concentration of select contaminants potentially present in the sediment.

Continuous Temperature and DO Monitoring and Discrete Multi-parameter Water Quality Measurements

Duplicate combined water temperature and DO data loggers were set to record water temperature and DO at 1-hour intervals from May 1 through October 31, 2019. Calibrated Onset® HOBO U26 DO/Temperature Loggers were deployed at five water quality monitoring stations for continuous *in situ* measurements (Figure E.4-1). At all locations, a primary data logger and a secondary data logger were installed. The loggers were suspended in the water column approximately one meter below the surface on a steel cable attached to various stationary objects above the water's surface (i.e., trees, fencing).

Discrete multi-parameter water quality measurements of temperature, DO concentration, pH, and specific conductance were also collected at the five monitoring stations using a calibrated YSI ProDSS® multi-parameter probe. These data collections occurred monthly and concurrent with deployment and downloads of the continuous data loggers, starting May 1 and ending October 31, 2019, in accordance with the schedule listed in Table E.4-7.

**Table E.4-7
Water Quality Sampling and Data Download Schedule**

Data Type	4/29	5/1	5/13	5/30	6/27	8/1	8/29	9/30	10/31
Continuous DO/Temperature	NA	Deploy ¹	x	x	x	x	x	x	X Retrieve
Discrete Multi-parameter	X	NA	x	x	x	x	x	x	x

Note:

NA = Not applicable, no data collected.

¹ = Continuous data collection began on May 1, 2019.

X = Data collection and/or data download.

Water temperatures between stations had consistent daily and seasonal patterns and ranged from a minimum of 8.78 degrees Celsius (°C) at the bypassed reach downstream of the Fawn River on October 31, 2019, to a maximum of 29.20°C in the power canal on July 20, 2019. The bypassed reach upstream and downstream of the Fawn River generally had lower water temperatures than the reservoir, power canal, and tailrace.

With the exception of the bypassed reach downstream of the Fawn River, water temperatures recorded at all monitoring stations were below the month-by-month state regulatory thresholds outlined in Section 1.1 of the Water Quality Study Report (included as Appendix D of the ISR). Beginning on October 1 and ending on October 2, 2019, temperatures above 21.1°C were recorded in the bypassed reach downstream of the Fawn River for 26 consecutive hours. The temperature readings during this time ranged from 21.12°C to 21.48°C. Fourteen of the 26 readings were within 0.2°C (temperature probe accuracy is $\pm 0.2^\circ\text{C}$) of the state threshold.

DO ranged from a minimum of 1.06 mg/L at the bypassed reach upstream of the Fawn River on August 21, 2019, to a maximum of 15.48 mg/L on September 23, 2019, also at the bypassed reach upstream of the Fawn River. This lowest fluctuation in DO corresponds to the dates when it was suspected that water was not flowing over the water control structure upstream of the bypassed reach. The highest fluctuation in DO (15.48 mg/L) is an anomaly and likely due to an equipment malfunction since the value is much greater than the saturation value for DO at those temperatures.

The tailrace and bypassed reach upstream and downstream of the Fawn River experienced instantaneous DO concentrations below the state threshold of 4.0 mg/L. On July 16, 2019, DO in the tailrace fell below 4.0 mg/L for multiple hours between 07:00 and 13:00. The bypassed reach upstream of the Fawn River experienced a total of eight days in August and ten days in September where instantaneous DO readings were below 4.0 mg/L. The bypassed reach downstream of the Fawn River experienced three days in August where the instantaneous DO concentration dropped below the state threshold.

DO concentrations dropped below the daily average threshold of 5.0 mg/L at three locations. The daily average DO in the tailrace dropped below 5.0 mg/L on July 16, 2019, with an average reading of 4.61 mg/L. The bypassed reach downstream of the Fawn River experienced two days where DO was below the daily average threshold: July 21, 2019 (average DO was 4.87 mg/L) and August 19, 2019 (average DO was 4.99 mg/L). The bypassed reach upstream of the Fawn River had 10 days on which the DO fell below the daily average threshold: August 20, 21, 27, 28, and 29, with average DO values of 3.79, 2.28, 3.16, 2.44, and 4.26 mg/L, respectively and September 16, 17, 18, 19, and 20, with average DO values of 4.23, 3.86, 4.03, 4.18, and 4.91 mg/L, respectively.

**Table E.4-8
Range of Continuous Temperature and DO Readings
from May 1 to October 31, 2019.**

Monitoring Station	Temperature (°C)				DO (mg/L)			
	Max	Min	Mean	Median	Max	Min	Mean	Median
WQ1 – Reservoir	28.66	9.00	20.52	21.36	11.43	4.43	8.09	7.99
WQ2 – Power Canal	29.20	9.20	20.72	21.52	13.30	5.11	8.56	8.54
WQ3 - Tailrace	28.82	9.20	20.61	21.47	11.84	2.73	8.50	8.49
WQ4 – Bypassed Reach Upstream of the Fawn River	26.60	9.14	18.52	19.20	15.48	1.06	8.25	8.40
WQ5 – Bypassed Reach Downstream of the Fawn River	29.06	8.78	20.29	21.21	10.45	2.34	7.14	6.98

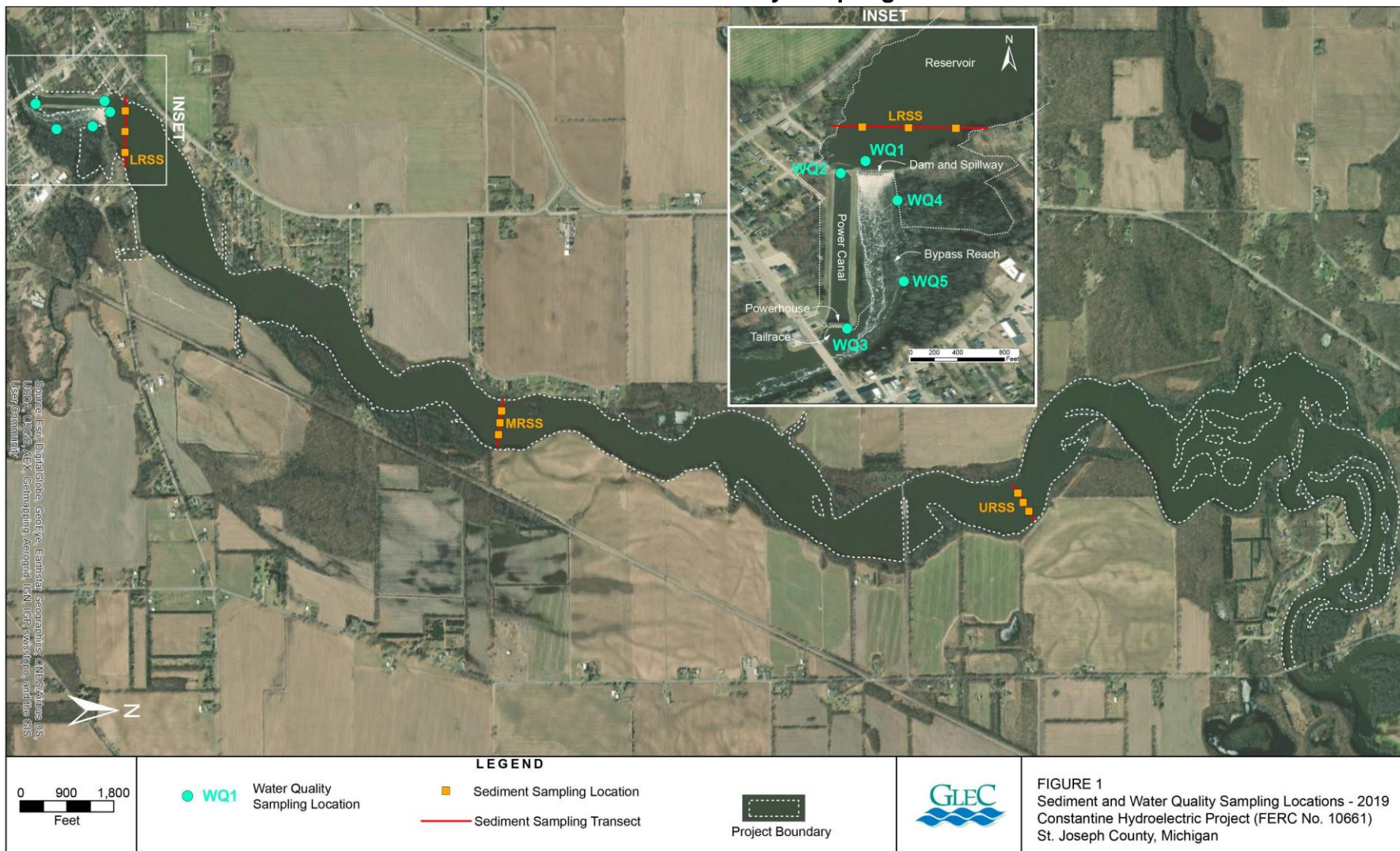
Sediment Contaminant Sampling

Although not required in FERC's SPD, per the request of resource agencies I&M conducted sediment contaminant sampling. Three transects were established in the reservoir: Lower Reservoir (LRSS), Middle Reservoir (MRSS), and Upper Reservoir (URSS). Along each transect, three sediment samples were collected on September 25, 2019, and composited for shipment and analysis. The Lower Reservoir transect was sampled in duplicate. Sediment sampling transects and locations are shown on Figure E.4-1. The composited sediment samples were analyzed for the following parameters:

- Total PCBs
- Mercury
- Percent Moisture
- Oil and Grease
- Total Phosphorus
- Total Organic Carbon
- Metals: Arsenic, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, and Zinc

Sediment samples were collected and processed following the methodologies outlined in *EPA-823-B-01-002 – Methods for Collection, Storage, and Manipulation of Sediments for Chemical and Toxicological Analyses*. Samples were shipped to Pace Analytical Laboratory for analysis.

Figure E.4-1
2019 Sediment and Water Quality Sampling Locations



E.4.3 Project Impacts on Water Resources

The results of the Water Quality Study conducted by I&M in 2019 indicated several instances where DO readings exceeded state standards in the bypassed reach. By letter dated June 9, 2020, FERC filed comments on the ISR and requested additional information regarding the DO exceedances collected in the bypassed reach. I&M reviewed available Project operations data and compared it to the instances where low DO levels were recorded during the 2019 study season. The fixed crest of the spillway structure is elevation 781.96 feet NGVD29 and the crest elevation when the flashboards are in place is 782.90 feet NGVD29. The flashboards were installed around August 13, 2019, and remained in place for the remainder of the 2019 water quality monitoring period. In response to FERC's comments on the Water Quality Study, I&M provided an Excel spreadsheet highlighting the times where the reservoir elevations were below the flashboard elevation of 782.90 feet NGVD29.

Based on I&M's review of water quality and reservoir elevation data collected during the 2019 study season, it appears that there were times where there was little to no flow over the spillway/flashboards that coincides with dates where low DO values were recorded in the bypassed reach. Conversely, there were also times where there was little to no flow over the spillway/flashboards where there were no recorded issues of low DO during the 2019 study season. In reviewing the existing data, there does not appear to be a clear correlation between flow over the spillway/flashboards and low DO readings. I&M believes that multiple factors, such as weather conditions (i.e., high temperatures concurrent with low flows) and low DO water coming into the Project from upstream that may be impacted by nutrient loading from agricultural runoff within the river basin, are likely contributing to the low DO readings in the Project area. The currently available data does not provide sufficient information to suggest that the Project operations may be impacting DO in the bypassed reach. Additionally, the Project is operated in a ROR mode and has limited ability to control flows or influence water quantity upstream or downstream of the Constantine Project.

Based on the aforementioned information, continued operation of the Project is not expected to have an adverse impact on water quantity or quality upstream, within, or downstream of the Project.

E.4.4 PM&E Measures Proposed by the Applicant, Resource Agencies, and/or Other Consulting Parties

No PM&E measures related to water resources have been proposed by any resource agencies or consulting parties. I&M proposes to continue ROR operations for the protection of water quality and fish and wildlife resources and is not proposing any additional PM&E measures at the Project.

E.5 Fish and Aquatic Resources

The Constantine reservoir supports a variety of non-migratory forage species and popular sportfish species such as Smallmouth Bass, Channel Catfish, sunfishes, pike, Walleye, and others. The MDNR has performed periodic fish surveys in the vicinity of the Project since at least 1972 (I&M 2018, 2020). The overall composition of fish collections in the Constantine reservoir, bypassed reach, and downstream reach is consistent with historical data and with the trophic status and ecological classification of the waterbody.

The Project is operated in a ROR mode and, thus, there is no required minimum bypassed reach flow or baseflow. Additionally, the Fawn River (a tributary to the St. Joseph River) enters the bypassed reach approximately 500 feet downstream of the Project dam and contributes an average flow of approximately 210 cfs to the bypassed and downstream reach of the Project. The flow from the Fawn River coupled with the backwater effect from the downstream Mottville Project creates continuous inundation of the bypassed and downstream reach of the Project.

There are no fish passage facilities at the Constantine Project or at the downstream Mottville Project. I&M believes fish passage facilities would be of limited resource benefit because non-migratory fish species occur in the vicinity of the Project, and such facilities would provide limited benefit given the relatively small size of the Project, the multiple dams on the St. Joseph River both upstream and downstream of the Constantine Project, the lack of suitable habitat for migratory fish such as salmonids, and the limited negative effects of fish entrainment and mortality at the Project.

E.5.1 Aquatic Habitat

The middle reach of the St. Joseph River from Mendon, Michigan, to Elkhart, Indiana, as defined by Wesley and Duffy (1999), meanders unconfined in a broad glacial fluvial valley. The width of the river doubles between Three Rivers (180 feet wide) and Elkhart (364 feet wide) due to tributary inflows. Substrate is mostly sand and gravel with some silt (Wesley and Duffy 1999). Stream bank cover is abundant in the upper half of this section; whereas, the lower section of this segment is urbanized and has very little stream bank cover. Based on available aerial imagery, the stream bank cover appears to be abundant within the Project boundary.

Habitat within the reservoir consists of lacustrine (lake) habitat ranging from 0-12 feet in depth (I&M 2018) with an unconsolidated bottom with less than 30 percent submerged aquatic or emergent vegetative cover that remains inundated for the entire year. (USGS 2021)

Habitat in the bypassed reach between the Constantine dam and the Project powerhouse encompasses about 1,300 feet of the St. Joseph River and is considered riverine habitat with an

unconsolidated bottom (USFWS 2020). This area is inundated by backwater from the Mottville Project and inflow from the Fawn River and supports a warmwater fishery.

E.5.1.1 Essential Fish Habitat

Based on a review of the National Marine Fisheries Service (NMFS) online database, no essential fish habitat under the Magnuson-Stevens Fishery Conservation and Management Act or established by the NMFS has been identified in the vicinity of the Project.

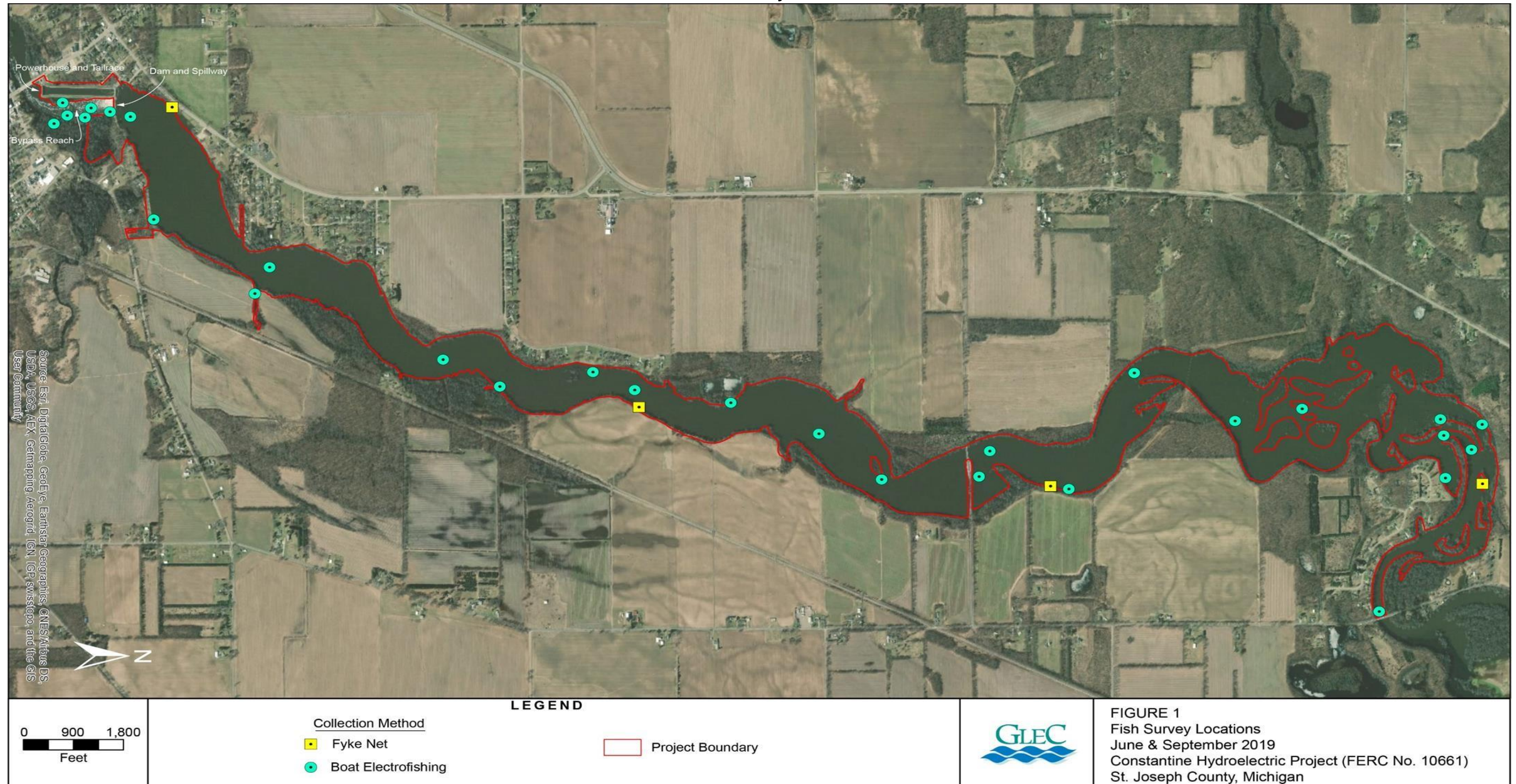
E.5.2 Fish Community

The St. Joseph River is characterized as a warmwater stream (I&M 1988), and the middle reach (from Mendon, Michigan, to Elkhart, Indiana) of the St. Joseph River is managed for Channel Catfish (*Ictalurus punctatus*), Smallmouth Bass (*Micropterus dolomieu*), and Walleye (*Sander vitreus*) (Wesley and Duffy 1999).

A number of fish surveys have been conducted throughout the St. Joseph River that provide an abundance of population level details of the historic and current population structure of the Constantine reservoir, bypassed reach, and downstream reach.

In June and September of 2019, a fisheries survey was conducted utilizing fyke nets (trap nets) and boat electrofishing in the Constantine reservoir, bypassed reach, and downstream/tailwater areas. The 2019 fish survey locations are shown on Figure E.5-1.

Figure E.5-1
2019 Fish Survey Locations



Bluegill (*Lepomis macrochirus*), Bowfin (*Amia calva*), Mimic Shiner (*Notropis volucellus*), Largemouth Bass (*Micropterus salmoides*), Golden Redhorse (*Moxostoma erythrurum*), and Rock Bass (*Ambloplites rupestris*) were the most abundant species collected and represent approximately 75 percent of all individuals captured (Table E.5-1). Some species captured were collected in sparse numbers with 17 species represented by less than five individuals, and five species with only a single individual caught. In total 1,625 fish were captured in the reservoir compared to 718 in the bypassed reach.

**Table E.5-1
Species Captured by Fyke Net or Electrofishing in the Constantine Project's Reservoir
and Bypassed Reach During All Sampling Events**

Family Common Name	Species Common Name	Scientific Name	Bypassed Reach	Reservoir	Total	Relative Abundance
Bowfins	Bowfin	<i>Amia calva</i>	288	14	302	12.90%
Bullhead Catfishes	Brown Bullhead	<i>Ameiurus nebulosus</i>		4	4	0.20%
	Channel Catfish	<i>Ictalurus punctatus</i>	2		2	0.10%
	Flathead Catfish	<i>Pylodictis olivaris</i>		1	1	0.00%
	Yellow Bullhead	<i>Ameiurus natalis</i>	2	11	13	0.60%
Carp & Minnows	Bluntnose Minnow	<i>Pimephales notatus</i>	8	221	229	9.80%
	Common Carp	<i>Cyprinus carpio</i>	7	13	20	0.90%
	Emerald Shiner	<i>Notropis atherinoides</i>	1	16	17	0.70%
	Golden Shiner	<i>Notemigonus crysoleucas</i>		21	21	0.90%
	Mimic Shiner	<i>Notropis volucellus</i>	92	143	235	10.00%
	Sand Shiner	<i>Notropis stramineus</i>	6		6	0.30%
	Spotfin Shiner	<i>Cyprinella spiloptera</i>	18	36	54	2.30%
	Striped Shiner	<i>Luxilus chrysocephalus</i>		8	8	0.30%

Family Common Name	Species Common Name	Scientific Name	Bypassed Reach	Reservoir	Total	Relative Abundance
Gars	Longnose Gar	<i>Lepisosteus osseus</i>	3	1	4	0.20%
Herrings & Shads	Gizzard Shad	<i>Dorosoma cepedianum</i>		37	37	1.60%
Lampreys	Chestnut Lamprey	<i>Ichthyomyzon castaneus</i>	1	1	2	0.10%
Perches	Blackside Darter	<i>Percina maculata</i>	3	1	4	0.20%
	Greenside Darter	<i>Etheostoma blennioides</i>	1		1	0.00%
	Johnny Darter	<i>Etheostoma nigrum</i>		1	1	0.00%
	Logperch	<i>Percina caprodes</i>	2	16	18	0.80%
	Pirate Perch	<i>Aphredoderus sayanus</i>		2	2	0.10%
	Rainbow Darter	<i>Etheostoma caeruleum</i>	2		2	0.10%
	Walleye	<i>Sander vitreus</i>	2		2	0.10%
	Yellow Perch	<i>Perca flavescens</i>	5	11	16	0.70%
Pikes & Pickerels	Grass Pickerel	<i>Esox americanus vermiculatus</i>		8	8	0.30%
	Northern Pike	<i>Esox lucius</i>	3	1	4	0.20%
Silversides	Brook Silverside	<i>Labidesthes sicculus</i>	4	15	19	0.80%
Suckers	Black Redhorse	<i>Moxostoma duquesnei</i>		2	2	0.10%
	Golden Redhorse	<i>Moxostoma erythrurum</i>	11	65	76	3.20%
	Greater Redhorse	<i>Moxostoma valenciennesi</i>		13	13	0.60%

Family Common Name	Species Common Name	Scientific Name	Bypassed Reach	Reservoir	Total	Relative Abundance
	Northern Hogsucker	<i>Hypentelium nigricans</i>		1	1	0.00%
	River Redhorse	<i>Moxostoma carinatum</i>		2	2	0.10%
	Shorthead Redhorse	<i>Moxostoma macrolepidotum</i>	20	38	58	2.50%
	Silver Redhorse	<i>Moxostoma anisurum</i>	2	13	15	0.60%
	Spotted Sucker	<i>Minytrema melanops</i>		63	63	2.70%
	White Sucker	<i>Catostomus commersonii</i>	1	3	4	0.20%
Sunfishes	Black Crappie	<i>Pomoxis nigromaculatus</i>	1	15	16	0.70%
	Bluegill	<i>Lepomis macrochirus</i>	99	632	731	31.20%
	Green Sunfish	<i>Lepomis cyanellus</i>	7	2	9	0.40%
	Largemouth Bass	<i>Micropterus salmoides</i>	16	87	103	4.40%
	Northern Sunfish	<i>Lepomis peltastes</i>	14	1	15	0.60%
	Pumpkinseed	<i>Lepomis gibbosus</i>	11	42	53	2.30%
	Rock Bass	<i>Ambloplites rupestris</i>	35	38	73	3.10%
	Smallmouth Bass	<i>Micropterus dolomieu</i>	43	23	66	2.80%
	Warmouth	<i>Lepomis gulosus</i>	8	2	10	0.40%
	White Crappie	<i>Pomoxis annularis</i>		1	1	0.00%
Totals	(Species: 46)		718	1,625	2,343	

Although not required in FERC’s SPD, per the request of resource agencies I&M conducted fish tissue sampling. Fish tissue samples (skinless filets) were obtained from ten (10) legal size Largemouth Bass (resident predator fish) and ten (10) Shorthead Redhorse (*Moxostoma macrolepidotum*) (bottom feeder fish) that were representative of the sizes that may be consumed by anglers. The ten Largemouth Bass were divided into two size groups and analyzed separately. Fish tissue analysis was performed in accordance with the appropriate USEPA Guidance (for specific guidance see the Fisheries Survey Report in Appendix E of the ISR). The results of those analyses are provided in Table E.5-2 through Table E.5-4.

**Table E.5-2
Percent Solids and Lipids**

Analyte	Group 1	Group 2	Group 3
Solids	79.5%	79.6%	78.8%
Lipids	0.61%	0.45%	2.3%

**Table E.5-3
Results from the Analysis of Mercury**

Analyte	Concentration (µg/kg wet weight)		
	Group 1	Group 2	Group 3
Total Mercury	340	200	190

ug/kg = micrograms per kilogram.

**Table E.5-4
Results from the Analysis of Polychlorinated Biphenyls (PCBs)**

Analyte	Concentration (ng/kg wet weight)		
	Group 1	Group 2	Group 3
Chlorination 1			
PCB 1	None	None	None
PCB 2			
PCB 3			
Chlorination 2			
PCB 4	None	None	
PCB 5			
PCB 6			
PCB 7			
PCB 8			29.5
PCB 9			
PCB 10			
PCB 11			

Analyte	Concentration (ng/kg wet weight)		
	Group 1	Group 2	Group 3
PCB 12/13			
PCB 14			
PCB 15			
Chlorination 3			
PCB 16	None	None	
PCB 17			37.2
PCB 18/30			
PCB 19			
PCB 20/28			150
PCB 21/33			
PCB 22			
PCB 23			
PCB 24			
PCB 25			42.1
PCB 26/29			75
PCB 27			
PCB 31			135
PCB 32			
PCB 34			
PCB 35			
PCB 36			
PCB 37			
PCB 38			
PCB 39			
Chlorination 4			
PCB 40/41/71	None		
PCB 42			72.7
PCB 43/73			
PCB 44/47/65			431
PCB 45/51			
PCB 46			
PCB 48			
PCB 49/69		112	450
PCB 50			
PCB 52		181	316
PCB 53			

Analyte	Concentration (ng/kg wet weight)		
	Group 1	Group 2	Group 3
PCB 54			
PCB 55			
PCB 56			102
PCB 57			
PCB 58			
PCB 59/62/75			
PCB 60			70.5
PCB 61/70/74/76			760
PCB 63			
PCB 64			192
PCB 66		81.2	437
PCB 67			
PCB 68			
PCB 72			
PCB 77			
PCB 78			
PCB 79			
PCB 80			
PCB 81			
Chlorination 5			
PCB 82			78.4
PCB 83			
PCB 84			130
PCB 85/116/117			273
PCB 86/87/97/108/119/125			759
PCB 88/91			152
PCB 89			
PCB 90/101/113	145	229	980
PCB 91			
PCB 92			147
PCB 93/98/100/102			
PCB 94			
PCB 95			398
PCB 96			
PCB 99	108	169	883

Analyte	Concentration (ng/kg wet weight)		
	Group 1	Group 2	Group 3
PCB 103			
PCB 104			
PCB 105	60.9	85.7	498
PCB 106			
PCB 107/124			
PCB 109			120
PCB 110/115	129	238	1,370
PCB 111			
PCB 112			
PCB 114			
PCB 118	172	247	1,430
PCB 120			
PCB 121			
PCB 122			
PCB 123			
PCB 126			
PCB 127			
Chlorination 6			
PCB 128/166			304
PCB 129/138/163	311	403	2,270
PCB 130			78.4
PCB 131			
PCB 132			264
PCB 133			
PCB 134/143			
PCB 135/151			252
PCB 136			65.1
PCB 137			120
PCB 139/140			
PCB 141			115
PCB 142			
PCB 144			
PCB 145			
PCB 146	49.4 (I)	59.7	340
PCB 147/149	106	164	773
PCB 148			

Analyte	Concentration (ng/kg wet weight)		
	Group 1	Group 2	Group 3
PCB 150			
PCB 152			
PCB 153/168	302	352	2,060
PCB 154			
PCB 155			
PCB 156/157			220
PCB 158			179
PCB 159			
PCB 160			
PCB 161			
PCB 162			
PCB 164			92.2
PCB 165			
PCB 167			91.4
PCB 169			
Chlorination 7			
PCB 170		50.2	272
PCB 171/173			
PCB 172			66.6
PCB 174			126
PCB 175			
PCB 176			
PCB 177			96.5
PCB 178			82.3
PCB 179			65.9
PCB 180/193	116	127	688
PCB 181			
PCB 182			
PCB 183/185			228
PCB 184			
PCB 186			
PCB 187	115	110	532
PCB 188			
PCB 189			
PCB 190			60.6
PCB 191			

Analyte	Concentration (ng/kg wet weight)		
	Group 1	Group 2	Group 3
PCB 192			
Chlorination 8			
PCB 194		None	139
PCB 195			
PCB 196			
PCB 197/200			
PCB 198/199			221
PCB 201			
PCB 202			
PCB 203			159
PCB 204			
PCB 205			
Chlorination 9			
PCB 206	None	None	165
PCB 207			
PCB 208			
Chlorination 10			
PCB 209	None	None	78.5
PCB Homologs			
Chlorination 1			
Chlorination 2			29.5
Chlorination 3			440
Chlorination 4		374	2,830
Chlorination 5	615	970	7,220
Chlorination 6	719	978	7,220
Chlorination 7	231	287	2,220
Chlorination 8			519
Chlorination 9			165
Chlorination 10			78.5

Analyte	Concentration (ng/kg wet weight)		
	Group 1	Group 2	Group 3
Aroclors			
Aroclor 1016	None	None	
Aroclor 1221			
Aroclor 1232			
Aroclor 1242			
Aroclor 1248			
Aroclor 1254			14,600 (J)
Aroclor 1260			
Total PCBs			
Total of all congeners	1,570	2,610	20,700

ng/kg = nanograms per kilogram.

The three fish samples were successfully analyzed for the chemicals listed in the above tables. Mercury was found in all three samples, with Group 1 having the highest concentration while Group 3 had the lowest.

PCB congeners were found in all three samples. Specifically,

- Group 1 – 11 congeners, total concentration = 1,570 ng/kg
- Group 2 – 15 congeners, total concentration = 2,610 ng/kg
- Group 3 – 58 congeners, total concentration = 20,700 ng/kg

The data show that the Shorthead Redhorse sample (Group 3) had a significantly higher PCB concentration than either of the two Largemouth Bass samples. Additionally, the Group 3 sample had a 14,600 ng/kg estimated concentration of Aroclor 1254; the estimated concentration was below the reporting limit but above the method limit (J flagged).

Table E.5-5 presents a comparison of sample results to published screening values. The USEPA document *Guidance for Assessing Chemical Contaminant Data for use in Fish Advisories: Volume 2 Risk Assessment and Fish Consumption Limits, 3rd Edition* lists screening values for tissue concentrations of particular chemicals in recreational and subsistence fisheries. These screening values represent tissue contaminant levels that pose a potential public health concern. The mercury results are of note when compared to the published values. The results from all three groups are below the recreational fishery value but above the subsistence fisheries value.

**Table E.5-5
Comparison of Sample Results to Published Screening Values**

Compound	EPA Recreational Fishery Screening Value (ppb) ^{a,b}	EPA Subsistence Fishery Screening Value (ppb) ^{a,b}	Group 1 Result (µg/kg wet weight)	Group 2 Result (µg/kg wet weight)	Group 3 Result (µg/kg wet weight)
Mercury	400	49	340	200	190
Total PCBs (congeners)	20	2.45	1.57	2.62	20.1

a. Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories, Volume 2, Third Edition. November 2000. US EPA Office of Water. <https://www.epa.gov/sites/production/files/2018-11/documents/guidance-assess-chemical-contaminant-vol2-third-edition.pdf>.

b. Screening values listed as parts per billion (ppb), which is equivalent to µg/kg, but not specified as being on a wet weight or dry weight basis.

In March 2019, Cardno conducted a Stranded Fish and Mussel Survey in the Project's power canal to support dewatering of the canal for inspection of the intake screens. The full report was filed with FERC as Attachment B of the ISR Meeting summary on May 8, 2020. Fish collections and relocations were made by electrofishing in the Project's power canal (Table E.5-6). These collections were conducted during scheduled maintenance work, unrelated to the current relicensing proceedings.

**Table E.5-6
Number of Live Fish Relocated from Project Area**

Common Name	Scientific Name	Collection Date		Total
		3/28/2019	3/29/2019	
Rock Bass	<i>Ambloplites rupestris</i>	9	18	27
Yellow Bullhead	<i>Ameiurus natalis</i>	18	17	35
Greenside Darter	<i>Etheostoma blennioides</i>	-	3	3
Rainbow Darter	<i>Etheostoma caeruleum</i>	69	174	243
Johnny Darter	<i>Etheostoma nigrum</i>	14	16	30
Northern Hogsucker	<i>Hypentelium nigricans</i>	3	1	4
Channel Catfish	<i>Ictalurus punctatus</i>	-	9	9
Brook Silverside	<i>Labidesthes sicculus</i>	3	-	3
Green Sunfish	<i>Lepomis cyanellus</i>	1	-	1
Bluegill	<i>Lepomis macrochirus</i>	9	7	16
Common Shiner	<i>Luxilus cornutus</i>	1	3	4
Smallmouth Bass	<i>Micropterus dolomieu</i>	186	139	325
Largemouth Bass	<i>Micropterus salmoides</i>	1	1	2
Golden Redhorse	<i>Moxostoma erythrum</i>	10	7	17

Common Name	Scientific Name	Collection Date		Total
		3/28/2019	3/29/2019	
Shorthead Redhorse	<i>Moxostoma macrolepidotum</i>	2	-	2
Stonecat	<i>Noturus flavus</i>	-	1	1
Yellow Perch	<i>Perca flavescens</i>	3	3	6
Logperch	<i>Percina caprodes</i>	70	99	169
Blackside Darter	<i>Percina maculate</i>	3	17	20
Black Crappie	<i>Pomoxis nigromaculatus</i>	-	1	1
Walleye	<i>Sander vitrus</i>	12	-	12
Total Individuals		414	516	930
Total Species		17	17	21

Source: Cardno 2019.

A diverse fish community of twenty-one species were collected and relocated. Primary game fish like those identified during the MDNR 1998 survey were present: Black Crappie (*Pomoxis nigromaculatus*), Bluegill, Channel Catfish, Smallmouth Bass, and Walleye.

In 2007 the MDNR conducted roving and access site angler surveys at seven sites along the St. Joseph River; two of the sites were located in the Constantine Project area (MDNR 2007). Surveys were conducted via boat and on shore on both weekend days and two randomly selected weekdays during each week from April 1 to November 30. Surveys were not collected on holidays. Smallmouth Bass, Bluegill, and Rock Bass were the most harvested and released species (MDNR 2007). Table E.5-7 provides the results of those data collection efforts.

**Table E.5-7
MDNR Roving and Access Site Angler Surveys at Seven Sites along the St. Joseph River
from April through November 2007 (MDNR 2007)**

Common Name	Scientific Name	Harvested		Released		Total Harvested/Released
		Total Catch	Catch/ Hour	Total Catch	Catch/ Hour	
Black Crappie	<i>Pomoxis nigromaculatus</i>	93	0.0072	201	0.0155	294
Bluegill	<i>Lepomis macrochirus</i>	1,288	0.0993	3,504	0.2702	4,792
Brown Bullhead	<i>Ameiurus nebulosus</i>	180	0.0139	5	0.0004	185
Carp	<i>Cyprinus carpio</i>	-	-	118	0.0091	118
Channel Catfish	<i>Ictalurus punctatus</i>	67	0.0052	-	-	67
Largemouth Bass	<i>Micropterus salmoides</i>	9	0.0007	1,964	0.1515	1,973

Common Name	Scientific Name	Harvested		Released		Total Harvested/Released
		Total Catch	Catch/Hour	Total Catch	Catch/Hour	
Northern Pike	<i>Esox lucius</i>	6	0.0005	18	0.0014	24
Pumpkinseed	<i>Lepomis gibbosus</i>	138	0.0107	93	0.0071	231
Redhorse	<i>Moxostoma spp.</i>	-	-	27	0.0021	27
Rock Bass	<i>Ambloplites rupestris</i>	299	0.0230	2,396	0.1848	2,695
Smallmouth Bass	<i>Micropterus dolomieu</i>	13	0.0010	5,593	0.4314	5,606
Walleye	<i>Sander vitreus</i>	308	0.0237	792	0.0611	1,100
Yellow Perch	<i>Perca flavescens</i>	20	0.0015	12	0.0010	32
Other	-	19	0.0015	-	-	19
TOTAL*		2,440	0.1881	14,724	1.136	17,164

*Calculated.

In 1998, the MDNR conducted a general survey to evaluate the fish community and the Walleye stocking program upstream of the Constantine dam using electrofishing, trap nets, and gill nets in June and July (MDNR 1998). The fish community was diverse, and nineteen species were collected during the survey (Table E.5-8). Bluegill, Black Crappie, Channel Catfish, Walleye, and Smallmouth Bass were identified as the primary sport fish. Bluegill were the most abundant fish and accounted for 47 percent of the catch by number. They ranged in size from 2 to 10 inches and 86 percent were of acceptable harvesting size. Black Crappie accounted for approximately 7 percent of the catch and 82 percent of fish were considered to be of acceptable harvesting size. Smallmouth Bass were present but were not of legal harvesting size. Only 13 Largemouth Bass were collected, but their size was fair with 43 percent above the legal harvesting size. All sport fish were at or above the state average growth rate except Smallmouth Bass, which were an inch less than the state average. Only 14 Walleye were collected, which were from two different year classes. Walleye growth was excellent and averaged two inches greater than the state average (MDNR 1998).

**Table E.5-8
MDNR Fish Community and Walleye Survey Upstream of the
Constantine Dam in June and July 1998 (MDNR 1998)**

Common Name	Scientific Name	Number	Percent
Black Crappie	<i>Pomoxis nigromaculatus</i>	45	7.1
Bluegill	<i>Lepomis macrochirus</i>	296	46.7
Bowfin	<i>Amia calva</i>	1	0.2
Bullhead Catfishes (family)	Ictaluridae	2	0.3
Common Carp	<i>Cyprinus carpio</i>	18	2.8
Channel Catfish	<i>Ictalurus punctatus</i>	29	4.6
White Sucker	<i>Catostomus commersonii</i>	3	0.5
Hybrid Sunfish	<i>Lepomis sp.</i>	4	0.6
Largemouth Bass	<i>Micropterus salmoides</i>	13	2.1
Longnose Gar	<i>Lepisosteus osseus</i>	16	2.5
Logperch	<i>Percina caprodes</i>	2	0.3
Northern Pike	<i>Esox lucius</i>	1	0.2
Pumpkinseed	<i>Lepomis gibbosus</i>	9	1.4
Redhorse	<i>Moxostoma spp.</i>	95	15.0
Rock Bass	<i>Ambloplites rupestris</i>	4	0.6
Smallmouth Bass	<i>Micropterus dolomieu</i>	34	5.4
Spotted Sucker	<i>Minytrema melanops</i>	44	6.9
Walleye	<i>Sander vitreus</i>	14	2.2
Yellow Perch	<i>Perca flavescens</i>	4	0.6
TOTAL		634	100.0

Source: MDNR 1998.

In 1996, a Walleye survey was conducted by the MDNR below the Constantine dam (MDNR 1996). A total of 38 Walleye were collected and ranged from 8 to 16 inches in length. Walleye growth was determined to be excellent and the mean growth index for all age groups was 2.7 inches greater than the state average growth rate (MDNR 1996).

From April 1990 through January 1991, a fish entrainment and riverine community study was conducted at the Project. Annual estimates of entrainment and associated mortality were calculated for the Project. The survey calculated an annual entrainment rate by extrapolating the results of a

single-turbine tailrace netting survey conducted at the Constantine Project. Mortality estimates were calculated using mortality rates from the entrainment mortality study completed at the Buchanan Hydroelectric Project (FERC Project 2551), which shares a nearly identical operating head and turbine placement relative to tailwater elevation (AEP 1991). The Constantine fish entrainment study also compiled comprehensive fish community data through seining, netting, and electrofishing in the Project's reservoir and the bypassed reach. The study concluded that entrainment mortality was relatively low with annual fish losses calculated at 7,751 fish. In the community assessment around the Project, 8,752 fish of 46 species were collected. The study found that the fish community was "diverse and the populations are abundant in the St. Joseph River near the Constantine Project" (AEP 1991).

In the summer of 1972, the MDNR conducted a fish survey along the St. Joseph River using electrofishing and fyke nets. Fifty-two sampling locations were established along the mainstem of the river from its headwaters to the mouth, one segment included below the dam in Three Rivers, Michigan, to the Constantine dam and another segment included from Constantine dam to the Mottville dam (Shepherd 1975, as cited in I&M 1988). Twenty-two taxa were collected in the segments upstream and downstream of the Constantine dam (Table E.5-9). Although abundance data were not available from this study, Wesley and Duffy (1999) summarized the Shepherd (1975) survey and indicated Bluegill, Black Crappie, and Smallmouth Bass were the most abundant sport fish collected. Redhorse (*Moxostoma spp.*), Spotted Sucker (*Minytrema melanops*), Longnose Gar (*Lepisosteus osseus*), and Golden Shiner (*Notemigonus crysoleucas*) were also abundant (Shepherd 1975, as cited in I&M 1988; Wesley and Duffy 1999). The survey found that there were lower fish numbers, species, and weights downstream of Three Rivers dam, which were attributed to discharges occurring at the City of Three Rivers, Michigan (I&M 1988). Studies conducted by I&M in 1990 suggested that the fishery has improved in the river both upstream and downstream from the Project since 1972 (FERC 1993a).

Table E.5-9
Fish Species Collected in Two Study Reaches of the St. Joseph River

Common Name	Scientific Name	Three Rivers Dam to Constantine Dam	Constantine Dam to Mottville Dam
Black Crappie*	<i>Pomoxis nigromaculatus</i>	X	X
Bluegill Sunfish*	<i>Lepomis macrochirus</i>	X	X
Bluntnose Minnow	<i>Pimephales notatus</i>		X
Common Carp	<i>Cyprinus carpio</i>	X	X
Common Shiner	<i>Luxilus cornutus</i>	X	

Common Name	Scientific Name	Three Rivers Dam to Constantine Dam	Constantine Dam to Mottville Dam
Golden Shiner	<i>Notemigonus crysoleucas</i>		X
Green Sunfish*	<i>Lepomis cyanellus</i>		X
Northern Hogsucker	<i>Hypentelium nigricans</i>		X
Largemouth Bass*	<i>Micropterus salmoides</i>	X	X
Logperch	<i>Percina caprodes</i>	X	X
Longnose Gar	<i>Lepisosteus osseus</i>	X	X
Northern Pike*	<i>Esox lucius</i>	X	X
Pumpkinseed Sunfish*	<i>Lepomis gibbosus</i>	X	X
Redhorse	<i>Moxostoma spp.</i>	X	X
Rock Bass*	<i>Ambloplites rupestris</i>	X	X
Smallmouth Bass*	<i>Micropterus dolomieu</i>	X	X
Spotfin Shiner	<i>Cyprinella spiloptera</i>		X
Spotted Gar	<i>Lepisosteus oculatus</i>		X
Spotted Sucker	<i>Minytrema melanops</i>	X	X
Warmouth Bass*	<i>Lepomis gulosus</i>		X
White Sucker	<i>Catostomus commersonii</i>	X	X
Yellow Bullhead	<i>Ameiurus natalis</i>	X	

*Identified as game fish, X indicates fish present.

Source: Shepherd 1975, as cited in I&M 1988.

E.5.2.1 Anadromous fish

There are no anadromous fish species in the Project area. Coho Salmon (*Oncorhynchus kisutch*), Chinook Salmon (*Oncorhynchus tshawytscha*) (spring and fall running), Steelhead Trout (*Oncorhynchus mykiss*), Brown Trout (*Salmo trutta*), and Lake Trout (*Salvelinus namaycush*) ascend the St. Joseph River from Lake Michigan during the spawning season and support a salmonid sport fishery in the lower reach of the river (FERC 1993a). However, the upstream movement of fish is currently limited by multiple dams downstream of the Project including the Mottville Project (immediately downstream of the Constantine Project), as well as the Elkhart Project and Twin Branch Project (immediately downstream of the Mottville Project) and there are currently no plans on record to install fish passage at these facilities. Additionally, FERC determined that upstream fish passage for resident fish was not necessary at the Mottville Project because a healthy fishery with suitable

habitats for key life stages of various resident species exists upstream and downstream of the Project (FERC 2002). In general, a lack of suitable substrate and the low velocities in the Constantine Project's reservoir would preclude anadromous fish spawning.

E.5.2.2 Entrainment

I&M presented entrainment and mortality estimates for fish in 1991. Entrainment rates were based on site-specific studies, whereas mortality estimates were derived from studies conducted at the Buchanan Project, which is located on the St. Joseph River and has similar turbines, hydraulic head, and resident fish community. Entrainment rates were typically low for all species except the Mimic Shiner, but the estimated mortality rate for this species was only 7 percent; therefore, annual mortality estimates of Mimic Shiners were also relatively low (2,220 fish). I&M estimated annual entrainment mortality at the Project to be 7,750 fish. The study concluded that the amount of entrainment and mortality at the Project was insignificant and would have an insignificant effect on the fish community (FERC 1993b).

In support of the original licensing, in May 1988, field investigations of flow in the headrace were conducted utilizing a portable current meter. Velocities were measured through the trashracks, at the face of the trashracks, within the headrace approximately 800 feet downstream of the headgates, and through the headgates. The velocity of flow through the trashrack bars was measured as 1.8 feet per second (fps) through the trashracks, and 1.3 fps at the face of the trashracks. Both of these values were higher than the calculated velocities at these locations (1.0 and 0.9 fps, respectively), which was attributed primarily to the accumulation of debris on the face of the trashracks during the measurement.

In June, 2019, intake velocities were recorded at two locations within the power canal (Figure E.5-2). The recorded velocities were similar to those reported in the entrainment survey completed in 1991 (AEP 1991). During the original licensing in 1988 velocities were measured at 1.8 feet per second (fps) through the trackracks and 1.3 fps at the face of the trackracks (I&M 2018). This is very similar to average velocities measured in 2019 in the power canal by an Acoustic Doppler Current Profiler (ADCP) of 1.57 fps (47.9 centimeters per second [cm/s]) just downstream of the headgate structure and 1.33 fps (40.5 cm/s) approximately 136 feet upstream of the trashracks. These velocity values have remained relatively unchanged as there have been no change to Project operations or significant modification of Project features (I&M 2020).

The values collected in 1988 and 2019 are lower than the guidance from the USFWS which recommends; "Normal velocities should not exceed 2 feet-per-second (fps) measured at an upstream location where velocities are not influenced by the local acceleration around the guidance structural members." (i.e., trashracks) (USFWS 2019).

Table E.5-10 is a comparison of published swim speeds for several freshwater fish that include the species collected during the 2019 Constantine Fisheries Survey. Entrainment susceptibility may be judged in part by the ability of a fish to swim against the current upstream of the powerhouse. The **average** (emphasis added) swim speeds reported are very similar to the measured water velocity in the power canal, whereas the published maximum or burst swim speeds often exceed the velocity measurements in the power canal.

**Figure E.5-2
Constantine Hydroelectric Project Velocity Transect Locations**



<p>0 150 300 Feet</p>	<p>LEGEND</p> <ul style="list-style-type: none">  Velocity Transect  Project Boundary 	<p>FIGURE 2 Velocity Transects Constantine Hydroelectric Project St. Joseph County, Michigan</p>
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**Table E.5-10
Experimental Observations of Prolonged Swimming Speeds Grouped by Genus**

Family	Genus	Number Fish Tested	Average of Minimum Swim Speed (ft/s)	Average of Swim Speed (ft/s)	Average of Maximum Swim Speed (ft/s) ³
Catostomidae	<i>Catostomus</i>	4	N/A	1.60	N/A
Centrarchidae	<i>Lepomis</i>	5	N/A	0.98	N/A
Centrarchidae	<i>Micropterus</i>	11	1.64 ¹	1.41 ²	3.87 ¹
Cyprinidae	<i>Campostoma</i>	1	0.92	1.31	1.76
Cyprinidae	<i>Cyprinus</i>	2	2.13	3.22	4.30
Cyprinidae	<i>Notemigonus</i>	1	1.01	N/A	2.34
Cyprinidae	<i>Notropis</i>	4	N/A	1.10	N/A
Esocidae	<i>Esox</i>	2	0.62	N/A	1.56
Percidae	<i>Etheostoma</i>	3	0.47	0.97	1.38
Percidae	<i>Sander</i>	9	1.20	1.02	2.97
Petromyzontidae	<i>Lampetra</i>	4	0.50	2.06	1.50

¹ Minimum and Maximum Speed from *Micropterus dolomieu*.

² Average Speed from *Micropterus salmoides*.

³ Burst swim speeds are generally much higher than the average maximum swim speed.

Source: FishXing Version 3.0 Beta, 2006.

The measured velocities in the intake canal and upstream of the trashracks appear to be similar to the velocity of the free-flowing portion of the St. Joseph River. The intake velocities at the Project would be easily navigated or avoided by most fish inhabiting the St. Joseph River in the vicinity of the Project.

E.5.3 Fisheries Management

Historically, the MDNR has stocked Walleye and Channel Catfish in this reach of the St. Joseph River (Wesley and Duffy 1999). Over the past eleven years (2006 to 2016) nearly 275,000 Walleye (just over an inch long) have been stocked in the St. Joseph River in St. Joseph County (Table E.5-11). Stocking occurred in 2006, 2012, 2014, and 2016 (MDNR 2017b). Channel Catfish have not been stocked in this area of the St. Joseph River since 1999 (MDNR 2017b).

Table E.5-11
MDNR Walleye Stocking Efforts in the St. Joseph River,
St Joseph County, from 2006 to 2016 (MDNR 2017b)

Year	Number of fish
2006	34,966
2012	80,273
2014	85,250
2016	72,998
TOTAL	273,487

The St. Joseph River is managed for Channel Catfish, Smallmouth Bass, and Walleye (Wesley and Duffy 1999). Therefore, the life-history characteristics of these species are described below.

Channel Catfish

Channel Catfish live in a diverse array of habitats including inland lakes and medium to large rivers. In rivers, young Channel Catfish are generally found in shallow riffles, whereas adults typically inhabit deep pools with log jams or rocks for cover during the day and move into shallow water at night. Channel Catfish feed both day and night. They take a large part of their food from the bottom, but also feed at the surface. In the late spring or early summer, male Channel Catfish build nests in dark, secluded areas (e.g., undercut banks, log jams, or rocks). The female leaves the nest soon after depositing the eggs on it. The male stays behind to protect and fan the eggs. Eggs hatch in 5 to 10 days. Fry remain in the nest for about seven days after hatching (MDNR 2017a).

Smallmouth Bass

Smallmouth Bass are found in inland lakes, rivers, and Great Lakes bays where waters are cool and clear and the bottom consists of rock or gravelly substrate. Spawning activity begins in the spring when water temperatures are 60°F or warmer. Males build a nest, usually near shore, where they will guard the nest and fry. Eggs hatch in 2 to 3 days. The fry will leave the nest in a couple of weeks after hatching. At first, they eat microcrustaceans, but soon add insects and fish to their diet as they grow (MDNR 2017a).

Walleye

Walleye prefer cool waters and are often found next to ledges, large rocks, underwater islands, large logs, edges of large beds of aquatic vegetation, along old riverbed channels, and along reefs and bars.

In the spring and fall, Walleye congregate in shallow bay waters of the Great Lakes and other inland lakes, where they are found in rocky areas and submerged bars (MDNR 2017a). Spawning occurs from March to May over rock shoals in tributaries or lakes. Walleye are known to migrate to upstream tributaries to spawn, but they will spawn in lakes over rocky or gravel shoals or clean, low-growing emergent vegetation (MDNR 2017a).

E.5.4 Macroinvertebrates

Benthic macroinvertebrates are an important component of riverine systems. They are an important fish food and are useful indicators of environmental stress. Often, the presence of pollution-intolerant species, or EPT taxa (Ephemeroptera [mayflies], Plecoptera [stoneflies], and Trichoptera [caddisflies]) can be indicative of a healthy stream. However, this is only one of many indices that can be used to assess the biological integrity of a stream. The diversity of invertebrates in southwest Michigan is high because it is in the junction of three major ecoregions (Wesley and Duffy 1999).

The EGLE samples Michigan's lakes, streams, and rivers. Routine sampling of the St. Joseph River occurs every five years to check stream condition or health. Sampling occurred in 2015 and 2016 and was scheduled to occur again in 2020 and 2021. It is unknown if this sampling actually occurred or was postponed due to travel restrictions associated with the COVID-19 pandemic. Although sampling occurs near the Constantine Project, no sampling currently occurs within the Project boundary. The St. Joseph River in the vicinity of the Project is considered Excellent to High Acceptable (EGLE 2020a).

Additionally, macroinvertebrate surveys are conducted by the City of Elkhart, Indiana, on the St. Joseph River in Elkhart, Indiana, approximately 15 miles downstream of the Constantine Project. Data from those surveys show Invertebrate Community Index (ICI) scores ranging from 42--54 (City of Elkhart-South Bend 2019), indicating that the biology in the St. Joseph River is equivalent to what would be found in a "natural" stream of the area.

Additional historical data exists on tributaries of the St. Joseph River (MDEQ 2007, 2011), and show a general upward trend in the water quality conditions of the watershed based on the aquatic macroinvertebrate community and the associated assessments and surveys.

E.5.5 Freshwater Mussels

The distribution of freshwater mussels has been documented in several reports (Van der Schalie 1930, Horvath et al. 1994, Sherman 1997, and Fisher 1998) and is summarized in Wesley and Duffy (1999). Data collected in these studies that are in close proximity to the Project are provided in Table E.5-12.

**Table E.5-12
Mussels Found at Two Study Reaches near the Constantine Project
in the St. Joseph River**

Common Name	Scientific Name	St. Joseph River by Three Rivers	St. Joseph River at Mottville
Creeper	<i>Strophitus undulatus</i> ¹	X	X
Cylindrical Papershell	<i>Anodontoides ferussacianus</i>	--	X
Elktoe	<i>Alasmidonta marginata</i>	X	X
Ellipse	<i>Venustaconcha ellipsiformis</i>	X	X
Fluted-Shell	<i>Lasmigona costata</i>	--	X
Giant Floater	<i>Pyganodon grandis</i> ²	X	--
Mucket	<i>Actinonaias carinata</i>	--	X
Ohio Pigtoe	<i>Pleurobema cordatum</i>	--	X
Pocketbook	<i>Lampsilis cardium</i>	--	X
Purple Wartyback ³	<i>Cyclonaias tuberculata</i>	--	X
Rainbow Shell	<i>Villosa iris</i>	--	X
Spike	<i>Elliptio dilatata</i>	X	X
Wabash Pigtoe	<i>Fusconaia flava</i>	X	X

¹ Identified in report as *Strophitus rugosus* - not recognized as a valid taxon.

² Identified in report as *Anodonta grandis* - not recognized as a valid taxon.

³ State threatened.

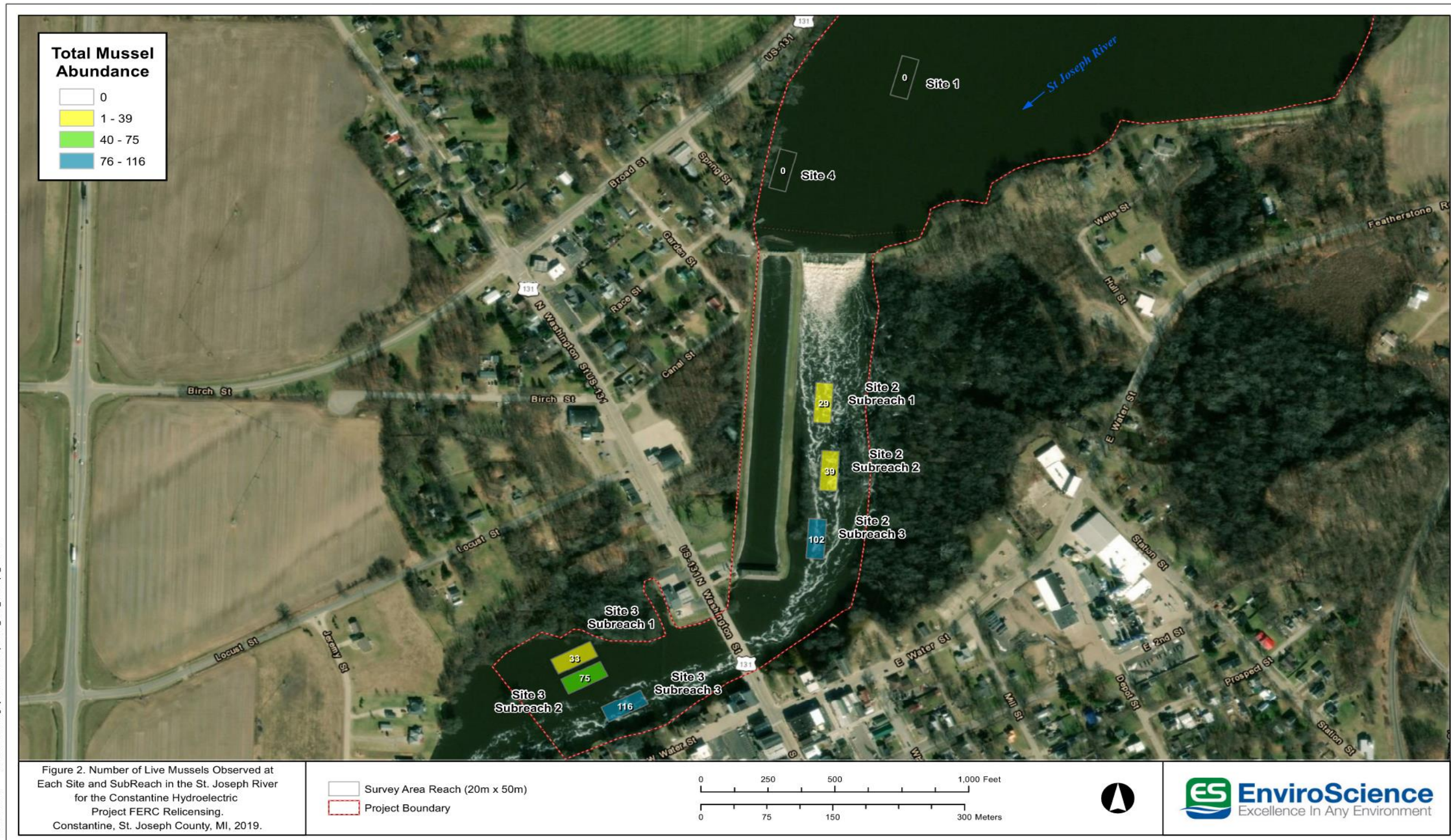
Source: Wesley and Duff 1999.

Of the 44 mussel species found in the State of Michigan, 19 (43 percent) are listed as either endangered or threatened pursuant to the Endangered Species Act of the State of Michigan, Part 365 of PA 451 1994, Michigan Natural Resources and Environmental Protection Act (MDNR 2009).

The 2019 Michigan Mussel Survey Protocol (Protocol) classified the Project reach of the St. Joseph River as a "Group 2 Stream" (Hanshue et al. 2019). Group 2 Streams are defined as streams where state threatened and/or endangered mussels are known or are expected to occur and historically supported federally listed mussel species.

A Mussel Survey was conducted in the Project reservoir, bypassed reach, and downstream reach between August 20 and August 21, 2019 (Figure E.5-3).

Figure E.5-3
Number of Mussels Observed at Each Site and Subreach in the St Joseph River During 2019



Date: 4/6/2020
 Path: C:\Users\Gregory Hovevar\Desktop\12072_HDR_GIS\Map3_Site.mxd

Overall, a total of 394 mussels representing 12 live species were detected and an additional four species were detected as shells only (Table E.5-13). All live mussels were collected below the dam. The Plain Pocketbook (*Lampsilis cardium*) was the dominant species (total number [n] 111) representing 27.5 percent of all individuals collected. The Ellipse (*Venustaconcha ellipsiformis*; n=82) and Mucket (*Actinonaias ligamentina*; n=74) were subdominant representing 20.8 percent and 18.8 percent of all individuals collected, respectively. The Ellipse is designated as a state special concern species; no legal protection is afforded to special concern species in Michigan. One additional special concern species was collected (Elktoe [*Alasmidonta marginata*]) (I&M 2020).

**Table E.5-13
Status, Number, Relative Abundance, and Minimum, Maximum, and Mean Shell Length of the Total Freshwater Mussels Collected from the Constantine Project during 2019**

Scientific Name	Common Name	Federal Status ¹	MI Status ¹	Condition ²			RA	Shell Length (mm)			Sex (No. Live)	
				Live	FD	D		Min.	Max.	Mean	Female	Male
<i>Actinonaias ligamentina</i>	Mucket	--	--	74	--	1	18.8%	85.0	147.0	114.1	--	--
<i>Alasmidonta marginata</i>	Elktoe	--	SC	30	--		7.6%	34.0	82.0	64.8	--	--
<i>Cyclonaias pustulosa</i>	Pimpleback	--	T	20	--		5.1%	51.0	84.0	66.2	--	--
<i>Cyclonaias tuberculata</i>	Purple Wartyback	--	--	--	--	1	--	--	--	--	--	--
<i>Eurynia dilatata</i>	Spike	--	--	10	--	2	2.5%	70.0	122.0	90.8	--	--
<i>Fusconaia flava</i>	Wabash Pigtoe	--	--	3	--		0.8%	38.0	92.0	70.0	--	--
<i>Lampsilis cardium</i>	Plain Pocketbook	--	--	111	--	1	28.2%	47.0	122.0	91.0	40	71
<i>Lampsilis siliquoidea</i>	Fatmucket	--	--	--	--	1	--	--	--	--	--	--
<i>Lasmigona costata</i>	Flutedshell	--	SC	19	--	1	4.8%	80.0	137.0	108.8	--	--
<i>Pleurobema sintoxia</i>	Round Pigtoe	--	SC	--	--	1	--	--	--	--	--	--
<i>Pyganodon grandis</i>	Giant Floater	--	--	--	--	6	--	--	--	--	--	--
<i>Quadrula quadrula</i>	Mapleleaf	--	--	2	--		0.5%	80.0	83.0	81.5	--	--
<i>Strophitus undulatus</i>	Creeper	--	--	32	--		8.1%	40.0	98.0	81.0	--	--
<i>Toxolasma parvum</i>	Lilliput	--	E	1	--		0.3%		26.0		--	--
<i>Utterbackia imbecillis</i>	Paper Pondshell	--	SC	10	--	5	2.5%	35.0	87.0	59.5	--	--
<i>Venustaconcha ellipsiformis</i>	Ellipse	--	SC	82	--	1	20.8%	40.0	77.0	61.0	--	--
Total				394		20	100.0%					
No. of Species				12		10						

¹E=Endangered; SC=Special Concern; T=Threatened
²FD=fresh dead shell; D=include weathered dead and subfossil shells.

E.5.6 Rare, Threatened, and Endangered Aquatic Species

No federally listed mussel species were detected within the Project area. An undetectable mussel community may occupy areas not surveyed in the region upstream of the dam, and mussel scarcity is likely due to a lack of habitat and unstable conditions in Sites 1 and 4 of the Mussel Survey conducted in 2019. There appears to be a stable, recruiting mussel community below the dam that has likely persisted for several years based on the diversity and abundances observed in this survey and historical records (I&M 2020). The mussels observed would likely not be affected by continued operation of the Project.

By letter dated September 11, 2017, the Michigan Natural Features Inventory (MNFI) indicated that three state-listed species have been documented in the vicinity of the Project. The MNFI indicated that the state-threatened purple wartyback mussel (*Cyclonaias tuberculata*), water willow (*Justicia americana*), and the yellow-throated warbler (*Setophaga dominica*) are state-listed species that could potentially occur in the Project area. Information on the two aquatic species are provided in this section, while information on the yellow-throated warbler is presented in Section E.7.2

Purple Wartyback Mussel

The purple wartyback mussel inhabits medium to large rivers that have gravel or mixed sand and gravel substrates. Suitable habitat for fish host species must be present for purple wartyback reproduction to be successful. Known hosts for the purple wartyback are the Yellow Bullhead (*Ameiurus natalis*) and Channel Catfish, but there may be others. Purple wartybacks can live to over 25 years of age. Freshwater mussels require a fish host to complete their life cycle as eggs are fertilized and develop into larvae within the gills of the female mussel. These larvae, called glochidia, are released into the water and must attach to a suitable fish host to survive and transform into the adult mussel. The purple wartyback is a summer breeder with fertilized eggs and glochidia released during the summer (MNFI 2017).

Major threats to freshwater mussels are habitat degradation, poor water quality, flow alterations, water temperature changes, heavy metals, organic pollution, sedimentation, and siltation (MNFI 2017).

E.6 Terrestrial Resources

Lands within the Constantine Project vicinity include forests, well-vegetated shorelines, agricultural lands, and some residential properties. Oak-hickory forests, northern swamp forests, and beech forests are typical in the region. White oak, red oak, black oak, bitternut hickory, shagbark hickory, sugar maple, beech are dominant tree species. The region contains numerous perennial streams of mostly low to moderate gradient with many small and medium-sized lakes.

The area supports a diverse range of wildlife and botanical species typical of that found in residential and agricultural areas.

The Project area also supports a variety of wetland and riparian cover types. I&M implements best management practices to prevent the spread of invasive terrestrial animals and plant species in accordance with MDNR's operational order 113 – Invasive Species Prevention and Management.

E.6.1 Ecoregions

The Constantine Project is located within the Eastern Temperate Forest, Mixed Wood Plains, S. Michigan/N. Indiana Drift Plains, Battle Creek/Elkhart Outwash Plain. This region occurs in southern Michigan and northern Indiana. It is bordered by Lake Michigan on the west and the Huron/Erie Lake Plain on the east. A mix of agricultural land, forest and woodland, pasture, and urban, suburban, and rural residential land uses (USEPA 2020). This region is heavily utilized for agriculture throughout. Farms primarily produce corn, soybean, and wheat, and there is also some pastureland. Saturated organic soils found on some sites are utilized for mint and vegetable farming (Bryce et al 1999). Although the region is significant regarding residential development in cities like Elkhart and South Bend, Indiana, and Kalamazoo and Battle Creek, Michigan, the area surrounding the Constantine Project is primarily forested riparian zone and agriculture with only a few areas of residential development. Forest cover is significantly higher in the north; in the south, forests are mostly limited to small, isolated woodlots and riparian corridors. Forests are mostly second-growth oak forests. (Bryce et al 1999). The ecoregion has a severe mid-latitude humid continental climate, marked by warm to hot summers and severe winters, with no pronounced dry season. The region has an assortment of landforms, soil types, and soil textures. Broad till plains with thick and complex deposits of drift, paleobeach ridges, relict dunes, morainal hills, kames, drumlins, meltwater channels, and kettles occur (USEPA 2020).

E.6.2 Botanical Resources

Directly east of the Constantine dam lies a diverse mixed hardwood community, which drops into forested wetland to the south. The overstory of this hilly floodplain forest consists of three species of maple with oak, basswood, cottonwood, elm, ash, walnut, and northern catalpa (*Catalpa speciosa*) associates. The mid/understory is dominated by spice bush (*Lindera benzoin*) and buttonbush (*Cephalanthus occidentalis*), mixed with white mulberry (*Morus alba*), honeysuckle, and black raspberry (*Rubus occidentalis*). The understory is dominated by Virginia wildrye (*Elymus virginicus*), asters, vervain, American germander (*Teucrium canadense*), bedstraw, New York fern (*Thelypteris noveboracensis*), sensitive fern (*Onoclea sensibilis*), and wild ginger (*Asarum canadense*). The low pockets of forested wetland in the southern portion have a similar overstory with green ash (*Fraxinus*

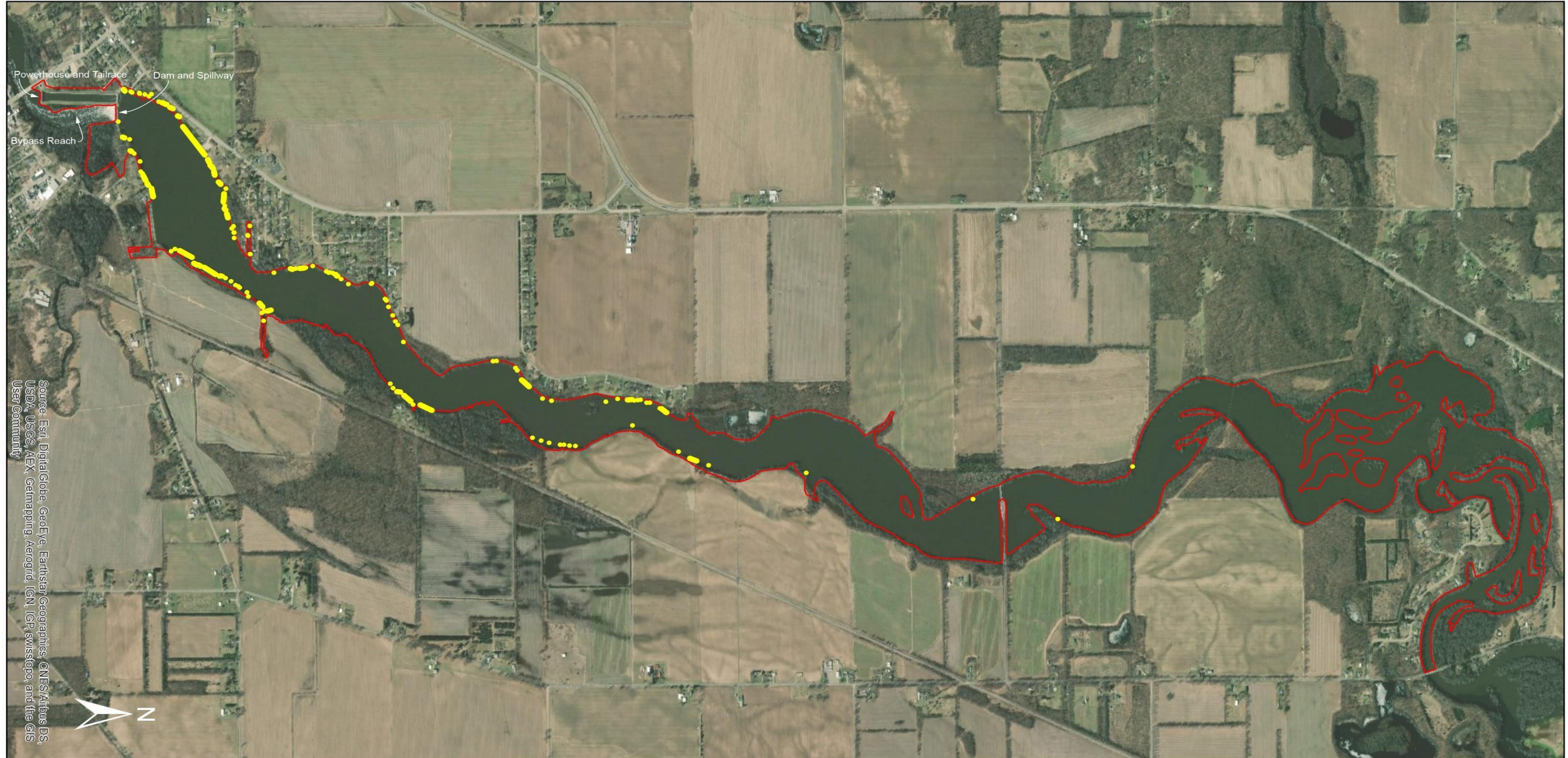
pennsylvanica), silver maple (*Acer saccharinum*), swamp white oak (*Quercus bicolor*), and black walnut (*Juglans nigra*) dominating. Understory species in this southern section including sensitive fern, interrupted fern (*Osmunda claytoniana*), southern blue flag (*Iris virginica*), false nettle (*Bohmeria cylindrical*) and meadow rue (*Thalictrum daisycarpum*). Small embedded scrub/shrub and emergent wetlands in this area are composed of buttonbush, southern blue flag, watercress, sensitive fern, and Canada clearweed (*Pilea pumila*) (I&M 2020).

The southern and mid-section of the Project area is a mixture of floodplain forested, residential, and small inlets of scrub/shrub and emergent wetlands. The majority of the reservoir is lined with broadleaf arrowhead (*Sagittaria latifolia*), which then transitions into green arrow arum (*Peltandra virginica*) in the northern sections of the reservoir. Lizard's tail (*Saururus cernuus*) and two species of *Persecaria* (*Persecaria amphibia* and *P. hydropiperoides*) are also dominant along the reservoir shoreline. Offshore species, primarily in coves and inlets, include variegated pond-lily (*Nuphar variegata*) and American white waterlily (*Nymphaea odorata*), with some large sections of large-leaf cattail (*Typha latifolia*) and a few populations of narrow-leaf cattail (*Typha angustifolia*). Nearshore aquatic species occur throughout the entirety of the reservoir. Primary aquatic species include coontail (*Ceratophyllum demersum*), Carolina fanwort (*Cabomba caroliniana*), Eurasian watermilfoil (*Myriophyllum spicatum*), sago pondweed (*Stuckenia pectinata*), common waterweed (*Elodea canadensis*), tape-grass (*Vallisneria americana*), and pondweed (*Potamogeton berchtoldii*) (I&M 2020).

Water Willow

The state-threatened water willow is a mat-forming perennial of river slackwater areas; leaves opposite, narrowly elliptical; flowers pale violet marked with dark purple, borne in axillary clusters near top of plant. It primarily occurs in large river systems and less commonly in lakes. It is almost always found along muddy banks at the edge of the shore (MNFI 2017). Flowering begins in June and may continue to September depending on location (USDA 2017). This species is found from Texas, Oklahoma, Kansas, Iowa, and Michigan east to New York and Vermont, and south to Florida. It also occurs in northern Ontario and Quebec (USDA 2017). Numerous populations of the state-threatened water willow line the southern and mid-section of the Project area of the reservoir (Figure E.6-1).

Figure E.6-1
Locations of Water Willow along the Constantine Project Shoreline, 2019



LEGEND



American Water Willow



Project Boundary



FIGURE 1
Rare, Threatened, or Endangered Plant Species Locations
August & September 2019
Constantine Hydroelectric Project (FERC No. 10661)
St. Joseph County, Michigan

The northern reaches of the reservoir (north of Withers Road Bridge) are dominated by floodplain forested and forested wetland. Scrub/shrub wetlands and emergent wetlands are also present in this section of the reservoir. Silver maple and various species of willow dominate the canopy. The understory is primarily buttonbush, swamp loosestrife (*Decodon verticillatus*) and purple loosestrife (*Lythrum salicaria*). The islands in the northern reaches are dominated by purple loosestrife (I&M 2020).

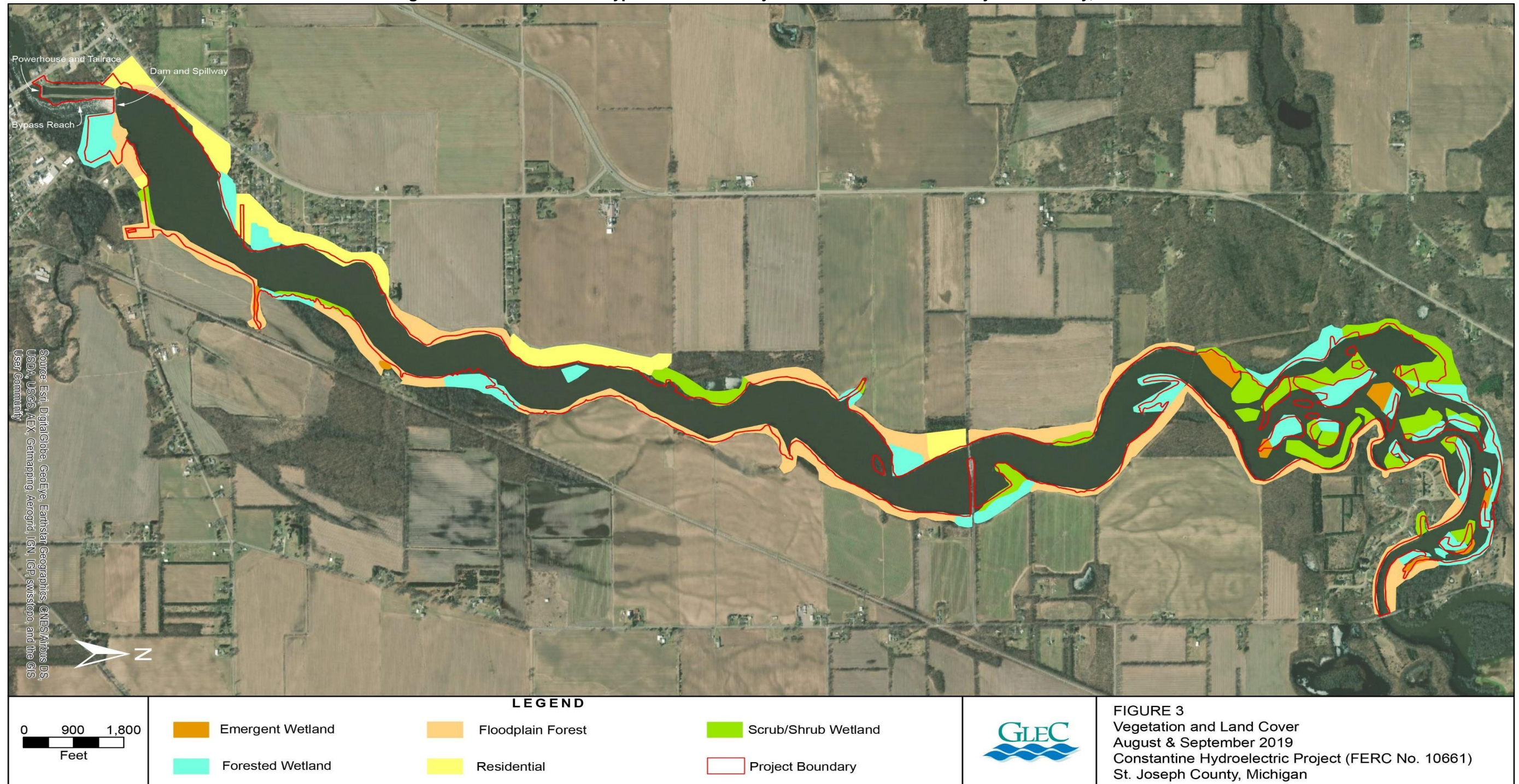
Floodplain Forest

Floodplain forest exists throughout the majority of the Project boundary. The overstory tree species composition changes slightly moving from the south to the northern reaches of the reservoir boundary; therefore, this cover type is described in additional detail. Digital polygons of the cover type map have associated attribute data showing the dominant species in each region of floodplain forest (Figure E.6-2). Much of this forest type's edge is lined with populations of the state-threatened American water willow.

East of the Constantine dam, the Floodplain forest canopy consists of a diverse overstory of various maples (*Acer saccharum*, *Acer saccharinum*, and *Acer negundo*), bur oak (*Quercus macrocarpa*), basswood (*Tilia Americana*), cottonwood (*Populus deltoides*), elm (*Ulmus Americana*), ash (*Fraxinus americana*, *Fraxinus pennsylvanica*), hickory (*Carya ovata*), black walnut, redbud (*Cercis canadensis*), and Catalpa. The mid and understory of this floodplain forest is dominated by the woody shrubs buttonbush, blackberry (*Rubus alleghaniensis*), and honeysuckle (*Lonicera* spp.) as well as mulberry. The understory/herbaceous layer is composed primarily of the following herbs, grasses and forbes: Virginia wildrye, aster (*Symphyotrichum lateriflorum*), vervain (*Verbena urticifolia*), Missouri ironweed (*Veronica missurica*), bedstraw (*Galium triflorum*), moneywort (*Lysimachia nummularia*), ferns (*Thelypteris noveboracensis*, *Osmunda claytoniana*), ginger (*Asarum canadense*), and woodsorrel (*Oxalis dillenii*) (I&M 2020).

The southwestern shoreline of the Project area is dominated by oak species, as mapped circa 1800 as Mixed Oak Savanna (Corner et al. 1995). Canopy species include white oak (*Quercus alba*), bur oak, red oak (*Quercus rubra*), and pin oak (*Quercus palustris*). Other canopy species include silver maple, elm, and willow (*Salix petiolaris*). The mid/understory of this floodplain forest is primarily composed of buttonbush, purple loosestrife, broadleaf arrowhead, lizard's tail, and water willow (I&M 2020).

Figure E.6-2
Vegetation and Land Cover Types Within and Adjacent to the Constantine Project Boundary, 2019



The mid-section of the reservoir shoreline, up to the Withers Road Bridge, has a forest canopy dominated by silver maple, elm, sycamore (*Plantanus occidentalis*), ash (*Fraxinus americana*, *Fraxinus nigra*), willow (*Salix petiolaris*, *Salix nigra*) and black oak (*Quercus nigra*), with mulberry, pin oak, basswood (*Tilia americana*), walnut (*Juglans nigra*), hickory (*Carya cordiformis*) and sugar maple (*Acer saccharum*) intermixed. Occasional red cedar (*Juniperus virginiana*) and honey locust (*Gleditsia triacanthos*) are also present along these sections. This floodplain forest mid/understory is dominated by broadleaf arrowhead, lizard's tail, and water willow (I&M 2020).

North of the Withers Road Bridge, the floodplain forest canopy is dominated by silver maple and willow (*Salix petiolaris*, *Salix nigra*), merging into significant areas of forested wetland. Other canopy species include basswood (*Tilia americana*), mulberry, hickory (*Carya cordiformis*), cottonwood (*Populus deltoides*), green and black ash (*Fraxinus pennsylvanica* and *F. nigra*), elm (*Ulmus americana*), and honey locust. The mid-story/shrub layer of this section is primarily rose (*Rosa multiflora*), privet (*Ligustrum vulgare*), buttonbush, and loosestrife (*Lythrum salicaria*, *Decodon verticillatus*). Understory species include false nettle, riverbank grape (*Vitis riparia*), avens (*Geum canadense*), wild yam (*Dioscorea villosa*), black currant (*Ribes americanum*), cardinal flower (*Lobelia cardinalis*), aster (*Symphotrichum lateriflora*), Virginia wildrye, and bluegrass (*Poa compressa*) (I&M 2020).

Table E.6-1
List of Botanical Species at Constantine Reservoir, 2019

Scientific Name	Common Name	Status
<i>Abutilon theophrasti</i>	Velvetleaf	Non-native
<i>Acalypha rhomboidea</i>	Common copperleaf	Native
<i>Acer negundo</i>	Boxelder maple	Native
<i>Acer saccharinum</i>	Silver maple	Native
<i>Acer saccharum</i>	Sugar maple	Native
<i>Alnus incana</i>	Speckled alder	Native
<i>Ambrosia artemisiifolia</i>	Common ragweed	Native
<i>Amphicarpaea bracteata</i>	Hog peanut	Native
<i>Asarum canadense</i>	Canadian wild ginger	Native
<i>Asclepias incarnata</i>	Swamp milkweed	Native
<i>Asclepias syriaca</i>	Common milkweed	Native
<i>Asimina triloba</i>	Common pawpaw	Native
<i>Asplenium platyneuron</i>	Ebony spleenwort	Native
<i>Bidens cernua</i>	Nodding beggarticks	Native
<i>Bidens frondosa</i>	Devil's beggarticks	Native
<i>Bidens trichosperma</i>	Marsh Tickseed	Native

Scientific Name	Common Name	Status
<i>Boehmeria cylindrica</i>	False nettle	Native
<i>Cabomba caroliniana</i>	Carolina fanwort	Non-native
<i>Carex gracillima</i>	Sedge	Native
<i>Carex vulpinoidea</i>	Fox sedge	Native
<i>Carya glabra</i>	Pignut hickory	Native
<i>Carya cordiformis</i>	Bitternut hickory	Native
<i>Catalpa speciosa</i>	Northern catalpa	Non-native
<i>Celastrus orbiculatus</i>	Oriental bittersweet	Non-native
<i>Cephalanthus occidentalis</i>	Buttonbush	Native
<i>Ceratophyllum demersum</i>	Coontail	Native
<i>Cercis canadensis</i>	Eastern redbud	Native
<i>Cicuta bulbifera</i>	Water hemlock	Native
<i>Cicuta maculata</i>	Water hemlock	Native
<i>Clematis virginica</i>	Virgin's bower	Native
<i>Cornus amomum</i>	Silky dogwood	Native
<i>Cornus foemina</i>	Gray dogwood	Native
<i>Cornus sericea</i>	Red osier dogwood	Native
<i>Cuscuta gronovii</i>	Common dodder	Native
<i>Cyperus bipartitus</i>	Shining flatsedge	Native
<i>Cyperus strigosus</i>	Long scaled nut sedge	Native
<i>Decodon verticillatus</i>	Swamp loosestrife	Native
<i>Dioscorea villosa</i>	Wild yam	Native
<i>Elaeagnus umbellata</i>	Autumn olive	Non-native
<i>Elodea canadensis</i>	Common waterweed	Native
<i>Elymus virginicus</i>	Virginia wildrye	Native
<i>Equisetum arvense</i>	Field horsetail	Native
<i>Erigeron annuus</i>	Annual fleabane	Native
<i>Erigeron strigosus</i>	Daisy fleabane	Native
<i>Eutrochium maculatum</i>	Spotted Joe-pye weed	Native
<i>Fraxinus americana</i>	White ash	Native
<i>Fraxinus nigra</i>	Black ash	Native
<i>Fraxinus pennsylvanica</i>	Green ash	Native
<i>Galium triflorum</i>	Fragrant bedstraw	Native
<i>Geum canadense</i>	White avens	Native
<i>Glechoma hederacea</i>	Ground-ivy	Non-native
<i>Gleditsia triacanthos</i>	Honey locust	Native
<i>Hesperis matronalis</i>	Dame's rocket	Non-native

Scientific Name	Common Name	Status
<i>Hydrocotyle americana</i>	American Water-pennywort	Native
<i>Hypericum ascyron</i>	Great St. John's wort	Native
<i>Impatiens capensis</i>	Common jewelweed	Native
<i>Iris virginica</i>	Southern blue flag	Native
<i>Juniperus virginiana</i>	Red-cedar	Native
<i>Juglans nigra</i>	Eastern black walnut	Native
<i>Justicia americana</i>	American water willow	Native, S2
<i>Leersia oryzoides</i>	Cut grass	Native
<i>Leersia virginica</i>	White grass	Native
<i>Lemna turionifera</i>	Red duckweed	Native
<i>Ligustrum vulgare</i>	Common privet	Non-native
<i>Lindera benzoin</i>	Northern spicebush	Native
<i>Liriodendron tulipifera</i>	Tulip tree	Native
<i>Lobelia cardinalis</i>	Cardinal flower	Native
<i>Lobelia siphilitica</i>	Great blue lobelia	Native
<i>Lonicera maackii</i>	Amur honeysuckle	Non-native
<i>Lonicera spp.</i>	Honeysuckle	*
<i>Lycopus americanus</i>	Common water horehound	Native
<i>Lysimachia ciliata</i>	Fringed loosestrife	Native
<i>Lysimachia nummularia</i>	Moneywort	Non-native
<i>Lythrum salicaria</i>	Purple loosestrife	Non-native
<i>Lysimachia thyrsoiflora</i>	Tufted loosestrife	Native
<i>Melilotus officinalis</i>	Yellow sweet clover	Non-native
<i>Mentha canadensis</i>	American corn mint	Native
<i>Morus alba</i>	White mulberry	Non-native
<i>Myosotis scorpioides</i>	Forget-me-not	Non-native
<i>Myriophyllum spicatum</i>	Eurasian watermilfoil	Non-native
<i>Nasturtium officinale</i>	Watercress	Native
<i>Nuphar variegata</i>	Variegated pond-lily	Native
<i>Nymphaea odorata</i>	American white waterlily	Native
<i>Oenothera biennis</i>	Common evening-primrose	Native
<i>Onoclea sensibilis</i>	Sensitive fern	Native
<i>Osmunda claytonii</i>	Interrupted fern	Native
<i>Oxalis dillenii</i>	Common yellow wood sorrel	Native
<i>Peltandra virginica</i>	Green arrow arum	Native
<i>Persicaria hydropiperoides</i>	Water-pepper	Native
<i>Persicaria amphibia</i>	Water smartweed	Native

Scientific Name	Common Name	Status
<i>Persicaria robustior</i>	Stout smartweed	Native
<i>Persicaria sagittata</i>	Arrow-leaved tearthumb	Native
<i>Persicaria virginiana</i>	American jumpseed	Native
<i>Phalaris arundinaceae</i>	Reed canary grass	Non-native
<i>Physostegia virginiana</i>	False dragonhead	Native
<i>Phytolacca americana</i>	American pokeweed	Native
<i>Pilea pumila</i>	Canada clearweed	Native
<i>Platanus occidentalis</i>	American sycamore	Native
<i>Poa compressa</i>	Canada bluegrass	Non-native
<i>Poa spp.</i>	Meadow-grass	*
<i>Podophyllum peltatum</i>	Mayapple	Native
<i>Polystichum acrostichoides</i>	Christmas fern	Native
<i>Pontederia cordata</i>	Pickernelweed	Native
<i>Populus deltoides</i>	Eastern cottonwood	Native
<i>Populus grandidentata</i>	Bigtooth aspen	Native
<i>Potamogeton berchtoldii</i>	Pondweed	Native
<i>Potamogeton crispus</i>	Crispy pondweed	Non-native
<i>Quercus alba</i>	White oak	Native
<i>Quercus bicolor</i>	Swamp white oak	Native
<i>Quercus macrocarpa</i>	Bur oak	Native
<i>Quercus palustris</i>	Pin oak	Native
<i>Quercus rubra</i>	Northern red oak	Native
<i>Quercus velutina</i>	Black oak	Native
<i>Ranunculus flabellaris</i>	Yellow water crowfoot	Native
<i>Rhynchospora alba</i>	White beak-sedge	Native
<i>Ribes americanum</i>	Wild black currant	Native
<i>Ribes cynosbati</i>	Prickly gooseberry	Native
<i>Robinia spp.</i>	Locust	Non-native
<i>Rosa multiflora</i>	Multiflora rose	Non-native
<i>Rubus occidentalis</i>	Black raspberry	Native
<i>Rumex obtusifolius</i>	Broad-leaved dock	Non-native
<i>Rumex verticillatus</i>	Swamp dock	Native
<i>Sagittaria latifolia</i>	Broadleaf arrowhead	Native
<i>Salix sericea</i>	Silky willow	Native
<i>Salix petiolaris</i>	Slender willow	Native
<i>Salix nigra</i>	Black willow	Native
<i>Sambucus canadensis</i>	American black elderberry	Native

Scientific Name	Common Name	Status
<i>Sanicula trifoliata</i>	Black snakeroot	Native
<i>Sassafras albidum</i>	Sassafras	Native
<i>Saururus cernuus</i>	Lizard's tail	Native
<i>Scutellaria lateriflora</i>	Side-flowering skullcap	Native
<i>Sium suave</i>	Water parsnip	Native
<i>Smilax ecirrata</i>	Upright carrion flower	Native
<i>Solanum dulcamara</i>	Bittersweet nightshade	Non-native
<i>Solidago rugosa</i>	Rough-leaved goldenrod	Native
<i>Sparganium spp.</i>	Bur-reed	Native
<i>Stachys tenuifolia</i>	Smooth hedgenettle	Native
<i>Stuckenia pectinata</i>	Sago pondweed	Native
<i>Symphotrichum lateriflorum</i>	Calico aster	Native
<i>Symphotrichum puniceum</i>	Swamp aster	Native
<i>Symplocarpus foetidus</i>	Eastern skunk cabbage	Native
<i>Teucrium canadense</i>	American germander	Native
<i>Thalictrum dasycarpum</i>	Purple meadow rue	Native
<i>Thelypteris noveboracensis</i>	New York fern	Native
<i>Tilia americana</i>	Basswood	Native
<i>Toxicodendron vernix</i>	Poison sumac	Native
<i>Toxicodendron radicans</i>	Poison ivy	Native
<i>Typha angustifolia</i>	Narrow-leaved cattail	Non-native
<i>Typha latifolia</i>	Broadleaf cattail	Native
<i>Ulmus americana</i>	American elm	Native
<i>Ulmus pumila</i>	Siberian elm	Non-native
<i>Urtica dioica</i>	Stinging nettle	Native
<i>Vallisneria americana</i>	Tape-grass	Native
<i>Verbena hastata</i>	Blue vervain	Native
<i>Verbena urticifolia</i>	White vervain	Native
<i>Vernonia missurica</i>	Missouri ironweed	Native
<i>Viburnum lentago</i>	Nannyberry	Native
<i>Viola spp.</i>	Violet	*
<i>Vitis riparia</i>	Riverbank grape	Native

*Not enough material for identification.

E.6.2.1 Invasive Plant Species

Invasive species occurring within the Project boundary are purple loosestrife, Eurasian watermilfoil, and Carolina fanwort. Carolina fanwort is not widely distributed in Michigan and is listed as “prohibited,”

whereas purple loosestrife and Eurasian watermilfoil are established in the state and are listed as “restricted.” Often, management or control techniques are not available for prohibited species (State of Michigan 2018). Article 409 of the current license requires I&M to conduct surveys for purple loosestrife and Eurasian watermilfoil within the Project’s reservoir. The surveys are to be conducted annually between late July and early August, the time during which Eurasian watermilfoil is at or near peak growth and purple loosestrife is in bloom. Great Lakes Environmental Center, Inc. (GLEC) was contracted by I&M to complete the survey in 2020, the results of which are briefly described below.

Purple Loosestrife

Purple loosestrife was documented at a total of 156 locations in the Constantine reservoir in 2020. The majority of these infestations were characterized by a single plant or a few scattered plants. However, there were 34 documented instances of moderate purple loosestrife infestations and seven heavy purple loosestrife infestations, characterized by nearly pure stands of purple loosestrife.

Historical purple loosestrife infestations in the Project reservoir indicate that light infestations have consistently increased between 1998 and 2020. Moderate infestations remained relatively stable between 1998 and 2018. However, in 2020 (and previously in 2019) there were more moderate purple loosestrife infestations than previously observed. Heavy purple loosestrife infestations were relatively stable between 1998 and 2011, but between 2012 and 2019 the number of heavy purple loosestrife infestations increased from three to 16. In 2020 significantly fewer heavy purple loosestrife infestations were observed, possibly a result of implementation of a three-year treatment plan specifically designed to target purple loosestrife and study the effectiveness of herbicide treatment. The invasive species treatment was also possibly responsible for an increase in moderate purple loosestrife infestations in 2020 since previously dense infestations may have become less dense due to the herbicide application (GLEC 2020).

In addition, I&M implemented a three-year biological control pilot project at the Constantine Project from 2015 through 2017, which was designed to test the feasibility of biological controls for purple loosestrife using the *Galerucella* sp. beetle. Data from the three-year project were evaluated to determine if there was evidence to suggest that the release of the beetles in 2015 and 2016 may have impacted the purple loosestrife population at the Test site. (Kieser & Associates 2017). The data collected from the pilot project was inconclusive in determining if the release of beetles would be sufficient to establish sustained biocontrol effectiveness in the Project area. Based on the results of the pilot program, the many vectors by which purple loosestrife and other invasive plant species are introduced into the system, and that no resource agencies or consulting parties have requested any PM&E measure related to invasive species, I&M is not proposing to continue monitoring for invasive plant species or implementing other invasive species control measures at the Project.

Eurasian Watermilfoil

A total of 48 Eurasian watermilfoil infestations were observed in the Constantine reservoir in 2020. Most of these infestations were characterized by a single plant or a few scattered plants, but there were ten instances of moderate infestations and one instance characterized by dense plants crowding out native vegetation. Where not choking out native vegetation, Eurasian watermilfoil was often mixed with coontail, pondweeds (*Potamogeton* sp.) and Carolina fanwort. Excluding year-to-year variability, light infestations of Eurasian watermilfoil in the Constantine reservoir have increased since 1998. Moderate and heavy infestations of Eurasian watermilfoil generally increased between 1998 and 2014, with a particularly significant increase observed between 2011 and 2012. Since 2014, the number of moderate and heavy infestations of Eurasian watermilfoil have generally decreased.

In 2015, I&M collected watermilfoil at three locations along a gradient within the Constantine reservoir and had DNA analyses performed. The purpose of the DNA analyses were to determine whether watermilfoil within the Project reservoir is native, Eurasian watermilfoil, or hybrid. The DNA testing confirmed that the watermilfoil in the Constantine reservoir is pure Eurasian watermilfoil.

E.6.2.2 Rare, Threatened, and Endangered Plant Species

In consultation with resource agencies and stakeholders, a list of target plant species of interest to detect and map during the Botanical Resources Study was developed along with the characterization of other botanical resources (other species, vegetative cover, habitats, and forest types). Among these species of interest included one federally threatened plant species and two state threatened plant species. These species are listed in Table E.6-2 along with their respective status. A description of their occurrence at the Project is also provided below.

**Table E.6-2
Rare, Threatened, and Endangered Plant Species at the Constantine Project, 2019**

Common Name	Scientific Name	Status
Water Willow	<i>Justicia americana</i>	State Threatened, S2 Rank
Southern wild rice	<i>Zizania aquatica</i>	State Threatened, S2S3 Rank
Eastern Prairie Fringed Orchid	<i>Platanthera leucophaea</i>	Federally threatened

Justicia americana, American water willow (State Threatened, S2 Rank)

American water willow is a native willow of special concern in Michigan. Populations of the American water willow are located along both the eastern and western shorelines of the reservoir from the Constantine dam, northward approximately two-thirds of the length of the Project area. Populations begin to dwindle when purple loosestrife increases, in the northern reaches of the reservoir. All populations of American water willow were mapped using GPS technology (Figure E.6-3).

Zizania aquatica, Southern wild-rice (State Threatened, S2S3 Rank)

During the 2019 Botanical Resources Study, wild rice was not observed to occur within or adjacent to the Project boundary. Historic county data show that wild rice beds may have been present in the area in the past (M.R. Penskar et al. 2000).

Platanthera leucophaea, Eastern Prairie Fringed Orchid (Federally Threatened)

During the 2019 Botanical Resources Study, Eastern prairie fringed orchid was not observed to occur within or adjacent to the Project boundary.

E.6.3 Wetland, Riparian, and Littoral Habitats

Wetlands are generally defined as those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support vegetation typically adapted for life in saturated soil conditions. The State of Michigan administers Section 404 of the federal Clean Water Act regulating wetlands in most areas of the state through the EGLE. The U.S. Army Corps of Engineers (USACE) retains jurisdiction over traditionally navigable waters including the Great Lakes and connecting channels and wetlands directly adjacent to these waters.

The USFWS (Cowardin 1979) defines wetlands as:

...lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification, wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominately hydrophytes; (2) the substrate is predominantly undrained hydric soil; and (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some point during the growing season of the year.

The littoral zone is defined as the area just above the influence of wave action along the shore of a lake or river to a depth where warm surface waters still reach the lake/river bed in summer (Goldman

and Horne 1994). This area can roughly be defined as the shoreline up to a depth of approximately one meter in water depth.

The riparian zone serves as the primary interface between aquatic and upland habitats, influencing both the primary productivity and food resources within the adjacent aquatic habitat. For the purposes of this section, the term “riparian” shall be used to refer to anything connected to or immediately adjacent to the shoreline or banks of the Constantine reservoir and the bed and banks of the St. Joseph River.

Total wetland acreage within the Project boundary was calculated as 35.8 acres across six National Wetlands Inventory (NWI) categories that fall under the system/class categories palustrine emergent, palustrine forested, and palustrine scrub-shrub wetland habitats (Cowardin 1979). The majority of the Project wetland area (20.8 acres) is classified as: PF01Ch Palustrine, Forested, Broad Leaved Deciduous, Seasonally Flooded, and Diked/Impounded. The Project wetland map included in the PAD was developed through GIS editing (clipping) of the USFWS NWI wetlands polygon layer against the Constantine Project boundary polygon.

The Project area is in the Beach-Maple Association of the Eastern Deciduous Forest Province (Bailey 1978). Dominant vegetation in the Project area is a mixed hardwood community consisting of oak, ash, beach, hickory, maple, cottonwood, and aspen. Willow species dominate the plant community in the scrub-shrub areas and maple, sycamore, and cottonwood dominate the forested wetlands. Other species of the palustrine forested areas include ash, sumac, walnut, and oaks. Plant species of the aquatic bed community include American white waterlily (*Nymphaea odorata*), Eurasian watermilfoil (*Myriophyllum spicatum*), and crispy pondweed (*Potamogeton crispus*). Green arrow arum (*Peltandra virginica*) is a dominant species in the emergent wetland class. Cattails are a minor component of the wetland plant community in the Constantine reservoir (FERC 1993a).

Figure E.6-3 below provides wetlands as categorized and mapped by the USFWS as part of the NWI and Figure E.6-4 provides a map of the 48 verification stations used to field verify the NWI maps during the 2019 Wetlands Study.

The wetlands mapping and field survey exercises determined that the wetland coverages described by the Project NWI wetland map and summarized by classification and acreage in Table E.6-3 below generally fit the same description with a few exceptions.

The most notable recommended update is the island between the tailrace and bypassed reach from PEM1C Freshwater Emergent Wetland to PFO1C Forested Shrub Wetland, likely an example where a field investigation (i.e., ground-truthing) provided more accurate information than interpreting an image (i.e., remote sensing). This difference is further explained in the survey notes for station 48

found in the ISR (I&M 2020) and is visually evident in Figure E.6-4. The recommended update to the classification of the island at station 48 is the most significant recommendation to the existing NWI wetlands (within the Project boundary) from the survey findings.

**Table E.6-3
National Wetlands Inventory Classification System and Estimated Acreage
from August 2019 Survey**

Wetland Code	System	Class	Subclass	Regime	Qualifier	Estimated Acres
PFO1Ah	Palustrine	Forested	Broad-Leaved Deciduous	Temporary Flooded	Diked/ Impounded	0.5
PFO1C	Palustrine	Forested	Broad-Leaved Deciduous	Seasonally Flooded	Diked/ Impounded	9.0
PFO1Ch	Palustrine	Forested	Broad-Leaved Deciduous	Seasonally Flooded	Diked/ Impounded	20.8
PSS1Ch	Palustrine	Scrub-Shrub	Broad-Leaved Deciduous	Seasonally Flooded	Diked/ Impounded	0.8
PSS1Fh	Palustrine	Scrub-Shrub	Broad-Leaved Deciduous	Semi permanently Flooded	Diked/ Impounded	4.7
Total						35.8

Figure E.6-3
USFWS Wetlands in the Vicinity of the Project

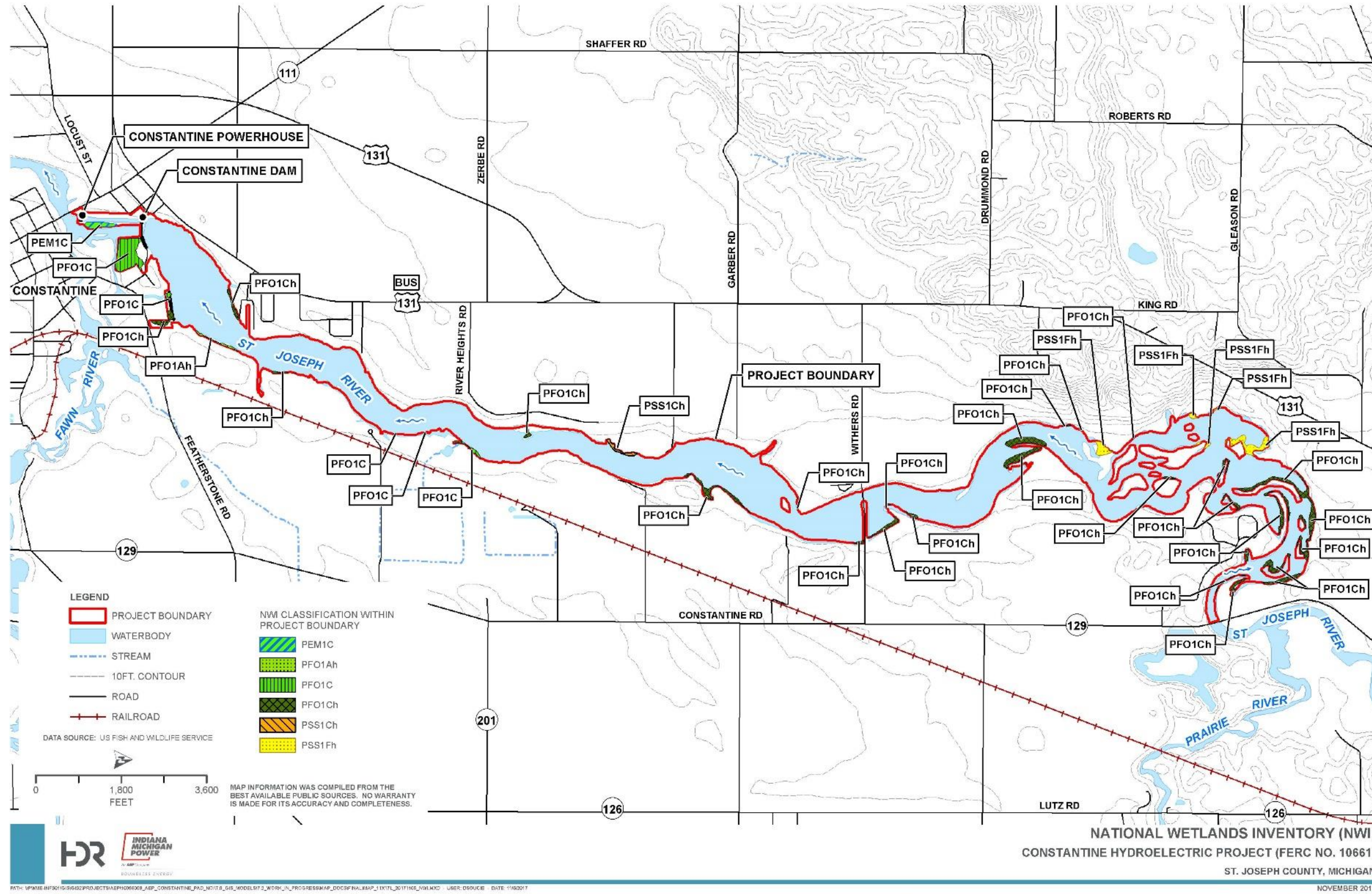
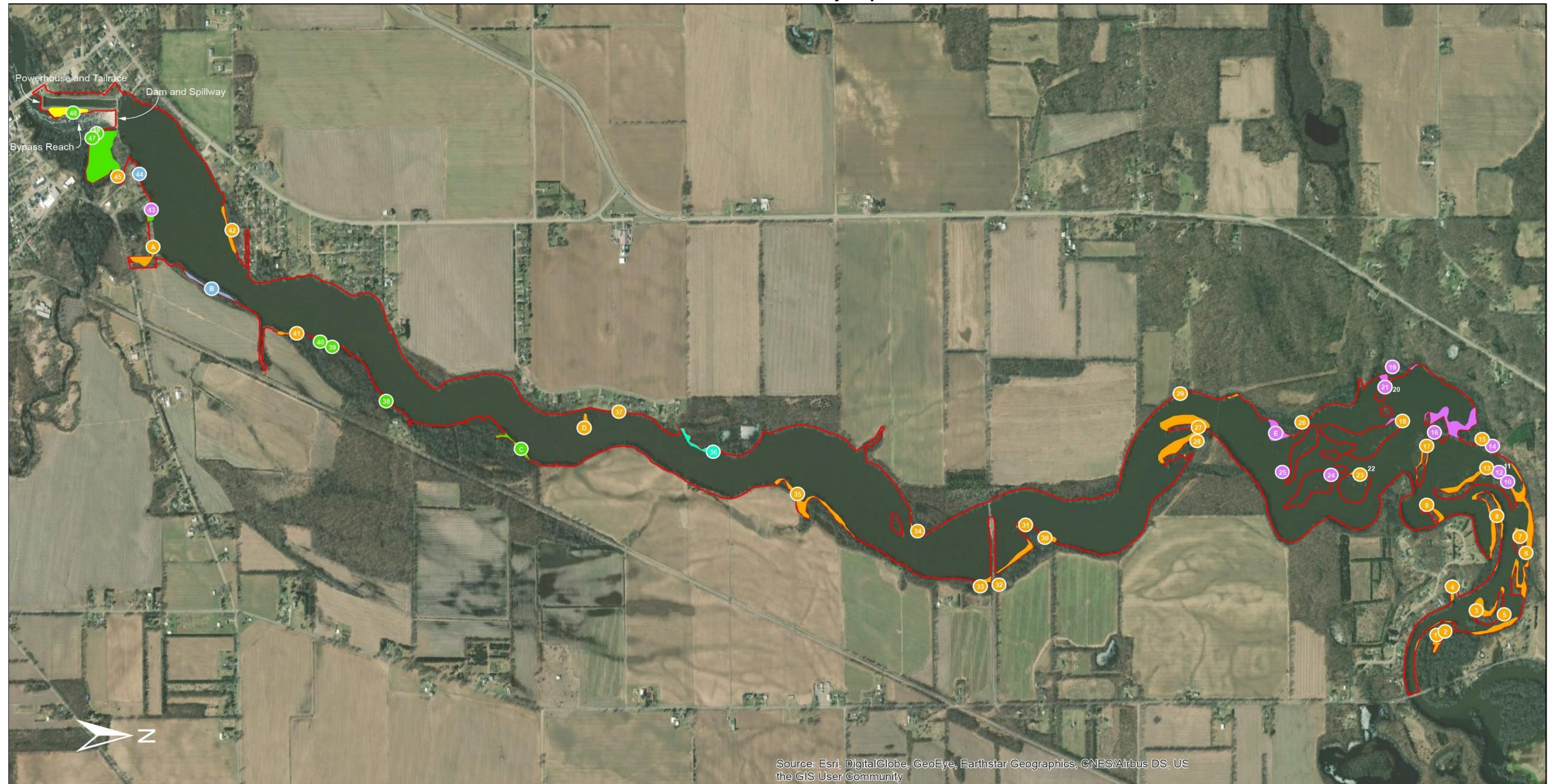


Figure E.6-4
2019 Wetland Survey Map



<p>0 900 1,800 Feet</p>	<p>LEGEND</p> <table border="0"> <tr> <td></td> <td>PEM1C</td> <td></td> <td>PFO1Ch</td> <td></td> <td>PFO1C</td> </tr> <tr> <td></td> <td>PFO1Ah</td> <td></td> <td>PSS1Ch</td> <td></td> <td>PSS1Fh</td> </tr> <tr> <td></td> <td>Project Boundary</td> <td></td> <td></td> <td></td> <td></td> </tr> </table>		PEM1C		PFO1Ch		PFO1C		PFO1Ah		PSS1Ch		PSS1Fh		Project Boundary					<p>KEY</p> <table border="0"> <tr> <td></td> <td>NWI Wetlands Classification Code</td> </tr> <tr> <td></td> <td>NWI Wetlands Feature Within Project Boundary</td> </tr> <tr> <td></td> <td>Wetlands Survey Location</td> </tr> </table>		NWI Wetlands Classification Code		NWI Wetlands Feature Within Project Boundary		Wetlands Survey Location		<p>FIGURE 1 Wetlands Survey August 2019 Constantine Hydroelectric Project (FERC No. 10661) St. Joseph County, Michigan</p>
	PEM1C		PFO1Ch		PFO1C																							
	PFO1Ah		PSS1Ch		PSS1Fh																							
	Project Boundary																											
	NWI Wetlands Classification Code																											
	NWI Wetlands Feature Within Project Boundary																											
	Wetlands Survey Location																											

The wetlands survey did produce some other recommended updates to the Project NWI wetlands map coverage data. There are no estimates of changes to acreage by classification types since field measurements (i.e., delineations) were not conducted. Other than the island mentioned above, recommended changes were relatively minor and do not significantly affect the mix of wetland types or introduce new wetland types not already described within the Project boundary. Table E.6-4 provides a summary where station observations differed from the Project NWI wetlands map classification for the station area.

**Table E.6-4
Survey Stations with Different Classification versus Underlying NWI Map Data**

Station	Observed Wetlands Classification	Project NWI Wetlands Map Class
10	PSS1Fh	PFO1Ch
11	PSS1Fh	PFO1Ch
12	PSS1Fh	PFO1Ch
18	PFO1Ch	PSS1Fh
43	PSS1Fh	PFO1Ch
45	PFO1Ch	PFO1C
48	PFO1C	PEM1C

E.6.4 Project Impacts on Terrestrial Resources

The Project supports a healthy, vigorous, and diverse range of terrestrial species and habitats including vigorous wetland resources. Existing data maintained by the USFWS indicate that the Project areas support a variety of wetland and riparian cover types. Since the Project has been in operation for nearly 150 years and is operated in a ROR mode with minimal reservoir fluctuations, these habitats are not fundamentally affected by I&M's operation of the Project.

E.6.5 PM&E Measures Proposed by the Applicant, Resource Agencies, and/or Other Consulting Parties

I&M is not proposing any new PM&E measures related to terrestrial resources but plans to continue the current ROR operations that lend to the protection of terrestrial resources at the Project. I&M is also proposing to continue to annually monitor purple loosestrife, Eurasian watermilfoil, and Carolina fanwort within the Constantine reservoir and consult with MDNR and USFWS.

E.7 Wildlife Resources

The Project area supports a number of mammals, avifauna, reptiles, and amphibians as described in the sections below.

E.7.1 Mammals

Mammals such as white-tailed deer (*Odocoileus virginianus*), red fox (*Vulpes fulva*), squirrels, and bats have been known to occur in the vicinity of the Project (FERC 1993a). Federally endangered Indiana bat and the federally threatened northern long-eared bat may occur within the Project's vicinity. These species could potentially use the Project area for foraging corridors adjacent to the St. Joseph River during the non-hibernating period. Table E.7-1 provides a list of mammal species potentially occurring in the vicinity of the Constantine Project.

**Table E.7-1
List of Mammal Species Occurring in Michigan and Potentially Occurring in the vicinity of the Project**

Common Name	Scientific Name	Common Name	Scientific Name
Badger	<i>Taxidea taxus</i>	Moose	<i>Alces alces</i>
Big Brown Bat	<i>Eptesicus fuscus</i>	Deer Mouse	<i>Peromyscus maniculatus</i>
Indiana Bat	<i>Myotis sodalis</i>	Meadow Jumping Mouse	<i>Zapus hudsonius</i>
Little Brown Bat	<i>Myotis lucifugus</i>	Muskrat	<i>Ondatra zibethicus</i>
Silver Haired Bat	<i>Lasionycteris noctivagans</i>	Opossum	<i>Didelphis marsupialis</i>
Black Bear	<i>Ursus americanus</i>	River Otter	<i>Lontra canadensis</i>
Beaver	<i>Castor canadensis</i>	Porcupine	<i>Erethizon dorsatum</i>
Bobcat	<i>Lynx rufus</i>	Eastern Cottontail Rabbit	<i>Sylvilagus floridanus</i>
Woodland Caribou	<i>Rangifer tarandus caribou</i>	Raccoon	<i>Procyon lotor</i>
Eastern Chipmunk	<i>Tamias striatus</i>	American Water Shrew	<i>Sorex palustris</i>
Least Chipmunk	<i>Neotamias minimus</i>	Cinereus Shrew	<i>Sorex cinereus</i>
Cougar	<i>Puma concolor</i>	Northern Short-tailed Shrew	<i>Blarina brevicauda</i>
Coyote	<i>Canis latrans</i>	Water Shrew	<i>Sorex palustris</i>
White-tailed Deer	<i>Odocoileus virginianus</i>	Striped Skunk	<i>Mephitis mephitis</i>
Elk	<i>Cervus canadensis</i>	Fox Squirrel	<i>Sciurus niger</i>
Fisher	<i>Pekania pennanti</i>	Gray Squirrel	<i>Sciurus carolinensis</i>
Gray Fox	<i>Urocyon cinereoargenteus</i>	Red Squirrel	<i>Sciurus vulgaris</i>
Red Fox	<i>Vulpes vulpes</i>	Meadow Vole	<i>Microtus pennsylvanicus</i>
Thirteen-lined Ground Squirrel	<i>Ictidomys tridecemlineatus</i>	Woodland Vole	<i>Microtus pinetorum</i>

Common Name	Scientific Name	Common Name	Scientific Name
Snowshoe Hare	<i>Lepus americanus</i>	Least Weasel	<i>Mustela nivalis</i>
Southern Bog Lemming	<i>Synaptomys cooperi</i>	Long-tailed Weasel	<i>Mustela frenata</i>
Marten	<i>Martes americana</i>	Gray Wolf	<i>Canis lupus</i>
Mink	<i>Neovison vison</i>	Wolverine	<i>Gulo gulo</i>
Eastern Mole	<i>Scalopus aquaticus</i>	Woodchuck	<i>Marmota monax</i>
Star-Nosed Mole	<i>Condylura cristata</i>		

Source: Exploring Nature 2021.

I&M maintained and monitored artificial Indiana bat structures for a total of five years (1994-1999) at the Project in accordance with the approved Wildlife Management Plan under Article 409 of the current license. During the monitoring period, there was no evidence that Indiana bat or any other species of bat had used the artificial structures. On July 14, 2000, FERC issued an order amending the Wildlife Management Plan to remove the requirement to maintain the artificial nesting structures for the Indiana bat.

E.7.2 Avifauna

The list of bird species occurring in southern Michigan is lengthy and includes common backyard birds. There are over 450 species of birds that occur or can occur in Michigan. A variety of avian fauna, particularly songbirds, may occur in the lands surrounding the Project. Avian species potentially occurring in the terrestrial uplands of the Project area include American crow (*Corvus brachyrhynchos*), eastern bluebird (*Sialia sialis*), northern cardinal (*Cardinalis cardinalis*), mourning dove (*Zenaida macroura*), warblers (*Cardellina canadensis* and *Setophaga tigrina*), and sparrows (*Zonotrichia querula* and *Passer domesticus*). A variety of ducks and water fowl could be found utilizing the Project reservoir, rivers, and marsh habitats including species such as Canada goose, common loon, mallard (*Anas platyrhynchos*), wood duck (*Aix sponsa*), and several other duck species common in Michigan. The variety of waterfowl typically increases during the migrating period in the spring and fall. Raptor species are also a common occurrence within the Project vicinity, with species such as bald eagle, Osprey (*Pandion haliaetus*), red-tailed hawk (*Buteo jamaicensis*), and barred owl (*Strix varia*). Table E.7-2 provides a list of avian species potentially occurring in the vicinity of the Constantine Project.

**Table E.7-2
List of Avian Species Occurring in Michigan and Potentially Occurring in the vicinity of
the Project**

Common Name	Scientific Name	Common Name	Scientific Name
Acadian Flycatcher	<i>Empidonax virescens</i>	Little Gull	<i>Hydrocoloeus minutus</i>
Alder Flycatcher	<i>Empidonax alnorum</i>	Long-eared Owl	<i>Asio otus</i>
American Avocet	<i>Recurvirostra americana</i>	Long-tailed Duck	<i>Clangula hyemalis</i>
American Bittern	<i>Botaurus lentiginosus</i>	Louisville Waterthrush	<i>Parkesia motacilla</i>
American Black Duck	<i>Anas rubripes</i>	Magnolia Warbler	<i>Dendroica magnolia</i>
American Coot	<i>Fulica americana</i>	Mallard	<i>Anas platyrhynchos</i>
American Crow	<i>Corvus brachyrhynchos</i>	Manx Shearwater	<i>Puffinus puffinus</i>
American Golden Plover	<i>Pluvialis dominica</i>	Marbled Godwit	<i>Limosa fedoa</i>
American Goldfinch	<i>Spinus tristis</i>	Marsh Wren	<i>Cistothorus palustris</i>
American Kestrel	<i>Falco sparverius</i>	Merlin	<i>Falco columbarius</i>
American Pipit	<i>Anthus rubescens</i>	Mourning Dove	<i>Zenaida macroura</i>
American Redstart	<i>Setophaga ruticilla</i>	Mourning Warbler	<i>Oporornis philadelphia</i>
American Robin	<i>Turdus migratorius</i>	Mute Swan	<i>Cygnus olor</i>
American Tree-Sparrow	<i>Spizella arborea</i>	Nashville Warbler	<i>Vermivora ruficapilla</i>
American White Pelican	<i>Pelecanus erythrorhynchos</i>	Northern Bobwhite	<i>Colinus virginianus</i>
American Wigeon	<i>Anas americana</i>	Northern Cardinal	<i>Cardinalis cardinalis</i>
American Woodcock	<i>Scolopax minor</i>	Northern Flicker	<i>Colaptes auratus</i>
Baird's Sandpiper	<i>Calidris bairdii</i>	Northern Goshawk	<i>Accipiter gentilis</i>
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Northern Harrier	<i>Circus hudsonius</i>
Baltimore Oriole	<i>Icterus galbula</i>	Northern Hawk-owl	<i>Surnia ulula</i>
Bank Swallow	<i>Riparia riparia</i>	Northern Mockingbird	<i>Mimus polyglottos</i>
Barn Swallow	<i>Hirundo rustica</i>	Norther Parula	<i>Parula americana</i>
Barred Owl	<i>Strix varia</i>	Northern Pintail	<i>Anas acuta</i>
Bay-breasted Warbler	<i>Dendroica castanea</i>	Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>
Belted Kingfisher	<i>Megaceryle alcyon</i>	Northern Saw-whet Owl	<i>Aegolius acadicus</i>
Blackburnian Warbler	<i>Dendroica fusca</i>	Northern Shoveler	<i>Anas clypeata</i>
Black-and-White Warbler	<i>Mniotilta varia</i>	Northern Shrike	<i>Lanius borealis</i>
Black-backed Woodpecker	<i>Picoides arcticus</i>	Northern Waterthrush	<i>Parkesia noveboracensis</i>
Black Bellied Plover	<i>Pluvialis squatarola</i>	Olive-sided Flycatcher	<i>Contopus cooperi</i>

Common Name	Scientific Name	Common Name	Scientific Name
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	Orange-crowned Warbler	<i>Vermivora celata</i>
Black-capped Chickadee	<i>Poecile atricapillus</i>	Orchard Oriole	<i>Icterus spurius</i>
Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>	Osprey	<i>Pandion haliaetus</i>
Black-legged Kittiwake	<i>Rissa tridactyla</i>	Ovenbird	<i>Seiurus aurocapillus</i>
Blackpoll Warbler	<i>Dendroica striata</i>	Pacific Loon	<i>Gavia pacifica</i>
Black Scoter	<i>Melanitta americana</i>	Palm Warbler	<i>Dendroica palmarum</i>
Black Tern	<i>Chlidonias niger</i>	Parasitic Jaeger	<i>Stercorarius parasiticus</i>
Black-throated Blue Warbler	<i>Dendroica caerulescens</i>	Pectoral Sandpiper	<i>Calidris melanotos</i>
Black-throated Green Warbler	<i>Dendroica virens</i>	Peregrine Falcon	<i>Falco peregrinus</i>
Blue-gray Gnatcatcher	<i>Poliophtila caerulea</i>	Philadelphia Vireo	<i>Vireo philadelphicus</i>
Blue-headed Vireo	<i>Vireo atricapilla</i>	Pied-billed Grebe	<i>Podilymbus podiceps</i>
Blue Jay	<i>Cyanocitta cristata</i>	Pileated Woodpecker	<i>Dryocopus pileatus</i>
Blue-winged Teal	<i>Anas discors</i>	Pine Grosbeak	<i>Pinicola enucleator</i>
Blue-winged Warbler	<i>Vermivora cyanoptera</i>	Pine Siskin	<i>Carduelis pinus</i>
Bobolink	<i>Dolichonyx oryzivorus</i>	Pine Warbler	<i>Dendroica pinus</i>
Bohemian Waxwing	<i>Bombycilla garrulus</i>	Piping Plover	<i>Charadrius melodus</i>
Boreal Chickadee	<i>Poecile hudsonicus</i>	Prairie Warbler	<i>Dendroica discolor</i>
Boreal Owl	<i>Aegolius funereus</i>	Prothonotary Warbler	<i>Protonotaria citrea</i>
Brewers Blackbird	<i>Euphagus cyanocephalus</i>	Purple Finch	<i>Carpodacus purpureus</i>
Broad-winged Hawk	<i>Buteo platypterus</i>	Purple Martin	<i>Progne subis</i>
Brown Creeper	<i>Certhia americana</i>	Purple Sandpiper	<i>Calidris maritima</i>
Brown-headed Cowbird	<i>Molothrus ater</i>	Red-breasted Merganser	<i>Mergus serrator</i>
Brown Thrasher	<i>Toxostoma rufum</i>	Red-breasted Nuthatch	<i>Sitta canadensis</i>
Buff-breasted Sandpiper	<i>Tryngites subruficollis</i>	Red-bellied Woodpecker	<i>Melanerpes carolinus</i>
Bufflehead	<i>Bucephala albeola</i>	Red Crossbill	<i>Loxia curvirostra</i>
Cackling Goose	<i>Branta hutchinsii</i>	Red-eyed Vireo	<i>Vireo olivaceus</i>
Canada Goose	<i>Branta canadensis</i>	Redhead	<i>Aythya americana</i>
Canada Jay	<i>Perisoreus canadensis</i>	Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>
Canada Warbler	<i>Cardellina canadensis</i>	Redknot	<i>Calidris canutus</i>
Canvasback	<i>Aythya valisineria</i>	Red-throated Loon	<i>Gavia stellata</i>
Cape May Warbler	<i>Setophaga tigrina</i>	Red-necked Grebe	<i>Podiceps grisegena</i>

Common Name	Scientific Name	Common Name	Scientific Name
Carolina Wren	<i>Thryothorus ludovicianus</i>	Red-necked Phalarope	<i>Phalaropus lobatus</i>
Caspian Tern	<i>Hydroprogne caspia</i>	Red-shouldered Hawk	<i>Buteo lineatus</i>
Cedar Waxwing	<i>Bombycilla cedrorum</i>	Red-tailed Hawk	<i>Buteo jamaicensis</i>
Cerulean Warbler	<i>Dendroica cerulea</i>	Red-winged Blackbird	<i>Agelaius phoeniceus</i>
Chestnut-sided Warbler	<i>Dendroica pensylvanica</i>	Ring-billed Gull	<i>Larus delawarensis</i>
Chimney Swift	<i>Chaetura pelagica</i>	Ring-Necked Duck	<i>Aythya collaris</i>
Chipping Sparrow	<i>Spizella passerina</i>	Ring-necked Pheasant	<i>Phasianus colchicus</i>
Clay-colored Sparrow	<i>Spizella pallida</i>	Rock Dove	<i>Columba livia</i>
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>
Common Gallinule	<i>Gallinula galeata</i>	Ross's Goose	<i>Chen rossii</i>
Common Goldeneye	<i>Bucephala clangula</i>	Rough-legged Hawk	<i>Buteo lagopus</i>
Common grackle	<i>Quiscalus quiscula</i>	Ruby-crowned Kinglet	<i>Regulus calendula</i>
Common Loon	<i>Gavia immer</i>	Ruby-throated Hummingbird	<i>Archilochus colubris</i>
Common Merganser	<i>Mergus merganser</i>	Ruddy Duck	<i>Oxyura jamaicensis</i>
Common Nighthawk	<i>Chordeiles minor</i>	Ruddy Turnstone	<i>Arenaria interpres</i>
Common Raven	<i>Corvus corax</i>	Ruff	<i>Calidris pugnax</i>
Common Redpoll	<i>Carduelis flammea</i>	Ruffed Grouse	<i>Bonasa umbellus</i>
Common Tern	<i>Sterna hirundo</i>	Rusty Blackbird	<i>Euphagus carolinus</i>
Common Yellowthroat	<i>Geothlypis trichas</i>	Sabines Gull	<i>Xema sabini</i>
Connecticut Warbler	<i>Oporornis agilis</i>	Sanderling	<i>Calidris alba</i>
Cooper's Hawk	<i>Accipiter cooperii</i>	Sandhill Crane	<i>Antigone canadensis</i>
Dark-eyed Junco	<i>Junco hyemalis</i>	Savannah Sparrow	<i>Passerculus sandwichensis</i>
Dickcissle	<i>Spiza americana</i>	Scarlet Tanager	<i>Piranga olivacea</i>
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	Sedge Wren	<i>Cistothorus platensis</i>
Downy Woodpecker	<i>Picoides pubescens</i>	Semipalmated Plover	<i>Charadrius semipalmatus</i>
Dunlin	<i>Calidris alpina</i>	Semipalmated Sandpiper	<i>Calidris pusilla</i>
Eared Grebe	<i>Podiceps nigricollis</i>	Sharp-shinned Hawk	<i>Accipiter striatus</i>
Eastern Bluebird	<i>Sialia sialis</i>	Sharp-tailed Grouse	<i>Tympanuchus phasianellus</i>
Eastern Kingbird	<i>Tyrannus tyrannus</i>	Short-billed Dowitcher	<i>Limnodromus griseus</i>
Eastern Meadowlark	<i>Sturnella magna</i>	Short-eared Owl	<i>Asio flammeus</i>
Eastern Phoebe	<i>Sayornis phoebe</i>	Snow Bunting	<i>Plectrophenax nivalis</i>
Eastern Screech-Owl	<i>Megascops asio</i>	Snow Goose	<i>Anser caerulescens</i>

Common Name	Scientific Name	Common Name	Scientific Name
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	Snowy Owl	<i>Nyctea scandiaca</i>
Eastern Whip-poor-will	<i>Caprimulgus vociferus</i>	Solitary Sandpiper	<i>Tringa solitaria</i>
Eastern Wood-Peevee	<i>Contopus virens</i>	Spotted Sandpiper	<i>Actitis macularius</i>
European Starling	<i>Sturnus vulgaris</i>	Spruce Grouse	<i>Falcapennis canadensis</i>
Evening Grosbeak	<i>Coccythraustes vespertinus</i>	Song Sparrow	<i>Melospiza melodia</i>
Field Sparrow	<i>Spizella pusilla</i>	Sora	<i>Porzana carolina</i>
Franklin's Gull	<i>Leucophaeus pipixcan</i>	Stilt Sandpiper	<i>Calidris himantopus</i>
Forster's Tern	<i>Sterna forsteri</i>	Surf Scoter	<i>Melanitta perspicillata</i>
Fox Sparrow	<i>Passerella iliaca</i>	Summer Tanager	<i>Piranga rubra</i>
Gadwall	<i>Anas strepera</i>	Swainson's Hawk	<i>Buteo swainsoni</i>
Glaucous Gull	<i>Larus hyperboreus</i>	Swainson's Thrush	<i>Catharus ustulatus</i>
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	Swamp Sparrow	<i>Melospiza georgiana</i>
Gray Catbird	<i>Dumetella carolinensis</i>	Tennessee Warbler	<i>Oreothlypis peregrina</i>
Gray-cheeked Thrush	<i>Catharus minimus</i>	Tree Swallow	<i>Tachycineta bicolor</i>
Green-crested Flycatcher	<i>Myiarchus crinitus</i>	Townsend's Solitaire	<i>Myadestes townsendi</i>
Green-winged Teal	<i>Anas carolinensis</i>	Tufted Titmouse	<i>Baeolophus bicolor</i>
Great Blue Heron	<i>Ardea herodias</i>	Tundra Swan	<i>Cygnus columbianus</i>
Greater Black-Backed Gull	<i>Larus marinus</i>	Turkey Vulture	<i>Cathartes aura</i>
Greater Yellowlegs	<i>Tringa melanoleuca</i>	Upland Sandpiper	<i>Bartramia longicauda</i>
Great Gray Owl	<i>Strix nebulosa</i>	Varied Thrush	<i>Ixoreus naevius</i>
Great Horned Owl	<i>Bubo virginianus</i>	Veery	<i>Catharus fuscescens</i>
Greater Scaup	<i>Aythya marila</i>	Vesper Sparrow	<i>Pooecetes gramineus</i>
Greater White-Fronted Goose	<i>Anser albifrons</i>	Virginia Rail	<i>Rallus limicola</i>
Golden-winged Warbler	<i>Vermivora chrysoptera</i>	Warbling Vireo	<i>Vireo gilvus</i>
Gyrfalcon	<i>Falco rusticolus</i>	Western Kingbird	<i>Tyrannus verticalis</i>
Hairy Woodpecker	<i>Picoides villosus</i>	Western Meadowlark	<i>Sturnella neglecta</i>
Harlequin Duck	<i>Histrionicus histrionicus</i>	Western Sandpiper	<i>Calidris mauri</i>
Harris's Sparrow	<i>Zonotrichia querula</i>	Whimbrel	<i>Numenius phaeopus</i>
Henslow's Sparrow	<i>Ammodramus henslowii</i>	White-breasted Nuthatch	<i>Sitta carolinensis</i>
Hermit Thrush	<i>Catharus guttatus</i>	White Crowned Sparrow	<i>Zonotrichia leucophrys</i>
Herring Gull	<i>Larus smithsonianus</i>	White-eyed Vireo	<i>Vireo griseus</i>
Hoary Redpoll	<i>Carduelis homemanni</i>	White-rumped Sandpiper	<i>Calidris fuscicollis</i>
Hooded Merganser	<i>Lophodytes cucullatus</i>	White-throated Sparrow	<i>Zonotrichia albicollis</i>

Common Name	Scientific Name	Common Name	Scientific Name
Hooded Warbler	<i>Wilsonia citrina</i>	White-winged Crossbill	<i>Loxia leucoptera</i>
Horned Grebe	<i>Podiceps auritus</i>	White-winged Scoter	<i>Melanitta deglandi</i>
Horned Lark	<i>Eremophila alpestris</i>	Winter Wren	<i>Troglodytes hiemalis</i>
House Finch	<i>Carpodacus mexicanus</i>	Willet	<i>Tringa semipalmata</i>
House Sparrow	<i>Passer domesticus</i>	Wilson's Phalarope	<i>Phalaropus tricolor</i>
House Wren	<i>Troglodytes aedon</i>	Wilson's Snipe	<i>Gallinago delicata</i>
Hudsonian Godwit	<i>Limosa haemastica</i>	Wilson's Warbler	<i>Wilsonia pusilla</i>
Iceland Gull	<i>Larus glaucoides</i>	Whooping crane	<i>Grus americana</i>
Indigo Bunting	<i>Passerina cyanea</i>	Wild Turkey	<i>Meleagris gallopavo</i>
Kentucky Warbler	<i>Oporornis formosus</i>	Willow Flycatcher	<i>Empidonax traillii</i>
Kirtland's Warbler	<i>Dendroica kirtlandii</i>	Wood Thrush	<i>Hylocichla mustelina</i>
Killdeer	<i>Charadrius vociferus</i>	Worm-eating Warbler	<i>Helmitheros vermivorus</i>
Lapland Lomgspur	<i>Calcarius lapponicus</i>	Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>
Laughing Gull	<i>Leucophaeus atricilla</i>	Yellow-bellied Flycatcher	<i>Empidonax flaviventris</i>
LeConte's Sparrow	<i>Ammodramus leconteii</i>	Yellow-billed Cuckoo	<i>Coccyzus americanus</i>
Lesser Black-backed Gull	<i>Larus fuscus</i>	Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>
Lesser Scaup	<i>Aythya affinis</i>	Yellow Rail	<i>Coturnicops noveboracensis</i>
Lesser Yellowlegs	<i>Tringa flavipes</i>	Yellow-rumped Warbler	<i>Dendroica coronata</i>
Least Sandpiper	<i>Calidris minutilla</i>	Yellow-throated Chat	<i>Icteria virens</i>
Least Flycatcher	<i>Empidonax minimus</i>	Yellow-throated Warbler	<i>Dendroica dominica</i>
Lincoln's Sparrow	<i>Melospiza lincolnii</i>	Yellow Warbler	<i>Dendroica petechia</i>

Source: Avibase 2021.

Avifauna are highly mobile in nature. Species such as American crow, eastern bluebird, common sparrow, mourning dove, and northern cardinal are generalists and will utilize a wide variety of habitats, including both upland and riparian areas for foraging, shelter, and reproduction. Several species prefer terrestrial upland and may be present in the Project vicinity year-round, these include: ruffed grouse (*Bonasa umbellus*) and raptor species (eagles, hawks, and owls). Highly migratory birds may be present within the Project vicinity as well but would be seasonally dependent. These include American bittern (*Botaurus lentiginosus*), woodcock (*Scolopax minor*), Canada warbler (*Cardellina canadensis*), wood thrush (*Hylocichla mustelina*), sandhill crane (*Grus canadensis*), and waterfowl.

Waterfowl that use the area for feeding and resting periodically during the year include but are not limited to mallard (*Anas platyrhynchos*), Canada goose (*Branta canadensis*), blue-winged teal (*Anas discors*), wood duck (*Aix sponsa*), great blue heron (*Ardea herodias*), green heron (*Butorides*

virescens), American bittern (*Botaurus lentiginosus*), and spotted sandpiper (*Actitis macularius*). Raptors in the Project area include sharp-shinned (*Accipiter striatus*), Cooper's (*Accipiter cooperii*), red-tailed (*Buteo jamaicensis*), rough legged (*Buteo lagopus*), and broad-winged (*Buteo platypterus*) hawks, American kestrel (*Falco sparverius*), marsh hawk (*Circus cyaneus*), and osprey (*Pandion haliaetus*) (FERC 1993a).

Article 409 of the current FERC license requires I&M to develop a Wildlife Management and Land Use Plan. Under the approved Wildlife Management Plan, I&M is required to install and monitor avian nesting structures within the Project boundary. In 2020, a total of nine nesting structures were installed within the Project boundary, including four wood duck boxes, two mallard hen houses, and three eastern blue bird houses. This program has had varied success since it was implemented. During the 2020 monitoring period, all four of the wood duck boxes were occupied by wood duck hens and two of the four boxes had evidence of successful nesting. The two Mallard hen houses have not been inhabited by Mallards or other non-target species since 2015 (when GLEC initiated monitoring of the avian nesting structures for I&M), and, therefore, the two remaining Mallard hen houses were removed from the Constantine reservoir in 2020. One of the three eastern blue bird boxes was occupied by an eastern blue bird in 2020. Additionally, one of the three eastern blue bird boxes was occupied by a non-target species (house wren). Given the occupancy and nesting success observed in 2020, and similar occupancy and nesting success observed during previous monitoring years for both target and non-target species, I&M proposes to continue deploying the nesting structures along the Project reservoir. However, I&M is not proposing to monitor the nesting structures but will perform maintenance and repair the structures as needed on an annual basis.

Yellow-throated warbler (*Setophaga dominica*)

The Yellow-throated warbler is medium-size warbler with a bright yellow throat and breast. It ranges from 4.5-4.75 inches (11.4-12.1 cm) in length. The upper parts of its body are gray and the area around its eyes has distinctive black and white markings. (MSU 2021). In Michigan, the Yellow-throated warbler occurs in contiguous tracts of mature bottomland and floodplain forest. They use sycamores as nest trees, placing their nests high in the tree and far out on the branches. Elsewhere in their range, they nest in cypress swamps and southern pine forests (MSU 2021). They forage more deliberately and with less fluttering than other warblers, probing crevices, pine cones, and pine needles for insects. Males establish territories with song during the breeding season and generally associate only with their mate and offspring (Cornell 2019). During the nonbreeding season, they form mixed-species flocks with Carolina Chickadees, Tufted Titmice, and other warblers. They range from Pennsylvania, Indiana, and Iowa in the north, south through Eastern and South Central Texas, to Northern Central America and the Caribbean. Michigan appears to be at the northern most portion of their range (Cornell 2019).

E.7.3 Reptiles and Amphibians

Reptile and amphibian species inhabit various habitat types such as woodland, riparian, scrub-shrub or early successional areas, and grasslands. Use of these areas may shift during different life stages and/or times of year. Reptiles and amphibian habitat preferences are primarily influenced by food and reproductive requirements. Table E.7-3 lists the reptiles and amphibians that are known to occur in Michigan and may potentially occur in the Project vicinity.

**Table E.7-3
Reptiles and Amphibians Known to Occur in Michigan**

Common name	Scientific name
Snakes	
Butler's garter snake	<i>Thamnophis butleri</i>
Smooth green snake	<i>Liochlorophis vernalis</i>
Eastern milk snake	<i>Lampropeltis triangulum</i>
Northern water snake	<i>Nerodia sipedon</i>
Queen snake	<i>Regina septemvittata</i>
Brown snake	<i>Storeria dekayi</i>
Red-bellied snake	<i>Storeria occipitomaculata</i>
Eastern garter snake	<i>Thamnophis sirtalis</i>
Northern ribbon snake	<i>Thamnophis sauritus septentrionalis</i>
Ring-necked snake	<i>Diadophis punctatus edwardii</i>
Eastern hognose snake	<i>Heterodon platirhinos</i>
Blue racer	<i>Coluber constrictor foxi</i>
Black rat snake	<i>Elaphe obsoleta</i>
Fox snake	<i>Elaphe vulpine and Elaphe gloydi</i>
Kirtland's snake	<i>Clonophis kirtlandii</i>
Eastern massasauga rattlesnake	<i>Sistrurus catenatus</i> (T)
Copperbelly water snake	<i>Nerodia erythrogaster neglecta</i> (T)
Frogs and Toads	
Fowler's toad	<i>Bufo fowleri</i>
Green frog	<i>Rana clamitans</i>
Mink frog	<i>Rana septentrionalis</i>
Western chorus frog	<i>Pseudacris triseriata</i>
Gray treefrog	<i>Hyla versicolor and H. chrysoscelis</i>

Common name	Scientific name
Eastern American toad	<i>Bufo americanus</i>
Bullfrog	<i>Rana catesbeianus</i>
Wood frog	<i>Rana sylvatica</i>
Northern leopard frog	<i>Rana pipiens</i>
Pickerel frog	<i>Rana palustris</i>
Northern spring peeper	<i>Pseudacris crucifer</i>
Blanchard's cricket frog	<i>Acris crepitans blanchardi</i>
Salamanders	
Western lesser siren	<i>Siren intermedia nettingi</i>
Red-backed salamander	<i>Plethodon cinereus</i>
Small-mouthed salamander	<i>Ambystoma texanum</i>
Eastern tiger salamander	<i>Ambystoma tigrinum</i>
Mudpuppy	<i>Necturus maculosus</i>
Four-toed salamander	<i>Hemidactylium scutatum</i>
Spotted salamander	<i>Ambystoma maculatum</i>
Eastern newt	<i>Notophthalmus viridescens</i>
Marbled salamander	<i>Ambystoma opacum</i>
Blue-spotted salamander	<i>Ambystoma laterale</i>
Turtles	
Easter box turtle	<i>Terrapene carolina</i>
Spiny soft-shell turtle	<i>Apalone spinifera</i>
Common snapping turtle	<i>Chelydra serpentine</i>
Common musk turtle	<i>Sternotherus odoratus</i>
Blanding's turtle	<i>Emys blandingii</i>
Painted turtle	<i>Chrysemys picta</i>
Red-eared slider	<i>Trachemys scripta elegans</i>
Common map turtle	<i>Graptemys geographica</i>
Wood turtle	<i>Glyptemys insculpta</i>
Spotted turtle	<i>Clemmys guttata</i>
Lizards	
Five-lined skink	<i>Eumeces fasciatus</i>

Source: MDNR 2017c.

T: Federally listed as threatened.

E.7.4 Rare, Threatened, and Endangered Wildlife Species

By letter dated September 11, 2017 (included in Appendix B), the MNFI indicated that three state-listed species have been documented in the vicinity of the Project. The MNFI indicated that the state-threatened purple wartyback mussel (*Cyclonaias tuberculata*), water willow (*Justicia americana*), and the yellow-throated warbler (*Setophaga dominica*) are state-listed species that could potentially occur in the Project area. The purple wartyback mussel, the water willow, and the yellow-throated warbler were previously described in sections E.5.5, E.6.2, and E.7.2, respectively.

E.7.5 Federally Listed Threatened, Endangered, and Candidate Wildlife Species

I&M conducted a review of federally listed threatened, endangered, and candidate fauna species using USFWS' IPaC online system on August 15, 2017. A total of six threatened, endangered, or candidate species have the potential to occur within the Project boundary (Table E.7-4).

**Table E.7-4
Federally Listed Species Potentially Occurring within the Project Boundary**

Common Name	Scientific Name	Status
Indiana bat	<i>Myotis sodalis</i>	Endangered
Mitchell's satyr butterfly	<i>Neonympha mitchellii</i>	Endangered
Northern long-eared bat	<i>Myotis septentrionalis</i>	Threatened
Copperbelly water snake	<i>Nerodia erythrogaster neglecta</i>	Threatened
Eastern massasauga	<i>Sistrurus catenatus</i>	Threatened
Eastern prairie fringed orchid	<i>Platanthera leucophaea</i>	Threatened

Source: USFWS IPaC consultation (USFWS 2017b).

E.7.5.1 Indiana Bat

Indiana bats are found over most of the eastern half of the United States (USFWS 2006). The Indiana bat is small with dark-brown to black fur, usually weighing only one-quarter of an ounce, with a wingspan of 9 to 11 inches. The Indiana bat is similar in appearance to many other related species but can be distinguished by comparing the structure of the foot and color variations in the fur (USFWS 2006).

Indiana bats hibernate during winter in caves or occasionally in abandoned mines. They hibernate in cool, humid caves with stable temperatures under 10 degrees Celsius (°C), but above freezing. Very

few caves are known to have these characteristics. After hibernation, Indiana bats migrate to their summer habitat in wooded areas where they roost under loose tree bark on dead or dying trees. They forage in or along the edges of forested areas (USFWS 2006).

Indiana bats mate during the fall before they enter hibernation, but fertilization is delayed until the spring after they emerge from the caves. Females migrate to summer colonies where they roost and give birth to a single pup (USFWS 2006).

The Indiana bat is endangered due to human disturbance, cave commercialization and improper gating, summer habitat loss or degradation, and pesticides and environmental contaminants (USFWS 2006).

E.7.5.2 Northern Long-eared Bat

The northern long-eared bat is found across much of eastern and north-central United States and all Canadian provinces from the Atlantic Ocean west to the southern Yukon Territory and British Columbia (USFWS 2015). It is a medium-sized bat, measuring 3.0 to 3.7 inches, with a wingspan of 9 or 10 inches. Its fur color can be medium to dark brown on the back and tawny to pale brown on the underside (USFWS 2015). The bat is distinguished by its longer ears relative to other bats in the genus *Myotis* (USFWS 2015).

The northern long-eared bat spends winters hibernating in caves and mines, preferring hibernacula with very high humidity. During the summer months, the northern long-eared bat prefers to roost singly or in colonies underneath bark, in cavities, or in the crevices of live or dead trees. Breeding begins in late summer or early fall when males swarm near hibernacula. After a delayed fertilization, pregnant females migrate to summer colonies where they roost and give birth to a single pup. Young bats start flying 18 to 21 days after birth, and adult northern long-eared bats can live up to 19 years (USFWS 2015).

Northern long-eared bats emerge at dusk and fly through the understory of forested hillsides feeding on moths, flies, leafhoppers, caddisflies, and beetles. They also feed by gleaning motionless insects from vegetation and water (USFWS 2015).

The most severe and immediate threat to the northern long-eared bat is white-nose syndrome. As a result of this disease, numbers have declined by 99 percent in the northeast. Other significant sources of mortality include impacts to hibernacula from human disturbance. Loss or degradation of summer habitat as a result of highway or commercial development, timber management, surface mining, and wind facility construction and operation can also contribute to mortality (USFWS 2015).

E.7.5.3 Copperbelly Water Snake

The copperbelly water snake is found in two geographically separated areas. The northern population segment includes southern Michigan, northeastern Indiana, and northwestern Ohio. Surveys of this population segment over the last 20 years have shown a continuing decline in the overall number of snakes. At present, only five small sub-populations persist within the tri-state area. The southern population, that includes portions of southern Indiana, southern Illinois, and northwestern Kentucky, is not protected by the Endangered Species Act (USFWS 2013).

The copperbelly water snake is a non-venomous snake that feeds mainly on frogs and tadpoles and grows approximately 2 to 4 feet in length. It has a solid dark (usually black) back with a bright orange-red belly. Females generally grow larger than males, with most copperbellies over 30 inches being females (USFWS 2013).

Copperbelly water snakes prefer shallow wetlands or floodplain wetlands surrounded by forested uplands. Seasonally flooded wetlands without fish are favored foraging areas, and copperbellies frequently move from one wetland to another. Copperbellies hibernate, often in crayfish burrows, in forested wetlands and immediately adjacent to forested uplands and remain underground from late October until late April (USFWS 2013).

Only a couple hundred snakes remain in the northern population segment. This ongoing decline can be attributed, in part, to habitat loss and fragmentation, collection, and predation (USFWS 2013).

E.7.5.4 Eastern Massasauga

Eastern massasaugas are known to occur in 10 states and 1 Canadian province, from central New York and southern Ontario to south-central Illinois and eastern Iowa. Historically, the snake's range covered this same area, but within this large area the number of populations and numbers of snakes within populations have steadily declined. Generally, only small, isolated populations remain. The eastern massasauga is listed as endangered, threatened, or a species of concern in every state and province where it is found (USFWS 2016).

Massasaugas are generally small snakes with thick bodies, heart-shaped heads, and vertical pupils with an average adult length of about 2 feet. Adult massasaugas are gray or light brown with large, light-edged chocolate brown blotches on the back and smaller blotches on the sides. Young snakes have the same markings but are more vividly colored (USFWS 2016).

Massasaugas live in wet areas including wet prairies, marshes, and low areas along rivers and lakes. They also use adjacent uplands during part of the year in many areas. They often hibernate in crayfish burrows but may also be found under logs and tree roots or in small mammal burrows (USFWS 2016).

Like all rattlesnakes, massasaugas bear live young. Depending on their health, adult females may bear young every year or every other year. When food is especially scarce they may only have young every three years. Most massasaugas mate in late summer and give birth about a year later with litter sizes ranging from 5 to 20 young (USFWS 2016).

The eastern massasauga has been listed as threatened due to human eradication based on fear, habitat loss, and lack of management and improper timing of management (USFWS 2016).

E.7.5.5 Mitchell's Satyr Butterfly

The Mitchell's satyr butterfly is one of the most geographically restricted eastern butterflies. Historically, the Mitchell's satyr was found in New Jersey, Ohio, Michigan, Indiana, and possibly Maryland. However, currently, the butterfly can be found in only 13 locations in Michigan and 2 locations in Indiana (USFWS 1999a). The Mitchell's satyr's habitat is restricted to fen wetlands which are rare, low-nutrient systems that receive carbonate-rich groundwater from seeps and springs (USFWS 1999a).

This butterfly is medium sized with a 1-¾-inch wingspan. It has an overall rich brown color and a distinctive series of orange-ringed black circular eyespots with silvery centers on the lower surfaces of both pairs of wings (USFWS 1999a).

There is little known about the Mitchell's satyr's three life stages. The eggs are likely laid on the young leaves of low, tender plants with the eggs hatching into caterpillars in about a week. The caterpillar grows throughout the year, shedding its skin many times. The fourth stage caterpillar hibernates under the snow and emerges in the spring. The caterpillar eventually makes a cocoon and then emerges as an adult butterfly, only living approximately two weeks (USFWS 1999a).

The greatest threat to the Mitchell's satyr is habitat destruction. Pesticides, fertilizer, and nutrient runoff from adjacent agriculture, including livestock production, also pose a threat to the butterfly's habitat. It is also believed that some populations have been eliminated by butterfly collectors (USFWS 1999a).

E.7.5.6 Eastern Prairie Fringed Orchid

The eastern prairie fringed orchid is primarily distributed in the mid-western United States and Canada, from Oklahoma to Ontario, with a limited distribution in the northern mid-Atlantic and New England regions (North American Orchid Conservation Center 2017).

This plant ranges from 8 to 40 inches tall and has a leafy stem with a flower cluster called an inflorescence. Each plant has one single flower spike composed of 5 to 40 white flowers. Each flower has a three-part fringed lip that is less than 1 inch long and a nectar spur which is about 1 to 2 inches long (USFWS 2005).

The eastern prairie fringed orchid can be found in moist prairies and meadows, bogs, marshes, and fens (North American Orchid Conservation Center 2017). It requires full sun for optimum growth and flowering and a grassy habitat with little or no woody encroachment. This orchid is a perennial herb with flowering generally beginning from late June to early July and lasting for 7 to 10 days. Seed capsules mature over the growing season and are dispersed by the wind from late August through September (USFWS 2005).

The current decline of this plant is mainly due to the loss of habitat from the drainage and development of wetlands. Succession to woody vegetation, competition from non-native species, and over-collection are other reasons for the decline of this species.

E.7.5.7 Critical Habitat

When a species is proposed for listing as endangered or threatened under the Endangered Species Act (ESA), the USFWS must consider whether there are areas of habitat believed to be essential to the species' conservation. Those areas may be proposed for designation as critical habitat. Critical habitat is a specific geographic area(s) that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection. Through consultation with the USFWS, no critical habitat has been designated under the ESA for species in the Project vicinity.

E.7.6 Project Impacts on Wildlife Resources

The Project supports a healthy, vigorous, and diverse range of wildlife species and habitats. Since the Project has been in operation for nearly 150 years and is operated in a ROR mode with minimal reservoir fluctuations, the wildlife and adjacent riparian and upland habitats are not fundamentally affected by I&M's operation of the Projects.

E.7.7 PM&E Measures Proposed by the Applicant, Resource Agencies, and/or Other Consulting Parties

No new PM&E measures have been proposed by consulting parties related to wildlife resources, as no wildlife resource issues associated with I&M operations have been identified. However, given the occupancy and nesting success observed in 2020, and similar occupancy and nesting success observed during previous monitoring years for both target and non-target species, I&M proposes to continue deploying the nesting structures along the Project reservoir. I&M is not proposing to continue monitoring the nesting structures but will perform maintenance and repair the structures as needed on an annual basis.

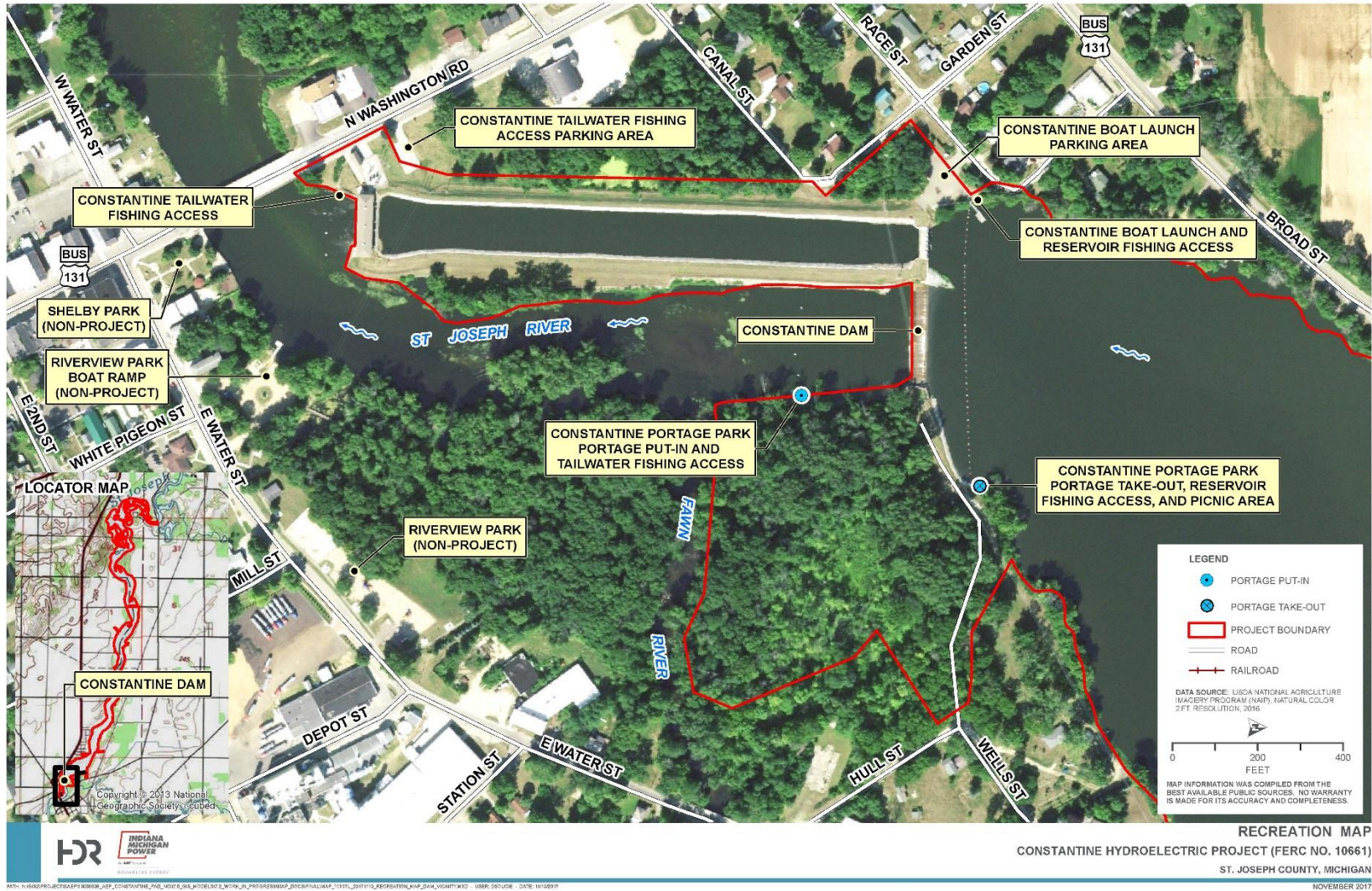
E.8 Recreational Resources

E.8.1 Existing Recreation Facilities and Opportunities in the Project Vicinity

The Constantine Project provides several formal (licensed) recreational facilities located upstream and downstream of the Constantine dam that are maintained and operated by I&M. These facilities provide the public free access to the Project reservoir as well as to the St. Joseph River below the Project's powerhouse and spillway. The Project amenities include a boat launch on the Project reservoir, a portage around the east abutment of the Project spillway, reservoir fishing access, a tailwater fishing access platform, Americans with Disabilities Act (ADA) accessible portable toilets, and a picnic area.

The tailwater fishing platform is located just downstream of the powerhouse with an associated parking lot with the capacity for approximately 14 vehicles. The Constantine boat launch is located adjacent to the west abutment of the spillway. There is a small fishing dock next to the one-lane boat launch with a parking area for approximately 10 vehicles and additional space for trailers. Located on the east side of the Constantine dam, there is a portage trail that allows individuals to transport canoes and kayaks around the dam, as well as providing limited access to the reservoir for fishing, and a picnic area. There is no official parking area at the portage site. However, street-side parking is available for approximately 5 vehicles, close to the intersection of Hull Street and Wells Street. These features can be seen on Figure E.8-1.

Figure E.8-1
Location Map of Recreation Areas in the Vicinity of the Project.



E.8.2 Specially Designated Recreation Areas in Close Proximity to the Project

E.8.2.1 Regionally or Nationally Significant Recreation Areas

The Fabius State Game Area is located approximately four and a half miles upstream of the Constantine Project. The Fabius State Game Area is managed by the MDNR. This facility is used primarily for hunting as full access to the property and the St. Joseph River is limited due to terrain and foliage impediments.

E.8.2.2 Recreational Attractions in the Vicinity of the Project

Additional I&M-Owned Recreational Facilities at Other Projects

The Mottville Hydroelectric Project, which is located approximately seven river miles downstream of the Constantine Project, provides a tailwater fishing platform just downstream of the Mottville powerhouse on the western shore of the St. Joseph River. Additionally, there is a boat launch, picnic, and fishing facilities on the eastern shore. Mill Creek Park, within the reservoir area, provides additional recreation opportunities.

Community Parks

There are several community parks in the vicinity of the Project, including Shelby Park and Riverview Park. Shelby Park is a one-acre park located east of the St. Joseph River with an open space with benches and picnic tables (Michigan Department of Transportation [MDOT] 2008). Riverview Park is also located on the east side of the river within the Village of Constantine. Facilities at Riverview Park include a boat launch, fishing platform, boardwalk, playground, and benches.

The Wahbememe Memorial Park is located in White Pigeon, Michigan, within five miles of the Project. The park is owned and operated by the St. Joseph County Parks Commission. The park is listed on the National Register of Historic Places and is a monument to Chief White Pigeon, who is buried at the site. A monument provided by the Alba Columbia Club in 1909 is located on the site. The park is maintained by the neighboring Welders Supplies and Gas Inc., under a 1986 agreement with the St. Joseph County Parks Commission. In addition to the Wahbememe Historical Monument, the park features a small grassy area as well as a sitting area. (MDOT 2008).

U.S. Title Series Annual Boat Races

The U.S. Title Series was founded in 1982 and is recognized as the premier professional outboard racing series in the United States. The U.S. Title Series' guiding vision is to establish a class of outboard racing competitions between the best professional outboard racing teams that boat racing

has to offer; promote the sport of powerboat racing by using any and all means available; and develop a series of outboard racing competitions across the country, putting the sport on a national level as any other professional sport (U.S. Title Series undated).

The U.S. Title Series Championship Racing Association hosts annual hydroplane and runabout boat races upstream of the Constantine powerhouse on the Constantine reservoir. The event consists of a 2 to 3-day program generally with testing and practice laps on Friday and professional racing on Saturday and Sunday. The racing program averages a 3 to 4-hour time frame each day (U.S. Title Series undated).

Other Recreational Opportunities

The American Legion maintains a boat launch upstream of the Constantine dam. This site is a popular place for members to launch boats on the Project reservoir, especially during the hydroplane and runabout boat races that are held by the U.S. Title Series Championship Racing Association annually at Constantine American Legion Post 223. The Constantine Project typically experiences the highest peak amenity use during this event (I&M 2015).

E.8.2.3 Wild, Scenic, and Recreational Rivers

No portion of the Project has been designated under the National Wild and Scenic Rivers System.

E.8.2.4 Nationwide Rivers Inventory

Approximately 210 miles of the St. Joseph River has been listed by the National Park Service (NPS) under the Nationwide Rivers Inventory (NRI). Sections from the mouth to Berrien Springs Dam (25 miles) and Berrien Springs Dam to the dam at Jonesville (185 miles) were listed in 1982 and proposed for study for inclusion in the State Natural Rivers System. The Outstandingly Remarkable Value identified by the NPS for this section of the river is recreation (NPS 2009).

E.8.2.5 Scenic Byways

The Project is not located in close proximity to a National Scenic Byway.

E.8.2.6 National Trail System and Wilderness Areas

No portion of the Project has been designated as wilderness area, recommended for such designation, or designated as a wilderness study area under the Federal Wilderness Act.

E.8.3 Recreation Use Levels

Recreation use levels have been documented as required in the FERC Licensed Hydropower Development Recreation Report (FERC Form 80). As of 2015, the number of annual visits to the recreational areas at the Constantine Project was estimated to be 11,851 daytime and 2,963 nighttime visits. According to the 2015 FERC Form 80, none of the licensed recreation facilities appear to be utilized to the maximum capacity, with all sites under 50 percent utilization.

E.8.3.1 2019 Recreation Study Results

As part of the relicensing of the Project, I&M conducted a Recreation Study in 2019. The purpose of the study was to assess the adequacy of existing public access and recreational facilities to meet current and future recreation needs. On behalf of I&M, Young Energy Services (YES) conducted the Recreation Study.

In accordance with the study plan approved in the Commission's SPD, YES performed a field inventory to document existing formal and informal recreation facilities in the Project area (within and adjacent to the Project boundary). In combination with the facility inventory, YES performed a qualitative assessment of the condition of the recreation facilities. The recreation amenities available at each recreation facility were rated using the following criteria: (N) Needs replacement (broken or missing components, or non-functional); (R) Needs repair (structural damage or otherwise in obvious disrepair); (M) Needs maintenance (ongoing maintenance issue, primarily cleaning); and (G) Good condition (functional and well-maintained).

Additionally, YES collected visitor use data at the FERC-approved recreation sites, formal non-Project recreation sites, and other informal recreation sites through a combination of in-person surveys, field reconnaissance, and photographic documentation. Recreation visitor use data was collected from May through September of 2019. Surveys were conducted from approximately 8:00 AM until 6:00 PM on May 22 and 27 (Memorial Day); June 15, 16 (Father's Day) and 28; July 1 and 21 (Boat Race²); August 15 and 25; and September 27 and 29.

A team of two technicians rotated between the recreation sites in random order and conducted interviews with willing participants. Technicians also recorded relevant conditions, including observed recreational activities, estimated number of vehicles, and number of recreational users. General information regarding date, time, and weather conditions was also recorded. A total of 21 recreation surveys were completed in the field.

² Each summer, hydroplane and runabout boat races are held by the U.S. Title Series Championship Racing Association. Boats in the competition are launched from the American Legion boat launch.

In addition to the personal interviews, I&M developed an online version of the interview questions for respondents to provide survey responses electronically. The online survey was available from May 1 through September 30, 2019. A notice of the online survey was posted to AEP's relicensing website and signs were posted at each of the Project's recreation facilities notifying recreationists of how to complete the online survey. A total of seven surveys were completed online during the study period.

The existing recreation facilities, both Project and non-Project, are well maintained and utilized by the public. Overall, the public indicated they were pleased with the recreation facilities provided by I&M, St. Joseph County, and the Village of Constantine. The cooperative effort of I&M and local governments has resulted in recreation facilities that not only meet the goals and objectives of the relevant recreation plans but contribute to the economies of the area. This is evidenced by individuals from outside of St. Joseph County visiting to boat on the Constantine Project reservoir, canoe/kayak the St. Joseph River, and fish the river and reservoir. According to the comments received, the existing facilities contribute to the enjoyment of all participating in those activities.

The primary recreation activities observed at the Constantine Project are fishing by boat, bank fishing, fishing from the tailwater fishing access platform located adjacent to the powerhouse, and pleasure boating. Results from the in-person and online surveys, provided below in Table E.8-1, substantiate those observations.

**Table E.8-1
Activities Participated in by Survey Respondents**

	Bank Fishing	Boat Fishing	Pleasure Boating	Canoe/ Kayak	Picnic	Swim	Sight-Seeing	Hunt	View Wildlife	Other
Number	5	5	6	1	0	0	1	0	0	0
Percent	27.8	27.8	33.3	5.6	0	0	5.6	0	0	0

Those surveyed indicated that their overall experience recreating at the Constantine Project was totally acceptable. Table E.8-2 presents the results of the surveys relative to rating the overall experience of the respondents.

**Table E.8-2
Overall Experience of Survey Respondents**

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Safety			1 (4.8%)		20 (95.2%)
Enjoyment				1 (4.8%)	20 (95.2%)
Crowding	1 (4.8%)			2 (10.5%)	17 (89.5%)
Overall Experience				1 (5.9%)	16 (94.1%)

Overall, survey respondents appear to be very satisfied with the existing recreation facilities in the Project area.

Suggested improvements for each of the existing Project recreation sites are detailed in Section 2.3.1 of the Recreation Study Report that was included in Appendix H of the ISR. The recommended improvements primarily reflect the need for signage improvements, identifying Americans with Disabilities-accessible parking areas, and improvements to vegetation management. The Project recreation site with the most suggested improvements is the canoe portage below the Project spillway. Suggested improvements include: better signage, upgraded walking surface, and increasing the trail width.

E.8.4 Shoreline Management

As a ROR facility, the Constantine Project is operated in a way that minimally affects the reservoir level and, therefore, has limited impacts on the shoreline. The flashboards are usually in place on the spillway crest, thereby creating a normal reservoir elevation of 782.90 feet NGVD29. The majority of the area surrounding the Project reservoir is agricultural lands with limited land within the Project boundary. The lower third of the reservoir is largely within pre-existing river banks and is bordered by a fringe of trees, while along the upper two-thirds of the reservoir the river often covers more extensive (up to 1,200 feet) widths of lowland areas (I&M 1988). I&M maintains a boat launch, portage, and reservoir fishing access site upstream of the Project's dam as well as a tailrace fishing area below the powerhouse.

E.8.5 Recreation Management

Michigan offers a wide range of outdoor recreation activities from the traditional (e.g., camping, hunting, cycling, fishing, photography, birdwatching, snowmobiling, and off-road vehicle riding) to activities that are seeing significant increases in national participation (e.g., adventure racing, kayak fishing, cross-country skiing, fat-tire biking, standup paddling, and other silent sports and backcountry

activities) (Outdoor Foundation 2017). Recreation opportunities can be found in the hundreds of state-owned parks, recreation areas, forests, campgrounds, and trails. Additionally, thousands of community playgrounds, parks, trails, nature preserves, beaches, and more than 30 federally owned parks, lakeshores, heritage/historic areas, scenic trails, forests, wilderness areas, wildlife refuges, and marine sanctuaries provide numerous recreation opportunities. Some of these facilities are highly developed with modern infrastructure, and others are more natural, remote places. These recreational opportunities are located all over the state, in rural communities as well as in the heart of some of urban centers. Every community in Michigan is within 50 miles of a State Park or Recreation Area and even closer to numerous local and regional parks or recreation spaces (MDNR 2017d).

All of these resources play an important role in Michigan's expansive outdoor recreation system, both individually and collectively. They provide numerous social, health, economic, and environmental benefits and are places that continue to attract residents and out-of-state visitors alike (MDNR 2017d).

Michigan's Statewide Comprehensive Outdoor Recreation Plan (SCORP) is a five-year strategic plan that shapes investment by the State of Michigan and local communities in priority outdoor recreation infrastructure and programming. This SCORP is designed to evaluate ongoing and emerging outdoor recreation trends, needs, and issues, and establish priority strategies for achieving outdoor recreation goals. This SCORP is used by the state and its local outdoor recreation partners as an ongoing framework and action plan for guiding their outdoor recreation management and policy decisions (MDNR 2017d).

In developing the 2018–2022 SCORP update, the MDNR undertook a variety of efforts to engage the public, recreation providers, nonprofit organizations, user groups, and recreation businesses in identifying key recreational assets, priorities, and strategies for the next five years. These stakeholders provided significant direction on how the state and local communities could better collaborate to approach management of Michigan's entire system of outdoor recreation spaces (MDNR 2017d).

Outdoor recreation continues to be an important and popular activity for residents and visitors to Michigan. Public Sector Consultants conducted a public opinion survey for the 2018-2022 SCORP to better understand participation rates and preferences regarding outdoor recreation in Michigan. The findings of the survey are presented below:

- Eight out of ten Michigan residents feel that outdoor recreation is very important or moderately important to their household.
- Three out of five of Michigan's black or African American and Hispanic, Latino - or Spanish-origin residents participate in outdoor recreation, compared to over four out of five white, non-Hispanics.

- Those aged 25–34 and 45–54 had the highest rates of outdoor recreation participation (around nine out of ten people).
- More than three-quarters of respondents are satisfied or very satisfied with the amount and quality of outdoor recreation in Michigan (around 84 and 82 percent, respectively).
- Just under three-quarters of respondents are satisfied or very satisfied with the amount and quality of outdoor recreation within a half hour of their home (73 percent and 74 percent, respectively).
- One out of five of Michigan’s black or African American; Hispanic, Latino- or Spanish-origin; or any other nonwhite race residents are dissatisfied or very dissatisfied with the amount of outdoor recreation within a half hour of their home, compared to only one out of ten white, non-Hispanic residents that are dissatisfied or very dissatisfied.
- One out of five of Michigan’s black or African American residents are dissatisfied or very dissatisfied with the quality of outdoor recreation within a half hour of their home, compared to less than one out of ten white, non-Hispanic and Hispanic, Latino- or Spanish-origin residents that are dissatisfied or very dissatisfied. Walking outdoors, including dog walking, was identified by 26 percent of users as the most important outdoor activity to them.
- Nearly half of people who camp or hunt are willing to travel more than six hours, on average, to participate in these activities.
- Over 89 percent of Michigan outdoor recreation users went outside 52 or more days in the year for outdoor recreation of any type, with nearly 60 percent doing so for more than 100 days. This compares to only 48 percent of adults aged 25 and older at the national level (although dog walking was not included as an outdoor recreation activity) (Outdoor Foundation 2016).
- Most outdoor recreation users utilize recommendations from family and friends (68 percent, an increase from 59 percent in 2012), followed by Internet searches (55 percent) or previous experience with a location (54 percent) to plan for their outdoor recreation activities.
- Household members under the age of 18 also participated in outdoor recreation, with visiting parks or playgrounds (85 percent), swimming outdoors (76 percent) and sledding or tubing (54 percent) having the most participants.

Table E.8-3 shows the top outdoor recreation activities in Michigan identified by survey participants (Public Sector Consultants 2017).

**Table E.8-3
Top Outdoor Recreation Activities, by Percent Participation**

Activity	Total Participant Days	Participation Rate
Relaxing outdoors	436,642,901	75%
Walking outdoors, including dog walking	576,132,624	74%
Visiting parks or playgrounds	150,420,905	67%
Sightseeing and/or driving for pleasure	200,974,504	64%
Visiting nature centers or historic sites	36,465,987	56%
Swimming outdoors	99,130,632	54%
Picnicking	58,330,039	53%
Fishing	77,266,345	41%
Team or individual sports outdoors	84,751,341	37%
Wildlife viewing and/or photography (including birding)	108,373,278	36%
Hiking/backpacking	48,025,953	34%
Jogging/running	137,149,463	34%
Canoeing, kayaking, stand-up paddle boarding, or wind surfing	26,960,187	32%
Road biking	68,469,091	31%
Motor boating	49,747,531	31%
Sledding/tubing	23,677,874	30%
Tent or rustic camping	28,629,569	30%
Shooting sports (including archery)	52,810,204	30%
Modern or RV camping	40,259,553	25%
*Biking of any kind (road or off-road)	N/A	40%
*Camping of any kind (modern, RV, tent, or rustic)	N/A	39%
*Hunting of any kind (big game, waterfowl, upland, or small game)	N/A	20%

Note: Due to different methodology, these participation rates cannot be compared directly to the 2012 SCORP survey.

*Denotes an activity in which multiple response categories were combined into a single figure.

Source: Public Sector Consultants conducted a statewide recreation telephone survey of Michigan residents on behalf of MDNR during April-May 2017 (MDNR 2017d).

E.8.6 Project Impacts on Recreational Resources

Continued ROR operation of the Project will support the existing recreational opportunities by maintaining stable water elevations in the Constantine reservoir. The results of the Recreation Study indicate that the existing recreation facilities, both Project and non-Project, meet the current and foreseeable future recreation needs of the public. I&M is not proposing any changes to the Project or operations that would have any impacts on existing recreation facilities. Therefore, no adverse effects on recreational resources within and downstream of the Project are expected as a result of the continued operation of the Project.

E.8.7 PM&E Measures Proposed by the Applicant, Resource Agencies, and/or Other Consulting Parties

The recreation facilities associated with the Project are mostly well maintained and require some routine maintenance and minor repairs. The Project recreation facility requiring the most improvement according to the results of the Recreation Study is the canoe portage on river left across from the Project's powerhouse. I&M proposes to enhance the existing canoe portage trail by adding signage and repairing or replacing faded signage, clearing vegetation, improving the quality of the existing trail (i.e., by potentially widening the trail and/or adding a more stable walking surface), and remediating the erosion site along the portage trail that was identified during the Shoreline Stability Assessment Study. Additionally, I&M will develop a Recreation Management Plan (RMP) for the Project that provides an inventory of all of the Project recreation facilities, describes routine maintenance and schedule, and details proposed recreation enhancements.

E.9 Cultural Resources

In considering a new license for the Project, FERC has the lead responsibility for compliance with applicable federal laws, regulations, and policies pertaining to historic properties, including the National Historic Preservation Act of 1966 (NHPA), as amended.³ Section 106 of the NHPA (Section 106)⁴ requires federal agencies to take into account the effects of their undertakings on historic properties and to afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment.

The regulations implementing Section 106 (36 CFR Part 800 – The Protection of Historic Properties) define an “historic property” as any pre-contact or historic period district, site, building, structure, or individual object listed in or eligible for inclusion in the National Register of Historic Places (NRHP).

³ 54 USC §300101 et seq.

⁴ 54 USC §306108

This term includes artifacts, records, and remains that are related to and located within historic properties, as well as properties of traditional religious and cultural importance (often referred to as “traditional cultural properties” or “TCPs”) that meet the NRHP criteria. The Section 106 process is intended to accommodate historic preservation concerns with the needs of federal undertakings through a process of consultation with agency officials, the State Historic Preservation Office (SHPO), federally recognized Indian Tribes, and other parties with a potential interest in an undertaking’s effects on historic properties.

The Secretary of the Interior has established the criteria for evaluating properties for inclusion in the National Register (36 CFR Part 60). In accordance with the criteria, properties are eligible if they are significant in American history, architecture, archaeology, engineering, or culture. The quality of significance is present in historic properties that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

- Are associated with events that have made a significant contribution to the broad patterns of our history; or
- Are associated with the lives of persons significant in our history; or
- Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant or distinguishable entity whose components may lack individual distinction; or
- Have yielded or may be likely to yield information important in prehistory or history.

FERC initiated consultation pursuant to Section 106 with federally recognized Indian tribes by letter dated October 12, 2017. By notice dated July 25, 2018, FERC designated I&M as its non-federal representative for purposes of conducting informal consultation pursuant to Section 106.

E.9.1 Affected Environment

E.9.1.1 Area of Potential Effects

An area of potential effect (APE) is defined as the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking. Although the nature of the Project’s potential effects are limited by the nature of this undertaking (the relicensing and continued operation of an existing hydroelectric project), the Project has the potential to directly or indirectly affect historic properties.

By letter dated February 5, 2019, I&M consulted with the Michigan SHPO, ACHP, Forest County Potawatomi Community Tribal Historic Preservation Officer (THPO), Pokagon Band of Potawatomi Indians, and the Nottawaseppi Huron Band of the Potawatomi regarding the proposed APE for this undertaking. I&M proposed to define the APE for Project relicensing as:

The APE for the Constantine Project includes lands within the FERC-approved Project boundary. The APE also includes lands outside of the Project boundary where Project operations, Project-related recreation activities, or other enhancements may cause changes in the character or use of historic properties, if any such properties exist.

I&M did not receive comments from the consulting parties regarding the proposed APE for this undertaking.

E.9.2 Cultural Context

E.9.2.1 Precontact Period

The earliest documented evidence of human occupation in Michigan dates to the Paleoindian period (11,500 – 9,500 before present [B.P.]) at the end of the Pleistocene glaciation (Epstein 2019). The late glacial and early Holocene transition presented a dynamic mosaic of changing environmental settings. Glacial retreat created rapid, unpredictable, and extreme changes in climate, drainage, topography, and soils. As noted by Epstein (2019), the Paleoindian landscape was very different than the present landscape of St. Joseph County:

At this time, tundra and spruce forest habitats prevailed and the configuration of the proglacial lakes that would become the Great Lakes was markedly different and, at times, significantly higher lake levels prevailed than at present.

Paleoindian populations likely followed a generalized subsistence/settlement strategy that relied on extensive seasonal mobility and a unique toolkit that included diagnostic fluted projectile points, gravers, utilized debitage, and tools crafted using bipolar percussion. A greater variety of unfluted projectile points began to appear by the Late Paleoindian period, but Paleoindian populations continued to rely on the seasonal migration of large herbivores such as caribou and elk (Epstein 2019). The age of Paleoindian deposits, subsequent landscape modifications, and associated ground-disturbing activities (e.g., agriculture and logging) make the likelihood of encountering intact Paleoindian sites relatively low. Other significant factors that affect the visibility of intact sites include the presumed low population densities during the Paleoindian period, the nature of material culture types common to hunter-gatherer groups (e.g., cordage and fiber technologies), and the general environmental conditions in the region at the end of the Wisconsinan glaciation.

A warming and more arid climate following glacial retreat led to increased ecological diversity during the Archaic period (9,500 B.P. – 2,600 B.C.) (Epstein 2019). The Early Archaic in southern Michigan was characterized by the spread of boreal (coniferous) forests, followed by the establishment of essentially modern mixed deciduous forests and faunal assemblages by the Middle Archaic (Epstein 2019). Relatively little is known about the Early and Middle Archaic in Michigan, and few sites have been extensively investigated. Fluctuations in the levels of the Great Lakes due to post-glacial advances and retreats combined with isostatic uplift may have resulted in the inundation of many Early and Middle Archaic sites (Epstein 2019). Available evidence indicates that Early and Middle Archaic groups exploited a range of ecological zones and a greater balance of hunting, fishing, and foraging than their Paleoindian predecessors (Epstein 2019). These patterns of resource utilization suggest that Early and Middle Archaic peoples in Michigan were semi-nomadic and that subsistence strategies “were geared to a broad resource base, rather than to an intense exploitation of any one environment” (Thomas and Kelly undated).

By the Late Archaic period, changes in subsistence and settlement patterns had emerged in the region. As summarized by Epstein (2019):

Throughout southern Michigan, the Late Archaic period is marked by an increase in population and the transition to a more broadly-based subsistence pattern with a greater reliance on plants, including cultigens. A larger and more varied tool kit, including tools for processing the newly used food sources, reflects these subsistence shifts.

The Late Archaic also saw the emergence of mortuary ceremonialism and an expansion of trade networks. The use of exotic and non-local materials such as copper and marine shell in mortuary and ceremonial contexts in southern Michigan is associated with burial complexes identified in the Upper Great Lakes and northern Midwest (Epstein 2019).

The Woodland period (2,600 B.P. – 400 B.P.) is traditionally associated with the introduction of ceramics and widespread changes in subsistence and settlement patterns. Increasing adoption of horticulture introduced a greater degree of sedentism. Early Woodland populations continued to rely on diversified hunting and fishing strategies, and sites from southwestern Michigan are characteristic of seasonal encampments found in diverse ecological and physiographic zones (Epstein 2019). By the Middle Woodland period, populations in southern Michigan were participating in the Hopewell Interaction Sphere, a widespread network of trade and burial ceremonialism (Epstein 2019). Exotic and elaborate artifacts including pipes, gorgets, and celts are typical of the Hopewell Interaction Sphere, and these are found in mortuary and ceremonial contexts in southern Michigan during the Middle Woodland (Epstein 2019). Middle Woodland villages and settlements appear mostly on

terraces and levees adjacent to waterways, whereas mound sites are typically found at higher elevations (Epstein 2019).

The Late Woodland period represents “a time of major changes in the precontact cultures of the Upper Great Lakes region” (Epstein 2019). More permanent, year-round, settlements emerged as populations came to rely increasingly on maize, squash, and beans as components of their subsistence strategies. From about 950 B.P. – 500 B.P., Upper Mississippian populations appear to be widespread in southern Michigan, signaling increasing links to those agricultural communities to the south (Epstein 2019). By the end of the Late Woodland period, the population in southern Michigan was primarily living in semi-permanent villages centered around seasonal horticulture and supplemented with hunting, fishing, and foraging subsistence practices.

E.9.2.2 Historic Period

The European colonization of the New World brought massive social, political, and economic changes on Native American communities, and indigenous populations attempted to adapt to these changes in a number of ways. Shifts in cultural patterns and technologies were widespread even prior to direct contact with Europeans. Waves of epidemic diseases, internecine fighting, dislocation, and displacement triggered by European colonization had profound impacts on indigenous populations before the first European traders and explorers reached present-day Michigan.

At the time of European contact, present-day St. Joseph County was inhabited by the Miami Nation (Remensnyder 2019). Early French fur traders and priests established regional missions in Sault Ste. Marie and St. Ignace in the late 17th century, but later relocated to Detroit (Epstein 2019). During this period, French *voyageurs* lived among and traded with the Ottawa, Chippewa, and the Nottawaseppi Nation, including the tribes of the Potawatomi which had moved into the region after the Miami relocated to Starved Rock in present-day Illinois (Remensnyder 2019).

The British gained political control of the Upper Great Lakes in 1760, but eventually ceded control to the United States in 1796 after the American Revolution (Remensnyder 2019). Euro-American settlement of the region began in the early 19th century, and the earliest Euro-American inhabitants of St. Joseph County arrived in the 1830s (Remensnyder 2019). Settlers were attracted to the extensive prairie land in St. Joseph County and the existing road network that followed Native American trails (Remensnyder 2019). In 1830, William Meeks constructed the first hydro-powered mill in the region along the Fawn River, a tributary to the St. Joseph River (Epstein 2019). The St. Joseph River eventually served as an important transportation route and provided hydropower to numerous industries in the Village of Constantine. In 1873, the Constantine Hydraulic Company constructed a dam in Constantine, and the extant powerhouse was constructed in 1902 (Remensnyder 2019). As

summarized by Remensnyder (2019), the Project underwent a series of improvements in the early 20th century before being acquired by I&M in 1967:

In 1912 Michigan Gas and Electric Company (MGEC) acquired the Constantine Hydraulic Company. Later known as Michigan Power Company, by 1923 MGEC refurbished the interior of the powerhouse, installed new generating machinery, and built a modern concrete dam to replace the original timber-crib dam. In 1928 the hydroelectric plant was capable of producing 1,200 kilowatts of power, which served 583 customers in Constantine, along with nearly 400 more in surrounding areas in conjunction with the Mottville hydroelectric plant.

E.9.3 Existing Discovery Measures

Article 410 of the existing license for the Project includes measures to protect and manage historic properties:

Article 410. The Licensee, before starting any land-clearing or land-disturbing activities, other than those specifically authorized in this license, shall consult with the State Historic Preservation Officer (SHPO).

If the Licensee discovers previously unidentified archeological or historic properties while constructing or developing project works or other facilities at the project, the Licensee shall stop all land-clearing and land-disturbing activities in the vicinity of the properties and consult with the SHPO.

E.9.4 Cultural Resources Studies

E.9.4.1 I&M's Previous Cultural Resources Studies

In 1989, I&M conducted a Phase I Archaeological Investigation. Background research was conducted at the Michigan SHPO and the Michigan State Library in Lansing, Michigan. Examination of cultural resource management reports indicated that limited archaeological investigations have been conducted in the area, which may account for the absence of recorded sites in the Project area. A preliminary study of the Project area conducted in 1989 by Louis Berger and Associates Inc. (Berger) suggested a moderate to high potential of prehistoric archaeological resources, since the Project parcels are near the St. Joseph River. In contrast, the potential for historic archaeological sites was evaluated as moderate to low, based on the distribution of known historic sites in this area (Berger 1990a).

Archaeological fieldwork was conducted at three parcels at the Constantine Project, which included visual inspection, pedestrian survey, and subsurface testing. The visual inspection conducted in this area at the inception of fieldwork revealed that the majority of the area was intensively disturbed, including the station yard and the west bank of the canal. These areas were evaluated as having limited potential for intact cultural deposits, and the archaeological fieldwork of these areas did not extend beyond the initial visual inspection. Fieldwork was completed in May 1990. The archaeological investigation concluded that there were no historic or precontact archaeological sites recorded within the Project's APE.

In support of the previous licensing, I&M also conducted an evaluation of Project facilities to determine their eligibility for inclusion in the NRHP. On behalf of I&M and the Michigan Power Company, Berger prepared a report that developed a framework for evaluating the NRHP eligibility of hydroelectric projects in Michigan's Lower Peninsula, including the Constantine Project. The report was intended to facilitate evaluation of hydroelectric projects within a broader, regional context to "permit the identification of those projects that possess demonstrable historical significance apart from those possessing simply historical interest" (*emphasis in original*) (Berger 1990b). Berger conducted a literature review and developed a context for hydroelectric development in the Lower Peninsula that described the history of hydroelectric development, engineering, and design. With respect to the Constantine Project, Berger concluded that the Project did not possess significance within this context and was not a significant example of the work of a prominent engineer or architect. Berger also found that the Project had undergone significant reconstruction after 1920 and was one of several similar hydroelectric projects in the Lower Peninsula from the post-World War I era (Berger 1990b). Finally, Berger determined that the Constantine Project possessed no significant associations with local business or economic development. For these reasons, Berger recommended that the Project be determined ineligible for the NRHP (Berger 1990b). The Michigan SHPO concurred with Berger's recommendation by letter dated January 17, 1991.

E.9.4.2 Cultural Resources Studies Conducted in Support of Project Relicensing

In accordance with the approved study plan, I&M conducted a Cultural Resources Study of the Project's APE. At I&M's request, Commonwealth Heritage Group, Inc. (CHG) conducted an archaeological survey of the Project's APE and a survey of historic architectural resources. The results of these studies are presented in the following reports that were filed with the Commission as appendices to the April 14, 2020 ISR:

- *Archaeological Survey for the Constantine Hydroelectric Project Relicensing (FERC No. 10661), St. Joseph County, Michigan (CHG 2020a); and*

- *Above-Ground Survey for the Constantine Hydroelectric Project Relicensing (FERC No. 10661) (CHG 2020b).*

CHG's archaeological survey included a literature review, a review of archaeological site forms and previous survey reports on file with the Michigan SHPO, development of environmental and cultural contexts, and background research to identify previously recorded archaeological resources located within the vicinity of the APE. Consistent with the ACHP's *Section 106 Archaeology Guidance* (ACHP 2009), CHG also conducted an assessment of the Project's shoreline to identify erosion areas where Project operations had the potential to affect historic properties, should any be present⁵.

The results of the background research and literature review indicated that six previous archaeological surveys had been conducted within the vicinity of the Project, including two surveys that overlapped portions of the Project's APE. A total of 12 archaeological sites were located within one mile of the Project's APE, including four precontact period sites and eight historic period sites. None of the 12 archaeological sites previously identified within one mile of the Project's APE were located within or adjacent to the APE. Of these 12 sites, 11 were previously determined to be not eligible for the NRHP; the eligibility of one site was undetermined (CHG 2020a).

CHG conducted a shoreline inspection by canoe on July 22 – July 24, 2019. As described in CHG's survey report, CHG's methodology included a multi-step process for identifying and surveying locations of the Project's APE that may be experiencing Project-related effects. CHG proposed to complete a Stream Bank Erosion Inventory (SBEI) Schema and Data Collection Form for erosion areas more than 100 feet in length. CHG also proposed to conduct subsurface testing of these areas to determine if erosion had the potential to affect intact cultural deposits.

The results of shoreline inspection indicated that the shoreline of the Project's impoundment appeared stable, and no erosion areas extending 100 feet along the shoreline were identified. Accordingly, CHG did not complete the SBEI Schema and Data Collection Form, and no subsurface testing was conducted. No new archaeological sites were identified. CHG concluded that, "bank stability is apparent in the Project APE including the Constantine Hydroelectric Project Facility raceway" (CHG 2020a).

⁵ Pursuant to the ACHP's Section 106 Archaeology Guidance, "A federal agency is not expected to conduct a 100 percent survey of the area of potential effects. Rather, the identification effort should be conditioned by where effects are likely to occur and the likely impact of these effects on listed or eligible archaeological sites. For example, archaeological identification efforts for a license renewal from the Federal Energy Regulatory Commission likely would not involve the entire area of potential effects (APE). Rather it would be directed to those locations within the APE that are experiencing project related effects associated with operation, usually along the shoreline."

CHG's survey of above-ground architectural resources was conducted in 2020 and included background research at the Michigan SHPO and a literature review to identify previously recorded architectural resources within one mile of the Project's APE. No properties listed on or eligible for listing on the NRHP were identified in the APE. The NRHP-listed Constantine Historic Commercial District is located approximately 400 feet downstream from the Project along river right (across from the powerhouse) and includes 28 contributing commercial and residential structures representing examples of mid-nineteenth to early-twentieth century Greek Revival and Italianate styles. The Constantine Historic Commercial District was listed in the NRHP in 1985. The Art Gallery Building located at 156 Street Washington Street is a contributing resource to the Constantine Historic Commercial District and was also individually listed on the NRHP in 1980.

In addition to the Constantine Historic Commercial District, the Gov. John S. Barry House located at 280 North Washington Street in Constantine was also individually listed in the NRHP in 1972. The house was built by John S. Barry, Michigan's fourth governor, in a vernacular style and is currently operated as a museum. The John S. Barry House is located approximately 800 feet southwest from the Constantine dam.

The Morse-Scoville House, located at 685 South Washington Street in the Village of Constantine, is also listed on the NRHP. The Morse-Scoville House is located approximately 2,750 feet southwest of the Constantine dam and was constructed by prominent village doctor, pharmacist, and business leader Dr. Francis J. Morse in 1864 – 1865. The Morse-Scoville House was listed in the NRHP in 1996.

An additional nine properties within one mile of the Project's APE have also previously been determined eligible for the NRHP. These include the Constantine Residential District, Constantine Methodist Episcopal Church, William Heywood House, Wells-Bryan House, Hamilton-Willman Farmstead, Samuel Gibson Farmstead, O.C.M. Bates Farm, William H. Burger Farm, and Harvey-Stevens House. None of these historic properties are within or adjacent to the APE for this undertaking (CHG 2020b).

CHG's background research and literature review found that a historic resource inventory form had been completed for an additional 12 properties within one mile of the Project's APE. These include a church, cemetery, houses, and farmsteads. The NRHP eligibility of these resources have not been evaluated, and none of the resources are located within or adjacent to the Project's APE (CHG 2020b).

CHG conducted field investigations to determine if the properties adjacent to the APE could be indirectly affected by Project operations and concluded that those properties surveyed have one or more factors that limits visual impacts. As a result, CHG determined that there were no potential indirect Project-related impacts to any shoreline properties (CHG 2020b).

CHG's architectural field investigations also included an evaluation of Project facilities. CHG recommended the Project's facilities, including the powerhouse, machine shop, power canal and embankments, headgates, and dam and spillway as eligible for listing in the NRHP under Criterion A as a significant hydroelectric complex in the Village of Constantine. The complex was constructed in 1902 and has numerous extant facilities that date from the early to mid-twentieth century. However, CHG recommended the substation, which includes contemporary electrical equipment and transmission lines, as a non-contributing resource (CHG 2020b).

By letter dated April 27, 2020, I&M consulted with the Michigan SHPO, Forest County Potawatomi Community, Pokagon Band of Potawatomi Indians, Nottawaseppi Huron Band of the Potawatomi, and Miami Tribe of Oklahoma (collectively, the "Consulting Parties") regarding the results of the Cultural Resources Study and requested concurrence with the recommendations presented in the archaeological and historic architecture survey reports. I&M did not receive a response from any of the Consulting Parties.

E.9.4.3 Traditional Cultural Properties

Properties of traditional religious or cultural significance (often referred to as "traditional cultural properties" or TCPs) can qualify as historic properties to the extent they meet the definition under in 36 CFR §800.16(l). The cultural significance of a TCP is derived from the role the property plays in a community's historically rooted beliefs, customs, and practices. NRHP Bulletin 38 provides further guidance on identifying and evaluating TCPs (Parker and King 1998). TCPs may be eligible for inclusion in the NRHP because of their association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community. I&M recognizes the special expertise of the Indian tribes to identify and assess TCPs within the Project's APEs. None of the Consulting Parties have provided additional information regarding TCPs, and I&M has not identified any properties of traditional religious or cultural significance within the APE for this undertaking.

E.9.5 Project Impacts on Cultural Resources

The NHPA establishes the statutory responsibility of federal agencies to consider historic properties under their jurisdiction. Section 106 requires federal agencies to take into account the effects of their undertakings on historic properties listed in or eligible for inclusion in the NRHP. FERC's issuance of a new license for the Projects is defined as an undertaking under the NHPA and is, therefore, subject to the provisions of Section 106 and its implementing regulations at 36 CFR Part 800.

FERC's SD2 identified effects of continued Project operations on cultural resources as a potential resource issue; specifically, SD2 identified the potential "effects of continued project operation and

maintenance on properties that are included in or eligible for inclusion in the National Register of Historic Places” as resource issues to be analyzed for site-specific effects.

At present, the ongoing operation and maintenance of the Project is not adversely affecting any historic properties. No archaeological sites have been identified within the APE, and CHG’s field investigations determined that the shoreline of the Project’s impoundment is stable and not prone to erosion that could adversely affect the integrity of archaeological resources, should any be present. To the extent that high water or flooding events may cause periodic shoreline erosion, these events are beyond the control of I&M and are not related to Project operations. The continued operation and maintenance of Project facilities is consistent with their historic use and design. I&M is not currently proposing modifications to Project operations or Project-related land-clearing or land-disturbing development activities within the APE that would result in an impact to any historic properties. The continued operation of the Project as proposed by I&M is not expected to have any unavoidable adverse effects on historic or archaeological resources.

E.9.6 PM&E Measures Proposed by the Applicant, Resource Agencies, and/or Other Consulting Parties

While there are presently no ongoing or anticipated adverse Project-related effects on historic or archaeological resources, maintenance or repair of Project facilities have the potential to affect properties recommended as eligible for the NRHP. Additionally, the continued operation of the Project under a new license issued by the Commission may require ground-disturbing activities (e.g., routine maintenance of recreational facilities). As such, I&M proposes to develop a Historic Properties Management Plan (HPMP) for the Project that will describe appropriate management measures to avoid, minimize, or mitigate adverse effects on historic and archaeological resources (should any be identified) over the term of the new license issued for the Project. The measures provided in the HPMP will direct the Licensee’s management of NRHP-eligible historic properties within the Project’s APE.

I&M will develop an HPMP in consultation with the Consulting Parties. Through this consultation, I&M will develop management measures to be incorporated into the HPMP. I&M has outlined the following two goals for managing historic properties within the Project’s APE:

- Support continued normal operation of the Project while maintaining and preserving the integrity of historic properties; and
- To the fullest extent possible, avoid, minimize, or mitigate adverse effects on historic properties within the APE.

To address these goals, I&M will develop an HPMP for the Project in accordance with the *Guidelines for the Development of Historic Properties Management Plans for FERC Hydroelectric Projects* promulgated by FERC and the ACHP on May 20, 2002. The HPMP will describe measures for the management of and protection of historic properties within the Project's APE through the term of the new license, including any unanticipated discoveries of archaeological material or human remains. As such, continued operation of the Project as proposed by the Licensee is not expected to adversely affect historic or archaeological resources.

E.10 Aesthetic Resources

The Constantine Project is located on the west bank of the St. Joseph River in the Village of Constantine, Michigan. The Project consists of a concrete gravity overflow spillway dam, powerhouse, concrete headgate structure containing seven wooden gates, transmission line, and appurtenant facilities (See Exhibit A for additional details).

The 525-acre Project reservoir and the 1,600-foot-long reach of the river between the Project dam and powerhouse visually dominate the area landscape and are the landscape's principle aesthetic features. The Project's powerhouse, substation, and storage building are located next to the U.S. Route 131 bridge over the St. Joseph River in the Village of Constantine. These facilities are also fully visible from two village parks, one located immediately adjacent to the complex and the other situated directly across the river from the complex. The Project dam and headgate structure, both located about 1,300 feet upstream from the powerhouse, and a connecting headrace canal are concealed from view from these vantage points by the grass-covered embankments that line both sides of the canal and by the woodlands that surround the Project area (FERC 1993a). The Constantine Project was constructed in 1873 and has been part of the landscape in the community for more than a century.

Article 412 of the current license for the Project required the removal of an old storage building located next to the powerhouse and U.S. Route 131 to improve the quality of the visual resources at the Project. Per license article 412 and the FERC-approved building removal plan, I&M removed the old storage building and landscaped the area to include trees, shrubs, and grass areas to screen the switchyard from the view of passing motorists on U.S. Route 131. Additionally, a fence that originally aligned with the right-of-way along Route 131 was removed and a new fence was installed to separate the powerhouse entrance and switchyard from the publicly accessible areas.

Photo E.10-1
View of Powerhouse from Riverview Park on East Side of River



E.10.1 Project Impacts on Aesthetic Resources

The Constantine Project has been in place since 1873 and has become part of the local environment. The Project area is predominately agricultural with small portions of forested areas and wetlands. The Project area near the dam and powerhouse is moderately developed.

No issues related to aesthetic resource have been identified at the Project.

E.10.2 PM&E Measures Proposed by the Applicant, Resource Agencies, and/or Other Consulting Parties

No PM&E measures related to aesthetic resources have been proposed by any resource agencies or consulting parties. I&M is not proposing any PM&E measures related to aesthetic resources but plans to continue the current ROR operations that lend to the aesthetic value of the Project.

E.11 Socioeconomic Resources

The Project is located within St. Joseph County, which is 1 of 83 counties in Michigan. The 2010 census reported that approximately 61,295 people reside in St. Joseph County, which encompasses approximately 500 square miles with a population density of 122.4 persons per square mile. The estimated 2019 population residing in St. Joseph County is 60,964, which is a 0.6-percent decrease over the nine-year period between 2010 and 2019 (U.S. Census Bureau [USCB] undated). The 2010

census reported that approximately 2,076 people reside within the Village of Constantine (CensusViewer 2012).

From 2015-2019 the median household income for St. Joseph County was \$52,086 which compares to the statewide median household income of \$57,144 for the same time period (USCB undated). The annual unemployment rate for St. Joseph County in February 2021 was 5.2 percent, compared to 5.1 percent unemployment in Michigan (Bureau of Labor Statistics [BLS] 2021b), and a national unemployment rate of 6.2 percent as of February 2021 (BLS 2021a).

From 2017 to 2018, employment in St. Joseph County grew at a rate of 1.51 percent, from 27,600 employees to 28,000 employees. The most common job groups in 2018 were Production Occupations (24.4%), Office and Administrative Support Occupations (10.1%), and Sales and Related Occupations (7.86%). The most common employment sectors in 2018 for those who lived in St. Joseph County, were Manufacturing (38.9%), Health Care and Social Assistance (10.6%), and Retail trade (8.48%) (DataUSA undated).

The Constantine Project provides support to the Project area in the form of approximately 5,000 MWh of renewable energy annually.

E.11.1 Project Impacts on Socioeconomic Resources

No issues have been identified relevant to socioeconomic resources. The continued operation of the Project is only expected to have beneficial socioeconomic impacts to the local communities due to the addition of renewable energy to the energy grid.

E.11.2 PM&E Measures Proposed by the Applicant, Resource Agencies, and/or Other Consulting Parties

No PM&E measures are being proposed by I&M or any resource agencies or consulting parties related to socioeconomic resources measures, as no resource issues have been identified.

E.12 Summary of Proposed Actions and PM&E Measures

I&M is not proposing any modifications to the Project or changes to Project operations that could potentially negatively impact resources in the Project area. Although continued operation of the Project is not anticipated to have any adverse impacts to resources in the Project area, I&M is proposing PM&E measures related to recreation, cultural, terrestrial, and wildlife resources to enhance and protect existing resources associated with the Project area.

I&M is proposing to develop a RMP for the Project that will provide an inventory of all of the Project recreation facilities, describe routine maintenance and schedule, and detail proposed recreation

enhancements (i.e., improvements to the existing canoe portage trail). Additionally, I&M is proposing to develop a HPMP for the Project that will describe appropriate management measures to avoid, minimize, or mitigate adverse effects on historic and archaeological resources (should any be identified) over the term of the new license issued for the Project. I&M is proposing to also continue to annually monitor purple loosestrife, Eurasian watermilfoil, and Carolina fanwort within the Constantine reservoir and consult with MDNR and USFWS. Additionally, I&M is proposing to continue deploying the avian nesting structures along the Project reservoir. I&M is not proposing to continue monitoring the avian nesting structures but will perform maintenance and repair the structures as needed on an annual basis.

Exhibit F

General Design Drawings

F.1 List of General Design Drawings

The General Design Drawings show overall plan views, elevations, and sections of the principal Project works in sufficient detail to provide a full understanding of the Project. In accordance with 18 CFR Part 388, I&M is requesting that the General Design Drawings for the Constantine Project be given privileged treatment because the drawings contain Critical Energy Infrastructure Information. This request for privileged treatment is being made to the Commission in accordance with the Final Rule (Order No. 630-A) issued by the Commission on July 23, 2003 (revised August 8, 2003). Therefore, in conjunction with filing this License Application, the Exhibit F General Design Drawings listed below in Table F.1-1 are being filed under separate cover in accordance with Order 630-A.

**Table F.1-1
Constantine Project General Design Drawings**

Drawing Number	Title
Sheet F-1	General Design Drawing Plan and Sections
Sheet F-2	General Design Drawing Plan and Sections
Sheet F-3	General Design Drawing Plan and Sections

I&M is continuing to review the existing design drawings for the Constantine Project and will file revised General Design Drawings with the FLA, as appropriate.

F.2 Supporting Design Report

18 CFR §4.41(g)(3) requires that an applicant for a new license file with the Commission two copies of a Supporting Design Report (SDR) when the applicant files a license application. An SDR summarizes the studies that have been performed to date and the assumptions that have been made related to the development of the existing Project. The information contained within the SDR demonstrates that the existing structures are safe and adequate to fulfill their stated functions. The Project falls under the requirements of the Part 12 – Safety of Water Power Projects and Project Works, Subpart D – Inspection by an Independent Consultant. In 2003, FERC instituted a new program to be used in the context of the Part 12 Independent Consultant Safety Inspection Program entitled “Potential Failure Modes Analysis” (PFMA), which is a dam-and project-safety tool intended to broaden the scope of the safety evaluations to include potential failure scenarios that may have been overlooked in past investigations. In conjunction with these endeavors, FERC also initiated a

requirement for development of a Supporting Technical Information Document (STID) for sites subject to Part 12D.

The purpose of the STID is to summarize those Project elements and details that do not change significantly between 5-year FERC Part 12 independent consultant safety inspections. The STID includes sufficient information to understand the design and current engineering analyses for the Project such as:

- A complete copy of the PFMA report,
- A detailed description of the Project and Project works,
- A summary of the construction history of the Project,
- Summaries of Standard Operating Procedures,
- A description of geologic conditions affecting the Project works,
- A summary of hydrologic and hydraulic information,
- Summaries of instrumentation and surveillance for the Project and collected data,
- Summaries of stability and stress analyses for the Project works, and
- Pertinent correspondence from the FERC and state dam safety organizations related to dam safety.

Since the Project has been inspected by an independent consultant within the past five years and an STID has been prepared and submitted to the Commission, further discussions regarding geological and subsurface investigations, hydrologic and hydraulic analyses, stability analyses for all major structures, etc. will not be reiterated as part of an SDR.

For reference purposes, the Licensee denotes below the filing dates with the Commission's Chicago Regional Office of the most recent Part 12 Safety Inspection Report, the PFMA Report, which is included within the STID, and the STID as presented in Table F.2-1.

**Table F.2-1
Filing Dates for the Most Recent Part 12 Safety Inspection Report,
PFMA Report, and STID**

Document	Commission Filing Date
8 th Part 12 Safety Inspection Report	March 1, 2021
PFMA Report	May 23, 2016
STID	May 23, 2016

Exhibit G

Project Boundary Maps

G.1 Project Boundary Maps

The existing Exhibit G Project Boundary Maps, prepared in accordance with the requirements of 18 CFR §§ 4.39 and 4.51(h), are attached hereto and incorporated herein. I&M possesses property or easement rights to all areas within the defined Project boundary. The Project Boundary Maps show the Project vicinity, location, and boundary in sufficient detail to provide a full understanding of the Project and are listed in Table G.1-1.

**Table G.1-1
Project Boundary Maps**

Drawing Number	Title
Exhibit G – Sheet 1 of 2	Constantine Project Boundary
Exhibit G – Sheet 2 of 2	Constantine Project Boundary

At this time, I&M is not proposing any modifications to the existing Project boundary; however, I&M is continuing a review to determine if lands not necessary for Project operations can be removed from the Project boundary. As appropriate, I&M file revised Exhibit G Project Boundary Maps with the FLA.

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Appendix A

Constantine Project Single-Line Diagram (Filed As CEII)

Appendix B
Correspondence

Constantine Relicensing (P-10661) Correspondence Log

DATE	TYPE (Accession Number, if applicable)	FROM	TO	SUBJECT
August 15, 2017	Letter	HDR	Michigan Department of Environmental Quality (MDEQ)	Coastal Zone Management Determination Request
August 15, 2017	Letter	HDR	Michigan Department of Natural Resources (MDNR)	Request for Threatened and Endangered Species Information
August 15, 2017	Letter (20170822-0035)	HDR	Project Stakeholders ¹	Pre-Application Document (PAD) Questionnaire
August 15, 2017	Letter	HDR	U.S. Fish and Wildlife Service (USFWS)	Request for Threatened and Endangered Species Information
August 21, 2017	Letter	MDEQ	HDR	Coastal Zone Management Determination
August 23, 2017	Phone Message	Bureau of Indian Affairs (BIA)	HDR	Contact Information
August 25, 2017	E-mail	MDNR	HDR	Contact Information
August 28, 2017	E-mail	HDR	Michigan State University - Michigan Natural Features Inventory	Rare, Threatened and Endangered Species Request
September 2017	Letter	U.S. Department of Agriculture – Natural Resources Conservation Service	HDR	PAD Questionnaire Response

¹ Project Stakeholders is used to reference the larger stakeholder group and may include representatives from the Federal Energy Regulatory Commission (FERC), U.S. Fish and Wildlife Service (USFWS), U.S. National Park Service (NPS), U.S. Department of Agriculture (USDA), NOAA Fisheries Service, U.S. Department of Interior, FEMA, U.S. Environmental Protection Agency (USEPA), U.S. Geological Survey (USGS), Michigan Department of Agriculture, Michigan Department of Natural Resources (MDNR), Michigan Department of Environmental Quality (MDEQ), State Historic Preservation Office (SHPO), Advisory Council on Historic Preservation, Pokagon Band of Potawatomi Indians, Nottawaseppi Huron Band of the Potawatomi, Nature Conservancy of Michigan, Michigan Nature Association, American Whitewater, American Rivers, applicable federal, state, and/or local governmental agencies and non-governmental organizations.

Constantine Relicensing (P-10661)
Correspondence Log

DATE	TYPE (Accession Number, if applicable)	FROM	TO	SUBJECT
September 11, 2017	E-mail	Michigan State University - Michigan Natural Features Inventory	HDR	Rare Species Review
September 11, 2017	Letter	USFWS	HDR	Concurrence on Threatened and Endangered Species Information
September 15, 2017	E-mail	HDR	The Nature Conservancy	PAD Questionnaire
September 20, 2017	Letter	MDNR (Kyle Kruger)	HDR	PAD Questionnaire Response
September 20, 2017	Letter	U.S. Environmental Protection Agency (EPA)	HDR	PAD Questionnaire Response
October 5, 2017	Letter	Michigan Hydropower Relicensing Coalition	HDR	PAD Questionnaire Response
October 10, 2017	E-mail	MDEQ	HDR	Re-confirmation of Coastal Zone Determination
October 12, 2017	Letter (20171012-3006)	FERC	Tribes	Invitation to Participate in the Relicensing Process
October 26, 2017	Letter (20171026-5121)	Forest Co. Potawatomi Natural Resources	FERC	Request to Consult
October 26, 2017	Letter (20171026-5039)	Miami Tribe of Oklahoma	I&M/FERC	Request to Consult
January 30, 2018	Letter (20180130-5121)	Friends of the St. Joe River Association, Inc.	FERC	Request to Consult
April 4, 2018	Letter (20180404-0023)	FERC	Tribal Stakeholders	Consultation with Tribes for the Constantine Project
June 4, 2018	Letter (20180604-5132)	I&M	Project Stakeholders	Notice of Intent (NOI) and PAD
July 25, 2018	Letter (20180725-3005)	FERC	Project Stakeholders	NOI to File License Application, Filing of PAD, Commencement of Pre-Filing Process, and Scoping; Request for Comments on the PAD

Constantine Relicensing (P-10661)
Correspondence Log

DATE	TYPE (Accession Number, if applicable)	FROM	TO	SUBJECT
				and Scoping Document, and Identification of Issues and Associated Study Requests
July 25, 2018	Letter (20180725-3001)	FERC	Project Stakeholders	Scoping Document 1 (SD1)
September 27, 2018	Letter (20180927-3024)	FERC	I&M	Comments on Preliminary Study Plans, Request for Studies, and Additional Information
September 27, 2018	Letter (20180928-5097)	Friends of the St. Joe River Association, Inc.	FERC	Scoping Meeting Comments
September 28, 2018	Letter (20180928-5044)	U.S. EPA	FERC	Comments on SD1 – FERC Notice of Intent to prepare an Environmental Assessment for the Project
October 2, 2018	Letter (20181002-5045)	MDNR	FERC	Comments on SD1 for the Project
October 2, 2018	E-mail	Pokagon Band of Potawatomi	FERC	Comment Letter on Constantine Dam Relicensing
October 4, 2018	Transcript (20181004-4008)	FERC	Project Stakeholders	Transcript of 8/28/2018 Evening Scoping Meeting (errata filed 10/06/2018 - 20181005-4004)
October 4, 2018	Transcript (20181004-4009)	FERC	Project Stakeholders	Transcript of 8/29/2018 Morning Scoping Meeting (errata filed 10/05/2018 - 20181005-4005)
October 16, 2018	Letter (20181016-3039)	FERC	Nottawaseppi Huron Band of Potawatomi	Invitation to Participate in Relicensing Process
October 30, 2018	Telephone Memo (20181031-0008)	FERC	U.S. EPA	Comments on Scoping Document
November 13, 2018	Letter (20181113-3034)	FERC	Project Stakeholders	Scoping Document 2 for the Constantine Project

Constantine Relicensing (P-10661)
Correspondence Log

DATE	TYPE (Accession Number, if applicable)	FROM	TO	SUBJECT
November 16, 2018	E-mail/Letter (20181116-5161)	I&M/HDR	Project Stakeholders	Filing of Proposed Study Plan (PSP) for Relicensing Studies
December 11, 2018	Letter (20181211-5100)	Forest County Potawatomi Community	FERC	Request Phase I archaeological survey and State Historic Preservation Office (SHPO) comments on Project
January 9, 2019	Letter (20190109-5106)	MDNR	FERC	Comments on the PSP
January 16, 2019	Email	MDEQ	I&M	MDEQ Comments on Proposed Study Plan for Constantine Hydroelectric Project
January 31, 2019	Letter (20190131-3004)	FERC	I&M	Staff Comments on the PSP
February 5, 2019	Letter (20190205-5140)	I&M	Advisory Council on Historic Preservation, FERC, SHPO, Forest County Potawatomi Community, Pokagon Band of Potawatomi Indians, Nottawaseppi Huron Band of the Potawatomi	Consultation Regarding the Area of Potential Effects
February 5, 2019	E-mail	HDR	USFWS, MDEQ and MDNR	Proposed Study Plan Consultation – Water Quality Study
February 25, 2019	Letter	MDNR	FERC	Water Quality Comments
March 6, 2019	Letter	USFWS	I&M	Comments on Sampling Locations and Proposed Modifications to the Proposed Study Plan – Water Quality Study for the Constantine Project (P-10661)
March 7, 2019	Letter	Forest County Potawatomi Tribe	I&M	Area of Potential Effects Consultation

Constantine Relicensing (P-10661)
Correspondence Log

DATE	TYPE (Accession Number, if applicable)	FROM	TO	SUBJECT
March 7, 2019	Letter	MDEQ	I&M	Comments on Revised Proposed Water Quality Study Plan
March 15, 2019	E-mail/Letter (20190315-5141)	I&M/HDR	Project Stakeholders	Revised Study Plan
April 9, 2019	Letter (20190409-3001)	FERC	I&M	FERC Study Plan Determination
July 9, 2019	Letter (20190709-5058)	I&M	Project Stakeholders	First Quarterly Study Progress Report
October 9, 2019	Letter (20191009-5107)	I&M	FERC	Second Quarterly Study Progress Report
January 9, 2020	Letter (20200109-5113)	I&M	FERC	Third Quarterly Study Progress Report
April 9, 2020	Letter (20200409-5166)	I&M	FERC	Fourth Quarterly Study Progress Report
April 14, 2020	Letter (20200414-5158)	I&M	FERC	Initial Study Report (ISR)
April 15, 2020	E-mail	HDR	Project Stakeholders	ISR Filed
April 27, 2020	Letter	I&M	Cultural Resource Stakeholders	Cultural Resources Study Reports
May 8, 2020	Letter (20200508-5236)	I&M	FERC	ISR Meeting Summary
May 14, 2020	Letter (20200513-5009)	Forest County Potawatomi – Cultural Preservation Division	I&M	ISR Response and Archaeological Survey Report Request
May 19, 2020	E-mail	I&M	Forest County Potawatomi – Cultural Preservation Division	Archaeological Survey Report

Constantine Relicensing (P-10661)
Correspondence Log

DATE	TYPE (Accession Number, if applicable)	FROM	TO	SUBJECT
June 6, 2020	Letter (20200609-3016)	FERC	I&M	Comments on ISR and ISR Meeting Summary
July 9, 2020	Letter (20200709-5113)	I&M	FERC	Fifth Quarterly Study Progress Report
July 9, 2020	E-mail	HDR	Project Stakeholders	Filing of Fifth Quarterly Study Progress Report
July 13, 2020	Letter (20200713-5238)	I&M	FERC	Response to Comments on the ISR
July 14, 2020	E-mail	HDR	Project Stakeholders	Notification of Filing of Response to Comments on the ISR
July 24, 2020	E-mail	Commonwealth Heritage Group	Potawatomi Tribe	Updated Cultural Reports
July 28, 2020	Letter (20200728-5019)	I&M	FERC	Additional Response to ISR Comments
August 12, 2020	E-mail	FERC	I&M	Request for DO and Temperature ISR Data
August 13, 2020	Letter (20200813-5088)	I&M	FERC	ISR Request for Water Quality Data
March 8, 2021	Letter (20210308-5256)	I&M	Michigan Department of Environment, Great Lakes, and Energy (EGLE), MDNR and USFWS	USR and USR Meeting
March 12, 2021	Email	FERC	I&M	USR and USR Meeting
April 12, 2021	Email	I&M	EGLE, MDNR and USFWS	USR and USR Meeting



August 15, 2017

Ronda Wuycheck, Chief
Michigan Department of Environmental Quality
Coastal Zone Management Program
525 West Allegan Street
PO Box 30473
Lansing, MI 48909-7973

**Subject: Constantine Hydroelectric Project (FERC No. 10661)
Coastal Zone Consistency Determination**

Dear Ms. Wuycheck,

On behalf of Indiana Michigan Power Company (I&M), HDR, Inc. (HDR) is gathering information in support of the Pre-Application Document (PAD) for the upcoming Federal Energy Regulatory Commission (FERC) relicensing of the Constantine Hydroelectric Project (FERC No. 10661) (Project).

Consistent with this effort, HDR is requesting a determination from your office regarding the applicability of the State's Coastal Zone Policies to the Project, which is located on the St. Joseph River in St. Joseph County, Michigan. Based on a review of applicable information, we do not believe that the Project is located within the State's Coastal Zone and are requesting confirmation of this determination from your office. In support of this confirmation, we have included a map indicating the location of this facility.

It is our intent to include the results of the determination in the PAD. Therefore, we respectfully request a response to this determination within 30 days of the date of this letter. If you have any questions or need additional information regarding this Project or its location, please feel free to contact me at (704) 248-3620 or sarah.kulpa@hdrinc.com.

Thank you for your assistance with this request.

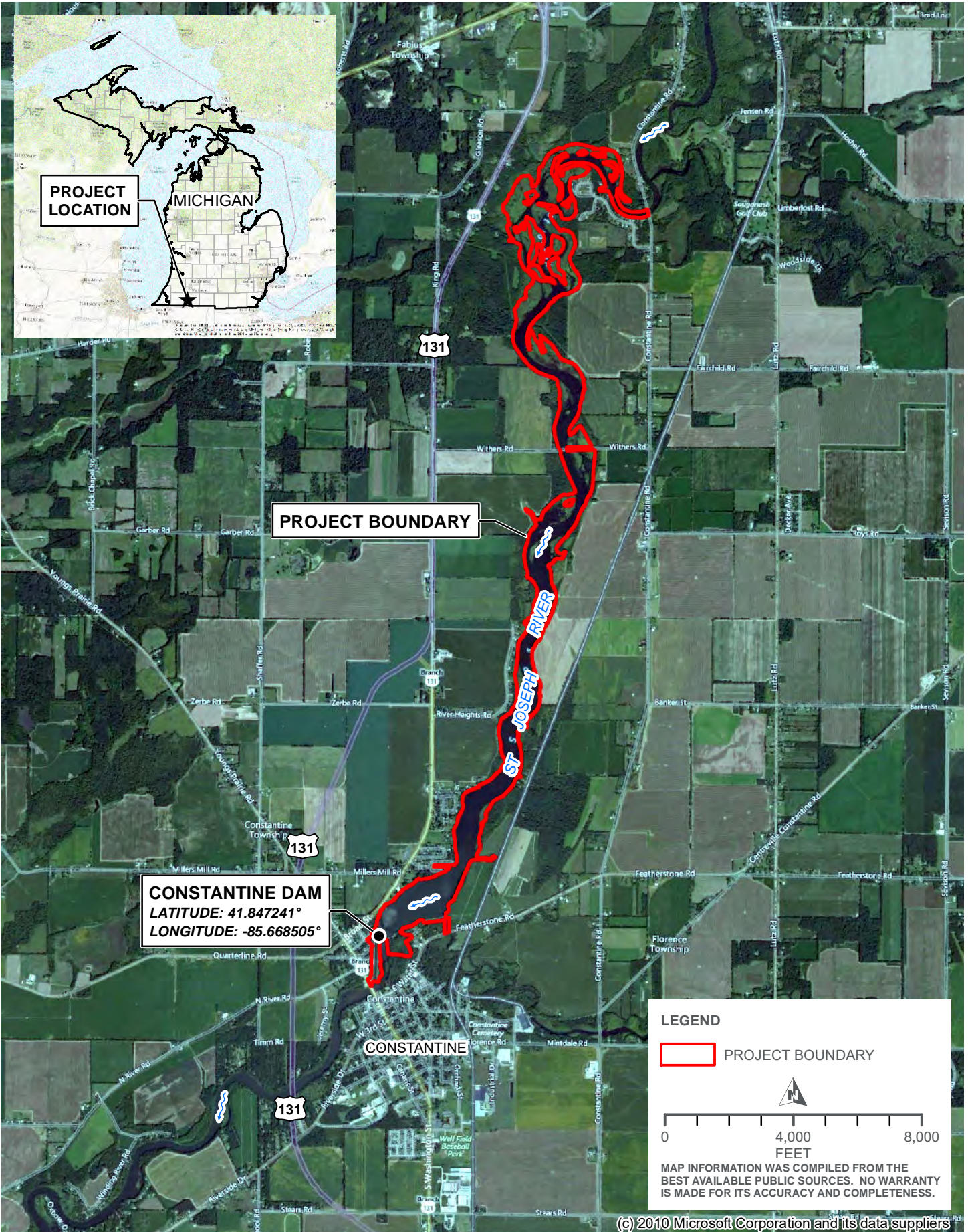
Sincerely,
HDR, Inc.

Sarah Kulpa
Project Manager

Constantine Hydroelectric Project
Coastal Zone Consistency Determination
August 15, 2017
Page 2

Attachment

cc: Jonathan Magalski, on behalf of I&M



PROJECT LOCATION MAP
CONSTANTINE HYDROELECTRIC PROJECT (FERC NO. 10661)
ST. JOSEPH COUNTY, MICHIGAN



August 15, 2017

Keith Creagh, Director
Michigan Department of Natural Resources
PO Box 30028
Lansing, MI 48909

**Subject: Constantine Hydroelectric Project (FERC No. 10661)
Request for Threatened and Endangered Species Information**

Dear Mr. Creagh,

On behalf of Indiana Michigan Power Company (I&M), HDR, Inc. (HDR) is gathering information in support of the Pre-Application Document (PAD) for the upcoming Federal Energy Regulatory Commission (FERC) relicensing of the Constantine Hydroelectric Project (FERC No. 10661) (Project). In support of this process, HDR is requesting information regarding the following within the Project area:

- State-listed threatened or endangered species;
- Species proposed for listing as threatened or endangered, or species of concern;
- Designated or proposed critical habitat; and
- Candidate species.

The Constantine Hydroelectric Project is located on the St. Joseph River in St. Joseph County, Michigan. The attached map shows the area of interest for which the information is being requested and the general location of the facility.

It is our intent to include the results of this request in the PAD. Therefore, we respectfully request a response to this request within 30 days of the date of this letter. If you have any questions or need additional information regarding this Project or its location, please feel free to contact me at (704) 248-3620 or sarah.kulpa@hdrinc.com.

Thank you for your assistance with this request.

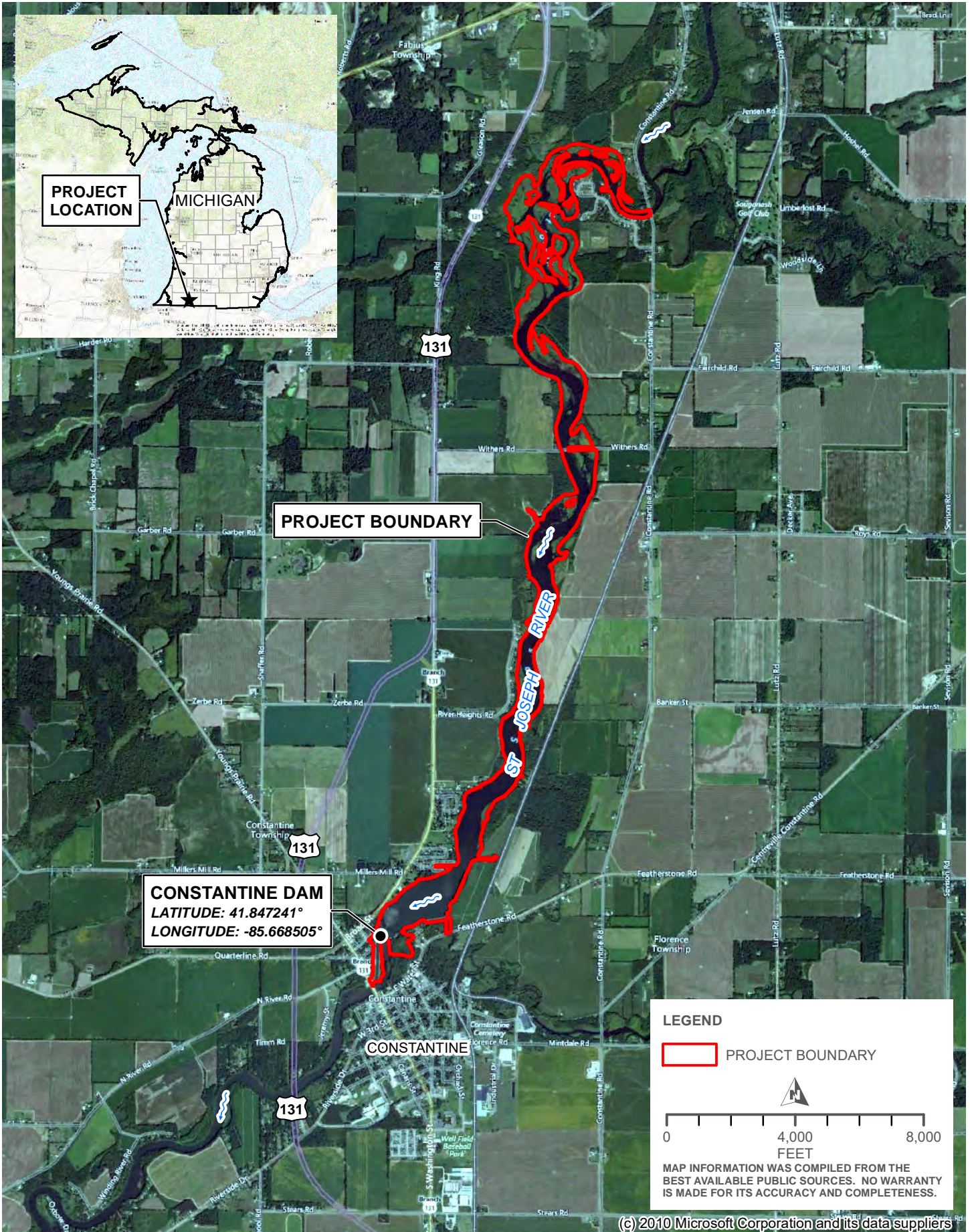
Sincerely,
HDR, Inc.

Sarah Kulpa
Project Manager

Constantine Hydroelectric Project
Request for Threatened and Endangered Species Information
August 15, 2017
Page 2

Attachment

cc: Jonathan Magalski, on behalf of I&M



PROJECT LOCATION MAP
CONSTANTINE HYDROELECTRIC PROJECT (FERC NO. 10661)
ST. JOSEPH COUNTY, MICHIGAN



August 15, 2017

**Subject: Constantine Hydroelectric Project (FERC No. 10661)
Relicensing Pre-Application Document Questionnaire**

To the Attached Distribution List:

Indiana Michigan Power Company (I&M) is the Licensee and operator of the Constantine Hydroelectric Project (FERC No. 10661) (Project) located on the St. Joseph River in St. Joseph County, Michigan. The Project is licensed by the Federal Energy Regulatory Commission (FERC).

The existing FERC license for the Project expires on September 30, 2023. I&M intends to pursue a new license for the Project and is preparing the Pre-Application Document (PAD) required by FERC's relicensing process. I&M has retained HDR, Inc. (HDR) for assistance with the relicensing process, including development of the PAD.

The PAD provides FERC and other entities with existing, relevant, and reasonably available information pertaining to the Project. This information is intended to help identify items of interest and related information needs, develop study requests and study plans, and prepare documents related to analyzing the relicensing application to be prepared by I&M. To prepare the PAD, I&M will use information in its possession and information obtained from others. On behalf of I&M, HDR is currently gathering information to support preparation of the PAD. Consistent with this effort, the purpose of this letter is to:

- 1) Notify interested governmental agencies, local governments, non-governmental organizations, Indian tribes, and individuals of the upcoming relicensing proceeding, and
- 2) Request your help in identifying existing, relevant, and reasonably available information related to the existing Project environment or known impacts or benefits of the Project.

I&M's goal is to produce a final comprehensive PAD by the end of 2017 and to file the PAD with the FERC in 2018. We are asking for your help to identify additional information of which you may be aware. To facilitate the information search, we have prepared the attached Pre-Application Document Information Questionnaire (PAD Questionnaire).

August 15, 2017

Page 2

I&M is requesting that you provide any relevant information for the PAD. Relevant information would include site-or-region specific studies, data, reports, or management plans on any of the following resource areas:

- Geology and soils
- Recreation and land use
- Water resources
- Aesthetic resources
- Fish and aquatic resources
- Cultural resources
- Wildlife and botanical resources
- Socioeconomic resources
- Wetlands, riparian, and littoral habitat
- Tribal resources
- Rare, threatened, and endangered species

To help ensure that your relevant information and resources are available for inclusion in the PAD, please fill out the attached PAD Questionnaire and return to Sarah Kulpa (of HDR) via email at sarah.kulpa@hdrinc.com or in the enclosed self-addressed, stamped envelope.

HDR intends to include relevant information in the PAD. Therefore, we respectfully request a response within 30 days of receipt of this letter. This will allow time for follow-up contacts that may be necessary. If we do not receive a response from you within 30 days, this will indicate you are not aware of any existing, relevant, and reasonably available information that describes the Project environment or known potential impacts of the Project, and that, unless you are representative of an Indian tribe or federal or state agency, you do not wish to remain on the distribution list for this relicensing process.

We want to thank you in advance for helping identify information that meets the criteria for inclusion in the PAD. We appreciate your assistance and look forward to working with you during the relicensing process. If you have any questions regarding this request or would like additional information, please contact me at sarah.kulpa@hdrinc.com or via phone at (704) 248-3620 or Jonathan Magalski who represents I&M at jmmagalski@aep.com or via phone at (614) 716-2240.

Sincerely,

HDR, Inc.



Sarah Kulpa

Project Manager

Attachment

cc: Jonathan Magalski, on behalf of I&M

DISTRIBUTION LIST

Constantine Hydroelectric Project (FERC No. 10661)

Charlene Dwin Vaughn
Advisory Council on Historic
Preservation
401 F Street NW, Suite 308
Washington, DC 20001-2637

Kimberly Bose
Federal Energy Regulatory Commission
888 1st St NE
Washington, DC 20426

FEMA Region 5
536 South Clark Street, 6th Floor
Chicago, IL 60605

John Bullard
NOAA Fisheries Service
Greater Atlantic Reg. Fisheries Office
55 Great Republic Drive
Gloucester, MA 01930-2276

US Department of Agriculture
Natural Resources Conservation Service
3001 Coolidge Road, Suite 250
East Lansing, MI 45769

Harold Peterson
US Department of the Interior
545 Marriott Dr, Suite 700
Nashville, TN 37214

US Department of the Interior
1849 C Street, NW
Washington, DC 20240

Lindy Nelson, US Dept of the Interior
Philadelphia Region
Custom House, Room 244
200 Chestnut Street
Philadelphia , PA 19106

US Environmental Protection Agency
Ralph Metcalfe Federal Building
77 West Jackson Boulevard
Chicago, IL 60604-3590

Alisa Shull
US Fish and Wildlife Service
5600 American Blvd West, Suite 990
Bloomington, MN 55437-1458

Burr Fisher
US Fish and Wildlife Service
2651 Coolidge Road, #101
East Lansing, MI 48823

US Geological Survey
6520 Mercantile Way, Suite 5
Lansing, MI 48911-5991

US Geological Survey
1451 Green Road
Ann Arbor, MI 48105

Aaron Miller
US House of Representatives
N-993 House Office Building
PO Box 30014
Lansing, MI 48909

Debbie Stabenow
US Senate
713 Hart Senate Office Building
Washington, DC 20510-2204

Gary Peters
US Senate
Hart Senate Office Building
Washington, DC 20510

Michael Reynolds
US National Park Service
1849 C Street, NW
Washington, DC 20240

Dena Sanford
US National Park Service
c/o Agate Fossil Beds Nat'l Monument
301 River Road
Harrison, NE 69346-2743

Kyle Kruger
Michigan Department of Natural
Resources Mio Field Office
191 S. Mt. Tom Road
Mio, MI 48647

Keith Creagh
Michigan Department of Natural
Resources
PO Box 30028
Lansing, MI 48909

Michigan Environmental Council
602 West Ionia Street
Lansing, MI 48933

Ronda Wuycheck
Michigan Dept of Environmental Quality
525 West Allegan Street
PO Box 30473
Lansing, MI 48909-7973

Michigan Dept of Environmental Quality
7953 Adobe Road
Kalamazoo, MI 49009-5025

Brian D. Conway
State Historic Preservation Office
735 East Michigan Avenue
PO Box 30044
Lansing, MI 48909

Michigan Department of Agriculture
525 West Allegan Street
Lansing, MI 48933

St. Joseph County
PO Box 189
Centreville, MI 49032

Gary Mathers
Village of Constantine
115 White Pigeon Street
Constantine, MI 49042

Mark R. Brown
Township of Constantine
425 Centreville Street
Constantine, MI 49042

Keith Shears
Town of Centreville
221 West Main
PO Box 399
Centreville, MI 49032

Robert Hile
City of Sturgis
130 North Nottawa
Sturgis, MI 49091

DISTRIBUTION LIST

Constantine Hydroelectric Project (FERC No. 10661)

George E. Morse
Township of Sturgis
70669 Stubby Road
Sturgis, MI 49091

Donald E. Gloy, Jr.
Township of White Pigeon
16825 Tomahawk Trail
White Pigeon, MI 49099

Tyler Royce
Village of White Pigeon
103 South Kalamazoo
PO Box 621
White Pigeon, MI 49099

Carolyn Grace
St. Joseph County Conservation District
693 E. Main Street
Centerville, MI 49032

Korie Blyveis
Cass County Conservation District
1127 East State St.
Cassopolis, MI 49031

Matt Meersman
St. Joseph River Basin Commission
227 West Jefferson Boulevard
1120 County-City Boulevard
South Bend, IN 46601

Pokagon Band of Potawatomi Indians
58620 Sink Road
PO Box 180
Dowagiac, MI 49047

Nottawaseppi Huron Band of the
Potawatomi
1485 Mno-Bmadzewen Way
Fulton, MI 49052

John Seebach
American Rivers
1104 14th St NW, Suite 1400
Washington, DC 20005

Kevin Richard Colburn
American Whitewater
PO Box 1540
Cullowhee, NC 28779

Nature Conservancy of Michigan
101 East Grand River
Lansing, MI 48906

Michigan Citizens for Water
Conservation
PO Box 1
Mecosta, MI 49332

Michigan Loon Preservation Association
10181 Sheridan Road
Millington, MI 48746

Michigan Nature Association
2310 Science Parkway, Suite 100
Okemos, MI 48864

Michigan Audubon Society
2311 Science Parkway, Suite 200
Okemos, MI 48864

Matt Meersman
Friends of the St. Joe River Assoc., Inc.
PO Box 1794
South Bend, IN 46634

Matt Meersman
St. Joseph River Basin Commission
227 West Jefferson Boulevard
1120 County-City Boulevard
South Bend, IN 46601

**Constantine Hydroelectric Project (FERC Project No. 10661)
Relicensing Pre-Application Document Information Questionnaire**

Indiana Michigan Power Company (I&M) is the Licensee and operator of the Constantine Hydroelectric Project (FERC No. 10661) (Project), located along the St. Joseph River in St. Joseph County, Michigan (see attached map). I&M, with assistance from HDR, Inc. (HDR), is beginning the Federal Energy Regulatory Commission (FERC) relicensing process for the Project. Accordingly, I&M is preparing a Pre-Application Document (PAD). The PAD provides FERC and other entities with existing, relevant, and reasonably available information pertaining to the Project.

This information is intended to help identify items of interest and related information needs, develop study requests and study plans, and prepare documents related to analyzing the relicensing application to be prepared by I&M. To prepare the PAD, I&M will use information in its possession and information obtained from others. This PAD Questionnaire will be used by I&M to help identify sources of existing, relevant, and reasonably available information that is not currently in I&M's possession. Comments and/or questions regarding this request may be sent to Sarah Kulpa with HDR via email at sarah.kulpa@hdrinc.com or via phone at (704) 248-3620, or to Jonathan Magalski who represents I&M at jmmagalski@aep.com or via phone at (614) 716-2240.

Please return this questionnaire in the enclosed, self-addressed, stamped envelope within 30 days of receipt to allow for any follow-up contact by I&M's or HDR's representative that may be needed. Not responding within 30 days indicates that you are not aware of any existing, relevant, and reasonably available information that describes the existing Project environment or known potential impacts of the Project.

I&M and HDR respectfully request the following information:

1. Information about person completing the questionnaire:

Name & Title	
Organization	
Address	
Phone	
Email Address	

**Constantine Hydroelectric Project (FERC Project No. 10661)
Relicensing Pre-Application Document Information Questionnaire**

2. Do you or your organization know of existing, relevant and reasonably available information that describes the existing Constantine Hydroelectric Project's environment (i.e., information regarding the St. Joseph River in or close to the Constantine Hydroelectric Project)?

___ Yes (*If yes, please complete 2a through 2e*) ___ No (*If no, go to 3*)

- a. If yes, please circle the specific resource area(s) that the information relates to:

- | | |
|--|------------------------------|
| ■ Geology and soils | ■ Recreation and land use |
| ■ Water resources | ■ Aesthetic resources |
| ■ Fish and aquatic resources | ■ Cultural resources |
| ■ Wildlife and botanical resources | ■ Socio-economic resources |
| ■ Wetlands, riparian, and littoral habitat | ■ Tribal resources |
| ■ Rare, threatened & endangered species | ■ Other resource information |

- b. Please briefly describe the information referenced above or list available documents (*additional information may be provided on page 4 of this questionnaire*).

- c. Where can I&M obtain this information?

**Constantine Hydroelectric Project (FERC Project No. 10661)
Relicensing Pre-Application Document Information Questionnaire**

- d. Please indicate whether there is a specific representative you wish to designate for a potential follow-up contact by I&M's or HDR's representative for the resource area(s) checked above (*additional information may be provided on page 4 of this questionnaire*).

Representative Contact Information

Name	
Address	
Phone	
Email Address	

Name	
Address	
Phone	
Email Address	

- e. Based on the specific resources listed in 2a, are you aware of any specific issues or improvements pertaining to the identified resource area(s)? (*Additional information may be provided on page 4 of this questionnaire.*)

Yes (*please list specific issues below*) No

Resource Area	Specific Issue

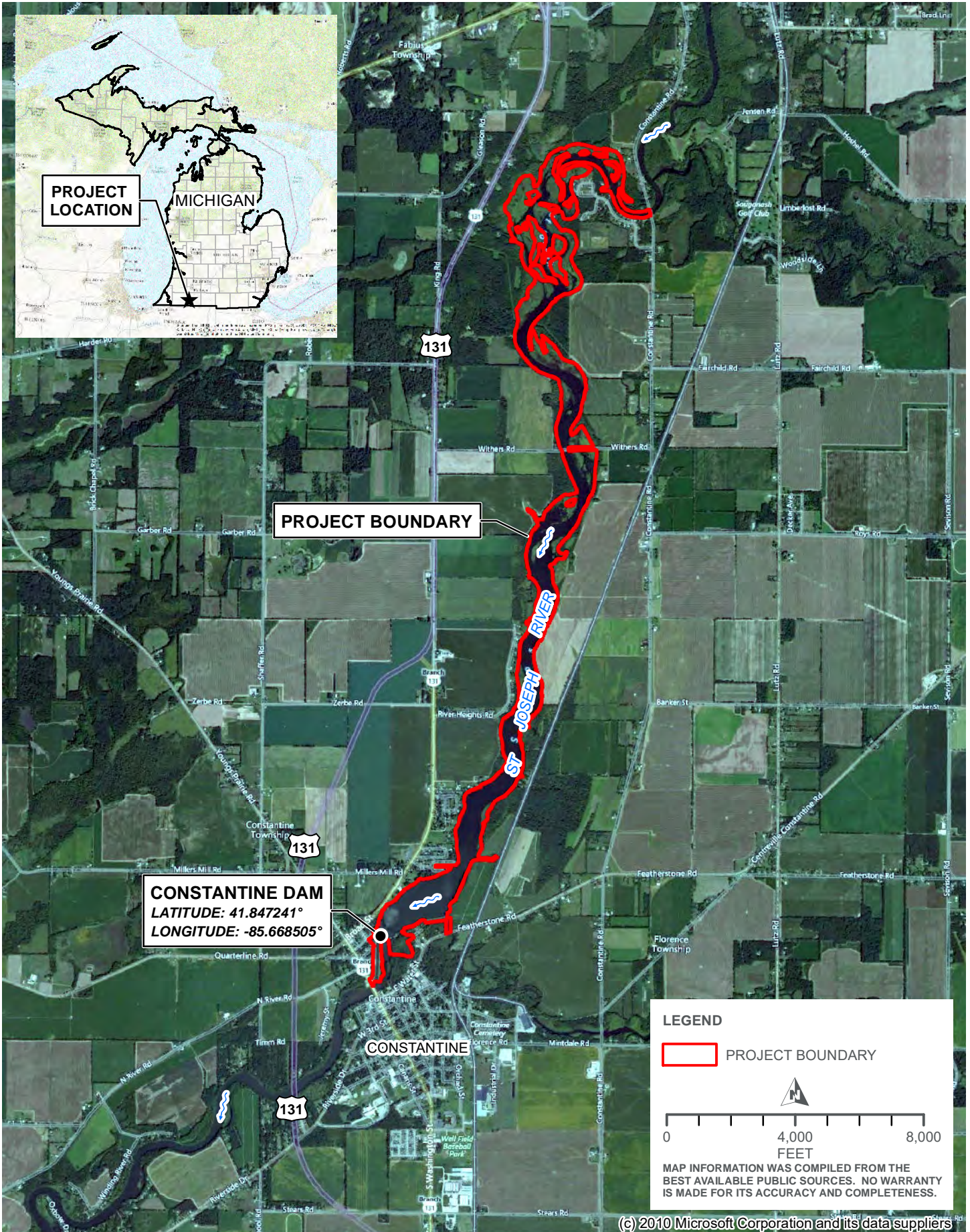
3. Do you or your organization plan to participate in the Constantine Hydroelectric Project relicensing proceeding? Yes No

**Constantine Hydroelectric Project (FERC Project No. 10661)
Relicensing Pre-Application Document Information Questionnaire**

4. We are interested in your comments. If you have comments and/or questions regarding the Constantine Hydroelectric Project or the relicensing process, please provide below. In addition, this questionnaire has been sent to the people/organizations shown on the attached distribution list; please let us know if there is anyone else you believe should receive this questionnaire that is not included on the attached distribution list.

(Comments and/or questions may be sent via email to: sarah.kulpa@hdrinc.com or jmmagalski@aep.com)

As noted above, please return this questionnaire in the enclosed, self-addressed, stamped envelope within 30 days of receipt to allow for any follow-up contact by I&M's or HDR's representative that may be needed. Not responding within 30 days indicates that you are not aware of any existing, relevant, and reasonably available information that describes the existing Project environment or known potential impacts of the Project.



PROJECT LOCATION MAP
CONSTANTINE HYDROELECTRIC PROJECT (FERC NO. 10661)
ST. JOSEPH COUNTY, MICHIGAN



August 15, 2017

Alisa Shull, Chief
United States Fish and Wildlife Service
Midwest Region 3
5600 American Boulevard West, Suite 990
Bloomington, MN 55437-1458

**Subject: Constantine Hydroelectric Project (FERC No. 10661)
Request for Threatened and Endangered Species Information**

Dear Ms. Shull,

On behalf of Indiana Michigan Power Company (I&M), HDR, Inc. (HDR) is gathering information in support of the Pre-Application Document (PAD) for the upcoming Federal Energy Regulatory Commission (FERC) relicensing of the Constantine Hydroelectric Project (FERC No. 10661) (Project). In support of this process, HDR has requested an official species list regarding any threatened or endangered species and any critical habitat within the Project area using the United States Fish and Wildlife Service's (USFWS) IPaC system online.

The Constantine Hydroelectric Project is located on the St. Joseph River in St. Joseph County, Michigan. The attached report was generated from the USFWS' IPaC system and includes a map that shows the area of interest for which the information was requested and the general location of the facility.

It is our intent to include these results in the PAD. Therefore, we respectfully request your concurrence that this information is accurate within 30 days of the date of this letter. If you have any questions or need additional information regarding this Project or its location, please feel free to contact me at (704) 248-3620 or sarah.kulpa@hdrinc.com.

Thank you for your assistance with this request.

Sincerely,
HDR, Inc.

Sarah Kulpa
Project Manager

Constantine Hydroelectric Project
Request for Threatened and Endangered Species Information
August 15, 2017
Page 2

Attachment

cc: Jonathan Magalski, on behalf of I&M



United States Department of the Interior



FISH AND WILDLIFE SERVICE
Michigan Ecological Services Field Office
2651 Coolidge Road Suite 101
East Lansing, MI 48823-6360
Phone: (517) 351-2555 Fax: (517) 351-1443

<http://www.fws.gov/midwest/endangered/section7/s7process/step1.html>

In Reply Refer To:

August 15, 2017

Consultation Code: 03E16000-2017-SLI-0677

Event Code: 03E16000-2017-E-01267

Project Name: Constantine Hydroelectric Project

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The attached species list identifies any federally threatened, endangered, proposed and candidate species that may occur within the boundary of your proposed project or may be affected by your proposed project. The list also includes designated critical habitat if present within your proposed project area or affected by your project. This list is provided to you as the initial step of the consultation process required under section 7(c) of the Endangered Species Act, also referred to as Section 7 Consultation.

Section 7 of the Endangered Species Act of 1973 requires that actions authorized, funded, or carried out by Federal agencies not jeopardize federally threatened or endangered species or adversely modify designated critical habitat. To fulfill this mandate, Federal agencies (or their designated non-federal representative) must consult with the Fish and Wildlife Service if they determine their project may affect listed species or critical habitat.

There are several important steps in evaluating the effects of a project on listed species. Please use the species list provided and visit the U.S. Fish and Wildlife Service's Region 3 Section 7 Technical Assistance website at <http://www.fws.gov/midwest/endangered/section7/s7process/index.html>. This website contains step-by-step instructions to help you determine if your project may affect listed species and lead you through the section 7 consultation process.

Under 50 CFR 402.12(e) (the regulations that implement section 7 of the Endangered Species Act), the accuracy of this species list should be verified after 90 days. You may verify the list by visiting the ECOS-IPaC website (<http://ecos.fws.gov/ipac/>) at regular intervals during project planning and implementation and completing the same process you used to receive the attached list.

For all **wind energy projects** and **projects that include installing towers that use guy wires or are over 200 feet in height**, please contact this field office directly for assistance, even if no federally listed plants, animals or critical habitat are present within your proposed project area or may be affected by your proposed project.

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see <http://www.fws.gov/migratorybirds/RegulationsandPolicies.html>.

Although no longer listed under the Endangered Species Act, bald eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 et seq.) and Migratory Bird Treaty Act (16 U.S.C. 703 et seq), as are golden eagles. Projects affecting these species may require measures to avoid harming eagles or may require a permit. If your project is near an eagle nest or winter roost area, see our Eagle Permits website at <http://www.fws.gov/midwest/midwestbird/EaglePermits/index.html> to help you avoid impacting eagles or determine if a permit may be necessary.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/BirdHazards.html>.

In addition to MBTA and BGEPA, Executive Order 13186: Responsibilities of Federal Agencies to Protect Migratory Birds, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit <http://www.fws.gov/migratorybirds/AboutUS.html>.

We appreciate your concern for threatened and endangered species. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
-

- USFWS National Wildlife Refuges and Fish Hatcheries
 - Migratory Birds
 - Wetlands
-

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Michigan Ecological Services Field Office

2651 Coolidge Road Suite 101

East Lansing, MI 48823-6360

(517) 351-2555

Project Summary

Consultation Code: 03E16000-2017-SLI-0677

Event Code: 03E16000-2017-E-01267

Project Name: Constantine Hydroelectric Project

Project Type: DAM

Project Description: Indiana Michigan Power Company (I&M) is the Licensee and operator of the 1.2 megawatt Constantine Hydroelectric Project (FERC No. 10661) (Project) located on the St. Joseph River in St. Joseph County, Michigan. The Project is licensed by the Federal Energy Regulatory Commission (FERC).

The existing FERC license for the Project expires on September 30, 2023. I&M intends to pursue a new license for the Project and is preparing the Pre-Application Document (PAD) required by FERC's relicensing process. As part of the data collection for the PAD, I&M is requesting information regarding rare, threatened and endangered species and critical habitat within the Project area.

Project Location:

Approximate location of the project can be viewed in Google Maps:

<https://www.google.com/maps/place/41.87959257458019N85.65104621179555W>



Counties: St. Joseph, MI

Endangered Species Act Species

There is a total of 6 threatened, endangered, or candidate species on this species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 1 of these species should be considered only under certain conditions. See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

Mammals

NAME	STATUS
Indiana Bat <i>Myotis sodalis</i> There is a final critical habitat designated for this species. Your location is outside the designated critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5949	Endangered
Northern Long-eared Bat <i>Myotis septentrionalis</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Reptiles

NAME	STATUS
Copperbelly Water Snake <i>Nerodia erythrogaster neglecta</i> Population: Indiana north of 40 degrees north latitude, Michigan, Ohio No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7253	Threatened
Eastern Massasauga (=rattlesnake) <i>Sistrurus catenatus</i> No critical habitat has been designated for this species. This species only needs to be considered under the following conditions: <ul style="list-style-type: none"> ▪ All Projects: Project is Within EMR Range Species profile: https://ecos.fws.gov/ecp/species/2202	Threatened

Insects

NAME	STATUS
Mitchell's Satyr Butterfly <i>Neonympha mitchellii mitchellii</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8062	Endangered

Flowering Plants

NAME	STATUS
Eastern Prairie Fringed Orchid <i>Platanthera leucophaea</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/601	Threatened

Critical habitats

There are no critical habitats within your project area under this office's jurisdiction.

USFWS National Wildlife Refuges And Fish Hatcheries

Any activity proposed on [National Wildlife Refuge](#) lands must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuges or fish hatcheries within your project area.

Migratory Birds

Certain birds are protected under the Migratory Bird Treaty Act¹ and the Bald and Golden Eagle Protection Act².

Any activity that results in the take of migratory birds or eagles is prohibited unless authorized by the U.S. Fish and Wildlife Service³. There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures.

-
1. The [Migratory Birds Treaty Act](#) of 1918.
 2. The [Bald and Golden Eagle Protection Act](#) of 1940.
 3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

The migratory birds species listed below are species of particular conservation concern (e.g. [Birds of Conservation Concern](#)) that may be potentially affected by activities in this location. It is not a list of every bird species you may find in this location, nor a guarantee that all of the bird species on this list will be found on or near this location. Although it is important to try to avoid and minimize impacts to all birds, special attention should be made to avoid and minimize impacts to birds of priority concern. To view available data on other bird species that may occur in your project area, please visit the [AKN Histogram Tools](#) and [Other Bird Data Resources](#). To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

NAME	SEASON(S)
Black Tern <i>Chlidonias niger</i> https://ecos.fws.gov/ecp/species/3093	On Land: Breeding
Bobolink <i>Dolichonyx oryzivorus</i>	On Land: Breeding
Least Bittern <i>Ixobrychus exilis</i> https://ecos.fws.gov/ecp/species/6175	On Land: Breeding
Marsh Wren <i>Cistothorus palustris</i>	On Land: Breeding
Rusty Blackbird <i>Euphagus carolinus</i>	On Land: Wintering
Wood Thrush <i>Hylocichla mustelina</i>	On Land: Breeding
Brown Thrasher <i>Toxostoma rufum</i>	On Land: Breeding

Golden-winged Warbler <i>Vermivora chrysoptera</i> https://ecos.fws.gov/ecp/species/8745	On Land: Breeding
Black-billed Cuckoo <i>Coccyzus erythrophthalmus</i> https://ecos.fws.gov/ecp/species/9399	On Land: Breeding
American Bittern <i>Botaurus lentiginosus</i> https://ecos.fws.gov/ecp/species/6582	On Land: Breeding
Pied-billed Grebe <i>Podilymbus podiceps</i>	On Land: Breeding
Blue-winged Warbler <i>Vermivora pinus</i>	On Land: Breeding
Dickcissel <i>Spiza americana</i>	On Land: Breeding
Henslow's Sparrow <i>Ammodramus henslowii</i> https://ecos.fws.gov/ecp/species/3941	On Land: Breeding
Prothonotary Warbler <i>Protonotaria citrea</i>	On Land: Breeding
Upland Sandpiper <i>Bartramia longicauda</i> https://ecos.fws.gov/ecp/species/9294	On Land: Breeding
Red-headed Woodpecker <i>Melanerpes erythrocephalus</i>	On Land: Breeding
Bald Eagle <i>Haliaeetus leucocephalus</i> https://ecos.fws.gov/ecp/species/1626	On Land: Year-round
Peregrine Falcon <i>Falco peregrinus</i> https://ecos.fws.gov/ecp/species/8831	On Land: Breeding
Short-eared Owl <i>Asio flammeus</i> https://ecos.fws.gov/ecp/species/9295	On Land: Wintering
Willow Flycatcher <i>Empidonax traillii</i> https://ecos.fws.gov/ecp/species/3482	On Land: Breeding
Common Tern <i>Sterna hirundo</i> https://ecos.fws.gov/ecp/species/4963	On Land: Breeding

Additional information can be found using the following links:

- Birds of Conservation Concern <http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php>
 - Conservation measures for birds
<http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php>
 - Year-round bird occurrence data
<http://www.birdscanada.org/birdmon/default/datasummaries.jsp>
-

Wetlands

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

FRESHWATER EMERGENT WETLAND

- [PEMC](#)

FRESHWATER FORESTED/SHRUB WETLAND

- [PFO1Ch](#)
- [PFO1C](#)
- [PSS1Ch](#)
- [PSS1Fh](#)
- [PFO1Ah](#)

FRESHWATER POND

- [PUBG](#)

LAKE

- [L1UBHh](#)
- [L2EM2G](#)

RIVERINE

- [R2UBHx](#)
 - [R2UBH](#)
-



RICK SNYDER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING



C. HEIDI GREYER
DIRECTOR

August 21, 2017

Sarah Kulpa
Project Manager
HRD, Inc.
440 S Church Street
Suites 900 & 1000
Charlotte, NC 28202-2075

Dear Ms. Kulpa:

SUBJECT: Federal Consistency Review of Proposed Constantine Hydroelectric Project
(FERC No. 10661), St. Joseph County, Michigan

Staff of the Water Resources Division has reviewed this phase of the project for consistency with the Michigan Coastal Management Program (MCMP), as required by Section 307 of the Coastal Zone Management Act, PL 92-583, as amended (CZMA). Thank you for providing the opportunity to review this proposed activity. Our review indicates that portions of this project will impact areas located within Michigan's coastal management boundary and are subject to consistency requirements.

Our review indicates that this project is located outside of Michigan's coastal management boundary. No adverse impacts to coastal resources are anticipated from this proposed activity as described in the information you forwarded to our office. Therefore, this phase of the project is consistent with MCMP.

This consistency determination does not waive the need for permits that may be required under other federal, state or local statutes. Please call me if you have any questions regarding this review.

Sincerely,

Chris Antieau
Great Lakes Shorelands Unit
Water Resources Division
517-290-5732

Hanson, Danielle

From: Kulpa, Sarah
Sent: Wednesday, August 23, 2017 12:43 PM
To: Hanson, Danielle
Cc: Quiggle, Robert
Subject: FW: Message from US BUREAU OF IN (+16155646500)
Attachments: VoiceMessage.wav

Harold Peterson, BIA re: Constantine

Michigan is in Mid West region so different contact Mary Manydeeds (sp?) – listen to the attached and please update dist list. Sounds like Harold will forward.

Thanks,

Sarah Kulpa
D 704.248.3620 M 315.415.8703



hdrinc.com/follow-us

From: Cisco Unity Connection Messaging System [mailto:unityconnection@noram-unity.hdrinc.com]
Sent: Wednesday, August 23, 2017 3:40 PM
To: skulpa@noram-unity.hdrinc.com
Subject: Message from US BUREAU OF IN (+16155646500)

Yayac, Maggie

Subject: FW: Michigan T&E species

From: Kennedy, Daniel (DNR) [<mailto:KENNEDYD@michigan.gov>]

Sent: Friday, August 25, 2017 8:47 AM

To: Kulpa, Sarah

Subject: Michigan T&E species

Sarah,

I left you a voice message earlier this week about the letter you sent our Director about the Constantine Hydroelectric project. I wanted to let you know that the Michigan DNR has authorized the Michigan Natural Features Inventory (MNFI) to conduct T&E reviews on our behalf. And that the T&E review is completed by MNFI for a fee. The MNFI contact person is Mike Sanders: 517-284-6215 or sander75@msu.edu.

Please let me know if you have any questions,
Dan

Dan Kennedy
Endangered Species Coordinator
Michigan DNR, Wildlife Division
P.O. Box 30444
525 W. Allegan
Lansing, MI 48909-7944
Office: 517-284-6194

Show your support for conserving wildlife habitat in Michigan by purchasing the [wildlife habitat license plate](#) or [Simply make a tax-deductible donation!!!](#)

Yayac, Maggie

Subject: FW: RTE Species Request for Constantine Hydroelectric Project
Attachments: RSR #2027 Invoice.pdf; IA_RSR#2027.pdf

From: Michael Alan Sanders [mailto:sander75@msu.edu]
Sent: Monday, August 28, 2017 5:51 PM
To: Hanson, Danielle <Danielle.Hanson@hdrinc.com>
Cc: 'Adkins, Ashley' <hurdashl@msu.edu>
Subject: RE: RTE Species Request for Constantine Hydroelectric Project

Danielle,

RE: RTE Species Request for Constantine Hydroelectric Project

Thank you for allowing MNFI to evaluate this activity for possible impacts to protected species. Attached is the project invoice plus our standard Information Agreement (IA) detailing how our data can be used/shared.

Please let me know if you have questions. We will begin processing this request once payment is received and the signed IA is returned.

V/r,

Mike Sanders

Michael A. Sanders
Environmental Review Specialist/Zoologist
Michigan Natural Features Inventory
MSU Extension Service
PO Box 13036
Lansing, MI 48901
Office: 517-284-6215
Cell: 517-980-5632
Sander75@msu.edu

From: Hanson, Danielle [mailto:Danielle.Hanson@hdrinc.com]
Sent: Monday, August 28, 2017 5:34 PM
To: Sanders, Mike (DNR) <SandersM1@michigan.gov>
Subject: RE: RTE Species Request for Constantine Hydroelectric Project

Mike,

Thank you for the response. We would like the Rare Species Review for this project and I don't believe a rush is necessary at this point in time. Please let me know if you need any additional information.

Danielle Hanson
M 315.729.4745

From: Sanders, Mike (DNR) [<mailto:SandersM1@michigan.gov>]
Sent: Monday, August 28, 2017 2:22 PM
To: Hanson, Danielle
Subject: RTE Species Request for Constantine Hydroelectric Project

Hi Danielle,

Thank you for allowing Michigan Natural Features Inventory to review this project for potential impacts to our rare natural resources.

Our [Information Services](#) site provides details on all the review types we offer and how to submit requests.

Your email provided everything I need for this review.

Just let me know if you want a rush order.

Thank you,

Mike Sanders

Michael A. Sanders
Environmental Review Specialist/Zoologist
Michigan Natural Features Inventory
MSU Extension Service
PO Box 13036
Lansing, MI 48901
Office: 517-284-6215
Cell: 517-980-5632
Sander75@msu.edu

**Constantine Hydroelectric Project (FERC Project No. 10661)
Relicensing Pre-Application Document Information Questionnaire**

Indiana Michigan Power Company (I&M) is the Licensee and operator of the Constantine Hydroelectric Project (FERC No. 10661) (Project), located along the St. Joseph River in St. Joseph County, Michigan (see attached map). I&M, with assistance from HDR, Inc. (HDR), is beginning the Federal Energy Regulatory Commission (FERC) relicensing process for the Project. Accordingly, I&M is preparing a Pre-Application Document (PAD). The PAD provides FERC and other entities with existing, relevant, and reasonably available information pertaining to the Project.

This information is intended to help identify items of interest and related information needs, develop study requests and study plans, and prepare documents related to analyzing the relicensing application to be prepared by I&M. To prepare the PAD, I&M will use information in its possession and information obtained from others. This PAD Questionnaire will be used by I&M to help identify sources of existing, relevant, and reasonably available information that is not currently in I&M's possession. Comments and/or questions regarding this request may be sent to Sarah Kulpa with HDR via email at sarah.kulpa@hdrinc.com or via phone at (704) 248-3620, or to Jonathan Magalski who represents I&M at jmmagalski@aep.com or via phone at (614) 716-2240.

Please return this questionnaire in the enclosed, self-addressed, stamped envelope within 30 days of receipt to allow for any follow-up contact by I&M's or HDR's representative that may be needed. Not responding within 30 days indicates that you are not aware of any existing, relevant, and reasonably available information that describes the existing Project environment or known potential impacts of the Project.

I&M and HDR respectfully request the following information:

1. Information about person completing the questionnaire:

Name & Title	Martin J. Rosek State Soil Scientist
Organization	USDA - Natural Resources Conservation Service
Address	3001 Coolidge Road East Lansing, MI 48823
Phone	517-324-5241
Email Address	martin.rosek@mi.usda.gov

Constantine Hydroelectric Project (FERC Project No. 10661)
Relicensing Pre-Application Document Information Questionnaire

2. Do you or your organization know of existing, relevant and reasonably available information that describes the existing Constantine Hydroelectric Project's environment (i.e., information regarding the St. Joseph River in or close to the Constantine Hydroelectric Project)?

Yes (*If yes, please complete 2a through 2e*) No (*If no, go to 3*)

- a. If yes, please circle the specific resource area(s) that the information relates to:

- | | |
|---|---|
| <input type="checkbox"/> Geology and soils | <input type="checkbox"/> Recreation and land use |
| <input type="checkbox"/> Water resources | <input type="checkbox"/> Aesthetic resources |
| <input type="checkbox"/> Fish and aquatic resources | <input type="checkbox"/> Cultural resources |
| <input type="checkbox"/> Wildlife and botanical resources | <input type="checkbox"/> Socio-economic resources |
| <input type="checkbox"/> Wetlands, riparian, and littoral habitat | <input type="checkbox"/> Tribal resources |
| <input type="checkbox"/> Rare, threatened & endangered species | <input type="checkbox"/> Other resource information |

- b. Please briefly describe the information referenced above or list available documents (*additional information may be provided on page 4 of this questionnaire*).

- c. Where can I&M obtain this information?

**Constantine Hydroelectric Project (FERC Project No. 10661)
Relicensing Pre-Application Document Information Questionnaire**

- d. Please indicate whether there is a specific representative you wish to designate for a potential follow-up contact by I&M's or HDR's representative for the resource area(s) checked above (*additional information may be provided on page 4 of this questionnaire*).

Representative Contact Information

Name	
Address	
Phone	
Email Address	

Name	
Address	
Phone	
Email Address	

- e. Based on the specific resources listed in 2a, are you aware of any specific issues or improvements pertaining to the identified resource area(s)? (*Additional information may be provided on page 4 of this questionnaire.*)

Yes (*please list specific issues below*) No

Resource Area	Specific Issue

3. Do you or your organization plan to participate in the Constantine Hydroelectric Project relicensing proceeding? Yes No

Constantine Hydroelectric Project (FERC Project No. 10661)
Relicensing Pre-Application Document Information Questionnaire

4. We are interested in your comments. If you have comments and/or questions regarding the Constantine Hydroelectric Project or the relicensing process, please provide below. In addition, this questionnaire has been sent to the people/organizations shown on the attached distribution list; please let us know if there is anyone else you believe should receive this questionnaire that is not included on the attached distribution list.

The Natural Resources Conservation Service (NRCS) under Part 523 of the Farmland Protection Policy Act has reviewed the Constantine Hydroelectric Project. This review was conducted with respect to the effect(s) that the proposal may have on prime and/or unique farmland. Since there are no prime and/or unique farmed lands in the proposed projects extent, we have concluded that this proposal will have no negative impact on prime and/or unique farmland.

(Comments and/or questions may be sent via email to: sarah.kulpa@hdrinc.com or jmmagalski@aep.com)

As noted above, please return this questionnaire in the enclosed, self-addressed, stamped envelope within 30 days of receipt to allow for any follow-up contact by I&M's or HDR's representative that may be needed. Not responding within 30 days indicates that you are not aware of any existing, relevant, and reasonably available information that describes the existing Project environment or known potential impacts of the Project.

Yayac, Maggie

Subject: FW: Rare Species Review #2027- Constantine Hydroelectric Project
Attachments: RSR #2027 Response Letter.pdf; RSR_2027_Section 7 Comments_St. Joseph County.pdf

From: Daria A. Hyde [mailto:hydeda@msu.edu]
Sent: Monday, September 11, 2017 1:46 PM
To: Hanson, Danielle <Danielle.Hanson@hdrinc.com>
Subject: Rare Species Review #2027- Constantine Hydroelectric Project

Hello,

Please find our response letter for Rare Species Review #2027 in St. Joseph County, Michigan.

Also included are comments for projects involving federal funding or a federal agency authorization.

Please let me know if you have questions or comments.

Thank you,

Daria

Daria A. Hyde
Michigan Natural Features Inventory
Michigan State University
Constitution Hall- 3N
PO Box 13036
Lansing, MI 48901-3036

Ph: 517-284-6189

email: hydeda@msu.edu
web: mnfi.anr.msu.edu

Danielle Hanson
Environmental Scientist
HDR
6592 E. 34th Lane
Yuma, AZ 85365

September 11, 2017

Re: Rare Species Review #2027 –Constantine Hydroelectric Project, St. Joseph County, MI

Ms. Hanson:

The location for the proposed project was checked against known localities for rare species and unique natural features, which are recorded in the Michigan Natural Features Inventory (MNFI) natural heritage database. This continuously updated database is a comprehensive source of existing data on Michigan's endangered, threatened, or otherwise significant plant and animal species, natural plant communities, and other natural features. Records in the database indicate that a qualified observer has documented the presence of special natural features. The absence of records in the database for a particular site may mean that the site has not been surveyed. The only way to obtain a definitive statement on the status of natural features is to have a competent biologist perform a complete field survey.

Under Act 451 of 1994, the Natural Resources and Environmental Protection Act, Part 365, Endangered Species Protection, "a person shall not take, possess, transport, ...fish, plants, and wildlife indigenous to the state and determined to be endangered or threatened," unless first receiving an Endangered Species Permit from the Michigan Department of Natural Resources (MDNR), Wildlife Division. Responsibility to protect endangered and threatened species is not limited to the lists below. Other species may be present that have not been recorded in the database.



MSU EXTENSION
Michigan Natural
Features Inventory

PO Box 13036
Lansing MI 48901

(517) 284-6200
Fax (517) 373-9566

mnfi.anr.msu.edu
MSU is an affirmative-
action, equal-opportunity
employer.

Several legally protected species have been documented within 1.5 miles of the project site and it is **possible** that negative impacts will occur. Keep in mind that **MNFI cannot fully evaluate this project without visiting the site.** MNFI offers several levels of Rare Species Reviews, including field surveys which I would be happy to discuss with you.

Sincerely,

Daria A. Hyde

Daria A. Hyde
Conservation Planner/Zoologist
Michigan Natural Features Inventory

Comments for Rare Species Review #2027: It is important to note that it is the applicant’s responsibility to comply with both state and federal threatened and endangered species legislation. Therefore, if a state listed species occurs at a project site, and you think you need an endangered species permit please contact: Lori Sargent, Nongame Wildlife Biologist, Wildlife Division, Michigan Department of Natural Resources, P.O. Box 30444, Lansing, MI 48909, 517-284-6216, or SargentL@michigan.gov. If a federally listed species is involved and, you think a permit is needed, please contact Carrie Tansy, Endangered Species Program, U.S. Fish and Wildlife Service, East Lansing office, 517-351-8375 or carrie_tansy@fws.gov. Please consult MNFI’s [Rare Species Explorer](#) for additional information regarding the listed species.

Federally Endangered

Indiana Bat - although there are no documented occurrences, there appears to be suitable habitat within the standard 1.5 mile search buffer. Indiana bats (*Myotis sodalis*) are found only in the eastern United States and are typically confined to the southern three tiers of counties in Michigan. Indiana bats that summer in Michigan winter in caves in Indiana and Kentucky. This species forms colonies and forages in riparian and mature floodplain habitats. Nursery roost sites are usually located under loose bark or in hollows of trees near riparian habitat. Indiana bats typically avoid houses or other artificial structures and typically roost underneath loose bark of dead elm, maple and ash trees. Other dead trees used include oak, hickory and cottonwood. Foraging typically occurs over slow-moving, wooded streams and rivers as well as in the canopy of mature trees. Movements may also extend into the outer edge of the floodplain and to nearby solitary trees. A summer colony's foraging area usually encompasses a stretch of stream over a half-mile in length. Upland areas isolated from floodplains and non-wooded streams are generally avoided.

Conservation strategies: The suggested seasonal tree cutting range for Indiana bat is between October 1 and March 31 (i.e., no cutting April 1-September 30). This applies throughout the Indiana bat range in Michigan.

Table 1: Legally protected species within 1.5 mile of RSR #2027

ELCAT	SNAME	SCOMNAME	USESA	SPROT	G_RANK	S_RANK	FIRSTOBS	LASTOBS
Plant	<i>Stellaria crassifolia</i>	Fleshy stitchwort		E	G5	S1	1890	1890-06-07
Plant	<i>Echinodorus tenellus</i>	Dwarf burhead		E	G5?	S1	1837	1837-08-11
Plant	<i>Berula erecta</i>	Cut-leaved water parsnip		T	G4G5	S2	1952	1952-07-28
Plant	<i>Sabatia angularis</i>	Rosepink		T	G5	S2	1837	1837-08-18
Plant	<i>Poa paludigena</i>	Bog bluegrass		T	G3	S2	1890	1890-06-06
Animal	<i>Setophaga cerulea</i>	Cerulean warbler		T	G4	S3	1992-07-02	1992-07-02
Animal	<i>Cyclonaias tuberculata</i>	Purple wartyback		T	G5	S2	2006-09-25	2006-09-25
Plant	<i>Justicia americana</i>	Water willow		T	G5	S2	2006-09-26	2006-09-26
Animal	<i>Setophaga dominica</i>	Yellow-throated warbler		T	G5	S3	1997-05-16	1997-05-16

Of concern: The state threatened **purple wartyback mussel** (*Cyclonaias tuberculata*) has been known to occur in the St. Joseph River, near the project site in Sec. 26, T7S R12W. The purple wartyback mussel inhabits medium to large rivers that have gravel or mixed sand and gravel substrates. Suitable habitat for fish host species must be present for purple wartyback reproduction to be successful. Known hosts for the purple wartyback are the yellow bullhead (*Ameiurus natalis*) and channel catfish (*Ictalurus punctatus*), but there may be others. If allowed, purple wartybacks likely live to over 25 years of age. Freshwater mussels (Unionidae) require a fish host to complete their life cycle. Eggs are fertilized and develop into larvae within the gills of the female mussel. These larvae, called glochidia, are released into the water and must attach to a suitable fish host to survive and transform into the adult mussel. The purple wartyback is a summer breeder with fertilized eggs and glochidia released during one summer.

Management and Conservation: Like other mussels, threats are varied and include: habitat degradation, poor water quality, flow alterations, water temperature changes, heavy metals, organic pollution, sedimentation, and siltation. Maintenance or establishment of vegetated riparian buffers can help protect mussel habitats from many of these threats. Control of zebra mussels is critical to preserving native mussels. As with all mussels, fish host requirements also need to be considered. Due to the unique life cycle of unionids, fish hosts must be present in order for reproduction to occur. The loss of habitat for these hosts can cause the extirpation of unionid populations. Barriers to the movement of fish hosts such as dams and impoundments also prevent unionid migration and exchange of genetic material among populations that helps maintain genetic diversity within populations.

Of concern: The state threatened **water willow** (*Justicia americana*) is a mat-forming perennial of river slackwater areas; leaves opposite, narrowly elliptical; flowers pale violet marked with dark purple, borne in axillary clusters near top of plant. It primarily occurs in large river systems and less commonly in lakes. It is almost always found along muddy banks at the edge of the shore.

Management and Conservation: Water-willow requires the protection of hydrology. Changing the course of rivers or adding impoundments negatively impacts this species. Agricultural run-off also likely has negative impacts.

Of concern: The state threatened **yellow-throated warbler** (*Setophaga dominica*) has been known to occur in the area. Michigan's yellow-throated warbler population is closely associated with mature sycamore trees, which are associated with bottomland and river floodplain forests. They have also been associated with mature silver maples and American basswood. The yellow-throated warbler is one of the earliest to return to Michigan in the spring, arriving in the state from mid-April to mid-May. Nests are generally placed in sycamores, far from the trunk and a substantial distance from the ground. Most individuals leave the breeding grounds by August. This warbler is an opportunistic feeder that gleans or "flycatches" a wide range of insect species.

Management and Conservation: Preserve and expand existing floodplain habitat and reduce human encroachment into the floodplain. This includes no logging of sycamores within the floodplain and very limited logging of other species outside of the nesting season. Maintain a natural stream channel with soft, vegetated banks so it can meander and periodically overtop its banks which will allow regeneration of the sycamores that the bird relies on for nesting. Reducing the levels of pollution in the streams may also increase prey abundance and reduce any toxic effects on the birds. Any construction activities within 1/2 mile of known breeding locations should be scheduled for the non-breeding season (August to March).

Table 2: Special concern species and rare natural communities within 1.5 miles of RSR #2023

ELCAT	SNAME	SCOMNAME	USES A	SPROT	G_RANK	S_RANK	FIRSTOBS	LASTOBS
Plant	<i>Boechea missouriensis</i>	Missouri rock-cress		SC	G5T3?Q	S2	1890	1890-06-04
Plant	<i>Agalinis auriculata</i>	Eared foxglove		X	G3	SX	1837	1837-08-23
Plant	<i>Boechea missouriensis</i>	Missouri rock-cress		SC	G5T3?Q	S2	1890	1890-06-04
Plant	<i>Amorpha canescens</i>	Leadplant		SC	G5	S3	2007-11-07	2013-09-03
Community	<i>Mesic Southern Forest</i>	Rich Forest, Central Midwest Type			G2G3	S3	2009-09-08	2009-10-02
Animal	<i>Villosa iris</i>	Rainbow		SC	G5Q	S3	2009-06	2009-09
Animal	<i>Venustaconcha ellipsiformis</i>	Ellipse		SC	G4	S3	1930	2013-07-16
Plant	<i>Brickellia eupatorioides</i>	False boneset		SC	G5	S2	2009-10-02	2009-10-02

Species of special concern are not protected under state endangered species legislation, but are considered to be rare in Michigan and should be protected to prevent future listing.

Of concern: The special concern **rainbow mussel** (*Villosa iris*) has been known to occur in the St. Joseph River and the Prairie River near the project site. Rainbow mussels inhabit small to medium streams in coarse sand or gravel where moderate currents prevail. Freshwater mussels (*Unionida*) require a fish host to complete their life cycle. Eggs are fertilized and develop into larvae within the gills of the female mussel. These larvae, called glochidia, are released into the water and must attach to a suitable fish host to survive and transform into the adult mussel. Likely fish hosts include smallmouth bass, green sunfish, largemouth bass, rainbow darter, and yellow perch.

Management and Conservation: Like other mussels, threats to the rainbow include: natural flow alterations, siltation, channel disturbance, point and non-point source pollution, and exotic species. Maintenance/establishment of vegetated riparian buffers can help protect mussel habitats from many threats. Control of zebra mussels is critical to preserving native mussels. And as with all mussels, protection of their hosts' habitat is also crucial.

Of concern: The special concern **ellipse mussel** (*Venustaconcha ellipsiformis*) has been documented in the Prairie River which flows into the St. Joseph River near the project site. The ellipse occurs in the swift currents of riffles or runs of clear, small to medium sized streams in gravel or sand and gravel substrates. **The host fish is unknown. The ellipse is known only from the Midwest United States and has declined considerably in its historic distribution and abundance due to habitat alterations, modification in river flows, and pollution.**

Management and Conservation: Like other mussels, threats to the ellipse include: natural flow alterations, siltation, channel disturbance, point and non-point source pollution, and exotic species. Maintenance or establishment of vegetated riparian buffers can help protect mussel habitats from many of their threats. Control of zebra mussels is critical to preserving native mussels. And as with all mussels, protection of their hosts' habitat is also crucial.

Of concern: The special concern **leadplant** (*Amorpha canescens*) inhabits prairies, dry bluffs and hills, sandy roadsides and clearings. Its leaves are pinnately compound, leaflets pubescent, 1-2 cm; flowers small, purple, in dense terminal spikes. Flowering occurs in June and July.

Management and Conservation: The habitat of this species has been severely degraded and diminished. This species likely requires natural disturbances associated with prairie habitat such as prescribed fire and brush removal. Prevent invasive species from entering the site.

Of concern: The special concern **false boneset** (*Kuhnia eupatorioides*) has been known to occur in the vicinity of the project area. This plant is a tall forb (1 m); leaves narrowly lanceolate, dotted with glands beneath, mostly sessile; flowers creamy-white, borne in terminal clusters. **False boneset inhabits sandy fields, prairies, disturbed areas including roadsides and bluffs. Flowering occurs from late July to October.**

Management and Conservation: Prescribed burns are necessary to maintain prairie habitat for this species.

Codes for Tables:

State Protection Status Code Definitions (SPROT)

E: Endangered
T: Threatened
SC: Special concern

Federal Protection Status Code Definitions (USESA)

LE = listed endangered
LT = listed threatened
LELT = partly listed endangered and partly listed threatened
PDL = proposed delist
E(S/A) = endangered based on similarities/appearance
PS = partial status (federally listed in only part of its range)
C = species being considered for federal status

Global Heritage Status Rank Definitions (GRANK)

The priority assigned by [NatureServe](#)'s national office for data collection and protection based upon the element's status throughout its entire world-wide range. Criteria not based only on number of occurrences; other critical factors also apply. Note that ranks are frequently combined.

G1 = critically imperiled globally because of extreme rarity (5 or fewer occurrences range-wide or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extinction.

G2 = imperiled globally because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extinction throughout its range.

G3: Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range (e.g. a single western state, a physiographic region in the East) or because of other factor(s) making it vulnerable to extinction throughout its range; in terms of occurrences, in the range of 21 to 100.

G4: Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.

G5: Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery.

Q: Taxonomy uncertain

State Heritage Status Rank Definitions (SRANK)

The priority assigned by the Michigan Natural Features Inventory for data collection and protection based upon the element's status within the state. Criteria not based only on number of occurrences; other critical factors also apply. Note that ranks are frequently combined.

S1: Critically imperiled in the state because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extirpation in the state.

S2: Imperiled in state because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extirpation from the state.

S3: Rare or uncommon in state (on the order of 21 to 100 occurrences).

S4 = apparently secure in state, with many occurrences.

S5 = demonstrably secure in state and essentially ineradicable under present conditions.

SX = apparently extirpated from state.

Rare Species Review #2027
Constantine Hydroelectric Project FERC No. 10661
St. Joseph County, MI
September 11, 2017

For projects involving Federal funding or a Federal agency authorization

The following information is provided to assist you with **Section 7 compliance** of the Federal Endangered Species Act (ESA). The ESA directs all Federal agencies "to work to conserve endangered and threatened species. Section 7 of the ESA, called "Interagency Cooperation, is the means by which Federal agencies ensure their actions, including those they authorize or fund, do not jeopardize the existence of any listed species."

The project falls within the range of six (6) federally listed/proposed species which have been identified by the U.S. Fish and Wildlife Service (USFWS) to occur in **St. Joseph County, Michigan:**

Federally Endangered

Indiana Bat - although there are no documented occurrences, there appears to be suitable habitat within the standard 1.5 mile search buffer. Indiana bats (*Myotis sodalis*) are found only in the eastern United States and are typically confined to the southern three tiers of counties in Michigan. Indiana bats that summer in Michigan winter in caves in Indiana and Kentucky. This species forms colonies and forages in riparian and mature floodplain habitats. Nursery roost sites are usually located under loose bark or in hollows of trees near riparian habitat. Indiana bats typically avoid houses or other artificial structures and typically roost underneath loose bark of dead elm, maple and ash trees. Other dead trees used include oak, hickory and cottonwood. Foraging typically occurs over slow-moving, wooded streams and rivers as well as in the canopy of mature trees. Movements may also extend into the outer edge of the floodplain and to nearby solitary trees. A summer colony's foraging area usually encompasses a stretch of stream over a half-mile in length. Upland areas isolated from floodplains and non-wooded streams are generally avoided.

Conservation strategies: The suggested seasonal tree cutting range for Indiana bat is between October 1 and March 31 (i.e., no cutting April 1-September 30). This applies throughout the Indiana bat range in Michigan.

Mitchell's Satyr Butterfly - there doesn't appear to be suitable habitat within the standard 1.5 mile search buffer. The state and federally endangered **Mitchell's satyr butterfly** (*Neonympha mitchellii mitchelliiis*) restricted to calcareous wetlands known as prairie fens. In Michigan, this habitat is characterized by scattered tamaracks, poison sumac, and dogwood with a ground cover of sedges, shrubby cinquefoil, and a variety of herbaceous species with prairie affinities. Adult Mitchell's satyr butterflies are active two to three weeks each summer, with males emerging before females. Adult flight dates are from mid-June to mid-July. Larvae hibernate near the bottom of a sedge. The larval food plant is thought to be several species of sedge. The caterpillar is green with white stripes.

Federally Threatened

Copperbelly Water Snake – although there are no documented occurrences, there appears to be suitable habitat within the standard 1.5 mile search buffer. Copperbelly water snakes (*Nerodia erythrogaster neglecta*) are usually found in or near shrub swamps, ponds, lakes, oxbow sloughs, fens, and slow-moving streams. They can also be found in mature or second-growth woodlands and in more open habitats adjacent to wetland areas. In spring these snakes often inhabit the open edges of shallow ponds and buttonbush swamps and frequently

bask on shoreline vegetation, muskrat lodges, or woody debris. When temperatures rise and these seasonal waters begin to dry up in early summer, the snakes migrate to permanent waters (lake and stream edges), often using fairly dry wooded or grassy upland corridors. They may become largely nocturnal during hot weather.

Unlike the northern water snake (*Nerodia sipedon*), this species may spend considerable periods of time in relatively dry habitats away from water, apparently by choice as well as necessity. Declining temperatures in fall appear to trigger migration to hibernation sites. Copperbelly water snakes are typically dormant from late October or November until sometime in April. They usually seek shelter in burrows or debris piles that are higher than the nearby wetlands. These snakes are migratory, moving from seasonally wet areas in spring and fall to permanently wet areas in summer. Please inform field crews that snakes should not be killed, harmed, or harassed. Any copperbelly water snake sightings should be reported to this office.

Northern Long-eared Bat - Although no known hibernacula or roost trees have been documented within 1.5 miles of the project area, this activity occurs within the designated **WNS zone** (i.e., within 150 miles of positive counties/districts impacted by WNS). In addition, suitable habitat does exist in and outside of our 1.5 mile search buffer. The USFWS has prepared a [dichotomous key](#) to help determine if this action may cause prohibited take of this bat. Please consult the USFWS [Endangered Species Page](#) for more information.

Northern long-eared bat (*M. septentrionalis*) numbers in the northeast US have declined up to 99 percent. Loss or degradation of summer habitat, wind turbines, disturbance to hibernacula, predation, and pesticides have contributed to declines in Northern long-eared bat populations. However, no other threat has been as severe to the decline as White-nose Syndrome (WNS). WNS is a fungus that thrives in the cold, damp conditions in caves and mines where bats hibernate. The disease is believed to disrupt the hibernation cycle by causing bats to repeatedly awake thereby depleting vital energy reserves. This species was federally listed in May 2015 primarily due to the threat from WNS.

Also called northern bat or northern myotis, this bat is distinguished from other *Myotis* species by its long ears. In Michigan, northern long-eared bats hibernate in abandoned mines and caves in the Upper Peninsula; they also commonly hibernate in the Tippy Dam spillway in Manistee County. This species is a regional migrant with migratory distance largely determined by locations of suitable hibernacula sites.

Northern long-eared bats typically roost and forage in forested areas. During the summer, these bats roost singly or in colonies underneath bark, in cavities or in crevices of both living and dead trees. These bats seem to select roost trees based on suitability to retain bark or provide cavities or crevices. Common roost trees in southern Lower Michigan included species of ash, elm and maple. Foraging occurs primarily in areas along woodland edges, woodland clearings and over small woodland ponds. Moths, beetles and small flies are common food items. Like all temperate bats this species typically produces only 1-2 young per year.

Conservation strategies: When there are no known roost trees or hibernacula in the project area, we encourage you to conduct tree-cutting activities and prescribed burns in forested areas during October 1 through March 31 when possible, but you are not required by the ESA to do so. When that is not possible, we encourage you to remove trees prior to June 1 or after July 31, as that will help to protect young bats that may be in forested areas, but are not yet able to fly.

Eastern Prairie Fringed Orchid - there does not appear to be suitable habitat within the 1.5 mile search buffer. The **Eastern prairie fringed orchid** (*Platanthera leucophaea*) occurs in a wide variety of habitats, from mesic prairie to wetlands such as sedge meadows, marsh edges, even bogs. It requires full sun for optimum growth and flowering and a grassy habitat with little or no woody encroachment. The white blossoms produce a heavy

fragrance at dusk that attracts many moths, including the primary pollinators of *P. leucophaea*, hawkmoths (Lepidoptera: Sphingidae). Hawkmoths are likely co-adapted pollinators, since their tongues are long enough to reach the nectar that lies deep in the spur of the flower. Capsules mature in September, releasing hundreds of thousands of airborne seeds. Plants may not flower every year but frequently produce only a single leaf above ground, possibly even becoming dormant when conditions are unsuitable, such as the onset of drought.

Federal Candidate Species

Eastern Massasauga Rattlesnake - although there are no documented occurrences, there appears to be suitable habitat within the standard 1.5 mile search buffer. Michigan's only venomous snake is found in a variety of wetland habitats including bogs, fens, shrub swamps, wet meadows, marshes, moist grasslands, wet prairies, and floodplain forests. **Eastern massasaugas** (*Sistrurus catenatus catenatus*) occur throughout the Lower Peninsula, but are not found in the Upper Peninsula. Populations in southern Michigan are typically associated with open wetlands, particularly prairie fens, while those in northern Michigan are better known from lowland coniferous forests, such as cedar swamps. These snakes normally overwinter in crayfish or small mammal burrows often close to the groundwater level and emerge in spring as water levels rise. During late spring, these snakes move into adjacent uplands they spend the warmer months foraging in shrubby fields and grasslands in search of mice and voles, their favorite food.

Often described as "shy and sluggish", these snakes avoid human confrontation and are not prone to strike, preferring to leave the area when they are threatened. However, like any wild animal, they will protect themselves from anything they see as a potential predator. Their short fangs can easily puncture skin and they do possess potent venom. Like many snakes, the first human reaction may be to kill the snake, but it is important to remember that all snakes play vital roles in the ecosystem. Some may eat harmful insects. Others like the massasauga, consider rodents a delicacy and help control their population. Snakes are also a part of a larger food web and can provide food to eagles, herons, and several mammals.

Any sightings of these snakes should be reported to the Michigan Department of Natural Resources, Wildlife Division. Reports can be submitted online at: [Eastern Massasauga Observation Report](#). If possible, a photo of the live snake is also recommended. As a species of special concern, the massasauga is not protected under state or federal endangered species legislation, but it is becoming rare throughout its range and it **is protected under the authority of the Department of Natural Resources Director's Order, Regulations on the Take of Reptiles and Amphibians, dated October 12, 2001 (section 324 of PA 451)**. Efforts to minimize impacts to the species now may eliminate the need to list the species in the future.

USFWS Section 7 Consultation Technical Assistance can be found at:
<http://www.fws.gov/midwest/endangered/section7/sppranges/michigan-cty.html>

The website offers step-by-step instructions to guide you through the Section 7 consultation process with prepared templates for documenting "no effect." as well as requesting concurrence on "may affect, but not likely to adversely affect" determinations.

Please let us know if you have questions.

Daria Hyde
Conservation Planner/Zoologist
hydeda@msu.edu
517-284-6189



United States Department of the Interior

FISH AND WILDLIFE SERVICE

2651 Coolidge Road, Suite 101
East Lansing, Michigan 48823-6360



IN REPLY REFER TO:

September 11, 2017

Ms. Sarah Kulpa
HDR, Inc.
440 South Church Street
Suites 900&1000
Charlotte, North Carolina 28202-2075

Re: Constantine Hydroelectric Project (FERC No. 10661) Request for Concurrence on Threatened and Endangered Species Information

Dear Ms. Kulpa:

Thank you for your letter from August 15, 2017, requesting our concurrence that you have received an accurate report on federally threatened and endangered species and any critical habitat within the project's area of interest. The project is located on the St. Joseph River in St. Joseph County, Michigan.

The generated species list from IPaC outlined six species currently listed under the Endangered Species Act. We concur that the species list is accurate. If the project is modified or new information becomes available that indicates listed species or critical habitat may be within the project area, you should ask for an updated official species list.

We appreciate the opportunity to cooperate with you in conserving threatened and endangered species. If you have any questions regarding these comments, please contact Lisa Fischer, of this office, at (517) 351-5293 or lisa_fischer@fws.gov.

Sincerely,

Scott Hicks
Field Supervisor

Yayac, Maggie

Subject: FW: PAD Questionnaire
Attachments: Constantine Project PAD Cover Letter_Full Package.pdf; Constantine Project PAD Questionnaire.doc

Maggie Yayac

D 704.248.3666 M 610.299.0959

hdrinc.com/follow-us

From: Kulpa, Sarah
Sent: Friday, September 15, 2017 8:32 AM
To: Lisa Camstra <lcamstra@TNC.ORG>
Cc: jmmagalski@aep.com; Quiggle, Robert <Robert.Quiggle@hdrinc.com>
Subject: RE: PAD Questionnaire

Hi Lisa,

Thanks for getting in touch. Please find attached an electronic copy of the questionnaire (Word document) as well as a pdf of the August mailing.

Thanks in advance for the Nature Conservancy's input, and have good weekend,

Sarah Kulpa

D 704.248.3620 M 315.415.8703



hdrinc.com/follow-us

From: Lisa Camstra [<mailto:lcamstra@TNC.ORG>]
Sent: Thursday, September 14, 2017 4:48 PM
To: Kulpa, Sarah
Subject: PAD Questionnaire

Ms. Kulpa,

Received attached postcard today. I'm writing to request an electronic copy of the questionnaire in hopes that it will help identify who the best person is to respond.

Thanks in advance,
Lisa

Lisa Camstra

The Nature Conservancy
Conservation Operations Manager, Michigan
lcamstra@tnc.org
(517) 316-2280 (Phone)
(517) 316-9886 (Fax)

Yayac, Maggie

Subject: FW: Comments Constantine Hydro Project P-10661
Attachments: MDNR Comments Constantine Project P-10661 9-20-2017.pdf; MDNR FERC 2003 Study Guidance.doc

From: Kruger, Kyle (DNR) [<mailto:KRUGERK@michigan.gov>]
Sent: Wednesday, September 20, 2017 11:15 AM
To: Kulpa, Sarah
Subject: Comments Constantine Hydro Project P-10661

Hi Ms. Kulpa,

I tried sending this information as one PDF, but it was too big for your inbox. I've attached smaller files. Please feel free to contact me if you have any questions.

Kyle

Kyle Kruger
Senior Fisheries Biologist
Habitat Assessment Unit
Fisheries Division
989-826-3211 x 7073
FAX: 989-826-3509
krugerk@michigan.gov



RICK SNYDER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
LANSING



KEITH CREAGH
DIRECTOR

September 20, 2017

Ms. Sarah Kulpa
Project Engineer
HDR
440 S. Church Street, Suites 900 & 1000
Charlotte, NC 28202-2075

**RE: CONSTANTINE HYDROELECTRIC PROJECT (FERC NO. 10661) RELICENSING PAD
INFORMATION REQUEST**

Dear Ms. Kulpa,

The Michigan Department of Natural Resources (Department) is in receipt of your information request for the relicensing of the Constantine Hydroelectric Project (project) on the Saint Joseph River, Saint Joseph County, Michigan. From your we will try to direct you to sources to help you move forward on relicensing the Constantine Hydroelectric Project.

I have enclosed a copy of the MDNR Fisheries Division's relicensing study guidelines to help you determine what items you will need to begin preparing for the licensing process from our perspective.

For the fisheries resources related to the project, I suggest you contact Mr. Brian Gunderman, Southern Lake Michigan Management Unit Supervisor at our Plainwell Office (269-685-6851 or GundermanB@michigan.gov). Mr. Gunderman can provide you more specific fisheries information for the vicinity of the project. In addition, you may want to review the Saint Joseph River Assessment. You can download a copy from the following site:

www.michigandnr.com/PUBLICATIONS/PDFS/ifr/ifrlibra/Special/Reports/sr24.pdf

For specific recreational needs, you can contact Parks and Recreation Division. For more general information on recreation trends and needs, The Michigan Statewide Comprehensive Outdoor Recreation Plan 2013–2017 can be found online at:

http://www.michigan.gov/documents/dnr/SCORPfnlrprt_513881_7.pdf

For the current and existing recreational facilities and use, you will need to acquire that information from the project owner.

For wildlife resources you will need to contact Wildlife Division for any plans or species of concern to the Department. You should be able to get that information from the Plainwell Customer Service Center, Plainwell, Michigan (269-685-6851).

For endangered species distribution or communities of special concern in the area, you should contact Michigan Natural Features Inventory (<https://mnfi.anr.msu.edu>) . They should be able to help you determine if any endangered or species of special concern are in the area of influence of the project.

For soils and geology, you'll need to contact the Soil Conservation Service and review their soil maps. They may also have information on underlying geology.

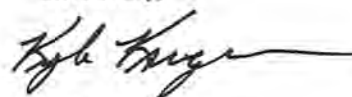
Wetland determinations can be acquired through the US Fish and Wildlife Service. I believe they have resources on wetland delineation online.

For coastal zone management, you'll have to contact Michigan Department of Environmental Quality (MDEQ) and the Army Corps of Engineers. They should be able to inform you where the delineations between regulatory authorities are drawn.

You will also need to contact MDEQ for the requirements monitoring water quality and any studies you may need to conduct for applying for the Water Quality Certification that FERC will require for the license.

If you have any further questions or need clarification, please feel free to contact me at: Michigan Department of Natural Resources, Mio Field Office, 191 S. Mt. Tom Rd., Mio, MI 48647.

Sincerely,



Kyle Kruger
Senior Fisheries Biologist
Habitat Assessment Unit
FISHERIES DIVISION
(989) 826-3211 x 7073

cc Brian Gunderman, Fisheries, Plainwell
Enclosures

Michigan Department of Natural Resources
Recommended Review Criteria
And Study Guidance
For the Federal Energy Regulatory Commission
Licensing Process
2003

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The following are Michigan Department of Natural Resources (MDNR) review criteria, data needs and study guidelines for the Federal Energy Regulatory Commission (FERC) licensing process. These guidelines are intended to facilitate the FERC licensing and re-licensing process by informing licensees of MDNR positions and by detailing studies that will fulfill and facilitate this process. These criteria and study guidelines are not binding on the applicant and are intended to be used in conjunction with applicable FERC licensing statutes, rules, and regulations. These criteria and guidelines were developed in 1986, and revised in 1988, 1989, 1990, 1991, 1992, 1994, 1996, 1998, 2001, and 2003. This document will be reviewed and resubmitted to FERC on an annual basis.

MDNR Positions

1) Plant Operation

A) Daily Operation

- i) Facilities with Riverine Tailwaters - We will recommend to FERC that the project(s) be operated as a run-of-river project (instantaneous inflow equals instantaneous outflow). The project will be limited to pond levels fluctuating $\leq 3''$ over the entire year.
- ii) Facilities with Reservoir Tailwaters - We may recommend that FERC allow some minimal peaking operations with site-specific minimum flow and ramping rate requirements.

B) Operational Verification

We will recommend that data to verify the operation of the plant be provided and funded by the licensee. This will be accomplished using continuous gage stations on the reservoir to determine instantaneous headwater elevation, and continuous gage stations below the reservoir to determine instantaneous tailwater elevation. To provide independent data on project operation, we will recommend that the licensee fund the installation and maintenance of the appropriate number of United States Geological Survey (USGS) gages in the vicinity of the project. We may also recommend to FERC additional site-specific needs on a case by case basis.

2) Habitat

A) Comparative Aquatic Habitat Studies

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We will recommend to FERC that all facilities with riverine tailwaters that choose not to operate their facilities as run-of-river operations conduct the following studies:

- Instream Flow Incremental Methodology (IFIM) studies on downstream river reaches for a comparative analysis of aquatic habitat under the proposed project operation(s) to run-of-river project operation
- Habitat Evaluation Procedures (HEP) studies on the reservoir to compare reservoir habitat under the proposed project operation(s) to run-of-river project operation

These studies are to assure that the appropriate amount of data is collected for an analysis of all operating scenarios. However, we will recommend run-of-river operation at all facilities to FERC in our final comments.

3) Fisheries

A) Fish Passage

We will recommend to FERC that appropriately designed, constructed, and operated fish passage facilities (for anadromous or other migratory fish species) be provided at all FERC projects. The recommendations for fish passage will consist either of fish passage facility construction and operation by the FERC licensee or dam removal. These recommendations will include time frames that may range from immediate to future implementation, depending upon the management goals for the river system. We will recommend that all passage and protective devices be evaluated for their effectiveness. MDNR may recommend that an escrow account be established to provide funds for the fish passage facility design and construction.

The purpose of fish passage is to: 1) regain access to spawning areas; 2) allow for the establishment of self-sustaining fish stocks; and 3) establish "special" fisheries of either state-wide or regional importance. In addition to upstream passage, downstream protection will be required at all projects.

B) Turbine and Spillway Entrainment and Mortality

We will recommend to FERC that the project be operated in a manner such that the entrainment and subsequent turbine and spillway mortality of fish will be minimized. To meet this request, the licensee can either immediately install protective devices to prevent entrainment and mortality or may decide to determine the extent of the problem via studies. The

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results of all studies and protective devices will be evaluated to determine minimum mitigation measures and effectiveness.

4) Woody Debris Transport and Management

We will recommend to FERC that the licensee develop a plan to improve aquatic habitat by maintaining and increasing the amount of large woody debris and vegetative material at the project. This woody debris plan shall be consistent with FERC boating safety requirements and any fish/watershed management plans.

5) Wildlife

We will recommend to FERC that all projects maintain and enhance wildlife resources found on their lands and develop plans to implement wildlife management.

6) Recreation

We will recommend to FERC that all project lands be open to public access. Project lands shall include boat launching facilities on the reservoir, fishing access sites and related facilities on the tailwater area, a safe marked canoe portage around the dam, and other facilities which MDNR views as necessary to optimize recreation on the project. All facilities should conform to the Americans with Disabilities Act (ADA).

All new recreation facilities should be constructed and maintained by the licensee. If public recreation facilities exist on the project, MDNR will recommend to FERC that the licensee provide maintenance funds or actual maintenance for those sites. If only private or leased facilities exist, MDNR will recommend to FERC that the licensee purchase the land and associated facilities. If this cannot be accomplished, MDNR will recommend that the licensee either purchase easements of lands or provide for free access to the project. The licensee always has the option to purchase and operate outright any recreational facility that it intends to use to satisfy FERC requirements. All recreational facilities used to meet FERC licensing requirements should be free of charge for public use.

7) Water Quality

Prior to development of a 401 water quality certification, we will recommend to FERC that flows for the facility, in addition to minimum flow, be maintained to alleviate any water quality problems that may be

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identified as having an adverse effect on restoring and maintaining productive aquatic resources.

The conditions that are established in the Section 401 certificate should govern the project operation in respect to water quality.

8) Coastal Zone

Federal Consistency is the Coastal Zone Management Act requirement that federal actions that have reasonably foreseeable effects on any land or water use or natural resource of the coastal zone (also referred to as coastal uses or resources, or coastal effects) must be consistent with the enforceable policies of a coastal state's federally approved Coastal Management Program.

Typically the Coastal Zone buffer extends not less than 1000' landward from the ordinary high water mark of the Great Lakes, but in many cases it extends significantly further inland (including coastal lakes and large river systems). The coastal zone does include the water areas around the coast such as rivers and lakes.

9) Mitigation Plan

We recommend to FERC that the licensee develop a mitigation plan to alleviate any adverse impacts and compensate for the loss of riverine habitat caused by plant operation. This plan should include a continuous program of analyzing and monitoring all planning, construction, and operational activities with respect to adverse impacts on the river ecosystem. We will also recommend that the licensee implement all measures necessary to correct any harmful effects identified during this ongoing monitoring program as a result of constructing, rehabilitating, operating, and maintaining the project.

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Overview of Project Information and Impact Data Needs

- 1) Plant Operation and Engineering
 - A) Present plant design of all facilities
 - B) Daily operation and maintenance records
 - D) Plant hydraulic characteristics

- 2) Fisheries (Aquatic) Habitat
 - A) Hydrographic maps of the reservoir and the tailwater areas, to include 500 meters downstream of the project
 - B) An aquatic habitat inventory, may include IFIM and HEP studies if required by the proposed project
 - C) A determination of the impact of plant operation on habitat availability and quality

- 3) Fisheries Data
 - A) Fisheries community inventory of the riverine and pond areas, to include endangered, threatened, and sensitive species
 - B) The adequacy of the any existing fish passage facility
 - C) The impact of plant operations on the existing fish passage structure
 - D) If the project proposes to study the facility entrainment/mortality problem, a two-stage study plan should be used to examine the extent of the problem: 1) A reconnaissance study to determine the gross extent of facility entrainment and mortality, which should include turbines and spillways; and 2) If necessary, a more intensive study to keenly determine facility entrainment and mortality of fish. Our guidelines for these studies are attached in Appendix 4.
 - E) Aquatic habitat management plans

- 4) Wildlife (Terrestrial) Habitat
 - A) Terrestrial and wetland habitat inventory
 - B) Determination of the impact of plant operation on habitat availability and quality
 - C) Forest management plans of the project area
 - D) Topographical maps which show all project lands

- 5) Wildlife
 - A) Wildlife community inventory of the riverine and pond areas, including endangered, threatened, and sensitive species
 - B) Wildlife management plans in the project area, as determined by MDNR personnel

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6) Recreation

- A) Inventory of recreational facilities in the project area, including written descriptions, maps, and diagrams of locations. This information will be used by MDNR to evaluate adequacy of facilities.

7) Water Quality

- A) All NPDES permits, Act 307, and Super Fund sites in the drainage basin should be identified
- B) All water management models and plans should be detailed
- C) The impact of the proposed project operation on water quality should be determined

8) Coastal Zone

- A) Federal and State Consistency must be determined under the Coastal Zone Management Act.
- B) Lands which fall within the Coastal Zone buffer should be identified.

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Project Operation and Engineering Information

Project Design Information

- 1) The present plant design for all facilities should include the following details:
 - A) Plant engineering designs
 - B) Type, number, kW, blade number, RPM, and design of turbines
 - C) Elevation, peripheral velocity, and diameter of the runners
 - D) Minimum and maximum blade clearance between runner and wicket gates for Francis Type Units, and runner and the ring for Kaplan Type Units
 - E) Cavitation at the plant
 - F) Project map which includes all lands, roads (including condition), and right of ways
 - G) An updated turbine output-water use and spillway/gate rating curves for all project components

Daily Operation and Maintenance Records

- 1) The present daily operation of facilities should include :
 - A) kW
 - B) Wicket gate openings
 - C) Efficiency
 - D) Hours of use of each unit
 - E) Bypass gate openings for the previous and current year, as well as low, average, and high water years
 - F) Use mean, minimum, and maximum daily data for kW, wicket gate openings, efficiency, each unit's hours of use, and openings of bypass gates. This information should be used to calculate weekly mean values as well as mean weekly minimum and maximum values.
- 2) A record for the last 5 years of plant outages and length of outages
- 3) Any plans for plant operation automation, construction, major maintenance, or plant retirement
- 4) An estimation of the longevity of the existing facilities including powerhouse(s), penstock(s), reservoir(s) capacity, dam(s)
- 5) All dam safety reports should be summarized and made available to MDNR.

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Project Hydrology Information

- 1) The daily fluctuation in the tailwater, any by-passed side channels, and reservoir should be reported for the previous year as well as average, high, and low water years. This should be reported in terms of discharge and elevation using mean, minimum, and maximum daily data to calculate weekly mean values, and mean weekly minimum and maximum values.
- 2) Monthly flow duration curves should be estimated for the river "without" plant operation and "with" plant operation for the assessment of minimum flow needs.
- 3) The operational compliance plan for all project operating conditions needs to be thorough and should include continuous (at least hourly basis) monitoring water level gages in the reservoirs, headwater, and tailwater areas. Specifications for all gaging equipment should be completely described and submitted along with the provisions to provide for both the establishment and maintenance of a new continuous monitoring USGS gage or the maintenance of one existing continuous monitoring USGS gaging at each operating facility of the project. Plans should also include procedures for calibration and maintenance of gages. All other site-specific needs as determined by MDNR should also be documented in the compliance plan.

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Fisheries (Aquatic) Habitat Information

Study Area

1. To include all reservoirs and stream reaches (including tributaries) from one-quarter mile above the high water level of the uppermost reservoir on the system to the downstream site of no project influence, as defined as follows:
 - A. Mainstem of the River- From a point one-quarter of a mile upstream of the normal high water mark of the impoundment and downstream to the normal high water mark of the dam on the river. If the project has acceptable data that indicates that project influence zone is less than the recommended zone, the zone may be adjusted to reflect these changes in influence zone boundary after consultation and concurrence from the MDNR.

Hydrographic Maps

1. Hydrographic maps of the reservoir, any de-watered river reach, and the tailwater areas (to include 500 meters downstream of the facility) are required of all sites with transects every 10 meters. If recent existing maps are available, data verification studies can be substituted for mapping with MDNR concurrence. Additional FERC study justification is in Appendix 1.

Maps should delineate the following habitat inventory data:

- A. Reservoirs - Predominant substrate (as classified using the Modified Wentworth Scale) and emergent and submergent plant beds (classified by dominant plant species complex) should be mapped on the hydrographic maps at all water levels. Other structure items such as logs, log complexes, and rock piles should also be denoted on the reservoir map.
- B. Tailwater areas - Predominant substrate (as classified using the Modified Wentworth Scale) and emergent and submergent plant beds (classified by dominant plant species complex) should be mapped on the hydrographic maps at all water levels. Other structure items such as logs, log complexes, and rock piles should also be denoted on the tailwater map.
- C. Other Project Impacted River Reaches - Predominant substrate, aquatic vegetation, and approximate mean depths should be indicated on river maps for all water levels.

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Aquatic Habitat Inventory

1. Comparative Riverine Habitat Studies - Comparative riverine habitat studies will be recommended at all sites with riverine tailwaters that will not be operated as run-of-river facilities and that have no by-passed river reaches. The objective of this study is to compare resource impacts of the proposed project operation(s) to run-of-river operations. IFIM studies will be recommended at all sites unless another methodology is accepted by the MDNR. Additional study justification is in Appendix 2.

The following guidelines should be followed in development of an IFIM study plan:

- A) The IFIM study plan will require close agency coordination on the following items:
 - i. Study Purpose
 - ii. Study Boundaries - The IFIM study boundaries should include all riverine tailwaters to the next lake or impoundment. In addition, we recommend that a pre-study be conducted determine the extent of downstream water fluctuations from each hydroelectric facility operations. This will be used to delineate modeling boundaries on the river.
 - iii. Time Constraints –on dates for critical decisions and field studies.
 - iv. Specific Study Objectives - Concurrence with MDNR needs to occur on the type of study and expected results. We suggest the following as an objective statement:

The objective of this study is to determine the optimal flow regime from the hydroelectric facility to protect and enhance the aquatic resources of the river system. The IFIM study should provide recommendations that, at a minimum, protect the instantaneous needs of the aquatic community and provide data on the habitat usability of the river system(s) under a number of alternative operational schemes, including the proposed peaking operation and the strict run-of-river (instantaneous inflow equals instantaneous outflow) modes.
 - v. Target Species - We need to discuss the target species desired and come to an agreement on those species.
 - vi. Methodology - After agreeing upon the target species, we need to determine what habitat suitability criteria are available, which curves will

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be used, if any modifications are needed, and what data is needed. Decisions will also need to be made jointly on which models will be used in the study. We recommend that the attached two-flow analysis guidelines be followed to examine peaking impacts (Appendix 3).

vii. Hydrologic Baseline - After compilation of all available data on the river system, we need to jointly discuss and determine the "base" hydrologic conditions for present conditions.

viii. Stream Segmentation and Study Area Selection - We need to scope the river system and determine the logical study boundaries for each segment from a macro and microhabitat perspective. We need to determine and agree where microhabitat and macrohabitat measures are to be taken.

B) We recommend that the IFIM scoping document be organized in the following manner:

i. Introduction - To include:

- Purpose of the study
- Study objectives
- Existing management objectives for each section of river
- Important background data
- Existing flow agreements

ii. Study Plan - To include:

- general approach
- Study area and reaches with detailed maps and reasoning

iii. Study Tasks - To include:

- Study area reconnaissance and macrohabitat segmentation
- Habitat characterization and reach selections
- Hydraulic data acquisition (includes transect selection and placement procedures with maps, candidate transect location, measurement methods and materials which include target measurement discharges, anticipated logistics and field activities schedule, acquisition and handling of field data)
- Hydraulic modeling approach (includes microhabitat simulations, evaluation species/life species and suitability criteria, models used and two flow analysis technique)
- Data analysis and reporting (includes model output composites and report preparation)

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- iv. Study Schedule
 - v. Study Plan Agreement
2. Comparative Reservoir Level Fluctuation Studies - Comparative Reservoir level fluctuation and habitat studies will be recommended at all sites that are not to be operated as run-of-river facilities. The study objective is to compare resource impacts of the proposed project operation(s) to run-of-river operations. Habitat Evaluation Procedures (HEP) methodology, to predict changes in fish community structure based on habitat changes, will be recommended at all sites unless another methodology is accepted by the MDNR. Additional justification is attached as Appendix 2.
 3. By-passed River Channel Minimum Flow Studies - On all projects that have by-passed river channels, we recommend that minimum flow studies be conducted on all by-passed river channels. IFIM studies will be recommended at all sites unless another methodology is accepted by the MDNR. Additional justification is attached as Appendix 2.
 4. All aquatic habitat management plans should be identified

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Fisheries

Aquatic Species Inventory

1. For all aquatic species, subdivide the systems by reservoirs and streams. Identify the relative abundance and species composition of each system using all available data sources which should include MDNR Fisheries, Michigan Department of Environmental Quality (MDEQ) Surface Water Quality Division, U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency, Scientific Publications, and Universities. If acceptable survey data is unavailable, the necessary surveys will be conducted according to MDNR standards.

Threatened, Endangered, and Sensitive Species

1. Species to include all Federal listed, proposed, candidate, endangered, or threatened species. The list should also include Federal species of management concern, State-listed endangered or threatened species, and State species of special concern
2. For all species, determine whether they are present and map their location if possible. If existing surveys are unavailable, new surveys should be conducted according to MDNR standards. Surveys should be limited to identifying those species likely to occur within the available habitat types.

Upstream Fish Passage Device Inventory and Guidelines

1. All currently installed fish passage devices, both upstream and downstream, should be documented with operational designs included.
2. The current use of all upstream and downstream fish passage facilities should be described and include the fish species and number using the facility for all years that data are available.
3. The current project impact on any upstream or downstream fish passage facility should be documented. Additional studies on the adequacy of the facility may be required on a site-specific basis.
4. Fish passage designs, which should include upstream and downstream passage as well as prevention of turbine entrainment, will be recommended at some facilities as elected by MDNR. All passage designs should be developed using the fish species of interest as determined by MDNR. We will recommend that all passage devices be evaluated for their effectiveness.

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Downstream Fish Passage Guidelines

1. We will recommend to FERC that plant operation minimize entrainment and subsequent turbine and spillway mortality of fish. The project can either immediately install protective devices to prevent entrainment and mortality or decide to determine entrainment and mortality via studies. We will recommend that all passage and protective devices be evaluated for their effectiveness along with minimum mitigation for any fish losses.
2. We recommend that the any turbine entrainment and mortality study follow the attached MDNR guidelines (Appendix 4). Additional justification for this study is provided in Appendix 5.

Woody Debris Transport and Management

1. We will recommend to FERC that the woody debris plan include procedures for:
 - A) Passing large woody debris and vegetative material collected near the project trashracks and log booms into each project's tailrace
 - B) Leaving currently existing instream and impoundment large woody debris unless it directly interferes with safe project operation
 - C) Installing instream or impoundment structures for fish habitat or addition of large woody debris to the river below the projects when opportunities arise.

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Wildlife (Terrestrial) Habitat Information

Study Area

1. For terrestrial species and associated habitat, include all lands within the project boundaries and influence zone.
2. For wetland and aquatic species, include reservoirs and stream reaches from one-quarter mile above the high water level of the uppermost reservoir on the system to the downstream site of no project influence, as defined as follows:
 - A. Mainstem of the River- From a point one-quarter of a mile upstream of the normal high water mark of the impoundment and downstream to the normal high water mark of the dam on the river. If the project has acceptable data that indicates that project influence zone is less than the recommended zone, the zone may be adjusted to reflect these changes in influence zone boundary after consultation and concurrence from the MDNR.
3. For fish-eating birds including, but not limited to bald eagles, ospreys, herons, and other colonial nesting birds, incorporate an area of one mile on either side of the stream reaches and reservoirs defined under item 2.A.

Terrestrial Habitat Inventory

1. Collect and map terrestrial habitat data using MDNR approved classification systems. Provide percentage and acreage of each habitat type in the application
2. Collect and map wetland habitat data using USFWS mapping system (Cowardin et al.). Provide percentage and acreage of each wetland type in the application
4. Identify all forest management plans and terrestrial management plans

Shoreline Management Plan

1. Create a detailed shoreline management plan for licensee-owned lands and easements abutting project waters (within 1000 feet of the high water elevation for lakes and within 300 feet of the high water elevation for streams) that are determined to be needed for project-related purposes, such as providing public access for recreation or protecting sensitive, unique, or scenic areas. The plan shall include, but need not be limited to:

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- (1) a description of those lands covered by the plan including a drawing or map showing their location relative to project facilities or project waters (those lands shall be included within the project boundary);
- (2) for each parcel of shoreline covered by the plan, a description of how the land will be managed and used;
- (3) a critical habitat inventory of the shoreline;
- (4) development of strategies and methods to educate property owners and reservoir users about the beneficial values of shoreline vegetation and shallow water habitats;
- (5) a discussion of how the plan addresses the following considerations: selection of lands that are largely undisturbed and free from any observable past alterations that may have impaired their ability to provide the necessary protection and enhancement of wildlife and plant species; selection of additional lands to provide additional buffering capacity against adjacent land disturbances in ecologically sensitive areas; and selection of lands that would protect existing upper-canopy trees and their suitability for raptor use;
- (6) development standards which include a setback of 200 feet from ordinary high water mark for all structures except piers, boat hoists, and boathouses; shoreline vegetation removal in the 35 foot strip adjacent to the ordinary high water mark will be limited; no more than 30 feet in any 100 feet may be clear cut (clear cut zone is limited to 10 feet in width); only 30% of the vegetation between 35 and 75 feet of the ordinary high water mark may be removed; and require that land uses be screened as viewed from the water and that the scenic beauty of the shoreline be maintained
- (7) an implementation schedule.

The licensee shall prepare the plan after consultation with the Michigan Department of Natural Resources (MDNR), the U.S. Fish and Wildlife Service (USFWS), and the Wisconsin Department of Natural Resources (WDNR) and U.S. Forest Service (USFS) where applicable.

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Wildlife

Wildlife Species Inventory

1. For wetland and aquatic species, subdivide the reservoirs and stream reaches into segments. Identify the relative abundance (common, uncommon, absent) of species in each area. Species should include water birds (seasonal designations will be needed for migratory use), marsh birds and the following mammals: otter, mink, muskrat and beaver. In particular, efforts should be made to determine the number of furbearers, water birds, and marsh birds breeding in the project influence zone and the nest or den locations. All existing data bases maintained by MDNR, WDNR (where applicable), USFWS, EPA, Michigan Breeding Bird Atlas, and universities should be examined and data compiled for this section. If no surveys exist, then field surveys should be conducted according to MDNR standards.
2. The following information may be recommended to evaluate timber management or other changes proposed to terrestrial habitat depending upon the project characteristics:
 - a) The relative abundance of the following management indicator species: black throated green warbler, chestnut-sided warbler, eastern bluebird, pileated woodpecker, ruffed grouse, and white-tailed deer
 - b) The relative abundance of owls and raptors not previously identified as threatened or sensitive

Threatened, Endangered and Sensitive Species

1. Species to include all Federal listed, proposed, candidate, endangered, or threatened species. The list should also include Federal species of management concern, State-listed endangered or threatened species, and State species of special concern
2. For all species, determine whether they are present and map their location if possible. If existing surveys are unavailable, new surveys should be conducted during the reproductive season (e.g., nesting, flowering) appropriate to each species. Surveys should be limited to identifying those species likely to occur within the available habitat types.

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Bald Eagle Information

1. Map both active and inactive nest sites
2. Identify available habitat (described as relatively undisturbed areas with super-canopy trees)
3. Identify potential habitat areas within project boundaries, this will include areas where timber management could be used to develop appropriate habitat
4. Conduct a winter survey to determine over-wintering use and roost sites
5. Conduct a nest watch program during breeding seasons on at least two active nest sites per river system in order to determine the following information:
 - Extent of human disturbance to nest (identified by distance to nest site)
 - Food base (species and relative abundance)
 - Foraging locations on the reservoir or river systems
 - Roost sites, especially those used for foraging
6. For all other nest sites, including inactive nests, determine the extent of human disturbance by analyzing distances to roads, trails, rights of way, and other human activities

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Recreation Information

Study Area

1. To include all reservoirs and stream reaches (including tributaries) from one-quarter mile above the high water level of the uppermost reservoir on the system to the downstream site of no project influence, as defined as follows:
 - A. Mainstem of the River- From a point one-quarter of a mile upstream of the normal high water mark of the impoundment and downstream to the normal high water mark of the dam on the river. If the project has acceptable data that indicates that project influence zone is less than the recommended zone, the zone may be adjusted to reflect these changes in influence zone boundary after consultation and concurrence from the MDNR.
2. Project county areas for certain sections of the off-site inventory. This should include surrounding counties.

Data Needs

- 1) For the above project area, the following information is needed for each recreation site (developed and undeveloped):
 - a) Map location
 - b) Map key should indicate:
 - 1) Type of facility (see list below)
 - 2) Provider of facility (State, Company, Private)
 - 3) Size of facility (area, capacity)
 - 4) Level of use (heavy, light)
 - 5) Condition of site
 - c) Summary table of facility type, condition, and provider
 - d) Non-company facilities in the project boundary and their relationship (if any) to the company
 - e) Commercial operators in the project boundary (e.g., liveries, bait shops, campgrounds serving the project area) and their name, location, size, etc.
- 2) A general description of relevant off-site recreation facilities within the county or counties where the project is located, along with a table of numerical totals of facilities and a description of major off site facilities.

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This description is for the purpose of examining overall recreational use, availability of similar recreational opportunities, and recreational experience demand of the facility influence zone.

- 3) Identify any recreation plans that the licensee has written for the project.
- 4) Identify and summarize all existing data on recreational resources in the project influence area. Data sources include MDNR, Wisconsin Department of Natural Resources (WDNR) where applicable, U.S. Fish and Wildlife Service (USFWS), U.S. Environmental Protection Agency (EPA), local governments, and universities.
- 5) A study will need to be conducted to determine the present and future use of all recreation facilities.

Recreation Facility Type Categories

Shore fishing site
Fishing dock or pier
Boat launch with ramp
Carry-in small boat access
Canoe portage
Beach for swimming or sunbathing
Trail (ORV, hiking, horse, fishing, other)
ORV/snowmobile area
Picnic sites
Campsites
Playgrounds
General use site (use for a variety of purposes)
Support facilities (rest rooms, fish cleaning stations etc.)
Other

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APPENDIX 1. MDNR Justification for Mapping Studies

The following is the Michigan Department of Natural Resources (MDNR) justification for the recommended habitat mapping and hydrographic study at your facilities. This document fulfills the requirement of Subpart B, Section 16.8 (i)-(vi) of the recently adopted FERC rules governing resource agency recommendations for necessary studies and information relating to a recommendation for the comparative habitat study.

Data Recommended For Analysis of Issue by MDNR

1. Provide quantitative data that documents the extent of each habitat type in the tailwater and the reservoir. If the above information is not available, then the applicant should arrange to collect the information.

Determination Basis of Resource Issue

Hydropower operations impact our water resources by: 1) altering normal stream flows for generating purposes; 2) de-watering river channels by diversion or peaking operations; and 3) fluctuating reservoir levels for either peaking operations or for storage purposes. All of the above influences could be found at your project. The impacts of hydro operations that potentially could exist at your facility include the flushing of riverine reaches by generating with flood flows during the peak power periods and de-watering of riverine reaches at other periods. The de-watering of riverine habitat reduces the algae and aquatic plant life which are important as food for aquatic insects and which provide important fish nursery areas. Further, it reduces fish growth and survival by reducing available habitat and stranding fish, and changes the benthic invertebrate community to smaller, less useful, fish foods. The fluctuations cause downstream erosion and sedimentation that destroys fish habitat and can disrupt fish migratory patterns. In addition, hydro operations cause reservoir fluctuations that de-water and disrupt fisheries habitat, which could be up to 3 foot on a daily basis, in the same fashion as the tailwater habitats.

MDNR needs quantitative habitat data to examine the severity and extent of habitat loss under any proposed operational mode. Without a baseline map of depth contours and habitat types in the impoundments and tailwaters, it is impossible for our agency to determine the impacts of the present or proposed operational modes. These maps will provide the background data for recommendations on operations at the projects that will adequately protect this river system.

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Fisheries Goals and Objectives

MDNR's overall aquatic habitat protection goal is:

To minimize and mitigate the negative impacts of hydroelectric facilities by operating these projects in a fashion that offers aquatic resources and users near natural riverine and reservoir conditions, protects and maintains aquatic environments and fish communities and rehabilitates those now degraded.

- 1) Riverine tailwater facilities to be operated in a run-of-river mode
- 2) Reservoir tailwater facilities to be operated with minimal tailwater and headwater fluctuation
- 3) Bypassed and/or diverted river facilities to be operated in a manner which maintains healthy aquatic resources of the river

Michigan's river systems provide a significant fishery and public trust resource. The fisheries resource includes important populations of game fish which include largemouth bass, smallmouth bass, northern pike, walleye, bluegills, yellow perch, black crappie, rock bass, channel catfish, suckers (including redhorse) and bullheads. The habitat availability for aquatic species is limited by the operational mode of project.

Our specific fisheries habitat goal at your facility is to protect and enhance the fish communities in the river and tributaries by maximizing and stabilizing available aquatic habitat. In our agency's professional opinion, this is best accomplished by recommending run-of-river-operating conditions. Run-of-river is defined as instantaneous inflow to the project impoundment equals instantaneous outflow downstream of the project tailwater.

Study Methodology Appropriateness

The recommended study methodologies for predominant habitat type inventory and hydrographic maps of the impoundment and tailwater are essential. This baseline data will allow MDNR the opportunity to examine the impacts of water development and to recommend further study plans if necessary. This standard baseline information will also produce documentation of habitat types and depth contours that are needed to analyze the impacts of hydro projects.

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Study Data Utilization

This study will provide initial data on the potential availability of fish habitat under a range of operating modes. This information will serve as qualifying data for our recommendations regarding IFIM and HEP study designs, if necessary. Ultimately, this data will allow for the determination of the operational mode under which the project will best protect the aquatic environment.

Our goals for protection and enhancement of the fish community call for the prevention of resource damage from hydroelectric generation and the optimal long term maintenance of the riverine fish community by maximizing and stabilizing the amount of available aquatic habitat. These data would provide the necessary background data to make the appropriate project operation recommendations to protect aquatic habitat in this river system.

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APPENDIX 2. MDNR Justification for Comparative Habitat Studies

For those projects that propose peaking operation, the following is the Michigan Department of Natural Resources (MDNR) justification for the recommended comparative habitat studies using Instream Flow Incremental Methodology (IFIM) and Habitat Evaluation Procedures (HEP). This explanation fulfills the requirement of Subpart B, Section 16.8 (i)-(vi) of the recently adopted FERC rules governing resource agency recommendations for necessary studies and information relating to a recommendation for the comparative habitat study.

Data Recommended For Analysis of Issue by MDNR

1. Provide quantitative data that documents habitat availability in the tailwater and the reservoir under the proposed operational mode, run-of-river, and other operational modes. If the above information is not available, then the applicant should arrange to collect the information.

Determination Basis of Resource Issue

At a minimum, hydropower operations impact our water resources by: 1) altering normal stream flows for generating purposes; 2) de-watering river channels by diversion or peaking operations; and 3) fluctuating reservoir levels for either peaking operations or for storage purposes. The impacts of peaking and semi-peaking operations include the flushing of riverine reaches by generating with flood flows during the peak power periods and de-watering of riverine reaches at other periods. The de-watering of riverine habitat reduces the algae and aquatic plant life that are important as food for aquatic insects and provide important fish nursery areas. Further, it reduces fish growth and survival by reducing available habitat, stranding fish, and changing the benthic invertebrate community to smaller, less useful, fish foods. The fluctuations cause downstream erosion and sedimentation that destroy fish habitat and can disrupt fish migratory patterns. In addition, peaking operations cause reservoir and tailwater fluctuations (up to 3 foot per day), resulting in de-watered and disrupted fisheries habitat.

The resource agencies have requested that all hydro projects operate in a run-of-river mode, defined as instantaneous inflow equals instantaneous outflow, with essentially no pond elevation fluctuation. If you decide to operate your project in a peaking mode, the MDNR will need quantitative habitat data to examine the severity and extent of habitat loss under the proposed operational mode of semi-peaking. Both IFIM and HEP allow for meaningful comparisons of operational strategies and will provide the background data for recommendations on the project operation that will adequately protect this river system.

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Fisheries Goals and Objectives

The Michigan Department of Natural Resources' overall aquatic habitat protection goal is:

To minimize and mitigate the negative impacts of hydroelectric facilities by operating these projects in a fashion that offers aquatic resources and users near natural riverine and reservoir conditions, protects and maintains aquatic environments and fish communities and rehabilitates those now degraded.

- 1) Riverine tailwater facilities to be operated in a run-of-river mode
- 2) Reservoir tailwater facilities to be operated with minimal tailwater and headwater fluctuation
- 3) Bypassed and/or diverted river facilities to be operated in a manner which maintains healthy aquatic resources of the river

Michigan's river systems provide a significant fishery and public trust resource. The fisheries resource includes important populations of game fish which include largemouth bass, smallmouth bass, northern pike, walleye, bluegills, yellow perch, black crappie, rock bass, channel catfish, suckers (including redhorse) and bullheads. The present habitat availability would be limited by any proposed peaking operational mode at the project.

Our specific fisheries habitat goal at your facility is to protect and enhance the fish community in the river and its tributaries by maximizing and stabilizing available aquatic habitat. This is best accomplished by recommending run-of-river-operating conditions. Run-of-river is defined as instantaneous inflow to the project impoundment equals instantaneous outflow downstream of the project tailwater

Study Methodology Appropriateness

The recommended study methodologies IFIM and HEP are commonly used techniques to examine the impacts of water development. Both methodologies will produce documentation on habitat availability under a range of operational strategies that are needed to analyze the impacts of these facilities.

Study Data Utilization

This study will provide data on the potential availability of fish habitat under a range of operating modes that will provide for meaningful comparisons of the options available to the resource agencies and the city. These data will provide

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the basis for our recommendations on which operation of the project will best protect the aquatic environment.

Our goals of protection and enhancement of the fish community would be furthered by the prevention of resource damage from hydroelectric generation and provide for the optimal long term maintenance of the riverine fish community by maximizing and stabilizing the amount of available aquatic habitat. This study would provide the necessary data to make the appropriate project operation recommendations to protect aquatic habitat in this river system.

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APPENDIX 3. MDNR IFIM Two Flow Analysis Guidelines October 1990

Introduction

Peaking operations cause impacts at both the low and high flow events. Low flow events mainly limit habitat by reducing both stream depth (de-watering habitat and stranding organisms) and water velocity. High flow events mainly limit habitat by increasing velocities beyond that used by organisms. The use of optimal flows from HABTAT and/or HABTAV for benthos and fish habitat only addresses low flow impacts, thus two flow analyses are needed to examine operational impacts at low and high flows. The following guidelines are for two-flow peaking analysis as discussed in Milhous et al. (1989).

Recommended Analytical Methodology

The intent in this type of study is to: 1) determine the actual peaking impact when movement ranges are known or to bracket the peaking impact when the actual movement ranges for species in question is unknown; and 2) compare the peaking operation to run-of-river conditions. Run-of-river should be simulated using the average daily discharge at peaking operations. The bracketing should be done by documenting the most conservative and liberal estimate of peaking impacts from both life stage (the movement question) and study area perspectives (independence of study reach question).

Two approaches to handle movement concerns for individual life stages should be used and are dependent upon whether the life stage or species was classified as a mobile or non-mobile. Non-mobile life stages and species are benthos, spawning and fry. Juvenile and adult life stages are should be classified as mobile. Recreational activities should also be classified as mobile. These approaches follow the procedures in Milhous et al. (1989) and communications with Milhous and Bartholow (personal communication, 1990). These approaches are described below:

Non-mobile species and life stages Peaking impacts on non-mobile life stages should be determined using the HABEF program. This program uses output files from HABTAT or HABTAV and examines WUA for each cell at both the generation and base flow. The lowest WUA of the two flows is then assigned to the cell for the summation of WUA for the reach. This approach assumes that no migration or movement occurs between cells, a realistic assumption for the non-mobile life stages and species. Run-of-river WUA should be determined using HABTAT or HABTAV results for the particular flow of interest. WUA percentage loss estimates for both the reach and whole study area should be calculated by dividing the appropriate peaking WUA (as determined by HABEF) by the appropriate run-of-river WUA (as determined

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by HABTAT) at each possible peaking discharge and multiplying these figures by 100.

Mobile life stages The impacts on mobile life stages with unknown home ranges should be determined using a combination of HABEF output and a comparison of whole reach generation and base flow WUA from HABTAT or HABTAV. The impacts should be bracketed by presenting the results of the two extremes of movement which are: 1) no migration between cells or reaches as modeled by HABEF; and 2) complete migration through the entire reach as modeled by comparing HABTAT or HABTAV WUA results for generation and base flow for each case and using the minimum value of the two to represent the peaking impact. The actual impact has to be somewhere within this impact window between these two scenarios as it is unlikely that juvenile and adult fish will not move at all in response to changes in stage and flow, and it is equally unlikely that fish will travel through an entire reach multiple times per day in response to the changes in stage and flow.

The individual reach WUA estimate of peaking impacts that allows total movement within the reach should be determined using the minimum of generation and base flow WUA from HABTAT or HABTAV for a given reach. The no migration within a reach case WUA should be determined using HABEF output for a given reach as described above for the non-mobile species and life stages. Individual reach run-of-river WUA and percent loss for a individual reach should be determined as described above for the non-mobile species and life stages.

When the actual home ranges are known and are not greater than the cross sectional distance of the transects, then HABTAM can be used as the best estimate of the peaking impact. Individual reach run-of-river WUA and percent loss for a individual reach should be determined as described above for the non-mobile species and life stages.

Literature Cited

Milhous, R.T., M.A. Updike, and D.M. Schnieder. 1989. Physical Habitat Simulation System Reference Manual - Version II. Instream Flow Information Paper No. 26. U.S. Fish and Wildlife Service Biological Report 89 (16). v.p.

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**APPENDIX 4. MDNR Fish Entrainment and Turbine Mortality Study Plan
Guidelines**

Introduction

The Michigan Department of Natural Resources (MDNR) has determined that a study to quantify the magnitude of potential turbine-induced injury or mortality on the fishery resources is needed. The overall study has been broken down into two main components: monitoring fish entrainment and mortality rates and controlled turbine mortality experiments. The fish entrainment and mortality rate study (Phase 1) should be conducted initially. Based on the results of Phase 1 studies, the need for a more formalized turbine mortality study (Phase 2) will be determined. A phased approach to addressing the turbine mortality issue will preclude a potential applicant from conducting a, perhaps, unnecessary turbine mortality study. The MDNR may accept a potential applicant's proposal to conduct Phase 1 and Phase 2 studies concurrently, however. The MDNR may recommend that components of the studies be redone if the studies are not conducted as agreed to or if the results are not representative.

The potential applicant may opt to implement fish protective measures at the outset of after Phase 1 studies. In this case, the potential applicant will be required to conduct studies to develop appropriate mitigation measures. In all cases, licensees will be required to monitor the effectiveness of fish protective or mitigation measures once they are implemented. These studies will need to be coordinated with the MDNR.

The guidelines presented below identify the critical elements that must be included in a detailed plan of study developed by the potential applicant. Specific details, such as design of sampling equipment, sampling schedules, etc., will require coordination with the MDNR. The final study plan must be approved by the MDNR before studies are begun.

This document contains exact technical specifications that should be used to design an entrainment study. These specifications should be used in obtaining bid and study designs from consultants. These specifications are minimum specifications subject to discussion only when site-specific conditions warrant.

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Phase 1 - Assessment of Fish Entrainment and Preliminary Mortality Rates

All entrainment studies should be designed to meet the following specific data objectives:

1. Estimates of the total number of each fish species (greater than one and a half inches) passing through the project during the study;
2. Estimates of the size distribution of fish entrained;
3. Estimates of the vertical and horizontal distribution of fish passing through the intake in one meter increments (pertains to hydroacoustic studies only); and
4. Estimates of the daily and hourly fish passage numbers through each turbine.

When an applicant is requested to perform an entrainment study, the protocol should be as follows:

1. Agency study specifications (this document) are provided to the applicant. MDNR and applicants may hold initial meetings to clarify the design or address specific concerns. Applicants should use the agency specifications as basis for obtaining consultants bids or scopes of work.
2. Applicant or consultant perform proof-of-concept study (POC) to verify that the procedures, equipment, and analyses proposed by the consultant will, in fact, provide the information promised
3. MDNR and applicant meet to review POC study results and develop scope of work for the entrainment study
4. Applicant conducts the entrainment study according to an agency-approved scope of work

Proof of Concept Study (POC)

To verify that the proposed study design will provide the data required for evaluating entrainment, a "proof-of-concept" (POC) study is required. The purpose of the POC is to determine the appropriate methodology to use at the site to determine entrainment. If hydro acoustics are proposed, then the POC should be designed to determine whether entrainment can be accurately estimated using this methodology and include tracking of live test fish. Ground truth netting should be used in the POC study to show an initial relationship

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between hydro acoustic sampling and tailwater netting. If a netting only study is proposed, the POC should show that entrainment can be accurately estimated using this method.

The POC study should be conducted for at least a two-week period to verify the applicability of the methodology selected. This study must be completed and reviewed by MDNR prior to the initiation of the scope of work. Each POC study must specifically address all of the technical and design parameters that are listed below. The procedures used must be fully documented.

A test-netting program must be conducted over a two-week period. This should include the installation and monitoring of the nets described below, a net efficiency study, and a visual evaluation by a SCUBA diver to confirm that the net support system is adequate and that the tailrace area is free of any obstructions that could tear the net or effect net fishability. Measures should be taken to prevent downstream infiltration of fish in areas where the net seal is not sufficient. In particular, the bottom seal should be examined as this is the area where infiltration problems usually occur.

The tailwater net efficiency study should include the introduction of at least 150 marked fish of various sizes and species into the turbine(s). A recapture rate of at least 70% of these fish is necessary to show that the nets are fishing properly. MDNR representatives should be notified prior to this test so they may observe and evaluate the operation.

Actual Entrainment Study

The following specific technical and design parameters must be incorporated into all studies. If site-specific conditions warrant the modification of these parameters, full justification and details of alternative methods must be provided to the MDNR. The MDNR must approve any deviation from the original plan of study prior to the start of the study.

If a hydro acoustic assessment is proposed:

1. Transducers should be placed so that at least 50% of the intake openings in all turbine bays that are sampled. Each transducer should operate for a period of no less than thirty minutes every hour. Near and far field dead zones must be fully measured and accounted for in consideration of the 50% coverage and vertical distribution requirements. Monitoring must be conducted 24 hours a day for at least one full year.
2. Single beam transducers should be used because they are less sensitive to noise and provide wide coverage. However, one dual beam transducer

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- per site is needed to develop a target strength distribution and effective beam angle.
3. The pulse width used should be 0.5 milliseconds or less
 4. A scientific echo sounder with a frequency of at least 400 kHz should be used
 5. An accurate 40 log R Time Varied Gain (TVG) must be used to account for range-related signal loss
 6. The echo signal processor-sampling rate must be no less than 15,000 samples per second
 7. The pulse repetition rate must be 10-15 pulses per second to ensure that targets will be fully tracked
 8. All transducers and equipment will be properly calibrated. The actual equipment used in the study must be calibrated using standard Naval Lab hydrophones before and after the study. If the study lasts more than one year, this calibration should be conducted annually. In situ calibration should be conducted at the start and end of the study as well as every three months during the study. This calibration consists of cable and transducer impedance measurements, TVG shape, and standard target return. All calibration measurements must be maintained and reported with the study results.
 9. Studies must use the echo-counting analysis technique unless the proportion of multiple targets exceeds 5%. Echo integration techniques are not recommended and are rarely necessary.
 10. All data extrapolations and calculations must use the effective beam width as measured at calibration based on the target strengths appropriate for the species and sizes of fish expected to be seen at that site. Calculations based on manufacturers nominal beam widths are not acceptable.
 11. Instrument specifications must be provided to the MDNR and copies of all equipment manuals must be available upon request.
 12. Target-tracking/recognition processing can be used to differentiate fish from noise and debris. All tracking parameters, including filters must be agreed on up front in the scope of the work. In situ field measurements of representative fish targets should be conducted as part of the POC study.

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13. A direct fish-counting fish flux estimation procedure is recommended because it directly incorporates target tracking. However, a mean density analysis procedure may be used if acceptable target recognition adjustments can be incorporated. In situ field trials may be needed to determine the efficacy of the two methods.
14. Target strength distributions and length relationships used to develop length distributions and effective beam width calculations must be fully documented. In situ lab measurements of batches of representative species and size fish should be conducted as part of the POC study. Correct all-aspect equations should be used where appropriate.
15. Site-specific noise levels must be adequately measured and mapped for each turbine bay. This should be conducted as part of the POC study. These should be incorporated into transducer placement plans and detection level estimates. The minimum effective detection threshold should be a signal return corresponding to a fish 1.5" in length.
16. All data extrapolation procedures must be fully documented prior to study initiation and use statistically valid procedures.
17. All hydro acoustics sampling must be accompanied by an appropriate level of tailwater netting (see below) to determine size ranges and species composition of fish seen in the hydro acoustics.
18. Hydro acoustics entrainment estimates must be correlated to net catch. Discrepancies suggest a design or configuration deficiency and should be addressed prior to study start. Calculations must be done at a minimum on a monthly basis with analysis of hourly counts on the time step, so those problems can be detected and corrected. These calculations should be included in the bimonthly reports.

Criteria for netting:

1. If a netting only study is proposed, at least 72 hours of netting at each unit should be done each week during the ice-free period (April-October). During winter months (November-March), 72 hours of sampling should be conducted on a biweekly basis assuming safe sampling conditions exist. If netting is done to ground truth hydroacoustics, a minimum of 24 hours should be done each week, April-October, and 24 hours biweekly, November-March. Sampling effort should be stratified on a weekly basis to make sure there is adequate coverage of all time periods.

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2. The recovery net(s) should be constructed of dark colored (to minimize fish avoidance) 1/4 inch bar mesh, knotless nylon, with a removable live box attached to the cod end of the net. A fyke net should be incorporated into the net, near the live box, to prevent escapement. The effects of the recovery net(s) and live box on the mortality or injury of fish must be determined through suitably designed experiments. Divers should inspect all nets to ensure nets are fishing according to specifications. Nets should be appropriately marked immediately following inspection so that proper placement can be gauged each time the net is installed.
3. The recovery net(s) should sample the entire turbine discharge. A marked fish study should be conducted to determine the capture efficiency of the recovery net(s) and to obtain preliminary turbine mortality estimates. The capture efficiency of the net(s) must be quantified by releasing known lot sizes of marked live and dead fish at the intake. At least two capture efficiency/turbine mortality bouts should be done in addition to the bout conducted during the POC study. Species should be determined in consultation with the MDNR. The capture efficiency of the recovery net(s) must be based on the release and subsequent recovery of marked live and dead fish. Preliminary estimates of turbine mortality will be based on the release of marked live fish; live fish used in the preliminary turbine mortality study may be used concurrently as part of the study to quantify capture efficiency of the recovery net(s). The two size classes of each species, juvenile and adult, as defined in consultation with the MDNR, should be used. Three groups of fish of each species and size group are needed for these studies: 1) a control group of 10 fish per species and size class to examine handling and marking mortality, 2) a net control group of 10 fish per species and size class to examine net mortality, and 3) a test group of 50 fish per species and size class to examine turbine passage and net efficiency. Fish may be of hatchery, wild, or commercial catch origin.

Suitably designed assemblies to introduce live and dead fish at the turbine intake must be used. Fish must be released at an appropriate location within the intake chamber to ensure entrainment of all released fish.

All fish used in the marked fish studies should be held for a minimum of 48 hours to determine latent mortality.

4. If more than one operational turbine unit exists, selection of the units to be sampled should be done through consultation with the MDNR, but with the overall goal of estimating entrainment to $\pm 10\%$.
5. Installed nets should be flushed before the tests begin to remove as many "resident" fish as possible from the draft tube/tailwater area.

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6. The species, size, and condition (live, dead, or injured) of all captured fish should be recorded. A randomly selected 10 percent of all fish used in the marked fish studies should be examined for internal injuries. Voucher samples of each species captured should be preserved so that MDNR can verify species identifications.

For all studies:

1. Environmental variables - data that should be recorded during the collection of each sample include a total river discharge (in cubic feet per second), percent gate opening (load level) and discharge (in cfs) of each sampled unit and of other operational turbine units, water temperature, dissolved oxygen, and transparency (Secchi disk), and other variables as identified by the MDNR. Also a velocity vs. depth profile to include vertical and horizontal velocity profiles should be obtained from directly upstream of the trash racks during low, average, and high water discharges.
2. Data analysis - a description of all statistical tests proposed for data analyses, including assumptions and how such assumptions will be addressed, significance levels, confidence levels, etc. must be provided and approved by the MDNR prior to study initiation.
3. Reports
 - A. Written progress reports should be provided to the MDNR on a bimonthly basis throughout the study period, and should include a description of any intentional or unintentional deviations from the approved study plan.
 - B. Reports should contain the following data:
 1. Hydro acoustic data
 - a. Amount of time sampled by day and explanations of any down time in sampling
 - b. Total daily fish passage
 - c. Daily fish passage by hour
 - d. Fish passage by location in the water column and across the intake structure
 - e. Fish passage by size
 2. Netting data

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- a. Amount of time sampled by day and explanation of any down time in sampling
- b. All fish data should be broken down by species and should include numbers and size (length)
- c. Data should be presented to on an hourly, daily, monthly and annual basis, and by net location.
- d. All fish with external and internal turbine passage damage should be documented

3. Environmental and Plant Parameters

- a. Daily mean and hourly river flow in cubic feet per second (cfs)
 - b. Daily mean and hourly river temperature (°F) and dissolved oxygen (mg/l)
 - c. Daily mean and hourly headwater level
 - d. An hourly description of plant operation (units operating, each unit's discharge, % gate opening and Kw)
 - e. A daily summary of weather
- C. A final study report is to be submitted to the MDNR within three (3) months after completion of the study.
- D. The MDNR will provide written comments within three (3) months after receipt of the final report and will include any recommendations for further study, i.e., Phase 2, or for the need of appropriate fish exclusion or mitigation measures.

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Phase 2 Study- Assessment of Turbine Mortality and Injury to Fish

This study is designed to develop intensive data on actual turbine-induced injury and mortality, based on the release and recovery of known lot sizes of marked test and control fish. Phase 2 studies are needed to more accurately quantify the occurrence and extent of turbine-related impacts to entrained fish.

1. Fish species of concern - target species and sizes to be studied will be determined through further consultation with the MDNR.
2. Sampling equipment
 - A. Suitably designed assemblies to introduce test and control fish at the turbine intake and discharge must be used. Test fish must be released at an appropriate location within the intake chamber to ensure entrainment of all released fish.
 - B. Total recovery net(s), if used, are to be located in the tailrace(s) as described above.
 - C. Ichthyoplankton sampling equipment details will be provided by the MDNR if ichthyoplankton studies are deemed necessary.
3. Sampling protocol
 - A. Fish injury and mortality experiments should be appropriately frequency as determined through consultation with the MDNR. In addition, the experimental design should include provisions for adequate sample sizes and an adequate number of replicates. Experiments should be conducted over the full range of normal project operating conditions, e.g., peak and off-peak.
 - B. Live test and control fish selected from the same lot of fish should be acclimated to the project water for at least 24 hours. A third group of fish not subjected to the test and control procedures, selected from the same lot of control fish, should be held separately in holding cages in the tailrace to permit an assessment of non-test impacts.
 - C. The effects of the fish introduction assemblies, the recovery net(s), and fish marking techniques (e.g., fin clipping, dye immersion) on the injury and mortality of test and control fish must be determined.
 - D. The condition of captured fish should be categorized according to the following criteria.

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- Live with no visible external injury
- Live with obvious external injury
- Dead with no visible external injury
- Dead with obvious external injury

Live test and control fish (with and without apparent external injury) recovered from the recovery net(s) should be held 48 hours in suitably designed holding cages secured in the tailrace to determine latent mortality of fish. Fish should be segregated by species and size to minimize stress and predation.

E. The number, species, condition, and size of all fish released and recovered in each trial must be recorded.

4. Environmental variables - see above
5. Data analysis - see above
6. Reports - see above. The MDNR will provide written comments within three (3) months after receipt of the final report and will include any recommendations for the need for appropriate fish exclusion or mitigation measures.

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APPENDIX 5. MDNR Turbine Entrainment and Mortality Study Justification

The following is the Michigan Department of Natural Resources (MDNR) justification for the recommended turbine entrainment and mortality study at your facility. This document fulfills the requirement of Subpart B, Section 16.8 (i)-(vi) of the recently adopted FERC rules governing resource agency recommendations for necessary studies and information relating to a recommendation for a standard turbine mortality/entrainment study.

Data Recommended For Analysis of Issue by MDNR

1. Provide quantitative estimates of the number, species composition and size distribution of fish being entrained at the project; or acceptable quantitative estimates of the above parameters from a comparable project; or acceptable quantitative evidence that installed protective devices are preventing fish entrainment.
2. Provide quantitative estimates of the mortality rate of fish being entrained at the project and the source of the mortality (turbine mortality, impingement on intake screens, etc.); or acceptable quantitative estimates of the above parameters from a comparable project; or acceptable quantitative evidence that installed protective devices are preventing fish mortalities.

If the above information is not available, then the applicant should arrange to collect the information using recommended survey procedures provided by the MDNR.

Determination Basis of Resource Issue

Numerous studies have been conducted to determine the extent of fish entrainment at hydroelectric projects nationwide with many of them summarized in Eicher et al. 1987. Unfortunately, most of these studies have been conducted at West Coast facilities and deal with migrating salmonid smolts. A number of entrainment studies have also been done on the east coast, targeting on anadromous species such as shad, striped bass, alewife, blueback herring and Atlantic salmon. These studies have shown that mortalities can be significant and range between 5-90% per facility. Very few entrainment studies have been done in the Midwest, where the hydroelectric facilities and their design, fish community composition and fish sizes are very different from those examined in the literature. Thus, little is known concerning turbine entrainment and mortality in the Midwest.

In the past, many fisheries biologists felt that the fish species indicative of Midwestern rivers were fairly sedentary and did not move long distances. These

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"resident" fish have recently been found to move long distances putting themselves at risk from turbine mortality. Studies by WDNR personnel on walleye in the Mississippi River, smallmouth bass in the Embarrass River, and channel catfish in the lower Wisconsin River all have shown movement of each of these species in excess of 30 miles over one year. In addition, studies on the threatened lake sturgeon in the Menominee River by Tom Thuemler have shown yearly movements of at least 20 miles with some radio tagged fish moving through hydroelectric facilities.

Summaries of the few recent entrainment studies on Midwestern rivers have shown large amounts of movement through hydroelectric facilities. The Morrow Dam Study, using tailwater netting, on the Kalamazoo River in Michigan estimated 45,987 fish passing the facility consisting of 21 species, ranging in size from 1.8 to 32.4 inches, in 6.5 months of sampling. Hydro acoustic studies at the Park Mill facility on the Menominee River showed daily movements of from 216 to 10,017 fish and hydro acoustic/netting studies at the Vanceburg hydroelectric plant on the Ohio River estimated hourly movement at from 282 to 6,000 fish.

The magnitude of resident Midwestern fish movements, available Midwestern data on entrainment and the wide range of known fish mortalities have led us to determine that turbine entrainment and mortality occurs at our facilities. Legally, all fish are property of the State of Michigan, under Public Act 165 of 1929 and any fish killed by any non-legal means are to be compensated for. Therefore, we are requesting a turbine entrainment and mortality study be conducted at your facility to determine the nature and degree of mortality, and to determine the necessary mitigation for those losses.

Fisheries Goals and Objectives

The overall Michigan Department of Natural Resources' goal on hydroelectric facility entrainment and mortality is:

To minimize and mitigate for the loss of fish at every hydroelectric facility from either turbine or spillway passage to protect and maintain fish communities, and rehabilitate those now degraded.

Michigan's river systems provide a significant fishery and public trust resource. The fisheries resource includes important populations of game fish which include largemouth bass, smallmouth bass, northern pike, walleye, bluegills, yellow perch, black crappie, rock bass, channel catfish, suckers (including redhorse) and bullheads. Our fisheries goal in respect to entrainment and mortality at your facilities is to protect and enhance the fish community in the river and its tributaries by minimizing and mitigating for fish losses from hydroelectric facility entrainment and mortality.

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Study Methodology Appropriateness

In order to adequately determine turbine entrainment and mortality a direct sampling system is needed. The joint agency, MDNR, WDNR and the U.S. Fish and Wildlife Service, sampling guidelines use a two-phase approach. Phase I is designed to determine entrainment and to estimate the magnitude of mortality. If mortality is found to be a problem then more detailed mortality studies are recommended as part of Phase II. Our hope and intent is that most of the studies should stop at Phase I, instead of requiring both phases to be done at once.

This overall methodology is preferable and less costly than trying to determine whole system effects. Whole system effects would require detailed and long-term population dynamics of each member of the fish community. Turbine entrainment and mortality data would still need to be collected and compared to natural mortality and year class strengths. By using just direct sampling techniques, mitigation measures can be more easily determined, and the very large and costly sampling effort can be avoided. This overall methodology also follows the methodology the State of Michigan uses to determine mitigation for fish kills. For example, if farmer X kills fish in drain A, we require direct compensation for those fish killed not a river system wide impact statement as these fish are property of the State of Michigan killed in an illegal method. We view turbine mortality as a chronic fish kill situation.

This overall methodology has been used before in numerous turbine mortality studies including Morrow Pond, Park Mill and Vanceburg studies. The actual methodologies recommended, hydro acoustics and tailwater netting, are commonly used as can be seen in the review by Eicher et al. (1987).

Study Data Utilization

This study will provide data on the numbers entrained and the mortality of each member of the fish community of the river and its tributaries at your hydroelectric facility. These data will then be converted to a mitigation value by either a lost angler day determination or some other acceptable technique. These mitigation values will be used to determine if the problem is severe enough to require screening, which is always an alternative to the study, or some other mitigation to replace the lost resource value.

Our goals of protection and enhancement of the coolwater fish community would be furthered by the replacement of lost resource values from hydroelectric generation if the losses are not severe enough to warrant protective devices or the complete exclusion of fish, by protective devices, if the losses are significant.

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Thus, no net loss of the fisheries resource value would occur in either case because of the results of this study.

Literature Cited

Eicher, G.J., M.C. Bell, C.J. Campbell, R.E. Craven and M.A. Wert. 1987.
Turbine Related Fish Mortality: Review and Evaluation of Studies. Electric
Power Research Institute Report No. AP-5480.

Yayac, Maggie

Subject: FW: EPA early comments - Constantine Dam Hydro relicensing, St. Joseph Co, MI (FERC Project No. P-10661)
Attachments: Constantine Dam Hydro Pre Application Questionnaire - EPA comments (9-20-2017).docx

From: Pellosso, Elizabeth [<mailto:Pellosso.Elizabeth@epa.gov>]
Sent: Wednesday, September 20, 2017 10:52 AM
To: Kulpa, Sarah
Subject: EPA early comments - Constantine Dam Hydro relicensing, St. Joseph Co, MI (FERC Project No. P-10661)

Ms. Kulpa,

Please see attached for EPA's comments on the Pre-Application Document Information Questionnaire for FERC licensing for the Constantine Hydroelectric Project on the St. Joseph River in St. Joseph County, MI.

At this time, we did not have substantive comments, but please keep us involved as the NEPA process moves forward.

Regards,

Liz Pellosso, PWS
Wetland/Environmental Scientist
NEPA Implementation Section
U.S. Environmental Protection Agency - Region 5
77 W. Jackson Blvd. (E-19J)
Chicago, IL 60604

Phone: 312-886-7425
Fax: 312-692-2540
Email: pellosso.elizabeth@epa.gov

Constantine Dam Hydroelectric Project, FERC Project No. P-10661

Pre-Application Document Information Questionnaire for FERC Licensing

Indiana Michigan Power Company (I&M) is the Licensee and operator of the Constantine Hydroelectric Project (FERC No. P-10661) (Project), located along the St. Joseph River in St. Joseph County, Michigan. I&M, with assistance from HDR, Inc. (HDR), is beginning the Federal Energy Regulatory Commission (FERC) relicensing process for the Project, and HDR is providing assistance with preparation of a Pre-Application Document (PAD). The PAD provides the Federal Energy Regulatory Commission (FERC) and other entities with existing, relevant, and reasonably available information pertaining to the Project.

This information is intended to help identify items of interest and related information needs, develop study requests and study plans, and prepare documents related to the relicensing application. To prepare the PAD, I&M/HDR will use information in its possession and information obtained from others. This PAD Questionnaire will be used to help identify sources of existing, relevant, and reasonably available information that is not currently in I&M/HDR's possession.

Comments and/or questions regarding this request may be sent to Sarah Kulpa with HDR via email at sarah.kulpa@hdrinc.com or via phone at (704) 248-3620, or to Jonathan Magalski who represents I&M at jmmagalski@aep.com or via phone at (614) 716-2240.

1. Contact Information for person completing the questionnaire:

Name & Title:	<u>Liz Pelloso, wetland/environmental scientist</u>
Organization:	<u>USEPA Region 5 – NEPA Implementation Section</u>
Address:	<u>77 W Jackson Blvd (E19-J)</u> <u>Chicago, IL 60604</u>
Phone:	<u>312-886-7425</u>
Email Address:	<u>pelloso.elizabeth@epa.gov</u>

2. Do you know of any reasonably available materials or information related to the Project or the Project's environment?

Yes (If yes, please complete 2.a. thru 2.e.) No (If no, please go to 3.)

a. Please indicate the specific resource area(s) for which you have information:

- | | |
|---|---|
| <input type="checkbox"/> Geology and soils | <input type="checkbox"/> Recreation and land use |
| <input checked="" type="checkbox"/> Water resources | <input type="checkbox"/> Aesthetic resources |
| <input type="checkbox"/> Fish and aquatic resources | <input type="checkbox"/> Cultural resources |
| <input type="checkbox"/> Wildlife and botanical resources | <input type="checkbox"/> Socio-economic resources |
| <input type="checkbox"/> Wetlands, riparian, and littoral habitat | <input type="checkbox"/> Tribal resources |
| <input type="checkbox"/> Rare, threatened & endangered species | <input type="checkbox"/> Other resource information |

b. Please briefly describe the information or list available documents: *(Additional information may be provided on a separate page.)*

The St. Joseph River is listed as impaired on the Clean Water Act Section 303(d) list of impaired waterbodies in Michigan. Several impairments exist.

c. Where and how can HDR obtain this information?

EPA recommends you access and use several of our databases to obtain environmental information pertaining to the project area:

- NEPAssist: <https://www.epa.gov/nepa/nepassist>
- WATERS: <https://www.epa.gov/waterdata/waters-watershed-assessment-tracking-environmental-results-system>
- Envirofacts: <https://www3.epa.gov/enviro/>
- EJSscreen: <https://www.epa.gov/ejscreen>
- Enviromapper: <https://www.epa.gov/emefdata/em4ef.home>
- Clean Water Act Section 303(d) impaired waters: <https://www.epa.gov/exposure-assessment-models/303d-listed-impaired-waters>
- NAAQS: <http://www.epa.state.oh.us/dapc/general/naaqs.aspx> and <https://www.epa.gov/green-book>

EPA also suggests I&M/HDR undertake early coordination as follows:

- Coordination with the U.S. Fish and Wildlife Service to determine if the project will have any detrimental effects on federally listed threatened or endangered species or their critical habitat.
- Initiation of a Rare Species Review with the Michigan Natural Features Inventory (MNFI). A Rare Species Review involves a refined review of the rare species in the immediate vicinity of your project. The Rare Species Review corresponds to the Endangered Species Assessment previously provided by the Wildlife Division of the Michigan Department of Natural Resources (MDNR), as MDNR ceased to accept review requests to the Environmental Review (ER) Program after

September 16, 2011. These consultations are required to determine if any Federally- or state-listed endangered or threatened species are present within the project boundaries, and if project implementation would or could detrimentally affect any listed species or their critical habitat. As on-site surveys vary by species, and in certain instances must be completed during specific short seasonal timeframes, EPA strongly encourages timely coordination with USFWS and MNFI.

- d. Please provide the names of other persons in your organization whom you wish to designate for a potential follow-up contact by HDR's representative for the resource area(s) checked above. If you know of others who are not part of your organization but who may have relevant information, please provide their name(s) and contact information as well. ***(Additional contacts may be provided on a separate page.)***

Representative Contact Information

Name & Title: Ken Westlake, Chief, NEPA Implementation Section
Organization: USEPA Region 5 – NEPA Implementation Section
Address: 77 W Jackson Blvd (E19-J)
Chicago, IL 60604
Phone: 312-886-2910
Email Address: westlake.kenneth@epa.gov

- e. Based on the resources listed in 2a., are you aware of any specific issues pertaining to the identified resource area(s) such as water quality, wildlife habitat, endangered species or cultural resources that may be affected by the Project operations? ***(Additional information may be provided on a separate page.)***

Yes *(Please list specific issues below)* No

Resource Area	Specific issue
The St. Joseph River is already listed as impaired.	The project should not further degrade water quality.

3. Do you or your organization plan to participate in the Dam licensing process?

Yes (*Please list specific issues below*) No

We are interested in your comments. If you have comments and/or questions regarding the Project, the Pre-Application Document, or FERC licensing, please note them below:

EPA will participate by reviewing NEPA documents required to be completed by FERC.
Please send future NEPA documents to EPA's NEPA program in Chicago for review.
This request was received by EPA R5's NEPA Program via US Mail on 8/24/2017.
Today's date: 9/20/2017

Constantine Hydroelectric Project (FERC Project No. 10661) Relicensing Pre-Application Document Information Questionnaire

Indiana Michigan Power Company (I&M) is the Licensee and operator of the Constantine Hydroelectric Project (FERC No. 10661) (Project), located along the St. Joseph River in St. Joseph County, Michigan (see attached map). I&M, with assistance from HDR, Inc. (HDR), is beginning the Federal Energy Regulatory Commission (FERC) relicensing process for the Project. Accordingly, I&M is preparing a Pre-Application Document (PAD). The PAD provides FERC and other entities with existing, relevant, and reasonably available information pertaining to the Project.

This information is intended to help identify items of interest and related information needs, develop study requests and study plans, and prepare documents related to analyzing the relicensing application to be prepared by I&M. To prepare the PAD, I&M will use information in its possession and information obtained from others. This PAD Questionnaire will be used by I&M to help identify sources of existing, relevant, and reasonably available information that is not currently in I&M's possession. Comments and/or questions regarding this request may be sent to Sarah Kulpa with HDR via email at sarah.kulpa@hdrinc.com or via phone at (704) 248-3620, or to Jonathan Magalski who represents I&M at jmmagalski@aep.com or via phone at (614) 716-2240.

Please return this questionnaire in the enclosed, self-addressed, stamped envelope within 30 days of receipt to allow for any follow-up contact by I&M's or HDR's representative that may be needed. Not responding within 30 days indicates that you are not aware of any existing, relevant, and reasonably available information that describes the existing Project environment or known potential impacts of the Project.

I&M and HDR respectfully request the following information:

1. Information about person completing the questionnaire:

Name & Title	Bob Stuber, Fisheries Biologist Michigan Hydropower Relicensing Coalition Consultant
Organization	Michigan Hydro Relicensing Coalition (MHRC)
Address	1620 High Street Traverse City, MI 49684
Phone	231-775-4321

2. Do you or your organization know of existing, relevant and reasonably available information that describes the existing Constantine Hydroelectric Project's

Constantine Hydroelectric Project (FERC Project No. 10661) Relicensing Pre-Application Document Information Questionnaire

environment (i.e., information regarding the St. Joseph River in or close to the Constantine Hydroelectric Project)?

Yes (If yes, please complete 2a through 2e) No (If no, go to 3)

a. If yes, please circle the specific resource area(s) that the information relates to:

- | | |
|--|---|
| <ul style="list-style-type: none">■ Geology and soils■ Water resources■ Fish and aquatic resources■ Wildlife and botanical resources■ Wetlands, riparian, and littoral habitat■ Rare, threatened & endangered species | <ul style="list-style-type: none">■ Recreation and land use■ Aesthetic resources■ Cultural resources■ Socio-economic resources■ Tribal resources■ Other resource information |
|--|---|

b. Please briefly describe the information referenced above or list available documents (*additional information may be provided on page 4 of this questionnaire*).

Michigan Department of Natural Resources St. Joseph River Fisheries Assessment
Fisheries Special Report No. 24 (Wesley and Duffy 1999)

c. Where can I&M obtain this information?

Michigan Department of Natural Resources Fisheries Division Library
(http://www.michigan.gov/dnr/0,4570,7-153-10364_52259_19056---,00.html)

Please also refer to Michigan Department of Natural Resources Fisheries Division correspondence dated September 20, 2017 (Kyle Kruger to Ms. Sarah Kulpa HDR). Listing of issues and areas of study for PAD.

d. Please indicate whether there is a specific representative you wish to designate for a potential follow-up contact by I&M's or HDR's representative for the resource area(s) checked above (*additional information may be provided on page 4 of this questionnaire*).

**Constantine Hydroelectric Project (FERC Project No. 10661)
Relicensing Pre-Application Document Information Questionnaire**

Representative Contact Information

Name	
Address	
Phone	
Email Address	

Name	
Address	
Phone	
Email Address	

- e. Based on the specific resources listed in 2a, are you aware of any specific issues or improvements pertaining to the identified resource area(s)?
(Additional information may be provided on page 4 of this questionnaire.)

Yes (please list specific issues below) No

Resource Area	Specific Issue

3. Do you or your organization plan to participate in the Constantine Hydroelectric Project relicensing proceeding? Yes No

4. We are interested in your comments. If you have comments and/or questions regarding the Constantine Hydroelectric Project or the relicensing process, please provide below. In addition, this questionnaire has been sent to the people/organizations shown on the attached distribution list; please let us know if

**Constantine Hydroelectric Project (FERC Project No. 10661)
Relicensing Pre-Application Document Information Questionnaire**

there is anyone else you believe should receive this questionnaire that is not included on the attached distribution list.

(Comments and/or questions may be sent via email to: sarah.kulpa@hdrinc.com or jmmagalski@aep.com)

As noted above, please return this questionnaire in the enclosed, self-addressed, stamped envelope within 30 days of receipt to allow for any follow-up contact by I&M's or HDR's representative that may be needed. Not responding within 30 days indicates that you are not aware of any existing, relevant, and reasonably available information that describes the existing Project environment or known potential impacts of the Project.

Yayac, Maggie

Subject: FW: Constantine Hydroelectric Project - Coastal Zone Consistency Determination
Attachments: Constantine Hydroelectric FERC Project 2017.pdf
Importance: High

From: Antieau, Christopher (DEQ) [mailto:ANTIEAUC@michigan.gov]
Sent: Tuesday, October 10, 2017 10:22 AM
To: Hanson, Danielle <Danielle.Hanson@hdrinc.com>; Kulpa, Sarah <Sarah.Kulpa@hdrinc.com>
Cc: Wuycheck, Ronda (DEQ) <WUYCHECKR@michigan.gov>
Subject: RE: Constantine Hydroelectric Project - Coastal Zone Consistency Determination
Importance: High

Ms. Hanson and Ms. Kulpa,

Attached is a copy of the CZM letter mailed in response to the Constantine FERC inquiry on August 21, 2017.

The letter confirms that as you suspected, this project is outside of Michigan's Coastal Zone Management Boundary.

Please contact me if there are any questions I can assist with,

Chris Antieau
Great Lakes Shorelands Unit
Water Resources Division
Department of Environmental Quality
(517) 290-5732 antieauc@michigan.gov

From: Hanson, Danielle [mailto:Danielle.Hanson@hdrinc.com]
Sent: Monday, October 9, 2017 12:01 PM
To: Wuycheck, Ronda (DEQ) <WUYCHECKR@michigan.gov>
Cc: Kulpa, Sarah <Sarah.Kulpa@hdrinc.com>; Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Jonathan M Magalski (jmmagalski@aep.com) <jmmagalski@aep.com>
Subject: Constantine Hydroelectric Project - Coastal Zone Consistency Determination

Good Morning Rhonda,

On behalf of Indiana Michigan Power Company, HDR is gathering information in support of the Pre-Application Document for the upcoming Federal Energy Regulatory Commission relicensing of the Constantine Hydroelectric Project (FERC No. 10661).

Consistent with this effort, HDR is requesting a determination from your office regarding the applicability of the State's Coastal Zone Policies to the Project, which is located on the St. Joseph River in St. Joseph County, Michigan. Based on a review of applicable information, we do not believe that the Project is located within the State's Coastal Zone and are requesting confirmation of this determination from your office. In support of this confirmation, we have attached a map indicating the location of this facility.

If you have any questions or need additional information regarding this Project please contact myself or Sarah Kulpa (cc'd on this email).

Thank you for your attention to this matter.

Sincerely,

Danielle Hanson
Environmental Scientist

HDR
6592 E. 34th Lane
Yuma, AZ 85365
M 315.729.4745
Danielle.Hanson@hdrinc.com

hdrinc.com/follow-us

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D.C. 20426
October 12, 2017

OFFICE OF ENERGY PROJECTS

Project No. 10661-000-MI
Constantine Project
Indiana Michigan Power Co.

Reference: Consultation with Tribes for the Constantine Project No. 10661

To The Parties Addressed:

The Federal Energy Regulatory Commission (Commission) invites your participation in the relicensing process for the existing Constantine Project No. 10661. The 1.2-megawatt Constantine Project, a hydroelectric project, is located on the St. Joseph River near the village of Constantine in St. Joseph County, Michigan. Indiana Michigan Power Co., the licensee for the project, must file a notice of intent and a Pre-Application Document by September 30, 2018, and must file an application for a new license by September 30, 2021.

It is very important that a tribe whose interests could be affected by the proposed Constantine Project participate early in the process so that tribal concerns are addressed. For this reason, please inform us if you have an interest in participating in the relicensing process for the project. In addition, please indicate if you would like to meet with Commission staff to discuss the Commission's licensing process, how your tribe can participate to the fullest extent possible, your interests and concerns in the affected area, and how to establish procedures to ensure appropriate communication between Commission and tribal staffs. The meeting can be limited to Commission and your tribal staff, or can be open to other tribes, Indiana Michigan Power Co., or any other licensing participants.

If at all possible, we would appreciate your response by November 13, 2017. The Commission strongly encourages electronic filing. Please file your response using the Commission's eFiling system at <http://www.ferc.gov/docs-filing/efiling.asp>. Commenters can submit brief comments up to 6,000 characters, without prior registration, using the eComment system at <http://www.ferc.gov/docs-filing/ecomment.asp>. You must include your name and contact information at the end of your comments. For assistance, please contact FERC Online Support at FERCOnlineSupport@ferc.gov, (866) 208-3676 (toll free), or (202) 502-8659 (TTY). In lieu of electronic filing, please send a paper copy to: Secretary, Federal Energy

P-10661-000

2

Regulatory Commission, 888 First Street N.E., Washington, D.C. 20426. The first page of any filing should include docket number P-10661-000.

If you have any questions or comments, please contact Colleen Corballis at (202) 502-8598, or at colleen.corballis@ferc.gov. Ms. Corballis will contact you shortly to follow-up on this letter.

Sincerely,

Janet Hutzal, Chief
Midwest Branch
Division of Hydropower Licensing

Addressees:

Joseph Wildcat Sr, President
Lac du Flambeau Band of Lake
Superior Chippewa Indians
P.O. Box 67
Lac du Flambeau, WI 54538

Liana Onnen, Chairperson
Prairie Band Potawatomi Nation
16281 Q Road
Mayette, KS 66509

Gary Besaw, Chairperson
Menominee Indian Tribe of Wisconsin
P.O. Box 910
Keshena, WI 54135

Douglas Lankford, Chief
Miami Tribe of Oklahoma
P.O. Box 1326
Miami, OK 74355

John Barrett, Chair
Citizen Potawatomi Nation
1601 South Gordon Cooper Drive
Shawnee, OK 74801

John Warren, Chairperson
Pokagon Band of Potawatomi Indians
P.O. Box 180
Dowagiac, MI 49047

Harold Frank, Chairman
Forest County Potawatomi Community
P.O. Box 340
Crandon, WI 54520

Regina Gasco-Bently, Chairperson
Little Traverse Bay Bands of Odawa
Indians
7500 Odawa Circle
Harbor Springs, MI 49740

Kenneth Meshigaud, Chairperson
Hannahville Indian Community
N14911 Hannahville B1 Road
Wilson, MI 49896

P-10661-000

2

Aaron Payment, Chairperson
Sault Ste. Marie Tribe of Chippewa
Indians
523 Ashmun Street
Sault Ste. Marie, MI 49783

Addressees CCed:

Melinda Young, THPO
Lac du Flambeau Band of Lake
Superior Chippewa Indians
P.O. Box 67
Lac du Flambeau, WI 54538

Kelli Mosteller, THPO
Citizen Potawatomi Nation
1899 S. Gordon Cooper Drive
Shawnee, OK 74801

David Gringon, THPO
Menominee Indian Tribe of Wisconsin
P.O. Box 910
Keshena, WI 54135

Michael LaRonge, THPO
Forest County Potawatomi Community
5320 Wesaut Lane
P.O. Box 340
Crandon, WI 54520

Hattie Mitchell, THPO
Prairie Band Potawatomi Nation
16281 Q Road
Mayette, KS 66509

Diane Hunter, THPO
Miami Tribe of Oklahoma
P.O. Box 1326
Miami, OK 74355

Marcus Winchester, THPO
Pokagon Band of Potawatomi Indians
P.O. Box 180
Dowagiac, MI 49047

Wesley Andrews, THPO
Little Traverse Bay Bands of Odawa
Indians
7500 Odawa Circle
Harbor Springs, MI 49740

Colleen Medicine, THPO
Sault Ste. Marie Tribe of Chippewa
Indians
531 Ashmun Street
Sault Ste. Marie, MI 49783

Earl Meshigaud, Cultural Resources
Hannahville Indian Community N14911
N-14911 Hannahville B1 Road
Wilson, MI 49896



FOREST COUNTY POTAWATOMI
NATURAL RESOURCES

5320 WENSAUT LANE • PO BOX 340 • CRANDON, WI 54520 • (715) 478-7222 • Fax: (715) 478-7225

October 26, 2017

Coleen Corballis
Midwest Branch
Division of Hydropower Licensing
Federal Energy Regulatory Commission
888 First Street N.E.
Washington D.C. 20426

Re: Project Number 10661-000-MI, Constantine Hydroelectric Project in the Village of Constantine, St. Joseph County, Michigan.

Dear Ms. Corballis,

Pursuant to consultation under Section 106 of the National Historic Preservation Act (1966 as amended) the Forest County Potawatomi as a Federally Recognized Native American Tribe reserves the right to comment on Federal undertakings, as defined under the act. Thank you for your participation in the process.

This response is regarding the project mention above. The Tribal Historic Preservation Office for the Forest County Potawatomi Community has submitted comments to this project which may contain information exempt from the Freedom of Information Act under Section 304 of the National Historic Preservation Act.

Respectfully,

Michael LaRonge
Tribal Historic Preservation Officer
Natural Resources Department
Forest County Potawatomi Community
5320 Wensaut Lane
P.O. Box 340
Crandon, Wisconsin 54520
Phone: 715-478-7354
Fax: 715-478-7225
Email: Michael.LaRonge@FCPotawatomi-nsn.gov

Miami Tribe of Oklahoma, Miami, OK.
October 26, 2017

Re: Constantine Project No. 10661-000-MI - Comments of the Miami Tribe of Oklahoma

To Whom It May Concern:

Aya, kikwehsitoole - I show you respect. My name is Diane Hunter, and I am the Tribal Historic Preservation Officer for the Federally Recognized Miami Tribe of Oklahoma. In this capacity, I am the Miami Tribe's point of contact for all Section 106 issues.

The Miami Tribe offers no objection to the above-mentioned project at this time, as we are not currently aware of existing documentation directly linking a specific Miami cultural or historic site to the project site. However, as this site is within the aboriginal homelands of the Miami Tribe, if any human remains or Native American cultural items falling under the Native American Graves Protection and Repatriation Act (NAGPRA) or archaeological evidence is discovered during any phase of this project, the Miami Tribe requests immediate consultation with the entity of jurisdiction for the location of discovery. In such a case, please contact me at 918-541-8966 or by email at dhunter@miamination.com to initiate consultation.

The Miami Tribe accepts the invitation to serve as a consulting party to the proposed project. In my capacity as Tribal Historic Preservation Officer I am the point of contact for consultation.

Respectfully,

Diane Hunter
Tribal Historic Preservation Officer
Miami Tribe of Oklahoma
P.O. Box 1326
Miami, OK 74355



Friends of the St. Joe River Association, Inc.

P.O. Box 1794
South Bend, Indiana 46634
www.fotsjr.org

Established 1994
501(c)(3) Not-for-Profit

January 25, 2018

Secretary
Federal Energy Regulatory Commission
888 First Street N.E.,
Washington, D.C. 20426

Re: Docket No. P-10661-000

Dear Secretary:

It has come to the attention of the Friends of the St. Joe River Association, Inc. (FotSJR), that the Constantine Hydroelectric Power Plant, Project No. 10661 is being considered for re-licensing by the Federal Energy Regulatory Commission.

The FotSJR is a non-profit citizen-based group working to protect the health of the St. Joseph River Watershed of Lake Michigan through education, advocacy, and scientific study. Its purpose is to support issues that concern the welfare of the St. Joseph River in general, including the development of resources to increase conservation of water quality, scenic beauty and natural resources while acting as the primary planning partner and advocacy group for the implementation of the St. Joseph River Watershed Management Plan. The FotSJR remains active in these goals within the St. Joseph River watershed located within the states of Michigan and Indiana.

For the reasons indicated above, and because the Constantine Hydroelectric Project plays a role in the efforts of the FotSJR to continue to endeavor to preserve and protect the health of the St. Joseph River Watershed, the FotSJR, through this correspondence, wishes to express its desire and interest in participating in the relicensing process for the Constantine Hydroelectric Power Plant (Project No. 10661).

If you have any questions, comments, or concerns about this request please contact me at the address listed above or by email at fotsjr.outreach@gmail.com

Sincerely,

A handwritten signature in blue ink, appearing to read 'Matthew A. Meersman'.

Matthew A. Meersman
President

Telephone Memo

To: Public Files
From: Colleen Corballis
Date: April 4, 2018
Dockets: P-10661-000
Project: Constantine Hydroelectric Project

Subject: Consultation with Tribes for the Constantine Hydroelectric Project No. 10661

On October 12, 2017, Colleen Corballis, staff of the Division of Hydropower Licensing with the Federal Energy Regulatory Commission (Commission) issued a letter initiating Tribal consultation for the relicensing process for the existing Constantine Hydroelectric Project No. 10661-000 (Constantine Project). Ms. Corballis followed up with the addressed Tribes via telephone on December 6 and 8, 2017, and on January 22 and 24, 2018 to determine if any would be interested in participating in consultation for the Constantine Project.

Following their filing on October 26, 2017, the THPO for the Forest County Potawatomi Community reached out to Ms. Corballis by email on December 28, 2017 expressing an interest in the project, specifically cultural resources surveys and SHPO comments. The THPO also requested to be added to the mailing list to receive electronic notifications. Ms. Corballis followed up by email.

On January 22, 2018, Ms. Corballis contacted the THPO for the Prairie Band of Potawatomi Nation by phone. The THPO requested additional copies of the initial consultation letter and a map of the project location, which was provided by email on January 23, 2018.

On December 6, 2017, the Tribal Historic Preservation Officer (THPO) for the Citizen Potawatomi Nation stated that the Tribe would not be interested in the project unless human remains are encountered on the property. On November 13, 2017 the THPO for the Miami Tribe of Oklahoma filed a letter with the same statement, but also said that the tribe would be interested in being a consulting party. Ms. Corballis made follow-up phone call to clarify their level of interest and the THPO stated that the tribe is not interested in formal consultation. The SHPO for the Little Traverse Bay Band of Odawa Indians also stated in a phone call on December 8, 2017 that the tribe has no interest in the project.

The Pokagon Band of Potawatomi Indians left Ms. Corballis a phone message on December 18, 2017. Ms. Corballis left a return message on January 22, 2018 and has not since been contacted.

The Lac Du Flambeau Band of Lake Superior Chippewa Indians, the Hannahville Indian Community, and the Menominee Indian Tribe of Wisconsin did not respond to the consultation letter or subsequent attempts to contact the tribes.



American Electric Power
1 Riverside Plaza
Columbus, OH 43215
aep.com

Via Electronic Filing

June 4, 2018

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, D.C. 20426

**Subject: Constantine Hydroelectric Project (FERC No. 10661)
Notice of Intent and Pre-Application Document**

Dear Secretary Bose:

Indiana Michigan Power Company (I&M or Applicant), a unit of American Electric Power (AEP), is submitting to the Federal Energy Regulatory Commission (FERC or Commission) the Notice of Intent (NOI) to file an application for a subsequent license and Pre-Application Document (PAD) for the Constantine Hydroelectric Project (FERC No. 10661) (Project) located on the St. Joseph River in St. Joseph County, Michigan. The existing FERC license for the Project expires on September 30, 2023.

The Applicant is distributing this letter to the stakeholders listed on the distribution list in Appendix A of the PAD. For stakeholders listed in Appendix A who have provided an email address, the Applicant is distributing this letter via e-mail; otherwise, the Applicant is distributing this letter via U.S. mail. Stakeholders interested in the relicensing process may obtain a copy of the NOI and PAD electronically through FERC's eLibrary at <https://elibrary.ferc.gov/idmws/search/fercgensearch.asp> under docket number P-10661 or on the Applicant's website www.aephydro.com/HydroPlant/Constantine. If any stakeholder would like to request a CD containing an electronic copy of the NOI and PAD, please contact the undersigned at the information listed below. In addition, the Applicant is providing two courtesy paper copies of the NOI and PAD to Commission Staff in the Office of Energy Projects and Office of General Counsel – Energy Projects, as required by the Commission's filing guidelines. The NOI and PAD are available for review at the Applicant's business office during regular business hours located at 1 Riverside Plaza Columbus, OH 43215.

Appendix D of the PAD includes a single-line electrical diagram of the Project and an existing Exhibit F Project drawing, as required by the Commission's PAD content requirements under 18 CFR § 5.6(d)(2)(iii)(D). The information contained in these drawings are deemed as Critical Energy Infrastructure Information (CEII) under 18 CFR §388.113, thus Appendix D of the PAD is not being distributed to the public. The Applicant is filing Appendix D under the Commission's eFiling guidelines for filing CEII.

In accordance with 18 CFR §5.5(e) of the Commission's regulations, the Applicant requests that the Commission designate I&M as the Commission's non-federal representative for purposes of

consultation under Section 106 of the National Historic Preservation Act (NHPA), 16 U.S.C. § 470f and the NHPA implementing regulations at 36 CFR Part 800.

In addition, the Applicant requests that FERC designate I&M as the non-federal representative for the Project for the purpose of consultation with the U.S. Fish and Wildlife Service and National Marine Fisheries Service, pursuant to Section 7 of the Endangered Species Act (ESA) and the joint agency ESA implementing regulations at 50 CFR Part 402.

We look forward to working with the Commission's staff, resource agencies, Indian Tribes, local governments, non-governmental organizations, members of the public, toward developing a license application for this renewable energy facility. If there are any questions regarding this letter or the NOI or PAD, please contact me at jmmagalski@aep.com or via phone at (614) 716-2240.

Sincerely,

A handwritten signature in black ink, appearing to read "Jonathan M. Magalski". The signature is written in a cursive style with a horizontal line extending to the left.

Jonathan M. Magalski
Environmental Specialist Consultant
American Electric Power Service Corporation, Environmental Services

Constantine Hydroelectric Project (FERC No. 10661) Distribution List

Federal Agencies

Mr. John Eddins
Office of Federal Agency Programs
Advisory Council on Historic Preservation
401 F Street NW, Suite 308
Washington, DC 20001-2637

Ms. Kimberly Bose
Secretary
Federal Energy Regulatory Commission
888 1st St NE
Washington, DC 20426

FEMA Region 5
536 South Clark Street, 6th Floor
Chicago, IL 60605

Mr. John Bullard
Regional Administrator
NOAA Fisheries Service
Greater Atlantic Regional Fisheries Office
55 Great Republic Drive
Gloucester, MA 01930-2276

Mr. Martin J. Rosek
State Soil Scientist
US Department of Agriculture
Natural Resources Conservation Service
3001 Coolidge Road, Suite 250
East Lansing, MI 48823

Ms. Mary Manydeeds
Bureau of Indian Affairs, Midwest Region
US Department of the Interior
Norman Pointe II Building
5600 W. American Boulevard, Suite 500
Bloomington, MN 55437

Office of the Solicitor
US Department of the Interior
1849 C Street, NW
Washington, DC 20240

Ms. Lindy Nelson
Regional Environmental Officer, Office of
Environmental Policy & Compliance
US Department of the Interior
Philadelphia Region
Custom House, Room 244
200 Chestnut Street
Philadelphia, PA 19106

Ms. Liz Pellosso
Wetland/Environmental Scientist, Region 5
US Environmental Protection Agency
77 West Jackson Boulevard (E19-J)
Chicago, IL 60604

Mr. Ken Westlake
Chief, NEPA Implementation Section - Region
5
US Environmental Protection Agency
77 West Jackson Boulevard (E19-J)
Chicago, IL 60604

Mr. Jack Dingleline
Assistant Field Office Supervisor/Michigan
Ecological Services Field Office
US Fish and Wildlife Service
2652 Coolidge Road, #101
East Lansing, MI 48823

Ms. Alisa Shull
Chief, Endangered Species - Midwest Region
(Region 3)
US Fish and Wildlife Service
5600 American Boulevard West, Suite 990
Bloomington, MN 55437-1458

Mr. Derrick Hubbell
Michigan Water Science Center
US Geological Survey
6520 Mercantile Way, Suite 5
Lansing, MI 48911-5991

Mr. Tom Weaver
Michigan Water Science Center
US Geological Survey
6520 Mercantile Way, Suite 5
Lansing, MI 48911-5991

US Geological Survey
1451 Green Road
Ann Arbor, MI 48105

Hon. Aaron Miller
US Congressman, 59th District
US House of Representatives
N-993 House Office Building
PO Box 30014
Lansing, MI 48909

Constantine Hydroelectric Project (FERC No. 10661) Distribution List

Acting Director, Headquarters
US National Park Service
1849 C Street, NW
Washington, DC 20240

Hon. Gary Peters
US Senate
Hart Senate Office Building
Washington, DC 20510

Hon. Debbie Stabenow
US Senate
713 Hart Senate Office Building
Washington, DC 20510-2204

State Agencies

Michigan Department of Agriculture
525 West Allegan Street
Lansing, MI 48933

Mr. Chris Antieau
Great Lakes Shorelands Unit - Water
Resources Division
Michigan Department of Environmental
Quality
525 West Allegan Street
PO Box 30473
Lansing, MI 48909-7973

Kalamazoo District Office
Michigan Department of Environmental
Quality
7953 Adobe Road
Kalamazoo, MI 49009-5025

Ms. Jessica Mistak
Michigan Department of Natural Resources
PO Box 30028
Lansing, MI 48909

Mr. Kyle Kruger
Senior Fisheries Biologist
Michigan Department of Natural Resources
Mio Field Office
191 S. Mt. Tom Road
Mio, MI 48647

Ms. Kesiree Thiamkeelakul
Michigan Department of Natural Resources
Mio Field Office
191 S. Mt. Tom Road
Mio, MI 48647

Mr. Brian D. Conway
State Historic Preservation Officer, Lansing
Office
State Historic Preservation Office
735 East Michigan Avenue
PO Box 30044
Lansing, MI 48909

Local Governments

Ms. Korie Blyveis
District Manager
Cass County Conservation District
1127 East State St.
Cassopolis, MI 49031

Mr. Robert Hile
Mayor
City of Sturgis
130 North Nottawa
Sturgis, MI 49091

Friends of the St. Joe River Association, Inc.
PO Box 1794
South Bend, IN 46634

St. Joseph County
PO Box 189
Centreville, MI 49032

Ms. Carolyn Grace
Administrator
St. Joseph County Conservation District
693 E. Main Street
Centerville, MI 49032

3. Local Governments
Mr. Keith Shears
President
Town of Centreville
221 West Main
PO Box 399
Centreville, MI 49032

Constantine Hydroelectric Project (FERC No. 10661) Distribution List

Mr. Mark R. Brown
Supervisor
Township of Constantine
425 Centreville Street
Constantine, MI 49042

Mr. George E. Morse
Supervisor
Township of Sturgis
70669 Stubey Road
Sturgis, MI 49091

Mr. Donald E. Gloy, Jr.
Supervisor
Township of White Pigeon
16825 Tomahawk Trail
White Pigeon, MI 49099

Mr. Gary Mathers
President
Village of Constantine
115 White Pigeon Street
Constantine, MI 49042

Mr. Tyler Royce
President
Village of White Pigeon
103 South Kalamazoo
PO Box 621
White Pigeon, MI 49099

Tribes

Mr. Michael LaRonge
Tribal Historic Preservation Officer
Forest County Potawatomi Community
5320 Wensaut Lane
PO Box 340
Crandon, WI 54520

Ms. Kelly Curran
Pokagon Band of Potawatomi Indians
58620 Sink Road
PO Box 180
Dowagiac, MI 49047

Nottawaseppi Huron Band of the Potawatomi
1485 Mno-Bmadzewen Way
Fulton, MI 49052

Non-governmental Organizations

Mr. John Seebach
American Rivers
1104 14th St NW, Suite 1400
Washington, DC 20005

Mr. Kevin Richard Colburn
National Stewardship Director
American Whitewater
PO Box 1540
Cullowhee, NC 28779

Michigan Audubon Society
2311 Science Parkway, Suite 200
Okemos, MI 48864

Michigan Citizens for Water Conservation
PO Box 1
Mecosta, MI 49332

Michigan Environmental Council
602 West Ionia Street
Lansing, MI 48933

Mr. Bob Stuber
Fisheries Biologist
Michigan Hydropower Relicensing Coalition
1620 High Street
Traverse City, MI 49684

Michigan Loon Preservation Association
10181 Sheridan Road
Millington, MI 48746

Michigan Nature Association
2310 Science Parkway, Suite 100
Okemos, MI 48864

Mr. Matt Meersman
Director
St. Joseph River Basin Commission
227 West Jefferson Boulevard
1120 County-City Boulevard
South Bend, IN 46601

**CONSTANTINE HYDROELECTRIC PROJECT
FERC PROJECT NO. 10661
NOTICE OF INTENT TO FILE APPLICATION FOR SUBSEQUENT
LICENSE**

Indiana Michigan Power Company (“I&M” or “Licensee”), a unit of American Electric Power (AEP) and the Licensee of the existing Constantine Hydroelectric Project (FERC Project No. 10661), hereby notifies the Federal Energy Regulatory Commission (“FERC” or “Commission”) of its intent to file an Application for Subsequent License for the Constantine Hydroelectric Project.

Pursuant to 18 C.F.R. §5.5(b) of the Commission’s regulations, I&M provides the following information:

(1) Licensee’s Name, Address, and Phone Number:

Indiana Michigan Power Company
1 Riverside Plaza
Columbus, OH 43215
Phone: (614) 716-2240

(2) FERC Project Number:

FERC Project No. 10661

(3) License Expiration Date:

September 30, 2023

(4) Statement of Intent to File Application for New License:

I&M hereby unequivocally declares its intent to file an Application for New License for the Constantine Hydroelectric Project on or before September 30, 2021. I&M will utilize the Commission’s Integrated Licensing Process (ILP) in support of this relicensing.

(5) Principal Works of the Constantine Hydroelectric Project:

Project works consist of: (a) an uncontrolled concrete gravity overflow spillway dam with a height of about 12 feet, a total length of 241.25 feet, including an abandoned 4-foot-wide fish chute at the left abutment which is now a sluice gate, and topped with 11-¼-inch-high flashboards; (b) a reinforced-concrete headgate structure 68 feet long and 20 feet high containing seven wooden gates about 7.75 feet wide by 15 feet high; (c) a 70-foot-long earthen embankment between the headgate structure and overflow spillway; (d) an earthfill reservoir impoundment dike with a maximum height of about 20 feet and a length of 650 feet located about 1,500 feet east from the left abutment of the main dam; (e) a reservoir with a surface area of 525 acres at a normal water surface elevation of

782.94 feet, National Geodetic Vertical Datum (NGVD); (f) a 1,270-foot-long power canal with a bottom width of 60 feet; (g) a brick powerhouse with dimensions of 140 feet by 30 feet containing four vertical-shaft Francis turbines connected to four 300-kilowatt (kW) generating units for a total installed capacity of 1,200 kW; (h) a switchyard adjacent to the powerhouse containing three step-up transformers; (i) a 2.4-kilovolt (kV) transmission line about 50 feet long; and (j) appurtenant facilities and equipment.

(6) Project Location:

The Constantine Project is located on the St. Joseph River in the Village of Constantine in St. Joseph County, Michigan.

(7) Plant Installed Capacity:

The Project's installed capacity is 1.2 megawatts (MW).

(8)(i) The names and mailing addresses of every county in which any part of the project is located and in which any federal facility that is used by the project is located are:

J. Patrick Yoder
County Administrator
St. Joseph County
125 W. Main St.
P.O. Box 189
Centreville, MI 49032

There are no federal lands or facilities associated with the Project.

(8)(ii)(A) The names and mailing addresses of every city, town, or similar political subdivision in which any part of the project is or is to be located and any federal facility that is or is to be used by the project is located:

Mark Honeysett
Village Manager
Village of Constantine
115 White Pigeon St.
Constantine, MI 49042

There are no federal lands or facilities associated with the Project.

(8)(ii)(B) The names and mailing addresses of every city, town, or similar political subdivision that has a population of 5,000 or more people and is located within 15 miles of the Project dam:

Verba DeMauro
Township Trustee
25600 County Road 4
Elkhart, IN 46514

Ruth Eash
Township Trustee
117 North Main Street
Middlebury, IN 46540

Mark Grabill
Township Trustee
228 Waterfall Drive
Suite A
Elkhart, IN 46516

Brandie Fitch
Township Trustee
365 East Main Street
PO Box 184
Shipshewana, IN 46565

Beuford Lee
Township Trustee
3503 Fox Chase
Bristol, IN 46507

Thomas Lowry
Mayor
53 ½ North Main Street
Three Rivers, MI 49093

James Weldy
Township Trustee
58518 State Road 15
Goshen, IN 46528

Mike Hughes
City Manager
130 North Nottawa Street
Sturgis, MI 49091

- (8)(iii) The names and mailing addresses of every irrigation district, drainage district, or similar special purpose political subdivision (A) in which any part of the project is located, and any federal facility that is or is proposed to be used by the project is located, or (B) that owns, operates, maintains, or uses any project facility or any federal facility that is or is proposed to be used by the project:**

There are no irrigation or drainage districts or similar special purpose political subdivisions associated with or in the general area of the Project. There are no federal lands or facilities associated with the Project.

- 8(iv) The names and mailing addresses of every other political subdivision in the general area of the project that there is reason to believe would likely be interested in or affected by the notification:**

Carolyn Grace
Administrator
St. Joseph County Conservation District
693 E. Main Street
Centerville, MI 49032

- 8(v) The names and mailing addresses of affected Indian Tribes:**

Lac du Flambeau Band of Lake Superior
Chippewa Indians
PO Box 67
Lac du Flambeau, WI 54538

Miami Tribe of Oklahoma
PO Box 1326
Miami, OK 74355

Menominee Indian Tribe of Wisconsin
PO Box 910
Keshena, WI 54135

Pokagon Band of Potawtomi Indians
58620 Sink Road
PO Box 180
Dowagiac, MI 49047

Citizen Potawatomi Nation
1601 South Gordon Cooper Drive
Shawnee, OK 74801

Little Traverse Bay Bands of Odawa
Indians
7500 Odawa Circle
Harbor Springs, MI 49740

Forest County Potawatomi
5320 Wensaut Lane
P.O. Box 340
Crandon, Wisconsin 54520

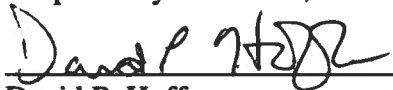
Sault Ste. Marie Tribe of Chippewa
Indians
523 Ashmun Street
Sault Ste. Marie, MI 49783

I&M is filing this NOI concurrently with a Pre-Application Document (PAD). In accordance with 18 C.F.R. §5.5(c), the Licensee is sending notification of these filings to the distribution list included in Appendix A of the PAD; the list includes applicable resource agencies, local governments, Indian Tribes, and non-government organizations.

In accordance with 18 C.F.R. §5.5(e), I&M is requesting designation as the non-federal representative for consultation under Section 7 of the Endangered Species Act and Section 106 of the National Historic Preservation Act.

If there are any questions concerning this NOI or the PAD, please contact the undersigned at the address or telephone number listed.

Respectfully submitted,



David P. Hoffman
Managing Director, Field and Support Services
American Electric Power
c/o American Electric Power Service Corporation
1 Riverside Plaza
Columbus, OH 43215
(614) 716-1772



PRE-APPLICATION DOCUMENT

Constantine Hydroelectric Project FERC NO. 10661

Indiana Michigan Power Company

June 2018



An **AEP** Company

BOUNDLESS ENERGY™

**CONSTANTINE HYDROELECTRIC PROJECT
FERC PROJECT NO. 10661
PRE-APPLICATION DOCUMENT**

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LIST OF ACRONYMS

°C	degrees Celsius
°F	degrees Fahrenheit
ADA	American with Disabilities Act
AEP	American Electric Power
AIRs	Additional Information Requests
APE	area of potential effect
CEII	Critical Energy Infrastructure Information
CFR	Code of Federal Regulations
cfs	cubic feet per second
DO	dissolved oxygen
EA	Environmental Analysis
EIS	Environmental Impact Statement
EPT	Ephemeroptera, Plecoptera, and Trichoptera taxa
ESA	Endangered Species Act
FERC or Commission	Federal Energy Regulatory Commission
FPA	Federal Power Act
fps	feet per second
GLEC	Great Lakes Environmental Center, Inc.
HPMP	Historic Properties Management Plan
I&M	Indiana Michigan Power Company or Licensee
ILP	Integrated Licensing Process
K&A	Kieser & Associates, LLC
kV	kilovolt
kW	kilowatt
M	magnitude
MDEQ	Michigan Department of Environmental Quality
MDNR	Michigan Department of Natural Resources
MDOT	Michigan Department of Transportation
mg/L	milligram per liter

MiSWIMS	Michigan Surface Water Information Management System
MNFI	Michigan Natural Features Inventory
msl	mean sea level
MW	megawatt
MWh	megawatt hour
NEPA	National Environmental Policy Act
NGO	non-governmental organization
NGVD	National Geodetic Vertical Datum
NHPA	National Historic Preservation Act of 1966
NMFS	National Marine Fisheries Service
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRHP	National Register of Historic Places
NRI	Nationwide Rivers Inventory
NWI	National Wetland Inventory
PAD	Pre-Application Document
PCBs	Polychlorinated Biphenyls
PLC	programmable logic controller
PM&E	protection, mitigation, or enhancement
PSP	Proposed Study Plan
PURPA	Public Utility Regulatory Policies Act of 1978
RSP	Revised Study Plan
RTE	rare, threatened, or endangered
S.U.	standard units
SCORP	State Comprehensive Outdoor Recreation Plan
SD1	Scoping Document 1
SD2	Scoping Document 2
Section 106	Section 106 of the National Historic Preservation Act of 1966

SHPO	State Historic Preservation Office
STORET	Storage and Retrieval data warehouse (USEPA)
TCP	traditional cultural properties
THPO	Tribal Historic Preservation Officer
TMDL	Total Maximum Daily Loads
USACE	U.S. Army Corps of Engineers
USC	United States Code
USCB	U.S. Census Bureau
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

Section 1

Introduction and Background

Indiana Michigan Power Company (I&M or Licensee), a unit of American Electric Power (AEP), is the Licensee, owner, and operator of the run-of-river, 1,200-kilowatt (kW) Constantine Hydroelectric Project (Project) (Project No. 10661), located on the St. Joseph River in the Village of Constantine in St. Joseph County, Michigan.

The Constantine Project consists primarily of an uncontrolled concrete gravity overflow spillway dam, a concrete headgate structure, an earthen embankment between the headgate structure and overflow spillway, an earthfill reservoir impoundment dike, a power canal, and a powerhouse. The Project was constructed in 1873 by the Constantine Hydraulic Company. The original timber crib dam and powerhouse were replaced with the existing dam and powerhouse in 1923. Today the Project is operated by I&M in a run-of-river manner, generating approximately 5,000 megawatt hours (MWh) annually of renewable energy.

The Project is currently licensed by the Federal Energy Regulatory Commission (FERC or Commission) under the authority granted to FERC by Congress through the Federal Power Act (FPA), 16 United States Code (USC) §791(a), et seq., to license and oversee the operation of non-federal hydroelectric projects on jurisdictional waters and/or federal land. There are no federal lands associated with the Project. The Project underwent original licensing in the early 1990s, and the current operating license for the Project expires on September 30, 2023. In accordance with FERC's regulations at 18 Code of Federal Regulations (CFR) §16.9(b), I&M must file its application for a new license with FERC no later than September 30, 2021.

In support of preparing an application for a new license, I&M has elected to use the Commission's Integrated Licensing Process (ILP). The ILP is designed to bring efficiencies to the licensing process by integrating the applicant's pre-filing consultation activities with FERC's National Environmental Policy Act (NEPA) scoping responsibilities. The Licensee believes that the ILP will be the most effective and efficient process for this relicensing. The ILP is formally initiated by I&M's filing with FERC this Pre-Application Document (PAD) and Notice of Intent (NOI) to relicense the Project. The PAD and NOI are distributed to federal and state resource agencies, local governments, Indian Tribes, and interested members of the public simultaneously with its filing with FERC. By regulation, I&M's PAD and NOI must be filed with FERC no earlier than April 1, 2018 and no later than October 1, 2018 (18 CFR §§5.5(d), 5.6(a)).

Under 18 CFR §5.8 of the Commission's regulations, FERC will review this PAD and associated NOI and, within 60 days of receipt, notice the commencement of the licensing proceeding, request comments on the PAD, and issue Scoping Document 1 (SD1). A public scoping meeting and site visit will then be conducted within 30 days of issuing SD1, or within 90 days of the submittal of the PAD.

Section 2

Purpose of the Pre-Application Document

The filing of this PAD and the associated NOI by I&M marks the formal start of the relicensing process for the Constantine Hydroelectric Project. The purpose of the PAD is to provide a description of the existing Project facilities and operations, and to provide existing, relevant, and reasonably available information related to the Project area. Further, the PAD is intended to assist the Commission, resource agencies, Indian Tribes, non-governmental organizations (NGOs), and other interested parties in identifying potential resource areas of interest and informational needs, to develop study requests, and to establish the information necessary to analyze the license application (18 CFR §5.6(b)).

2.1 Search for Existing, Relevant, and Reasonably Available Information

In support of preparing this PAD, HDR, Inc. (HDR), on behalf of and in collaboration with I&M, has undertaken an extensive search to identify and review information that is reasonably available and relevant to the Project. These efforts consisted of the following five primary activities:

1. A comprehensive search of I&M's files and documentation;
2. The distribution of a PAD information questionnaire to 50 parties requesting any information related to the Project, Project area, and the region;
3. A search and review of publicly available sources and databases;
4. Consultation with select resource agencies and other relicensing parties with potential information applicable to the Project area; and
5. A review of the Michigan State and Federal Comprehensive Plans relevant to the Project.

A copy of the PAD information questionnaire and associated distribution list is provided in Appendix A. Copies of completed questionnaires provided by Project stakeholders are included in Appendix B. I&M and HDR reviewed the responses and information applicable to the Project. Relevant information has been summarized in the applicable resource sections of this PAD.

2.2 Description of Consultation Process Undertaken by I&M Prior to the Submittal of the PAD

I&M performed preliminary consultation with potential stakeholders in support of preparing this PAD to obtain available information, to determine the potential relationship between stakeholders' interests and Project operations, and to identify potential information gaps and study needs in advance of the formal relicensing process.

I&M's preliminary consultation began with the identification of parties that may have an interest in the Constantine Hydroelectric Project relicensing. Based on the information obtained during this process, a stakeholder list of 50 parties was compiled and used as the distribution list for the PAD information questionnaire. Existing, relevant, and reasonably available information regarding the Project and the surrounding environment were requested. Parties were also requested to identify resource areas of interest. Section 6 provides additional details regarding the consultation performed to date and responses to the PAD information questionnaire.

Additionally, I&M has conducted initial consultation with the Michigan Natural Features Inventory (MNFI) and the U.S. Fish and Wildlife Service (USFWS) regarding rare, threatened, and endangered species. Furthermore, I&M has consulted with the Michigan Department of Environmental Quality (MDEQ) to confirm that the Project is located outside the state's coastal zone. I&M has consulted with the Michigan Department of Natural Resources (MDNR) and the MDEQ to collect additional information regarding fisheries and water quality data in the Project vicinity.

Section 3

Process Plan, Schedule, and Communication Protocol

3.1 Overall Process Plan and Schedule

I&M proposes to use the Commission's ILP in support of obtaining a new license for the Project. As presented in Table 3.1-1, I&M has prepared a Process Plan and Schedule that incorporates the overall ILP schedule for this relicensing.

**Table 3.1-1
Constantine ILP Process Plan and Schedule**

Activity	Responsible Party	Timeframe	Proposed Date
File NOI and PAD (18 CFR §5.5(d))	I&M	As early as 5.5 years, but no later than 5 years prior to license expiration	6/4/2018
Initial Tribal Consultation Meeting (18 CFR §5.7)	FERC	No later than 30 days of filing NOI and PAD	7/4/2018
Issue notice of NOI/PAD and SD1 (18 CFR §5.8(a))	FERC	Within 60 days of filing NOI and PAD	8/3/2018
Conduct scoping meetings and site visit (18 CFR §5.8(b)(viii))	FERC	Within 30 days of NOI/PAD notice and SD1 issuance	9/2/2018
Comments on PAD, SD1, and Study Requests (18 CFR §5.9(a))	Stakeholders	Within 60 days of NOI/PAD notice and issuance of SD1	10/2/2018
File Proposed Study Plan (PSP) (18 CFR §5.11)	I&M	Within 45 days of deadline for filing comments on PAD	11/16/2018
Issuance of Scoping Document 2 (SD2), if necessary (18 CFR §5.10)	FERC	Within 45 days of deadline for filing comments on SD1	11/16/2018
PSP Meeting (18 CFR §5.11(e))	I&M	To be held within 30 days of filing PSP	12/16/2018
Comments on PSP (18 CFR §5.12)	Stakeholders	Within 90 days after PSP is filed	2/14/2019
File Revised Study Plan (RSP) (18 CFR §5.13(a))	I&M	Within 30 days of deadline for comments on PSP	3/16/2019
Comments on RSP (18 CFR §5.13(b))	Stakeholders	Within 15 days following RSP	3/31/2019
Issuance of Study Plan Determination (18 CFR §5.13(c))	FERC	Within 30 days of RSP	4/15/2019
Formal Study Dispute Resolution Process if requested (18 CFR §5.14(a))	Agencies with mandatory conditioning authority	Within 20 days of study plan determination	5/5/2019

Section 3

Process Plan, Schedule, and Communication Protocol

Activity	Responsible Party	Timeframe	Proposed Date
Dispute Resolution Panel Convenes (18 CFR §5.14(d))	Dispute Resolution Panel	Within 20 days of notice of study dispute	5/25/2019
Comments on Study Plan Disputes (18 CFR §5.14(i))	I&M	Within 25 days of notice of study dispute	5/30/2019
Third Panel Member Selection Due (18 CFR §5.14(d)(3))	Dispute Resolution Panel	Within 15 days of when Dispute Resolution Panel convenes	6/9/2019
Dispute Resolution Panel Technical Conference (18 CFR §5.14(j))	Dispute Resolution Panel, I&M, Stakeholders	Prior to engaging in deliberative meetings	-
Dispute Resolution Panel Findings and Recommendations (18 CFR §5.14(k))	Dispute Resolution Panel	No later than 50 days after notice of dispute	6/24/2019
Study Dispute Determination (18 CFR §5.14(1))	FERC	No later than 70 days after notice of dispute	7/14/2019
Conduct First Season of Studies (18 CFR §5.15)	I&M	--	March to September 2019
Study Progress Reports (18 CFR §5.15(b))	I&M	I&M will provide summary updates every 3 months	June 2019 to September 2020
Initial Study Report (18 CFR §5.15(c))	I&M	Pursuant to the Commission-approved study plan and schedule provided in §5.13 or no later than 1 year after Commission approval of the study plan	4/14/2020
Initial Study Report Meeting (18 CFR §5.15(c)(2))	I&M and Stakeholders	Within 15 days of filing the initial study report	4/29/2020
File Initial Study Report Meeting Summary (18 CFR §5.15(c)(3))	I&M	Within 15 days of study results meeting	5/14/2020
File Meeting Summary Disagreements (18 CFR §5.15(c)(4))	Stakeholders	Within 30 days of study results meeting summary	6/13/2020
File Responses to Meeting Summary Disagreements (18 CFR §5.15(c)(5))	I&M	Within 30 days of filing meeting summary disagreements	7/13/2020
Resolution of Disagreements (18 CFR §5.15(c)(6))	FERC	Within 30 days of filing responses to disagreements	8/12/2020
Conduct Second Season of Studies (if necessary)	I&M	--	March to September 2020
File Updated Study Report (18 CFR §5.15(f)) (if necessary)	I&M	Pursuant to the Commission-approved study plan and schedule provided in §5.13 or no later than 2 years after Commission approval	4/14/2021

Section 3

Process Plan, Schedule, and Communication Protocol

Activity	Responsible Party	Timeframe	Proposed Date
Updated Study Report Meeting (18 CFR §5.15(f)) (if necessary)	I&M and Stakeholders	Within 15 days of updated study report	4/29/2021
File Updated Study Report Meeting Summary (18 CFR §5.15(f)) (if necessary)	I&M	Within 15 days of updated study report meeting	5/14/2021
File Meeting Summary Disagreements (18 CFR §5.15(f))	Stakeholders	Within 30 days of study results meeting summary	6/13/2021
File Responses to Meeting Summary Disagreements (18 CFR §5.15(f)(5))	I&M	Within 30 days of filing meeting summary disagreements	7/13/2021
Resolution of Disagreements (18 CFR §5.15(f))	FERC	Within 30 days of filing responses to disagreements	8/12/2021
File Draft License Application (18 CFR §5.16(a))	I&M	No later than 150 days prior to the deadline for filing a new or subsequent license application	5/3/2021
Comments on Draft License Application (18 CFR §5.16(a))	Stakeholders	Within 90 days of filing Preliminary License Proposal or Draft License Application	8/1/2021
File License Application (18 CFR §5.17)	I&M	No later than 24 months before the existing license expires	9/30/2021
Tendering Notice (18 CFR §5.19)	FERC	Within 14 days of filing of License Application	10/14/2021
Commission Decision on Any Outstanding Pre-filing Additional Information Requests (AIRs) (18 CFR §5.19)	FERC	Within 30 days of filing of License Application	10/30/2021
Notice of Acceptance and Notice of Ready for Environmental Analysis (EA) (18 CFR §5.22)	FERC	Within 60 days of issuance of Tendering Notice	12/13/2021
File 401 Water Quality Certification Application with Ohio Environmental Protection Agency and proof of application with FERC (18 CFR §5.23)	I&M	Within 60 days of issuance of Notice of Ready for EA	2/11/2022
Comments, Interventions, Preliminary Terms and Conditions (18 CFR §5.23)	Stakeholders	Within 60 days of issuance of Notice of Acceptance and Ready for EA	2/11/2022
Parties Submit Alternatives	Stakeholders and I&M	Within 30 days of Comments, Interventions, Preliminary Terms and Conditions	3/13/2022
Parties Request Trial-Type Hearing	Stakeholders and I&M	Within 30 days of Comments, Interventions, Preliminary Terms and Conditions	3/13/2022

Activity	Responsible Party	Timeframe	Proposed Date
Reply Comments	Stakeholders and I&M	Within 45 days of Comments, Interventions, Preliminary Terms and Conditions	3/28/2022
Interventions and Responses	Stakeholders	Within 15 days of Parties Requesting Trial-Type Hearing	3/28/2022
Agency Response to Trial-Type Hearing	Mandatory Conditioning Agency	Within 30 days of Interventions and Responses	4/27/2022
Agency Hearing Referral	Mandatory Conditioning Agency	Within 5 days of agency response to trial type hearing	5/2/2022
Trial Type Hearing Decision	Mandatory Conditioning Agency	Within 90 days of agency hearing referral	7/31/2022
Commission issues Non-Draft EA (18 CFR §5.24)	FERC	Within 75 days of reply comments deadline	6/11/2022
Comments on Non-Draft EA (18 CFR §5.24)	Stakeholders	Within 30-45 days of Commission issuance of Non-Draft EA or Environmental Impact Statement (EIS)	7/26/2022
Modified Terms and Conditions Based on Any Hearing Decision, Comments, and Proposed Alternatives (18 CFR §5.24)	Stakeholders	Within 60 days of filing of comments on Draft EA or EIS	9/24/2022
Commission issues License Order (18 CFR §5.25)	FERC	--	9/30/2023

1. If the due date falls on a weekend or holiday, the deadline is the following business day.
2. All Director's determinations are subject to request for rehearing to FERC pursuant to 18 CFR § 375.301(a) and 385.713. Any request for rehearing must be filed within 30 days of determination.
3. Shaded actions are not necessary if there are no study disputes.
4. This schedule is based upon FERC's issuance of a Non-Draft EA. FERC can also issue a Draft EA, which would modify the schedule slightly.

3.2 Scoping Meeting and Site Visit

Pursuant to 18 CFR §5.8(b), FERC will hold a Scoping Meeting and Site Visit to the Project within 30 days of issuing notice of the NOI and PAD (estimated to be on or before September 2, 2018) in accordance with its responsibilities under NEPA. The Scoping Meeting will be held at a location to be selected by FERC in the general vicinity of the Project. FERC will issue a public notice regarding the Scoping Meeting and Site Visit that will include the meeting date, meeting location, and additional instructions for attending the meeting and Site Visit. Additional information may also be obtained by contacting Lee Emery at FERC at (202) 502-8379.

3.3 ILP Participation

I&M has provided this PAD to representatives of relevant agencies, local governments, Indian Tribes, NGOs, and members of the public included on the distribution list attached to the cover letter transmitting this PAD. Any party that desires to be added to or removed from the distribution list should send a request to either of the individuals listed below:

Mr. Jonathan Magalski
Environmental Specialist Consultant
American Electric Power Service Corporation
c/o Indiana Michigan Power Company
1 Riverside Plaza
Columbus, OH 43215
(614) 716-2240
jmmagalski@aep.com

Ms. Elizabeth Parcell
Process Supervisor
c/o Indiana Michigan Power Company
40 Franklin Road SW
Roanoke, VA 24011
(540) 985-2441
ebparcell@aep.com

3.4 Communication Protocol

During the course of the Project relicensing process, communication will take place through public meetings, conference calls, and written correspondence. In order to establish the formal consultation record, all phases of formal correspondence require adequate documentation. The intent of the Communication Protocol is to provide a flexible framework for the dissemination of information and for documenting consultation among the participants throughout the relicensing proceeding. The Communication Protocol will remain in effect until issuance of the Project's New License by the Commission.

3.4.1 Distribution of Relicensing Materials

I&M will distribute relicensing materials via email (informal communications) and/or by emailing notifications (to the established mailing list) of the availability of formal relicensing filings and documents online. If I&M has not been provided with a stakeholder's email address, I&M will mail notification of the availability of documents online via regular mail. Documents filed with the Commission will be available on I&M's public relicensing website (www.aephydro.com) and from FERC's eLibrary at www.ferc.gov/docs-filing/elibrary.asp by searching under Docket P-10661.

Requests for hard copies of relicensing documents should be sent to Mr. Jonathan Magalski using the contact information provided in Section 3.3 and should clearly indicate the document name, publication

date (if known), and FERC Project No. 10661. A reproduction charge and postage costs may be assessed for hard copies requested by the public. Federal, state, and tribal entities will not be subject to document processing or postage fees.

Certain documents are restricted from general distribution. These documents include: (1) those covered under the FERC's regulations protecting Critical Energy Infrastructure Information (CEII) (18 CFR §388.113); (2) archaeological survey reports or other information identifying the locations of historic properties; and (3) reports that contain information regarding the locations of rare, threatened, or endangered (RTE) species.

3.4.2 FERC Communication

FERC has presently assigned Lee Emery of its staff to serve as the relicensing coordinator in support of this relicensing process. The role of the FERC relicensing coordinator will be in accordance with the rules and regulations for the ILP under 18 CFR Part 5. For questions related to FERC communications, please contact Lee Emery at lee.emery@ferc.gov or at (202) 502-8379.

All communications to FERC regarding Project relicensing must reference the **Constantine Hydroelectric Project FERC No. P-10661 - Application for New License**.

FERC strongly encourages paperless electronic filing of comments and interventions through its eFiling or eComment systems. Information and links to these systems can be found at the FERC webpage <http://www.ferc.gov/docs-filing/ferconline.asp>. In order to eFile comments and/or interventions, interested parties must have an eRegistration account. After preparing the comment or motion to intervene go to www.ferc.gov and select the eFiling link. Select the new user option and follow the prompts. Users are required to validate their account by accessing the site through a hyperlink sent to the registered email account.

An additional method to eFile comments is through the "Quick Comment" system available via a hyperlink on the FERC homepage. "Quick Comments" do not require the users to have a subscription; the comments are limited to 6,000 characters, and all information must be public. Commenters are required to enter their names and email addresses. They will then receive an email with detailed instructions on how to submit "Quick Comments."

Stakeholders without internet access may submit comments to FERC at the address below via hard copy, but should be aware that documents sent to FERC by regular mail can be subject to docket-posting delays:

Honorable Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, D.C. 20426

Section 4

Project Location, Facilities, and Operations

4.1 Authorized Agent

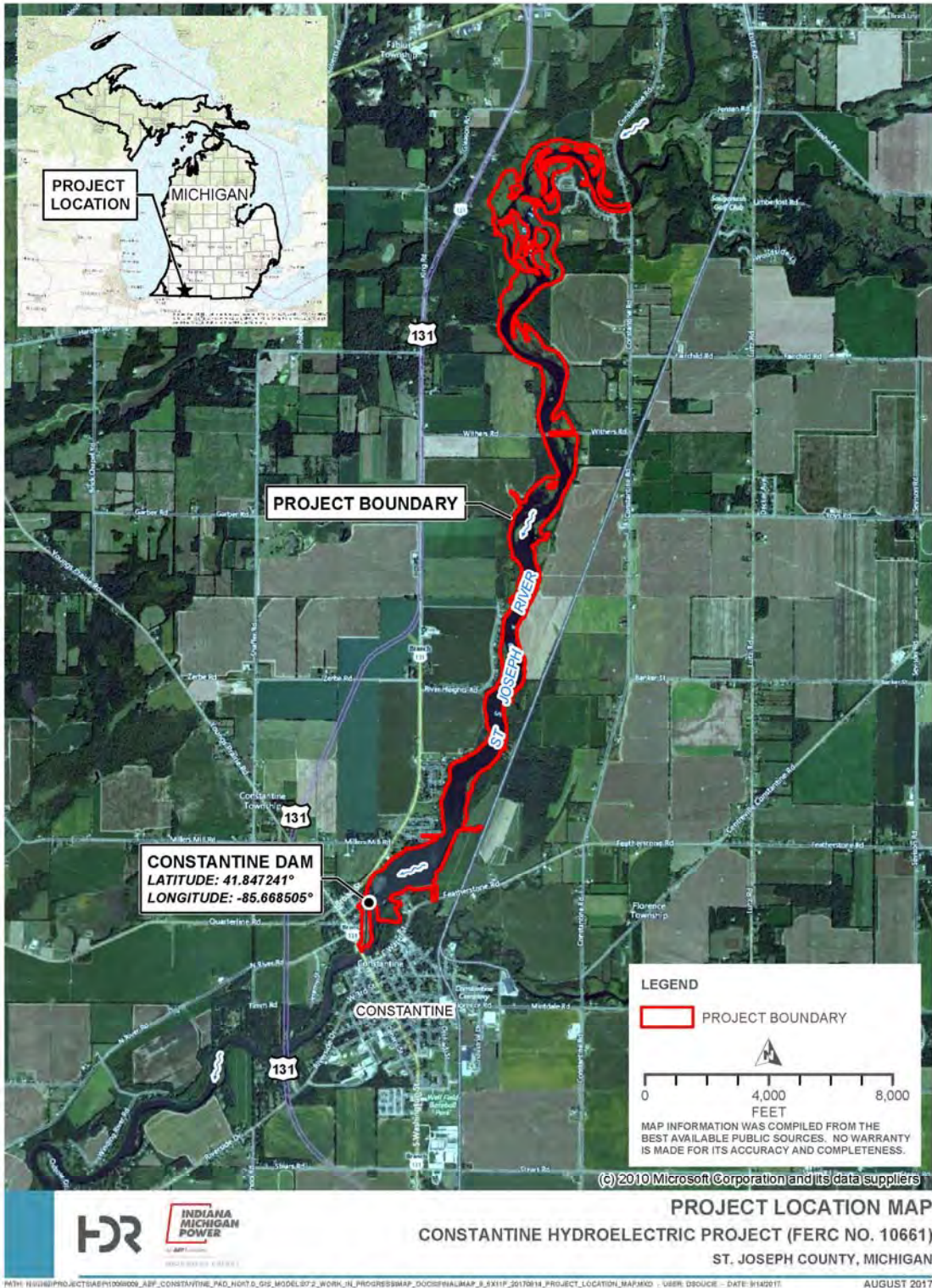
The exact name, business address, telephone number, and email address of each person authorized to act as an agent for I&M is listed below.

Mr. David P. Hoffman,
Director Field & Support Services
c/o Mr. Jonathan Magalski,
Environmental Specialist Consultant
American Electric Power Service Corporation
1 Riverside Plaza
Columbus, OH 43215
(614) 716-2240
jmmagalski@aep.com

4.2 Project Location

The Constantine Hydroelectric Project is located at approximately river mile 101.4 on the St. Joseph River in the Village of Constantine in St. Joseph County, Michigan. The reservoir formed by the Project is approximately six miles long. Figure 4.2-1 provides an overview of the Project location and setting. Figure 4.2-2 provides an overview of the Project facilities described further in Section 4.3. The Project area is primarily agricultural, with scattered single-family homes, multi-family homes, community facilities, and farmsteads in or surrounding the Village of Constantine. The existing Project boundary map for the Constantine Project is provided in Appendix C.

Figure 4.2-1
Project Location Map



**Figure 4.2-2
Aerial View of Project Facilities**



4.3 Project Facilities

On October 17, 1873, the St. Joseph County Board of Supervisors granted approval to construct a dam across the St. Joseph River to the Constantine Hydraulic Company. The Constantine Hydraulic Company operated the hydroelectric plant through 1917. The Project was purchased by Michigan Gas and Electric Company, the predecessor to I&M, in 1917 and subsequently placed under their operation. On October 20, 1993, I&M obtained a FERC license for the Project.

The licensed Project works consist of: (a) an uncontrolled concrete gravity overflow spillway dam with a height of about 12 feet, a total length of 241.25 feet, including an abandoned 4-foot-wide fish chute at the left abutment which is now a sluice gate, and topped with 11- $\frac{1}{4}$ -inch-high flashboards; (b) a reinforced-concrete headgate structure 68 feet long and 20 feet high containing seven wooden gates about 7.75 feet wide by 15 feet high; (c) a 70-foot-long earthen embankment between the headgate structure and overflow spillway; (d) an earthfill reservoir impoundment dike with a maximum height of about 20 feet and a length of 650 feet located about 1,500 feet east from the left abutment of the main dam; (e) a reservoir with a surface area of 525 acres at a normal water surface elevation of 782.94 feet, National Geodetic Vertical Datum (NGVD); (f) a 1,270-foot-long power canal with a bottom width of 60 feet; (g) a brick powerhouse with dimensions of 140 feet by 30 feet containing four vertical-shaft Francis turbines connected to four 300- (kW generating units for a total installed capacity of 1,200 kW; (h) a switchyard adjacent to the powerhouse containing three step-up transformers; (i) a 2.4-kilovolt (kV) transmission line about 50 feet long; and (j) appurtenant facilities and equipment.

The facilities and structures listed above are detailed further below and are also depicted in the Project drawings included in Appendix D, which is filed as CEII in accordance with 18 CFR §388.112. The average annual production for the Project typically ranges between 4,574 and 5,438 MWh.

4.3.1 Dam and Spillway

The abutment embankment to the left of the spillway is about 250 feet in length and up to 22.5 feet in height (adjacent to the spillway). The crest elevation is at 790 feet at the embankment. In 2009, the low areas on the embankment were raised to elevation 790 feet beyond the left end of the embankment.

The concrete spillway section has a total crest length of 241.25 feet including the abandoned fish ladder. The actual effective spillway width is 240.25 feet if the 1-foot-wide pier between the flashboard section and the fish chute is not included. Flashboards are mounted on the crest. The flashboards are 11- $\frac{1}{4}$ inches high and use wood pins to maintain the boards vertically. The crest elevation of the flashboards is 782.90 feet. The fixed crest of the spillway structure is elevation 781.96 feet. A steel sheet pile wall extends across the upstream side of the spillway and upstream along the spillway's

abutment wall. The tip elevation of this sheeting is about elevation 760 feet, 10.5 feet below the base of the structure. During 1991, a new 2-foot-thick concrete cap was constructed on top of the left abutment wall of the spillway. The width of the spillway from the upstream to downstream end of its apron is about 54.5 feet, 24.5 feet of which is the width of the spillway. The spillway is a slab-and-buttress-type structure with 19 bays of 18 foot width (pier face to pier face) plus an additional short bay of 14.83 feet under the fish chute. The bays are separated by 2-foot-wide buttresses.

There is a concrete-capped, grouted rubble apron extending 30 feet downstream of the spillway. The top elevation of the apron is 775.0 feet at the interface with the spillway and elevation 772.5 at the downstream end. The elevation of the bottom of the apron and underlying rubble fill is elevation 770.5 feet.

The reservoir embankment (also referred to as the reservoir dike, detached dike or embankment, or saddle dike) is approximately 650 feet long. The dike has a maximum height of about 20 feet and is constructed of sand. The reservoir embankment has undergone various modifications since 1987 for improved stability, and in 2014, the top of the embankment was raised to elevation 790 feet.

4.3.2 Reservoir

Normal headpond elevation at the Project (with flashboards in place) is 782.94 feet. The headpond elevation without the flashboards is 782.0 feet. The normal tailwater elevation is about 771.5 feet. The normal maximum surface area of the reservoir formed by the impounding structures at the Project is 525 acres. Additional details about the Project reservoir are included in Table 4.3-1.

**Table 4.3-1
Reservoir Data**

Drainage area	1,554 square miles
Shoreline length	12 miles
Typical surface area	525 acres
Maximum Depth	12 feet ¹
Permanent crest of dam elevation	790 feet mean sea level (msl)
Typical normal surface water elevation	782.94 feet msl
Operations	run-of-river
Storage capacity	5,750 acre-feet

¹ Source: MDEQ 2000.

4.3.3 Forebay and Intake

The canal headgate structure (also referred to as the headworks) is located at the upstream end of the power canal, adjacent to the spillway. The headworks are 73.75 feet long and 33 feet wide, with a deck elevation of 790.0 feet. The masonry structure has seven vertical slide gates. Each gate is 7-feet, 10-inches wide, except the gate on the right side which is 6-feet, 9-inches wide. The gate sill is at elevation 770.00 feet. The headgates are opened using a rack-and-pinion gearing system driven by a portable electric motor driver that can open two gates at a time. In May 1990, the headgates were repaired; new gates, stems, and gate guides were installed. The headgate structure is protected against piping by steel sheet piling to an elevation of about 753.5 feet under the wing walls and along the upstream and downstream toe of the structure.

4.3.4 Power Canal

The power canal is approximately 1,270 feet long and extends from the headgate structure to the powerhouse. Earthen embankments are located on either side of the canal. The right (land side) embankment is approximately 12 feet high, and the left (river side) embankment is approximately 20 feet high. The embankments have a top width of 12 feet, with a nominal crest elevation of 788.0 feet. The invert of the canal is about elevation 772 feet, making the water about 11 feet deep during normal reservoir levels. The width of the canal, from edge of crest to edge of crest of the embankments is about 120 feet. The invert width is about 50 feet.

4.3.5 Powerhouse and Intakes

The two-level concrete and masonry powerhouse contains four vertical S. Morgan Francis units. Each unit has a rated capacity of 300 kW at 12.5 feet of head. Discharge at full gate and normal full reservoir level is about 400 cubic feet per second (cfs), for a total plant discharge of 1,600 cfs if all four units are operating. The powerhouse is approximately 140 feet long and 58 feet wide. The generator floor level is about elevation 787.0 feet. The heel and toe elevations of the powerhouse are at about elevation 769.0 and 758.0 feet, respectively.

The forebay intake section is approximately 114 feet long and located directly below the upper level of the powerhouse. Each bay is faced with a continuous run of trashracks consisting of 1/2-inch-long by 4-inch, epoxy-coated steel bars. Each bar is 16 feet in length and angled toward the powerhouse at 25 degrees to vertical. The bars are spaced 3 ½ inches center-to-center and oriented to provide a clear space of 3 inches.

The invert of the turbine pit (forebay) is at elevation 771.5 feet. The draft tube invert is at about elevation 760.0 feet.

4.3.6 Bypass Reach

The bypass reach runs parallel to the Project's power canal and is approximately 1,300 feet long. The bypass reach is typically inundated by backwater from the Mottville Project (FERC No. 1750) located downstream. The Fawn River flows into the St. Joseph River about 500 feet downstream of the spillway, adding about 210 cfs to the bypass reach. A small gravel bar, located at mid-channel in the bypass reach adjacent to the mouth of the Fawn River, is exposed when the tailwater elevation drops to its lowest level.

4.3.7 Turbines and Generators

The Project includes four vertical-shaft Francis units that were installed in 1927. The Project has a total installed capacity of 1.2 megawatts (MW). In 1991, a major electrical upgrade was completed in the powerhouse. New static exciters were installed along with new switch gear and controls. The upgrade included automated operation of the generating equipment. The turbine and generator data is presented in Table 4.3-2.

**Table 4.3-2
Turbine and Generator Data**

<i>Turbines</i>	
Number of Units	4
Year Installed	1927
Type	Vertical Francis (S. Morgan Smith 48" Type S)
Design Head	12.5 feet
Rated Capacity	300 kW (each)
Rated Horsepower	426
Rated Speed	100 rotations per minute
Minimum Hydraulic Capacity	141 cfs
Maximum Hydraulic Capacity	430 cfs
<i>Generators</i>	
Type	AC generators manufactured by General Electric
Rated Capacity	300kW (each)
Phase	3-phase
Voltage	2,300 volts
Frequency	60 Hertz
Synchronous Speed	100 rotations per minute

4.3.8 Transmission

The transmission line associated with this Project is a 2.4-kV transmission line that is approximately 50 feet long. The Project's single-line electrical diagram is included in Appendix D (CEII).

4.4 Project Operations

The Project is operated as a run-of-river facility for the purpose of generating electric power. The Project is not staffed full time, but is tended five days per week by personnel who split their time between the Constantine Project and I&M's Mottville Project, located about 7 miles downstream. The generating units are operated locally by computer or manually. The Project is monitored remotely by I&M's Columbus Operation Center in Columbus, Ohio, which is staffed 24-hours per day, 365 days per year.

The generation units are operated locally through a programmable logic controller (PLC) and float controller. Flows in excess of the powerhouse's hydraulic turbine capacity (382 cfs/unit for a total of 1,528 cfs at a head of 11.3 feet; 430 cfs/unit for a total of 1,720 cfs at a head of 12.5 feet) are discharged by the uncontrolled overflow spillway.

The flashboards are usually in place on the spillway crest, thereby creating a normal reservoir elevation of 782.9 feet. The tailwater at Constantine is controlled by the gated spillway structure at the Mottville Project approximately 7 miles downstream. The normal pool elevation at Mottville is 771.0 feet.

During high water events, the flashboards on the spillway generally fail when the water level is about elevation 785.0 feet.

4.4.1 Generation and Outflow Records

The Project operates in a run-of-river mode and inflows to the Project are controlled by upstream flows. Table 4.4-1 provides a summary of monthly and annual Project generation for a period of five years in gross MWh. Average annual generation at the Project from 2012 through 2016 is 4,933 MWh.

Table 4.4-1
Monthly and Annual Generation (MWh)
(January 1, 2012 to December 31, 2016)

Period	2012	2013	2014	2015	2016	Average Monthly
January	689	484	371	172	626	468
February	704	603	349	279	536	494
March	716	653	511	415	726	604

Section 4

Project Location, Facilities, and Operations

Period	2012	2013	2014	2015	2016	Average Monthly
April	616	513	566	498	690	577
May	501	473	445	391	623	487
June	172	455	350	566	243	357
July	106	360	345	556	274	328
August	161	176	275	388	508	302
September	196	87	400	269	378	266
October	307	127	484	265	177	272
November	315	331	462	341	205	331
December	426	312	580	462	452	446
Gross Annual Generated	4,909	4,574	5,139	4,604	5,438	4,933

Source: I&M, 2017, personal communication.

Monthly and annual daily average Project outflows for 2011 through 2015 are shown in Table 4.4-2.

Table 4.4-2
Monthly and Annual Average Project Outflows (cfs)
(January 1, 2011 to December 31, 2015)

Period	2011	2012	2013	2014	2015	Monthly Average
January	879	2,745	1,019	1,738	1,294	1,535
February	1,217	2,477	1,900	1,597	1,002	1,645
March	2,467	2,894	1,750	2,607	1,570	2,258
April	2,283	1,948	2,912	2,746	1,431	2,264
May	2,789	1,379	2,137	1,736	1,198	1,848
June	2,207	635	1,418	1,635	2,409	1,661
July	911	340	1,379	1,466	2,178	1,255
August	835	411	830	644	921	728
September	739	451	636	846	780	690
October	1,245	620	705	1,053	729	870
November	1,564	650	1,212	1,174	871	1,094
December	3,225	807	1,154	1,334	1,108	1,526
Annual Average	1,405	1,610	1,333	1,505	1,364	1,446

4.4.2 Dependable Capacity

Dependable capacity is generally defined as the amount of load a hydroelectric plant can carry under adverse hydrologic conditions during a period of peak demand; for example, during the hot, dry conditions typical in late summer in the Project area. Under the current license, the Project's estimated dependable capacity is approximately 170 kW.

4.5 Current License Requirements and Compliance History

4.5.1 Current License Requirements

The Project's current license was issued by FERC on October 20, 1993. The license was amended by subsequent orders (1995, 1996, 1997, and additional orders modifying plans developed pursuant to license articles). As presently licensed, the primary compliance requirements associated with the operation of the Project is to operate the Project as run-of-river and to provide flows over the spillway to maintain a minimum water surface elevation of 770.0 feet NGVD downstream of the Project (tailwater elevation).

- Article 403 – Run-of-river operation.
- Article 404 – Provide flows over the spillway to maintain a minimum water surface elevation of 770.0 feet NGVD downstream of the Project (tailwater elevation).
- Article 405 – Monitor water surface elevation and compliance with run-of-river operation. Continue to operate and maintain the U.S. Geological Survey (USGS) gage at Three Rivers.
- Article 406 – Reservation of fishway prescription by Commission.
- Article 408 – Indiana bat protection.
- Article 409 – Wildlife management and land use plan to provide provisions for monitoring distribution and abundance of purple loosestrife and Eurasian milfoil in Project waters at least annually.
- Article 410 – State Historic Preservation Officer (SHPO) consultation prior to land-clearing or land-disturbing activities.
- Article 411 – Recreation Plan.
- Article 412 – Removal of old storage building located next to the powerhouse.

4.5.2 Compliance History

Based on a review of historical records, there have been no reoccurring license violations. The most recent FERC Environmental Inspection occurred in May 2004 in which it was noted that there were no issues of noncompliance.

4.6 Current Net Investment

The current net investment in the Constantine Hydroelectric Project (through the end of 2017) is approximately \$1,884,989. This value should not be interpreted as the fair market value of the Project.

4.7 Potential for New Project Facilities

While I&M does not presently propose any new Project facilities or upgrades, I&M continually evaluates the potential for such improvements. If I&M intends to propose any new Project facilities or upgrades in the final license application that would affect the scope of relicensing studies, I&M will inform the FERC and licensing participants of this proposal at a time early enough in the pre-filing consultation process to ensure that the effects of any new facilities or upgrades are appropriately evaluated as part of the relicensing process.

4.8 PURPA Benefits

I&M will not be seeking benefits under Section 210 of the Public Utility Regulatory Policies Act (PURPA) of 1978 for qualifying hydroelectric small power production facilities in §292.203 of this chapter.

Section 5

Description of Existing Environment and Resource Impacts

5.1 Description of the River Basin

The St. Joseph River Watershed is located in the southwest portion of the lower peninsula of Michigan and northwestern portion of Indiana. It is the third largest river basin in Michigan and spans the Michigan-Indiana border and empties into Lake Michigan at St. Joseph, Michigan. The watershed drains 4,685 square miles from 15 counties (Berrien, Branch, Calhoun, Cass, Hillsdale, Kalamazoo, St. Joseph, and Van Buren in Michigan and De Kalb, Elkhart, Kosciusko, Lagrange, Noble, St. Joseph, and Steuben in Indiana). The watershed includes 3,742 river miles and flows through and near the Kalamazoo-Portage, the Elkhart-Goshen, the South Bend, and the St. Joseph/Benton Harbor metropolitan areas. The drainage area for the Constantine Project is 1,554 square miles (Friends of the St. Joseph River Association 2005).

5.1.1 Stream Description

The St. Joseph River is approximately 206 miles long, in southern Michigan and northern Indiana, and empties into Lake Michigan. It drains a primarily rural farming area in the watershed of Lake Michigan (Trout Unlimited undated).

The St. Joseph River is a large river, and its flow can become intense during high water events. Large deep runs and pools are found throughout its length (Trout Unlimited undated).

5.1.2 Major Land and Water Uses

The watershed is predominantly agricultural with approximately 70 percent of the land used for crop and animal production, while 17 percent remains forested, and roughly 6 percent is wetlands. A significant remaining portion of the watershed is comprised of residential and commercial uses, particularly along the main stem (Friends of the St. Joseph River Association 2005).

The major water use category in St. Joseph County is irrigation with 87 percent of all water being withdrawn for irrigation purposes. Groundwater is the source of 83 percent of all water withdrawn in St. Joseph County with the other 17 percent from inland surface water. Groundwater is the source of all public drinking water withdrawals, 87 percent of industrial withdrawals, 81 percent of irrigation withdrawals, and almost 100 percent of commercial withdrawals (MDEQ 2014).

Land use in the Project area near the dam and powerhouse along the river ranges from low- to high-intensity development with some woody wetlands along the left descending bank near the Fawn River

(Figure 5.1-1). The majority of land use in the general Project area is for cultivated crops, but is mostly located outside of the Project boundary.

5.1.3 Dams and Diversion Structures within the Basin

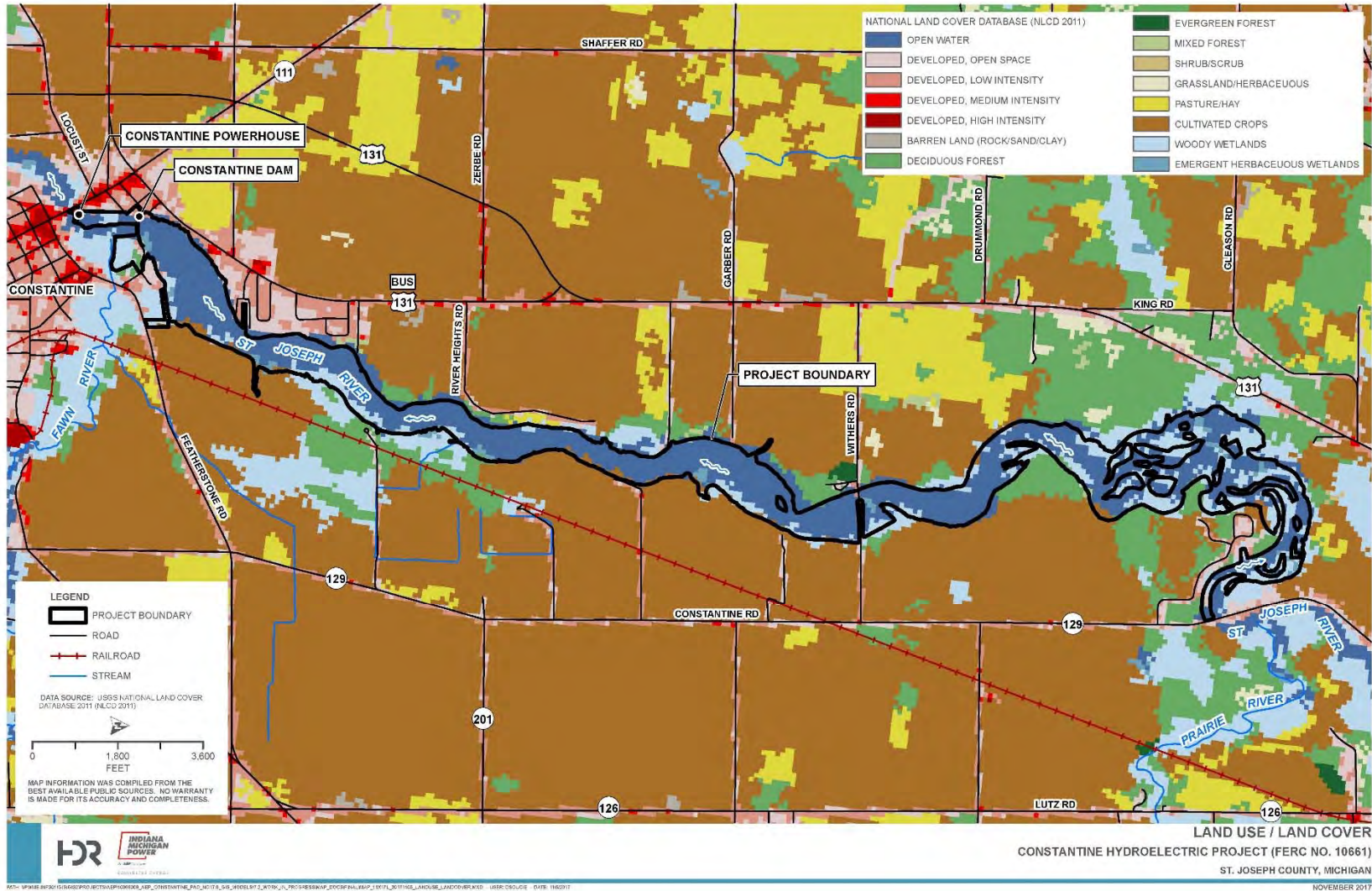
Within the St. Joseph River watershed there are 190 dams registered with MDEQ and the Indiana Department of Natural Resources, 17 of which are located on the main stem. The majority of these dams are classified according to their purpose: 29 for hydroelectric power generation (11 retired), 5 for irrigation, 105 for recreation, 9 for flood control, 4 for water supply, and 19 for miscellaneous reasons (private ponds, public ponds, hatchery ponds, etc.) (Friends of the St. Joseph River Association 2005).

There are eight FERC-licensed hydroelectric Projects located on the St. Joseph River (Table 5.1-1). The Three Rivers Hydroelectric Project (FERC No. 11797) is located approximately 9 miles upstream of the Constantine Project's dam. Approximately 7 miles downstream of the Constantine Project is the Mottville Hydroelectric Project (FERC No. 401), which is also owned and operated by I&M. In addition to these eight facilities, there is the Berrien Springs hydroelectric plant, which is also owned and operated by I&M and is located downstream of Buchanan. Berrien Springs was authorized by an act of Congress and, therefore, is not licensed by FERC.

**Table 5.1-1
Licensed Hydroelectric Projects on the St. Joseph River**

Project No.	Project Name	Authorized Capacity (kW)	Licensee	State
P-2964	Sturgis Dam	2,720	City of Sturgis	Michigan
P-11797	Three Rivers	900	Grande Pointe Power Corporation	Michigan
P-10661	Constantine	1,200	Indiana Michigan Power Company	Michigan
P-401	Mottville	1,750	Indiana Michigan Power Company	Michigan
P-2651	Elkhart	3,440	Indiana Michigan Power Company	Indiana
P-2579	Twin Branch	4,800	Indiana Michigan Power Company	Indiana
P-10624	French Paper	1,300	French Paper Company	Michigan
P-2551	Buchanan	4,105	Indiana Michigan Power Company	Michigan

**Figure 5.1-1
Land Use and Cover Map**



5.1.4 Tributary Rivers and Streams

Major tributaries to the St. Joseph River Watershed include the Prairie, Pigeon, Fawn, Portage, Coldwater, Elkhart, Little Elkhart, Dowagiac, and Paw Paw Rivers. According to the Michigan Center for Geographic Information and the USGS, the St. Joseph River Watershed is comprised of 217 subwatershed units (Friends of the St. Joseph River Association 2005). The Prairie River converges with the St. Joseph River approximately six miles upstream of the Project dam while the Fawn River joins the St. Joseph River approximately 500 feet below the Project dam.

5.2 Geology

5.2.1 Physiography and Topography

The Project area is located in the Three Rivers Lowlands physiographic region. This physiographic region is characterized by a well-drained, upland plain with low relief, regionally sloping from northwest to southeast (Michigan State University Department of Geography undated).

The landforms of southwest Michigan and northern Indiana are largely a result of the activities of the extensive glaciation of the Pleistocene epoch (from about 2 million years ago until 10,000 years ago). Six major ice sheets advanced across Michigan during that time, but it was the most recent ice advances during the Wisconsin event that by and large formed and sculpted the current St. Joseph River Valley. The advance and retreat of the Wisconsin ice sheet and subsequent changes to the Lake Michigan Basin caused major changes in the size, profile and direction of the St. Joseph River and left behind a landscape dominated by moraines, till plains, and outwash plains and the heterogeneous grab bag of soils that overlay the shale and sandstone bedrock of the basin (Friends of St. Joseph River Association 2005).

5.2.2 Bedrock Geology

The Michigan Basin dominates Michigan geology, covering the entire Lower Peninsula and the eastern portion of the Upper Peninsula. The Michigan Basin is defined by the Canadian Shield to the northwest and northeast, the Wisconsin and Kankakee Arches to the southwest and the Findlay and Algonquin Arches to the southeast. During the Paleozoic era, sedimentary rock was deposited in the Michigan Basin in layers like nested bowls with the oldest layers outcropping at the margins of the basin and buried deep near the center of the basin. The layers of sedimentary rock reach a maximum thickness of about 16,000 feet over basement terranes of Precambrian plutonic and volcanic igneous rock and metamorphic rock (Gillespie et al. 2008). Bedrock in the Project area is Mississippian age shale (MDNR 1999a). Solution-prone carbonate rocks of sedimentary origin are not present in the Project area in the vicinity of the dam (I&M 2016).

5.2.3 Surficial Geology

The St. Joseph River has moderately stable flows due to a thick surficial layer of coarse-textured glacial deposits and pervious soils (MDNR 1999b). The local surface geology at the Project consists of thick, sandy lacustrine and outwash deposits. Based on previous subsurface exploration programs (AEP 1987) and borings conducted at the site (Barr 1999), the foundations for the Project structures generally consist of sands, silty sands, and silts. The underlying foundation strata vary from loose to dense in relative density.

5.2.4 Mineral Resources

St. Joseph County has two mineral resources, gold and calcite (State of Michigan undated(a)). In general, gold is present in over 100 places in Michigan and has been discovered in 27 of the 68 counties in the Lower Peninsula and 6 of the 15 counties in the Upper Peninsula (Michigan State University undated). Reported discoveries of gold within the county occur in Marcellus, St. Joseph County, and Burr Oak, St. Joseph County. However, the gold located in Burr Oak is most likely pyrite (State of Michigan 1980). The Calcite limestone/dolomite quarry, near Rogers City Michigan, is the largest limestone quarry in the world (State of Michigan undated(b)). The Calcite quarry has been active for over 85 years and measures approximately 7 kilometers long by 4 kilometers wide (NASA 2006).

5.2.5 Topography

Drainage conditions are mostly well drained with variable areas from poorly to excessively well-drained. Moderately well to well-drained portions of the outwash are used for agriculture, but poorly drained outwash deposits remain as swamp or marsh (Albert et al. 1986).

5.2.6 Project Area Soils

Soils in the section of the St. Joseph River from Mendon, Michigan, to Elkhart, Indiana, are mainly characterized by silt loam or loam soils, but with a mixture of clay loam, silty clay loam, sandy clay, silty clay, or clay. In low lying areas near Three Rivers, there are pockets of organic soils used for muck farming and peat mining (MDNR 1999b).

The overburden materials in the Project region are a result of past glaciation. Soils tend to be sand and gravels resulting from glacial outwash and lacustrine deposition (I&M 2016). According to the U.S. Department of Agriculture (USDA), the mapped soils in the vicinity of the Project are mainly sandy loam (Figure 5.2-1).

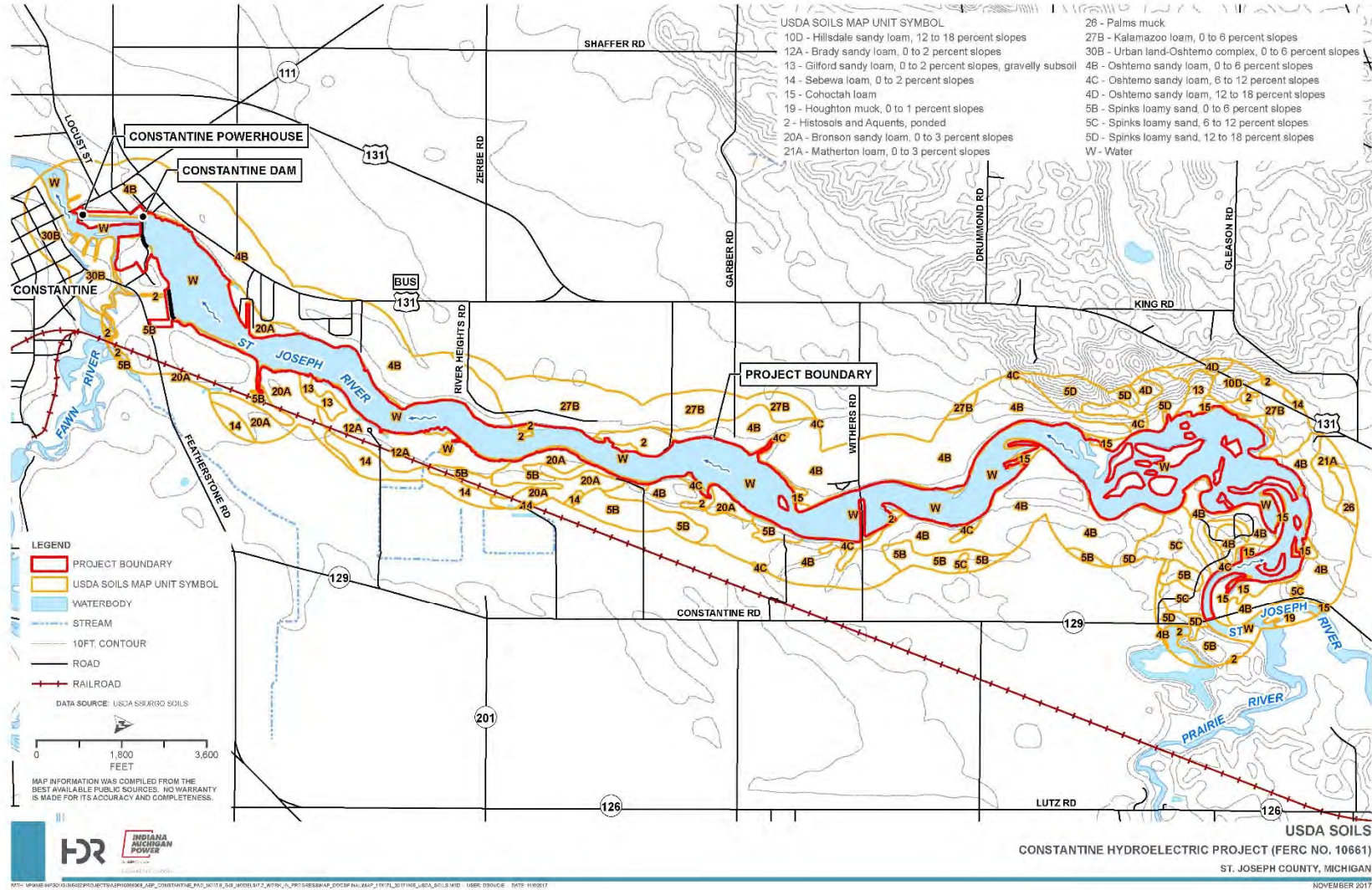
5.2.7 Reservoir Shoreline and Stream Banks

As discussed in Section 4.3.2, the reservoir embankment is approximately 650 feet long. The dike has a maximum height of about 20 feet and is constructed of sand. In 2014, the top of the embankment was raised to elevation 790. The downstream side of the embankment was reshaped to the present slope in 1987 and 2004. In 2004, sheet piles were installed on the downstream right end of the embankment (the length of the line of sheeting was 150 feet). The side slopes are about 2 H to 1 V (estimated in the field) on the upstream side and 2 H to 1 V to nearly flat (flush with native ground) on the downstream side (I&M 2016).

The upstream shoreline is surrounded by forested land, with nearby residential housing with minimal-to-moderate slope. Towards the Project dam, there is a boat launch, reservoir fishing access, and paved walking trails upstream of the dam. Canopy vegetation is present in the reservoir area, as well as groundcover layers of vegetation (shrubs, small trees, perennials) that thrive under tree canopies. Upstream of the dam, the river is flanked by farmland, residential neighborhoods, and forested land. The shoreline downstream of the Project's dam is also surrounded by forested land and residential housing and has a similar composition as lands upstream of the Project dam. The shoreline downstream of the Project can also be classified as having minimal-to-moderate sloping.

In 2011, the west downstream riverbank was repaired due to erosion, which has since been repaired and is monitored (I&M 2016). However, there is no current evidence of erosion, slumping, or slope instability around the reservoir shoreline.

**Figure 5.2-1
Mapped Soils in the Vicinity of the Project**



5.2.8 Seismicity

The Project region is considered tectonically stable. Seismicity is not deterministically associated with faults in this region. An inactive fault, the Royal Center Fault in Indiana, has been mapped about 35 miles south of the Project area (I&M 2016). Additionally, a new fault was discovered approximately 28 miles northeast of the Project area after a magnitude (M) 4.2 event near Scotts, Michigan (USGS 2015).

While no seismicity can be deterministically associated with known fault systems in southern Michigan and Northern Indiana, the area is subjected from time to time to randomly located earthquakes of mild to moderate strength. The most highly active seismic area associated with the region is the central Mississippi Valley area (New Madrid seismic area), located to the southwest at about 600 kilometers or more from the Dam site (I&M 2016).

The earliest record of an earthquake felt in the Project was from the great series of shocks centered near New Madrid, Missouri, in 1811 and 1812. As many as nine tremors from the New Madrid earthquake series were reportedly felt distinctly at Detroit. The four (possibly five) New Madrid earthquakes of 1811-12 (all estimated at M 8 or greater) are the largest intra-plate earthquakes to have been recorded in the world. The Mississippi River changed its course, the land surface sunk to form new lakes, and the violent shaking snapped off trees. These seismic events were centered about 680 kilometers to the southwest of the Project site. Based on the mid-continent attenuation relationship of Toro, Abrahamson and Schneider (1997), it is estimated that the peak ground acceleration of this event at the dam site was likely on the order of 0.01g (I&M 2016).

The closest historic event to the Project of M 4.0 or greater was a M 4.6 on August 10, 1947, and it was approximately 55 kilometers from the Project. The largest historic event within about 400 kilometers (250 miles) was a M 5.4 on September 27, 1909, and was approximately 261 kilometers from the Project. There have been 14 events over M 2.5 reported within 400 kilometers of the Project site from 1999 through 2018; the largest was M 4.2. (USGS undated).

5.3 Water Resources

5.3.1 Drainage Area

The St. Joseph River Watershed drains 4,685 square miles. The watershed includes 3,742 river miles and flows through and near the Kalamazoo-Portage, the Elkhart-Goshen, the South Bend, and the St. Joseph/Benton Harbor metropolitan areas. The drainage area for the Constantine Project is 1,554 square miles (Friends of the St. Joseph River Association 2005).

5.3.2 Flows

The median stream flow of the St. Joseph River is approximately 1,374 cfs. Monthly daily average flows for the Project for the period of record range from 858 cfs to 2,235 cfs (Table 5.3 1).

**Table 5.3-1
Daily Flow Data
(1987-2016)**

Period	Minimum (cfs)	90% Exceedance (cfs)	Average (cfs)	10% Exceedance (cfs)	Maximum (cfs)
January	583	809	1,847	3,165	6,708
February	604	974	1,874	3,009	5,120
March	637	1,365	2,235	3,265	6,443
April	614	1,291	2,154	3,333	5,287
May	680	1,141	1,866	2,773	4,188
June	306	709	1,578	2,666	8,873
July	185	439	1,028	1,800	3,043
August	280	458	858	1,308	3,261
September	287	481	936	1,517	6,167
October	374	568	1,097	1,825	4,488
November	454	662	1,343	2,083	3,715
December	549	783	1,579	2,365	3,958
Annual	187	638	1,526	2,648	8,487

5.3.3 Flow Duration Curves

Annual and monthly flow duration curves have been developed for the Project using flow data from the downstream USGS gage 04099000 at Mottville. These flow duration curves can be found in Appendix E.

5.3.4 Existing and Proposed Uses of Project Waters

Several industries in St. Joseph County use groundwater and surface water including commercial-institutional, industrial-manufacturing, irrigation, and public water supply among others (MDEQ 2014) (Table 5.3-2).

**Table 5.3-2
Michigan Water Use Data – Annual Water Use Volumes
for St. Joseph County in 2014**

Sector	From Great Lakes	From Groundwater	From Inland Surface	Total All Sources
	Gallons			
Commercial-Institutional	0	23,732,087	6,340	23,738,427
Electric Power Generation	0	0	0	0
Industrial-Manufacturing	0	603,812,247	88,974,334	692,786,581
Irrigation	0	16,932,162,494	3,921,251,437	20,853,413,931
Livestock	0	0	0	0
Other	0	1,017,311,783	0	1,017,311,783
Public Water Supply	0	1,266,312,235	0	1,266,312,235
Total	0	19,843,330,846	4,010,232,111	23,853,562,957

Source: MDEQ 2014.

The MDEQ issues National Pollutant Discharge Elimination System (NPDES) individual permits for all discharges into surface waters of the State that are not covered by general NPDES permits. A search was conducted for NPDES individual permits within the Project boundary on the Michigan Surface Water Information Management System (MiSWIMS). Results from the search identified one active NPDES-permitted facility within the Project area that was issued for Michigan Milk Producers Association (Individual Permit Number MI0001414).

5.3.5 Existing Instream Flow Uses

Existing instream flow uses of waters of the St. Joseph River within the Project boundary include various recreational activities (e.g., fishing) and hydroelectric generation.

5.3.6 Federally Approved Water Quality Standards

The State of Michigan's Part 4 Rules, Water Quality Standards (of Part 3, Water Resources Protection, of Act 451 of 1994), specify water quality standards which shall be met in all waters of the state. Michigan's Part 4 Water Quality Standards require that all designated uses of the receiving water be protected (MDEQ 2017a). Designated uses are defined in R 323.1100 and include at a minimum:

agriculture, navigation, industrial water supply, warmwater fishery, other indigenous aquatic life and wildlife, fish consumption, and partial body contact recreation. Additional designated uses (i.e. trout stream, public water supply) may be applied to specific waters. The St. Joseph River has no additional designations (i.e. trout stream or public water supply). Water quality standards for pH, dissolved oxygen (DO), and water temperature in the St. Joseph River are identified in Table 5.3-3.

**Table 5.3-3
Water Quality Standards for the St. Joseph River**

Parameter	Standard	
pH	The pH shall be maintained within the range of 6.5 to 9.0 S.U. in all surface waters of the state, except for those waters where the background pH lies outside the range of 6.5 to 9.0 S.U.	
Dissolved oxygen	A minimum of 5 milligrams per liter (mg/L) of dissolved oxygen shall be maintained.	
Water temperature	Rivers, streams, and impoundments naturally capable of supporting warmwater fish shall not receive a heat load which would warm the receiving water at the edge of the mixing zone more than 5 degrees Fahrenheit (°F) above the existing natural water temperature.	
	Rivers, streams, and impoundments naturally capable of supporting warmwater fish shall not receive a heat load which would warm the receiving water at the edge of the mixing zone to temperatures greater than the following monthly maximum temperatures:	
	January	50 °F
	February	50 °F
	March	55 °F
	April	65 °F
	May	75 °F
	June	85 °F
	July	85 °F
	August	85 °F
	September	85 °F
	October	70 °F
	November	60 °F
December	56 °F	

S.U. = standard units.

5.3.7 Existing Water Quality Data

I&M collected DO and water temperature data at the Project in the summer of 1990 prior to its licensing as well as in 1995 and 1996 from May through October, after the Project was issued its license. The lowest DO concentration recorded during monitoring efforts was recorded in June of 1996 and was 6.4 mg/L. Additionally, concentrations appeared to generally increase by approximately 1.0 mg/L downstream of the Project. Generally, it is during the summer months when the air temperature is the hottest that DO and water temperature conditions are most likely to be detrimental for fishery resources. All recorded DO concentrations were well above the state standards during all monitoring periods. Water temperature at the Project was generally well below state maximum criteria. The three years of collected water quality data were well within the state water quality standards (FERC 1997).

A search was conducted for water quality data within the Project area on the MiSWIMS. Data were collected by the MDEQ in the northern (750007 MDEQ Sampling Station Description: Saint Joseph River at Constantine Road; Lockport ship SEC31) and southern end of the Project boundary (750011 MDEQ Sampling Station Description: Saint Joseph River at Washington Street in Constantine). These data met state standards and are presented in Table 5.3-4. A search for water quality data was also conducted using the U.S. Environmental Protection Agency's (USEPA) STORage and RETrieval (STORET) data warehouse, but no relevant data was found in close proximity to the Project.

**Table 5.3-4
MDEQ Water Quality Data Collected at Two Sites in the Project Area**

MDEQ Station No.	Date	Dissolved Oxygen (mg/L)	Specific Conductance (umho/cm)	pH (S.U.)
750007	8/11/2005	5.4	518	-
	8/17/2005	6.6	516	-
	8/23/2005	7.2	508	-
	9/1/2005	6.4	519	-
750011	8/17/2005	7.3	496	-
	8/23/2005	8.0	495*	8.2
	9/1/2005	6.4	504	-

*average calculated.
Source: MiSWIMS.

On June 20, 2000, the MDEQ conducted water quality sampling approximately 300 feet upstream of the Constantine Dam. Water quality profile data was collected at two foot increments from the surface to the lake bottom. Temperature, DO, conductivity and pH data are listed in Table 5.3-5. The sampling data revealed essentially no variability in temperature or DO from the surface to bottom, suggesting the reservoir was not thermally or oxygen stratified at that time.

**Table 5.3-5
MDEQ Water Quality Data Collected in Constantine Reservoir**

Depth	Temperature	Dissolved Oxygen (mg/L)	Specific Conductance (umho/cm)	pH
Surface	73.7	8.4	491	8.0
2 feet	73.7	8.3	491	8.0
4 feet	73.7	8.3	491	8.0
6 feet	73.7	8.3	491	8.0
8 feet	73.7	8.3	491	8.0
10 feet	73.7	8.3	491	8.0
12 feet	73.7	8.3	490	8.0

Source: MDEQ 2000.

5.3.7.1 Impairment Listing

Every two years, the MDEQ prepares and submits an Integrated Report to the USEPA to satisfy the requirements of Sections 303(d), 305(b), and 314 of the federal Clean Water Act. The Integrated Report describes the status of water quality in Michigan and includes a list of waterbodies that are not attaining Michigan Water Quality Standards and require the establishment of pollutant Total Maximum Daily Loads (TMDL). A TMDL is used to determine the total amount of a pollutant that a waterbody can handle without resulting in the impaired status of that waterbody (MDEQ 2017b).

Waters downstream (6.9 mile reach of the St. Joseph River from Pigeon River upstream to Fawn River [HUC 40500010904-01]) and upstream of the Project (300 acres of the impoundment at Three Rivers [HUC 40500010904-02]) were assessed separately in the 2016 303(d) Water Quality Assessment Integrated Report (MDEQ 2017a). Uses including navigation, industrial water supply, and agriculture were identified as being fully supported in both reaches. Uses including total/partial body contact recreation, warmwater fishery, other indigenous aquatic life and wildlife, and coldwater fishery were not assessed in either reach. Fish consumption downstream of the Constantine Project were identified as not supported due to polychlorinated biphenyls (PCBs) in fish tissue and the water column, but were fully supported in the reach upstream of the Project. A TMDL for PCBs has been scheduled for 2022 (MDEQ 2017b).

5.3.8 Gradient for Downstream Reaches

The topography of the St. Joseph River watershed ranges from gently to moderately sloping. Below the Constantine Dam, the bypass reach extends approximately 1,300 feet to the powerhouse, with the river bed sloping at an average rate of approximately 76 feet per mile. For the reach 1 mile below the powerhouse, the river bed slopes at an average rate of approximately 40 feet per mile.

5.4 Fish and Aquatic Resources

5.4.1 Aquatic Habitat

The middle reach of the St. Joseph River from Mendon, Michigan, to Elkhart, Indiana, as defined by Wesley and Duffy (1999), meanders unconfined in a broad glacial fluvial valley. The width of the river doubles between Three Rivers (180 feet) and Elkhart (364 feet) due to tributary inflows. Substrate is mostly sand and gravel with some silt (Wesley and Duffy 1999). Stream bank cover is abundant in the upper half of this section; whereas, the lower section of this segment is urbanized and has very little stream bank cover. Based on available aerial imagery, the stream bank cover appears to be abundant within the Project boundary.

Habitat in the bypassed reach between the Constantine Dam and the Project powerhouse encompasses about 1,300 feet of the St. Joseph River. This area is typically inundated by backwater from the Mottville Project and supports a warmwater fishery.

5.4.2 Existing Fish and Aquatic Resources

The St. Joseph River is characterized as a warmwater stream (I&M 1988), and the middle reach (from Mendon, Michigan, to Elkhart, Indiana) of the St. Joseph River is managed for channel catfish (*Ictalurus punctatus*), smallmouth bass (*Micropterus dolomieu*), and walleye (*Sander vitreus*) (Wesley and Duffy 1999). Historically, the MDNR has stocked walleye and channel catfish in this reach of the St. Joseph River (Wesley and Duffy 1999). Over the past eleven years (2006 to 2016) nearly 275,000 walleye (just over an inch long) have been stocked in the St. Joseph River in St. Joseph County (Table 5.4-1). Stocking occurred in 2006, 2012, 2014, and 2016 (MDNR 2017b). Channel Catfish have not been stocked in this area of the St. Joseph River since 1999 (MDNR 2017b).

**Table 5.4-1
MDNR Walleye Stocking Efforts in the St. Joseph River,
St Joseph County, from 2006 to 2016 (MDNR 2017b)**

Year	Number of fish
2006	34,966
2012	80,273
2014	85,250
2016	72,998
TOTAL	273,487

A number of fish surveys have been conducted throughout the St. Joseph River. In 2007, the MDNR conducted roving and access site angler surveys at seven sites along the St. Joseph River, two of the sites were located in Constantine (MDNR 2007). Surveys were conducted via boat and on shore on both weekend days and two randomly selected weekdays during each week from April 1 to November 30. Surveys were not collected on holidays. Smallmouth bass, bluegill (*Lepomis macrochirus*), and rock bass (*Ambloplites rupestris*) were the most collected species and were often released (MDNR 2007) Table 5.4-2.

Table 5.4-2
MDNR Roving and Access Site Angler Surveys at Seven Sites along the St. Joseph River from April through November 2007 (MDNR 2007)

Common Name	Scientific Name	Harvested		Released		Total Harvested/Released
		Total Catch	Catch/Hour	Total Catch	Catch/Hour	
Black crappie	<i>Pomoxis nigromaculatus</i>	93	0.0072	201	0.0155	294
Bluegill	<i>Lepomis macrochirus</i>	1,288	0.0993	3,504	0.2702	4,792
Brown bullhead	<i>Ameiurus nebulosus</i>	180	0.0139	5	0.0004	185
Carp	<i>Cyprinus carpio</i>	-	-	118	0.0091	118
Channel catfish	<i>Ictalurus punctatus</i>	67	0.0052	-	-	67
Largemouth bass	<i>Micropterus salmoides</i>	9	0.0007	1,964	0.1515	1,973
Northern pike	<i>Esox lucius</i>	6	0.0005	18	0.0014	24
Pumpkinseed	<i>Lepomis gibbosus</i>	138	0.0107	93	0.0071	231
Redhorse	<i>Moxostoma spp.</i>	-	-	27	0.0021	27
Rock bass	<i>Ambloplites rupestris</i>	299	0.0230	2,396	0.1848	2,695
Smallmouth bass	<i>Micropterus dolomieu</i>	13	0.0010	5,593	0.4314	5,606
Walleye	<i>Sander vitreus</i>	308	0.0237	792	0.0611	1,100
Yellow perch	<i>Perca flavescens</i>	20	0.0015	12	0.0010	32
Other	-	19	0.0015	-	-	19
TOTAL*		2,440	0.1881	14,724	1.136	17,164

*Calculated.

In 1998, the MDNR conducted a general survey to evaluate the fish community and the walleye stocking program upstream of the Constantine Dam using electroshocking, trap nets, and gill nets in June and July (MDNR 1998). The fish community was diverse and nineteen species were collected during the survey (Table 5.4-3). Bluegill, black crappie (*Pomoxis nigromaculatus*), channel catfish, walleye, and smallmouth bass were identified as the primary sport fish. Bluegills were the most abundant fish and accounted for 47 percent of the catch by number. They ranged in size from 2 to 10 inches and 86 percent were of acceptable harvesting size. Black crappie accounted for approximately 7 percent of the catch and 82 percent of fish were considered to be of acceptable

harvesting size. Smallmouth bass were present, but were not of legal harvesting size. Only 13 largemouth bass (*Micropterus salmoides*) were collected, but their size was fair with 43 percent above the legal harvesting size. All sport fish were at or above the state average growth rate except smallmouth bass, which were an inch below the state average. Only 14 walleye were collected, which were from two different year classes. Walleye growth was excellent and averaged two inches above the state average (MDNR 1998).

Table 5.4-3
MDNR Fish Community and Walleye Survey Upstream of the
Constantine Dam in June and July 1998 (MDNR 1998)

Common Name	Scientific Name	Number	Percent
Black crappie	<i>Pomoxis nigromaculatus</i>	45	7.1
Bluegill	<i>Lepomis macrochirus</i>	296	46.7
Bowfin	<i>Amia calva</i>	1	0.2
Bullhead catfishes (family)	Ictaluridae	2	0.3
Common carp	<i>Cyprinus carpio</i>	18	2.8
Channel catfish	<i>Ictalurus punctatus</i>	29	4.6
White sucker	<i>Catostomus commersonii</i>	3	0.5
Hybrid sunfish	<i>Lepomis sp.</i>	4	0.6
Largemouth bass	<i>Micropterus salmoides</i>	13	2.1
Longnose gar	<i>Lepisosteus osseus</i>	16	2.5
Logperch	<i>Percina caprodes</i>	2	0.3
Northern pike	<i>Esox lucius</i>	1	0.2
Pumpkinseed	<i>Lepomis gibbosus</i>	9	1.4
Redhorse	<i>Moxostoma spp.</i>	95	15.0
Rock bass	<i>Ambloplites rupestris</i>	4	0.6
Smallmouth bass	<i>Micropterus dolomieu</i>	34	5.4
Spotted sucker	<i>Minytrema melanops</i>	44	6.9
Walleye	<i>Sander vitreus</i>	14	2.2
Yellow perch	<i>Perca flavescens</i>	4	0.6
TOTAL		634	100.0

Source: MDNR 1998.

In 1996, a walleye survey was conducted by the MDNR below Constantine Dam (MDNR 1996). A total of 38 walleye were collected and ranged from 8 to 16 inches in length. Walleye growth was determined to be excellent and the mean growth index for all age groups was 2.7 inches above the state average growth rate (MDNR 1996).

In the summer of 1972, the MDNR conducted a fish survey along the St. Joseph River using electroshocking and fyke nets. Fifty-two sampling locations were established along the mainstem of the river from its headwaters to the mouth, one segment included below the dam in Three Rivers,

Michigan, to the Constantine Dam and another segment included from Constantine Dam to the Mottville Dam (Shepherd 1975, as cited in I&M 1988). Twenty-two taxa were collected in the segments upstream and downstream of the Constantine Dam (Table 5.4-4). Although abundance data were not available from this study, Wesley and Duffy (1999) summarized the Shepherd (1975) survey and indicated bluegills, black crappie, and smallmouth bass were the most abundant sport fish collected. Redhorse (*Moxostoma spp.*), spotted sucker (*Minytrema melanops*), longnose gar (*Lepisosteus osseus*), and golden shiners (*Notemigonus crysoleucas*) were also abundant (Shepherd 1975, as cited in I&M 1988; Wesley and Duffy 1999). The survey found that there were lower fish numbers, species, and weights downstream of Three Rivers Dam, which were attributed to discharges occurring at the City of Three Rivers, Michigan (I&M 1988). Studies conducted by I&M in 1990 suggested that the fishery has improved in the river both upstream and downstream from the Project since 1972 (FERC 1993a).

Table 5.4-4
Fish Species Collected in Two Study Reaches of the St. Joseph River

Common Name	Scientific Name	Three Rivers Dam to Constantine Dam	Constantine Dam to Mottville Dam
Black crappie*	<i>Pomoxis nigromaculatus</i>	X	X
Bluegill sunfish*	<i>Lepomis macrochirus</i>	X	X
Bluntnose minnow	<i>Pimephales notatus</i>		X
Common carp	<i>Cyprinus carpio</i>	X	X
Common shiner	<i>Luxilus cornutus</i>	X	
Golden shiner	<i>Notemigonus crysoleucas</i>		X
Green sunfish*	<i>Lepomis cyanellus</i>		X
Northern hogsucker	<i>Hypentelium nigricans</i>		X
Largemouth bass*	<i>Micropterus salmoides</i>	X	X
Logperch	<i>Percina caprodes</i>	X	X
Longnose gar	<i>Lepisosteus osseus</i>	X	X
Northern pike*	<i>Esox lucius</i>	X	X
Pumpkinseed sunfish*	<i>Lepomis gibbosus</i>	X	X
Redhorse	<i>Moxostoma spp.</i>	X	X
Rock bass*	<i>Ambloplites rupestris</i>	X	X
Smallmouth bass*	<i>Micropterus dolomieu</i>	X	X
Spotfin shiner	<i>Cyprinella spiloptera</i>		X
Spotted gar	<i>Lepisosteus oculatus</i>		X
Spotted sucker	<i>Minytrema melanops</i>	X	X
Warmouth bass*	<i>Lepomis gulosus</i>		X
White sucker	<i>Catostomus commersonii</i>	X	X
Yellow bullhead	<i>Ameiurus natalis</i>	X	

*Identified as game fish, X indicates fish present.

Source: Shepherd 1975, as cited in I&M 1988.

5.4.2.1 *Anadromous fish*

There are no anadromous fish species in the Project area. Coho salmon (*Oncorhynchus kisutch*), chinook salmon (*Oncorhynchus tshawytscha*) (spring and fall running), steelhead trout (*Oncorhynchus mykiss*), brown trout (*Salmo trutta*), and lake trout (*Salvelinus namaycush*) ascend the St. Joseph River from Lake Michigan during the spawning season and support a salmonid sport fishery in the lower reach of the river (FERC 1993a). However, the upstream movement of fish is currently limited by multiple dams downstream of the Project including the Mottville Project (immediately downstream of the Constantine Project), as well as the Elkhart and Twin Branch Projects (immediately downstream of the Mottville Project) and there are currently no plans on record to install fish passage at these facilities. Additionally, FERC determined that upstream fish passage for resident fish was not necessary at the Mottville Project because a healthy fishery with suitable habitats for key lifestages of various resident species exists upstream and downstream of the Project (FERC 2002). In general, a lack of suitable substrate and the low velocities in the Constantine Project's reservoir would preclude anadromous fish spawning.

5.4.2.2 *Entrainment*

I&M presented entrainment and mortality estimates for fish in 1991. Entrainment rates were based on site-specific studies, whereas mortality estimates were derived from studies conducted at the Buchanan Project, which is located on the St. Joseph River and has similar turbines, hydraulic head, and resident fish community. Entrainment rates were typically low for all species except the mimic shiner (*Notropis volucellus*), but the estimated mortality rate for this species was only 7 percent; therefore, annual mortality estimates of mimic shiners were also relatively low (2,220 fish). I&M estimated annual entrainment mortality at the Project to be 7,750 fish. The study concluded that the amount of entrainment and mortality at the Project was insignificant and would have an insignificant effect on the fish community (FERC 1993b).

In support of the original licensing, in May 1988, field investigations of flow in the headrace were conducted utilizing a portable current meter. Velocities were measured through the trashracks, at the face of the trashracks, within the headrace approximately 800 feet downstream of the headgates, and through the headgates. The velocity of flow through the trashrack bars was measured as 1.8 feet per second (fps) through the trashracks, and 1.3 fps at the face of the trashracks. Both of these values were higher than the calculated velocities at these locations (1.0 and 0.9 fps, respectively), which was attributed primarily to the accumulation of debris on the face of the trashracks during the measurement. The measured velocities are expected to be similar to the current velocity of the free-flowing portion

of St. Joseph River. Therefore, the intake velocities would be easily avoided by most fish. As there have been no change to Project operations or modification of significant Project features; it is believed that existing velocities at the face of and through the trashracks are consistent with previously measured values.

5.4.3 Essential Fish Habitat

Based on a review of the National Marine Fisheries Service (NMFS) online database, no essential fish habitat under the Magnuson-Stevens Fishery Conservation and Management Act or established by the NMFS has been identified in the vicinity of the Project.

5.4.4 Temporal and Spatial Distribution of Fish Communities

As discussed in Section 5.4.2, the MDNR in 1972 (Shepherd 1975, as cited in I&M 1988) found that there were lower fish numbers, species, and weights downstream of Three Rivers Dam, which were attributed to discharges occurring at the City of Three Rivers, Michigan (I&M 1988). However, studies conducted by I&M in 1990 suggested that the fishery has improved in the river both upstream and downstream from the Project since 1972 (FERC 1993a). No additional temporal and spatial information is available for the fish communities in the Project area.

5.4.5 Spawning Run Timing and Extent and Location of Spawning, Rearing, Feeding, and Wintering Habitats

The St. Joseph River is managed for channel catfish, smallmouth bass, and walleye (Wesley and Duffy 1999). Therefore, the life-history characteristics of these species are described below. Threatened or endangered fish or aquatic species are discussed in Section 5.7.

5.4.5.1 *Channel Catfish*

Channel catfish live in a diverse array of habitats including inland lakes and medium to large rivers. In rivers, young channel catfish are generally found in shallow riffles, whereas adults typically inhabit deep pools with log jams or rocks for cover during the day and move into shallow water at night. Channel catfish feed both day and night. They take a large part of their food from the bottom, but also feed at the surface. In the late spring or early summer, male channel catfish build nests in dark, secluded areas (e.g., undercut banks, log jams, or rocks). The female leaves the nest soon after depositing the eggs on it. The male stays behind to protect and fan the eggs. Eggs hatch in 5 to 10 days. Fry remain in the nest for about seven days after hatching (MDNR 2017a).

5.4.5.2 *Smallmouth Bass*

Smallmouth bass are found in inland lakes, rivers, and Great Lakes bays where waters are cool and clear and the bottom consists of rock or gravelly substrate. Spawning activity begins in the spring when water temperatures are 60°F or warmer. Males build a nest, usually near shore, where they will guard the nest and fry. Eggs hatch in 2 to 3 days. The fry will leave the nest in a couple of weeks after hatching. At first, they eat microcrustaceans, but soon add insects and fish to their diet as they grow (MDNR 2017a).

5.4.5.3 *Walleye*

Walleye prefer cool waters and are often found next to ledges, large rocks, underwater islands, large logs, edges of large beds of aquatic vegetation, along old riverbed channels, and along reefs and bars. In the spring and fall, walleye congregate in shallow bay waters of the Great Lakes and other inland lakes, where they are found in rocky areas and submerged bars (MDNR 2017a). Spawning occurs from March to May over rock shoals in tributaries or lakes. Walleye are known to migrate to upstream tributaries to spawn, but they will spawn in lakes over rocky or gravel shoals or clean, low-growing emergent vegetation (MDNR 2017a).

5.4.6 Benthic Macroinvertebrates Habitat and Life-History Information

Benthic macroinvertebrates are an important component of riverine systems. They are an important fish food and are useful indicators of environmental stress. Often, the presence of pollution-intolerant species, or EPT taxa (Ephemeroptera [mayflies], Plecoptera [stoneflies], and Trichoptera [caddisflies]) can be indicative of a healthy stream. However, this is only one of many indices that can be used to assess the biological integrity of a stream. The diversity of invertebrates in southwest Michigan is considered to be high because it is in the junction of three major ecoregions (Wesley and Duffy 1999). Historical data exists on tributaries of the St. Joseph River (MDEQ 2007, 2011), but limited data was available for the mainstem of the river within the Project area.

5.4.7 Freshwater Mussels

The distribution of mussels have been documented in several reports (Van der Schalie 1930, Horvath et al. 1994, Sherman 1997, and Fisher 1998) and is summarized in Wesley and Duffy (1999). Data collected in these studies that is in close proximity to the Project are provided in Table 5.4-5. No additional data was available for these sites.

**Table 5.4-5
Mussels Found at Two Study Reaches near the Constantine Project
in the St. Joseph River**

Common Name	Scientific Name	St. Joseph River by Three Rivers	St. Joseph River at Mottville
Creepers	<i>Strophitus undulatus</i> ¹	X	X
Cylindrical Papershell	<i>Anodontooides ferussacianus</i>		X
Elktoe	<i>Alasmidonta marginata</i>	X	X
Ellipse	<i>Venustaconcha ellipsiformis</i>	X	X
Fluted-Shell	<i>Lasmigona costata</i>		X
Giant Floater	<i>Pyganodon grandis</i> ²	X	
Mucket	<i>Actinonaias carinata</i>		X
Ohio Pigtoe	<i>Pleuroberema cordatum</i>		X
Pocketbook	<i>Lampsilis cardium</i>		X
Purple Wartback ³	<i>Cyclonaias tuberculata</i>		X
Rainbow Shell	<i>Villosa iris</i>		X
Spike	<i>Elliptio dilatata</i>	X	X
Wabash Pigtoe	<i>Fusconaia flava</i>	X	X

¹ Identified in report as *Strophitus rugosus* - not recognized as a valid taxon.

² Identified in report as *Anodonta grandis* - not recognized as a valid taxon.

³ State threatened.

Source: Wesley and Duff 1999.

5.4.8 Invasive Aquatic Species

The Asian clam (*Corbicula fluminea*) and zebra mussel (*Dreissena polymorpha*) have been identified in the St. Joseph River (Wesley and Duffy 1999, Bandra 2004); however, there is no indication that they are found in the Project area. The Asiatic clam is a small bivalve, which can be found at the sediment surface or slightly buried. It is a filter feeder and removes particles from the water column. It reproduces rapidly and is intolerant to cold temperatures, which can produce fluctuations in annual population sizes. The invasive clam substantially alters benthic substrate and competes with native species for limited resources. There have also been problems with this species biofouling on power plant and industrial water systems (USGS 2017a). I&M has not experienced any operational impacts related to zebra mussels at the Project.

Zebra mussels are a small shellfish named for the striped pattern on its shell. It is typically found attached to objects, surfaces, or other mussels by threads extending from underneath the shells. They are notorious for their biofouling capabilities and colonizing the pipes of hydropower and nuclear power plants, public water supply plants, and industrial facilities. Zebra mussels can affect ecosystems by substantially reducing phytoplankton and other suspended material in the water column. Biomagnification of PCBs is also another effect associated with zebra mussels (USGS 2017b).

5.5 Wildlife and Botanical Resources

5.5.1 Botanical Resources

Southwest Michigan lies in the Beech-Maple Association of the Eastern Deciduous Forest Province (Bailey 1978). In the Project vicinity, vegetation is a mixed hardwood community of predominantly oak, with some ash, beech, hickory, maple, cottonwood, and aspen (I&M 1988).

The area surrounding the Constantine reservoir is largely agricultural. Along its lower third, the reservoir is largely within pre-existing river banks and is bordered by a fringe of trees, while along the upper two-thirds of the reservoir the river often covers more extensive (up to 1,200 feet) widths of lowland areas (I&M 1988).

Observations of aquatic vegetation were made as part of a MDNR survey of the entire St. Joseph River during the summer low-flow period of 1972 (Shepherd 1975). In general, they found aquatic vegetation to be sparse, especially in more turbid sections (Shepherd 1975).

Four stations were observed between Three Rivers Dam and Constantine Dam. In the vicinity of the sewage treatment plant below the Three Rivers Dam, vegetation was sparse (some *Potamogeton*, also some clumps of floating algae). Still in the flowing water segment, but further downstream, vegetation was sparse (some *Sagittaria*). In the upper impounded section, vegetation was moderate and dominated by Nuphar. At a station in the lower pool [where greater depths would be encountered], vegetation (*Nuphar* and *Sagittaria*) was again sparse (Shepherd 1975). Aquatic and riparian vegetation is further described in Section 5.6.

5.5.2 Wildlife

The Project area supports a number of mammals, avifauna, reptiles, and amphibians as described in the sections below.

5.5.2.1 Mammals

Mammals such as white-tailed deer (*Odocoileus virginianus*), red fox (*Vulpes fulva*), squirrels, and bats have been known to occur in the vicinity of the Project (FERC 1993a). Federally endangered Indiana bat and the federally threatened northern long-eared bat may occur within the Project's vicinity. These species could potentially use the Project area for foraging corridors adjacent to the St. Joseph River during the non-hibernating period.

I&M maintained and monitored artificial Indiana bat structures for a total of five years (1994-1999) at the Project in accordance with the approved Wildlife Management Plan under Article 409 of the current license. During the monitoring period, there was no evidence that Indiana bat or any other species of

bat had used the artificial structures. On July 14, 2000, FERC issued an order amending the Wildlife Management Plan to remove the requirement to maintain the artificial nesting structures for the Indiana bat.

5.5.2.2 *Avifauna*

Waterfowl that use the area for feeding and resting periodically during the year are mallard (*Anas platyrhynchos*), Canada goose (*Branta canadensis*), blue-winged teal (*Anas discors*), wood duck (*Aix sponsa*), great blue heron (*Ardea Herodias*), green heron (*Ardea Herodias*), American bittern (*Botaurus lentiginosus*), and spotted sandpiper (*Actitis macularius*). Raptors in the Project area include sharp-shinned (*Accipiter striatus*), Cooper's (*Accipiter cooperii*), red-tailed (*Buteo jamaicensis*), rough legged (*Buteo lagopus*), and broad-winged (*Buteo platypterus*) hawks, American kestrel (*Falco sparverius*), marsh hawk (*Circus cyaneus*), and osprey (*Pandion haliaetus*) (FERC 1993a).

Article 409 of the current FERC license required I&M to develop a wildlife management and land use plan. Under the approved Wildlife Management Plan, I&M is required to install and monitor avian nesting structures within the Project boundary. A total of eight nesting structures were installed within the Project boundary, including four wood duck boxes and four mallard hen houses.

Great Lakes Environmental Center, Inc. (GLEC) has been contracted by I&M to maintain and monitor the eight nesting structures each year. Specifically, nesting structures are examined for damage and repaired, as necessary, and inhabitation, egg count, and nest structure vandalism or parasitism are noted for each structure (GLEC 2016). Based on the results of the monitoring conducted by GLEC in 2016, it was noted that none of the four wood duck boxes or the four mallard hen houses were occupied during the 2016 monitoring period. Three of the mallard hen house structures received minor repairs. Three of the mallard hen houses were also relocated in October 2016 because sedimentation and emergent vegetation precluded safe access to perform monitoring activities (GLEC 2016).

All four wood duck boxes and all four mallard hen houses were present within the Project boundary in March of 2016. All wood duck boxes and mallard hen houses were in good condition during the last visit of the 2016 monitoring period, and each wood duck box was covered to prevent damage during the 2016/2017 winter (GLEC 2016).

None of the eight nesting structures present within the Project boundary were occupied at any time during the 2016 monitoring period, and no nesting structures were occupied in 2015 (GLEC 2015). Given the lack of nesting activities associated with these structures, GLEC recommended that I&M should consider abandoning the existing locations (excluding the three mallard hen houses relocated in October 2016) and relocating the structures to new areas in 2017.

In March 2017, all eight nesting structures were present within the Project boundary, however one of the mallard hen houses required minor repair. One wood duck box was also relocated in October 2017 to a habitat that is potentially more suitable for nesting. Specifically, the nesting structure was moved due to clustering of the nesting structures which may cause competition between courting pairs. Clustering of boxes may also attract the attention of raccoons which will prey on ducks. Finally, some of the nesting structures were elevated to potentially increase nesting success (GLEC 2017a). All wood duck boxes and mallard hen houses were in good condition during the last visit, and each wood duck box was covered to prevent damage during the 2017/2018 winter. Locations of nesting structures within the Project area are provided in Figure 5.5-1 and Figure 5.5-2.

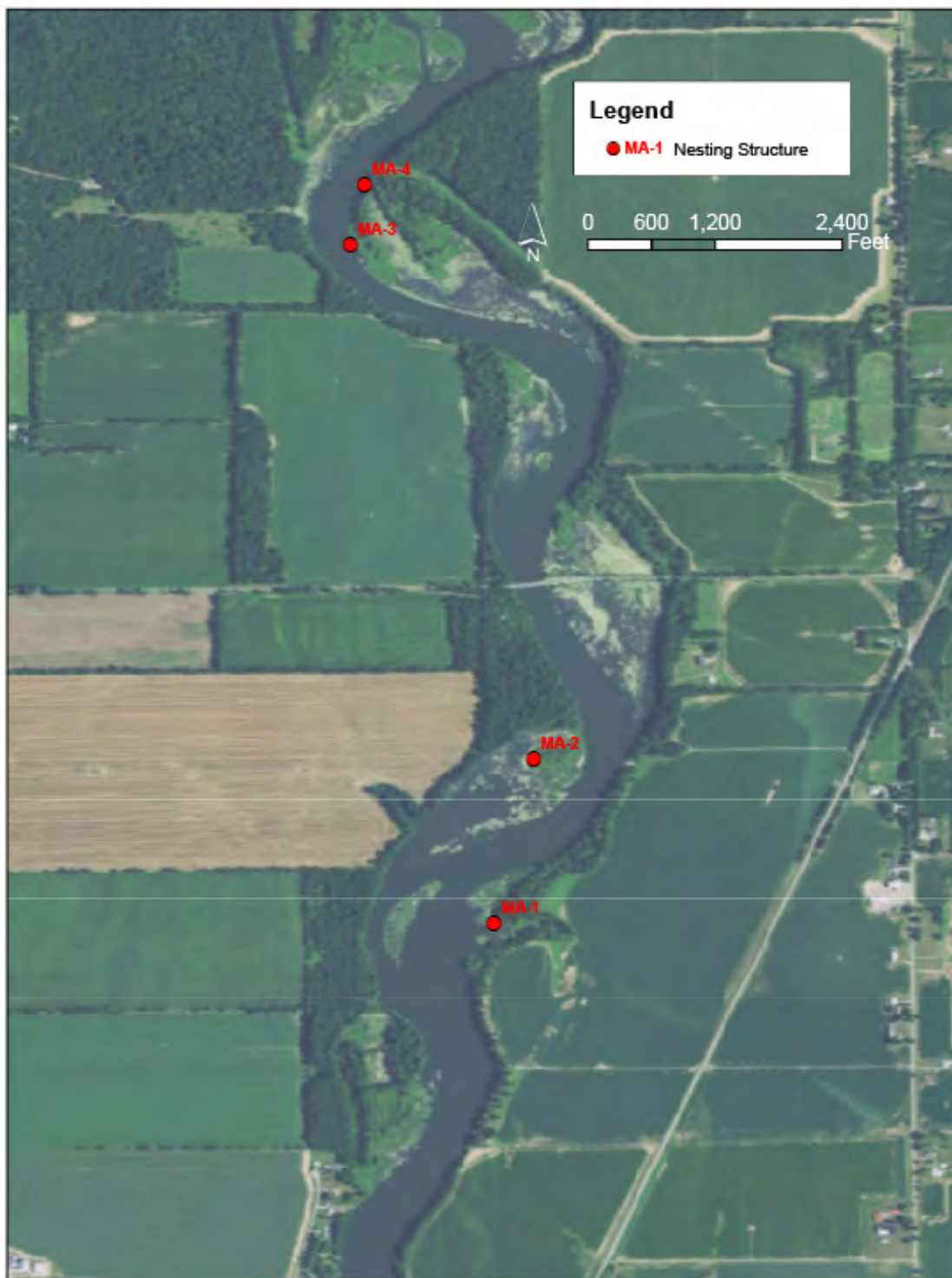
One of the eight nesting structures present within the Project boundary was occupied during the 2017 monitoring period, which is more than what was observed in both 2015 and 2016 (GLEC 2016). Many of the nesting structures also may provide shelter for non-target species, although occupancy by target species was not observed in 2017. Given this recent success and the fact that several structures were moved within the last year, GLEC recommended that I&M should continue to maintain nesting structures within the Project boundary.

GLEC also recommended that if poor nesting success is observed in 2018 that I&M should consider reducing the number of structures that are maintained within the Project boundary or moving structures to alternative locations to maximize the probability of nesting success of target species (GLEC 2017a).

Figure 5.5-1
Location of Avian Nesting Structures at the Constantine Project (2017)



Figure 5.5-2
Location of Avian Nesting Structures at the Constantine Project (2017)



5.5.2.3 Reptiles and Amphibians

Reptile and amphibian species inhabit various habitat types such as woodland, riparian, scrub-shrub or early successional areas, and grasslands. Use of these areas may shift during different life stages and/or times of year. Reptiles and amphibian habitat preferences are primarily influenced by food and reproductive requirements. Table 5.5-1 lists the reptiles and amphibians that are known to occur in Michigan and may potentially occur in the Project vicinity.

**Table 5.5-1
Reptiles and Amphibians Known to Occur in Michigan**

Common name	Scientific name
Snakes	
Butler's garter snake	<i>Thamnophis butleri</i>
Smooth green snake	<i>Liochlorophis vernalis</i>
Eastern milk snake	<i>Lampropeltis triangulum</i>
Northern water snake	<i>Nerodia sipedon</i>
Queen snake	<i>Regina septemvittata</i>
Brown snake	<i>Storeria dekayi</i>
Red-bellied snake	<i>Storeria occipitomaculata</i>
Eastern garter snake	<i>Thamnophis sirtalis</i>
Northern ribbon snake	<i>Thamnophis sauritus septentrionalis</i>
Ring-necked snake	<i>Diadophis punctatus edwardii</i>
Eastern hognose snake	<i>Heterodon platirhinos</i>
Blue racer	<i>Coluber constrictor foxi</i>
Black rat snake	<i>Elaphe obsoleta</i>
Fox snake	<i>Elaphe vulpine and Elaphe gloydi</i>
Kirtland's snake	<i>Clonophis kirtlandii</i>
Eastern massasauga rattlesnake	<i>Sistrurus catenatus</i> (T)
Copperbelly water snake	<i>Nerodia erythrogaster neglecta</i> (T)
Frogs and Toads	
Fowler's toad	<i>Bufo fowleri</i>
Green frog	<i>Rana clamitans</i>
Mink frog	<i>Rana septentrionalis</i>
Western chorus frog	<i>Pseudacris triseriata</i>
Gray treefrog	<i>Hyla versicolor and H. chrysoscelis</i>
Eastern American toad	<i>Bufo americanus</i>

Common name	Scientific name
Bullfrog	<i>Rana catesbeianus</i>
Wood frog	<i>Rana sylvatica</i>
Northern leopard frog	<i>Rana pipiens</i>
Pickerel frog	<i>Rana palustris</i>
Northern spring peeper	<i>Pseudacris crucifer</i>
Blanchard's cricket frog	<i>Acris crepitans blanchardi</i>
Salamanders	
Western lesser siren	<i>Siren intermedia nettingi</i>
Red-backed salamander	<i>Plethodon cinereus</i>
Small-mouthed salamander	<i>Ambystoma texanum</i>
Eastern tiger salamander	<i>Ambystoma tigrinum</i>
Mudpuppy	<i>Necturus maculosus</i>
Four-toed salamander	<i>Hemidactylium scutatum</i>
Spotted salamander	<i>Ambystoma maculatum</i>
Eastern newt	<i>Notophthalmus viridescens</i>
Marbled salamander	<i>Ambystoma opacum</i>
Blue-spotted salamander	<i>Ambystoma laterale</i>
Turtles	
Easter box turtle	<i>Terrapene carolina</i>
Spiny soft-shell turtle	<i>Apalone spinifera</i>
Common snapping turtle	<i>Chelydra serpentine</i>
Common musk turtle	<i>Sternotherus odoratus</i>
Blanding's turtle	<i>Emys blandingii</i>
Painted turtle	<i>Chrysemys picta</i>
Red-eared slider	<i>Trachemys scripta elegans</i>
Common map turtle	<i>Graptemys geographica</i>
Wood turtle	<i>Glyptemys insculpta</i>
Spotted turtle	<i>Clemmys guttata</i>
Lizards	
Five-lined skink	<i>Eumeces fasciatus</i>

Source: MDNR 2017c.

T: Federally listed as threatened.

5.5.2.4 *Invasive Terrestrial Species*

The MDNR maintains a watch list of terrestrial invasive species that have been identified as posing an immediate and significant threat to Michigan's natural resources (Table 5.5-2). These species have either never been confirmed in Michigan, have very limited distribution, or are localized (MDNR 2017d). There are no records indicating that any of these invasive species have been documented or have been known to occur in the vicinity of the Project.

**Table 5.5-2
Terrestrial Invasive Species Watch List for Michigan**

Common name	Scientific name	Category
Asian longhorned beetle	<i>Anoplophora glabripennis</i>	Insect
Asiatic sand sedge	<i>Carex kobomugi</i> Ohwi	Herbaceous Plant
Balsam woolly adelgid	<i>Adelges piceae</i>	Insect
Chinese yam	<i>Dioscorea oppositifolia</i> L.	Vine
Hemlock woolly adelgid	<i>Adelges tsugae</i>	Insect
Himalayan balsam	<i>Impatiens glandulifera</i>	Herbaceous Plant
Japanese stiltgrass	<i>Microstegium vimineum</i> (Trin.) A. Camus	Herbaceous Plant
Kudzu	<i>Pueraria montana</i> var. <i>lobata</i>	Woody Vine
Mile-a-minute weed	<i>Persicaria perfoliata</i>	Herbaceous Plant
Nutria	<i>Myocastor coypus</i>	Mammal
Thousand cankers disease	<i>Pityophthorus juglandis</i> , <i>Geosmithia morbida</i>	Tree Disease

Source: MDNR 2017d.

5.6 Wetlands, Riparian, and Littoral Habitat

Wetlands are generally defined as those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support vegetation typically adapted for life in saturated soil conditions. The State of Michigan administers Section 404 of the federal Clean Water Act regulating wetlands in most areas of the state through the MDEQ. The U.S. Army Corps of Engineers (USACE) retains jurisdiction over traditionally navigable waters including the Great Lakes and connecting channels and wetlands directly adjacent to these waters.

The USFWS (Cowardin 1979) defines wetlands as:

...lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification, wetlands must have one or more of the following three attributes: (1) at least

periodically, the land supports predominately hydrophytes; (2) the substrate is predominantly undrained hydric soil; and (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some point during the growing season of the year.

5.6.1 Wetland and Riparian Vegetation

The Project area is in the Beach-Maple Association of the Eastern Deciduous Forest Province (Bailey 1980). Dominant vegetation in the Project area is a mixed hardwood community consisting of oak, some ash, beach, hickory, maple, cottonwood, and aspen. The Project boundary also includes six palustrine wetland habitat types as classified by Cowardin (1979). The Project boundary includes one palustrine emergent, three palustrine forested, and two palustrine scrub-shrub wetland habitats. Willow species dominate the plant community in the scrub-shrub areas and maple, sycamore, and cottonwood dominate the forested wetlands. Other species of the palustrine forested areas include ash, sumac, walnut, and oaks. Plant species of the aquatic bed community include water-lily, watermilfoil, and the crisp pondweed. Arrow arum is a dominant species in the emergent wetland class. Cattails are a minor component of the wetland plant community in the Constantine reservoir (FERC 1993a).

5.6.1.1 *Invasive Plants*

Invasive species occurring within the Project boundary are purple loosestrife (*Lythrum salicaria*), Eurasian watermilfoil (*Myriophyllum spicatum*) and Carolina fanwort (*Cabomba caroliniana*). Carolina fanwort is not widely distributed in Michigan and is listed as “prohibited”, whereas purple loosestrife and Eurasian watermilfoil are established in the state and are listed as “restricted”. Often, management or control techniques are not available for prohibited species (State of Michigan 2018). Article 409 of the license requires I&M to conduct surveys for purple loosestrife and Eurasian watermilfoil within the Project’s reservoir. The surveys are to be conducted annually between late July and early August, the time during which Eurasian watermilfoil is at or near peak growth and purple loosestrife is in bloom. GLEC was contracted by I&M to complete the survey in 2017, the results of which are briefly described below.

Purple Loosestrife

Purple loosestrife was documented at a total of 170 locations in the Constantine reservoir in 2017 (Figure 5.6-1 through 5.6-3). The majority of these infestations were characterized by a single plant or a few scattered plants. However, there were 22 documented instances of moderate purple loosestrife infestations and ten heavy purple loosestrife infestations, characterized by nearly pure stands of purple loosestrife. Site photographs depicting examples of light, moderate, and heavy purple loosestrife

infestations observed in the Project reservoir in 2017 are provided in Photo 5.6-1, Photo 5.6-2, and Photo 5.6-3, respectively (GLEC 2017b).

Historical purple loosestrife infestations in the Project reservoir indicate that light infestations have consistently increased between 1998 and 2017, whereas moderate infestations have remained relatively stable over the same period of time. Heavy purple loosestrife infestations were relatively stable between 1998 and 2011. Between 2012 and 2017 the number of heavy purple loosestrife infestations increased from three to ten (GLEC 2017b).

Purple Loosestrife Biological Control Pilot

I&M had authorized Kieser & Associates, LLC (K&A) to design and implement a biological control pilot project at the Constantine Project. This pilot project was designed to test the feasibility of biological controls for purple loosestrife using the *Galerucella sp.* beetle. The pilot project was a three-year study which began in 2015 and concluded in 2017. Data from the three-year project were evaluated to determine if there was evidence to suggest that the release of the beetles in 2015 and 2016 may have impacted the purple loosestrife population at the Test site. The metrics of plant damage, stem height and flower head length were all considered in the evaluation (K&A 2017).

The initial data collected from 2015 through 2017 suggest that there may be emerging signs of impacts on the purple loosestrife following two years of targeted beetle releases at the Test site however, it may be premature to conclude that this is sufficient to establish sustained biocontrol effectiveness. Research on the use of the beetle for purple loosestrife biocontrol has shown that it may take five to seven years and multiple targeted yearly beetle releases to achieve a self-sustaining beetle population, and to see changes in plant species composition. Two years of release and follow-up may not be adequate to realize significant measurable results, though initial observations are encouraging (K&A 2017). I&M will continue to consider and analyze various potential control measures at the Project including biocontrol using beetles, herbicides, physical removal, or a combination of multiple control measures.

**Figure 5.6-1
Invasive Species Mapped in the Project Area (Map 1 of 3)**

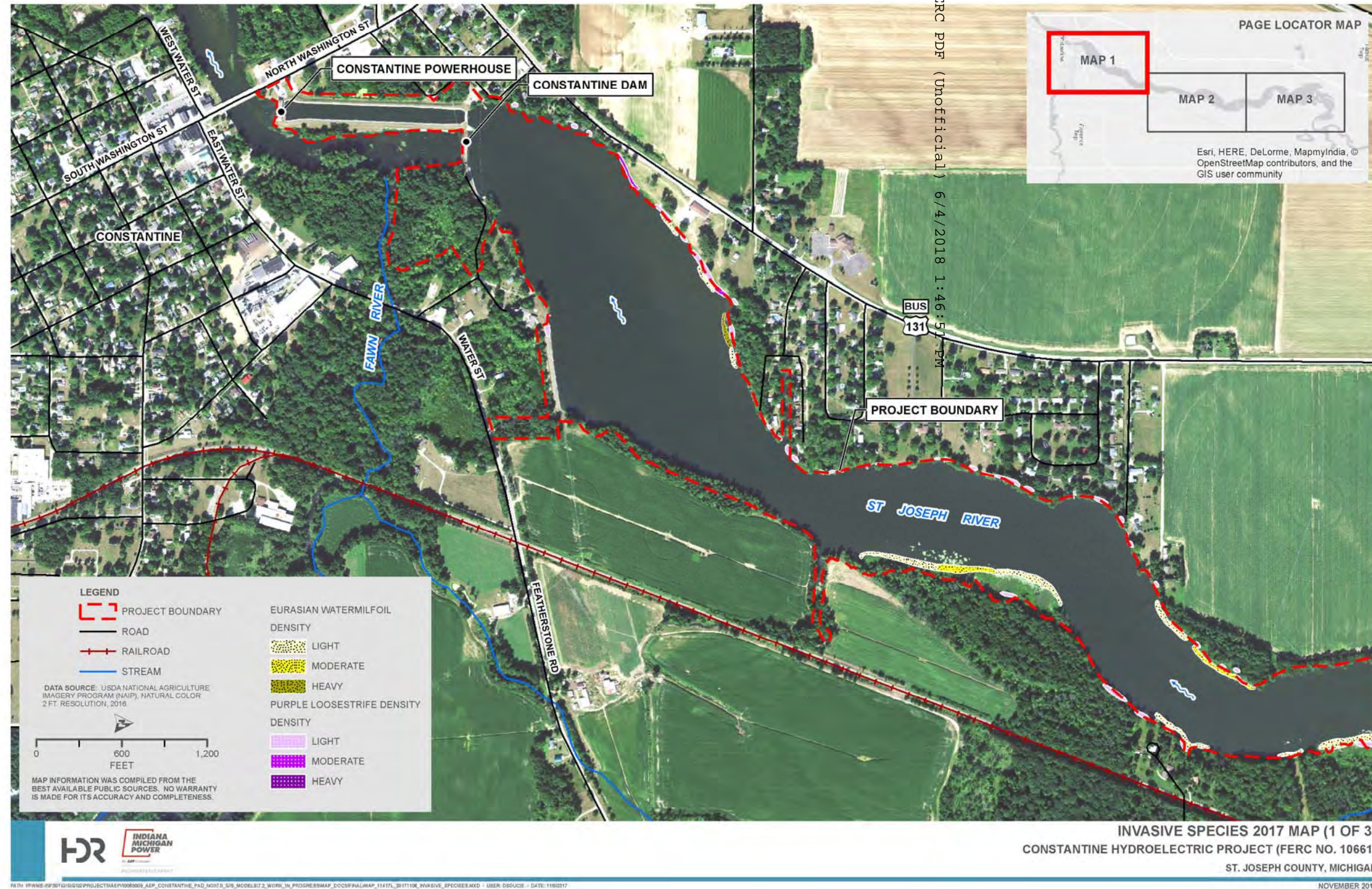


Figure 5.6-2
Invasive Species Mapped in the Project Area (Map 2 of 3)

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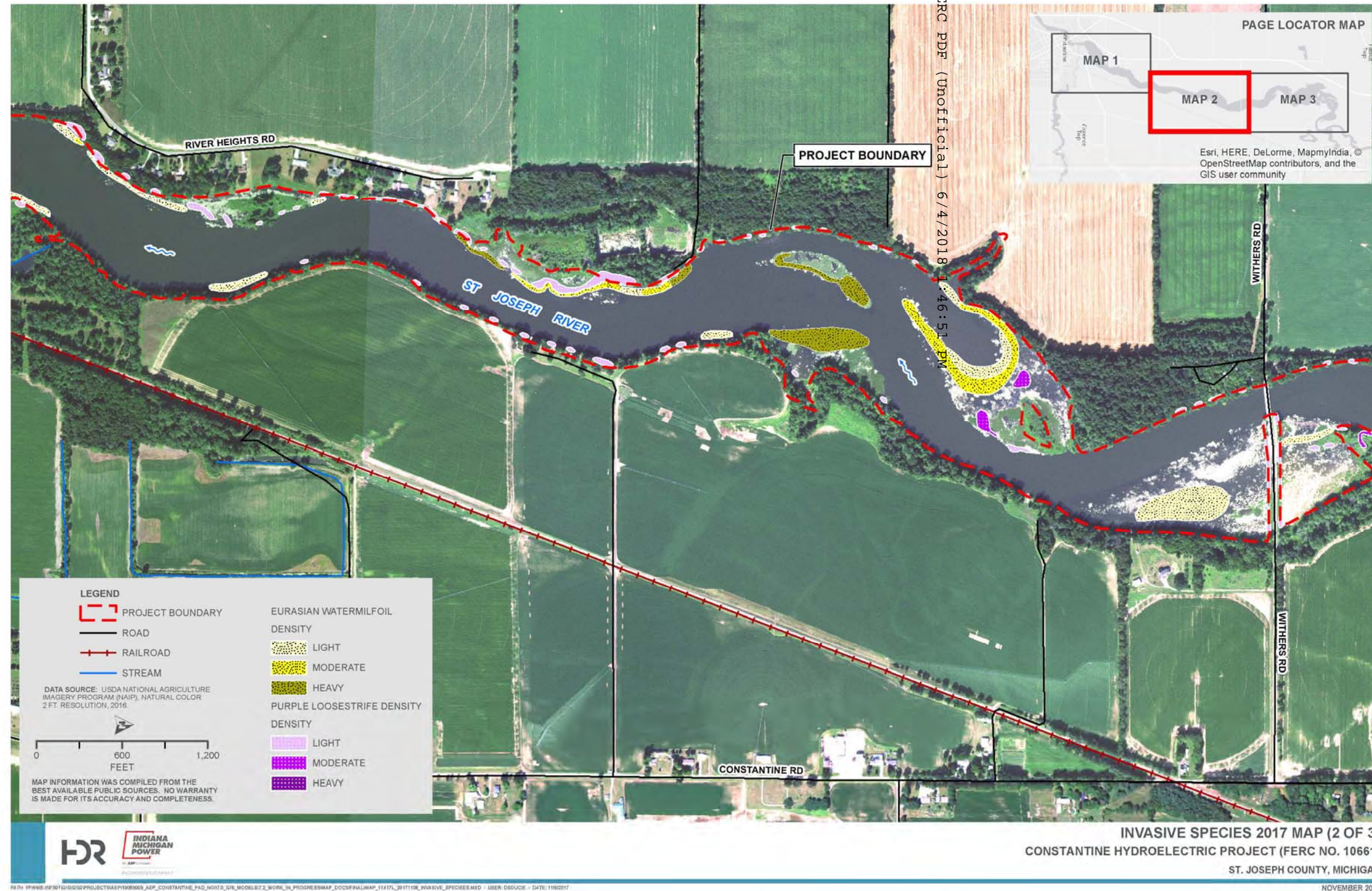


Figure 5.6-3
Invasive Species Mapped in the Project Area (Map 3 of 3)

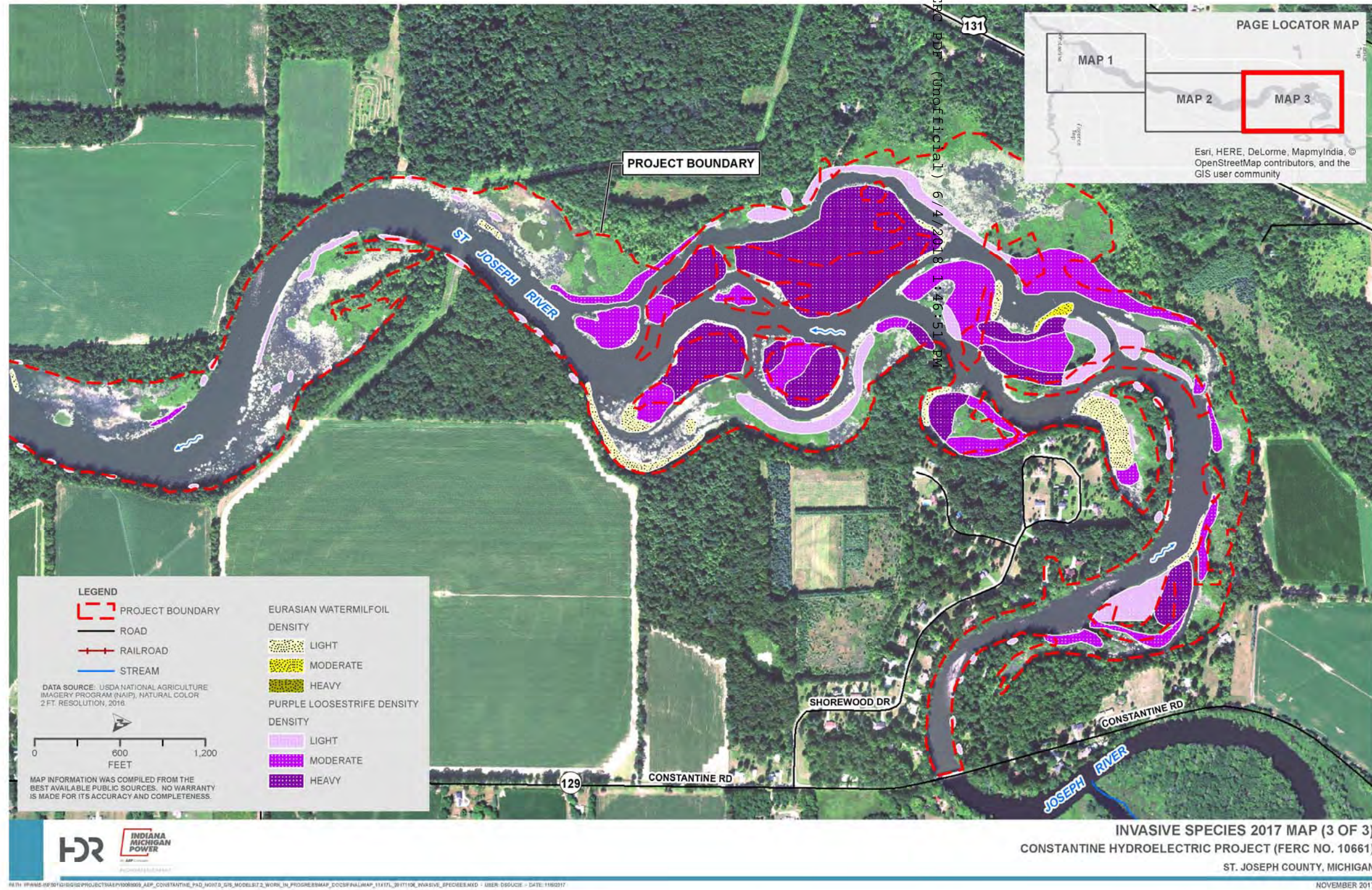


Photo 5.6-1
Example of a Light Infestation of Purple Loosestrife
Observed in the Constantine Project Reservoir in 2017



Photo 5.6-2
Example of a Moderate Infestation of Purple Loosestrife
Observed in the Constantine Project Reservoir in 2017



Photo 5.6-3
Example of a Heavy Infestation of Purple Loosestrife
Observed in the Constantine Project Reservoir in 2017



Eurasian Watermilfoil

A total of 46 Eurasian watermilfoil infestations were observed in the Project reservoir in 2017 (Figure 5.6-1 through 5.6-3). Most of these infestations were characterized by a single plant or a few scattered plants, but there were seven instances of moderate infestations and five instances characterized by dense plants crowding out native vegetation, often as a pure stand. Where not choking out native vegetation, Eurasian watermilfoil was often mixed with coontail (*Ceratophyllum demersum*), pondweeds (*Potamogeton* sp.), and Carolina fanwort. Site photographs depicting examples of light, moderate, and heavy Eurasian watermilfoil infestations observed in the Project reservoir in 2017 are provided in Photo 5.6-4, Photo 5.6-5, and Photo 5.6-6, respectively (GLEC 2017b).

Excluding year-to-year variability, light infestations of Eurasian watermilfoil in the Project reservoir have marginally increased since 1998. Moderate and heavy infestations of Eurasian watermilfoil have generally increased since 1998, with a particularly significant increase observed between 2011 and 2012. Since 2012 the numbers of moderate and heavy infestations of Eurasian watermilfoil have generally decreased (GLEC 2017b).

Photo 5.6-4
Example of a Light Infestation of Eurasian Watermilfoil
Observed in the Constantine Project Reservoir in 2017



Photo 5.6-5
Example of a Moderate Infestation of Eurasian Watermilfoil
Observed in the Constantine Project Reservoir in 2017



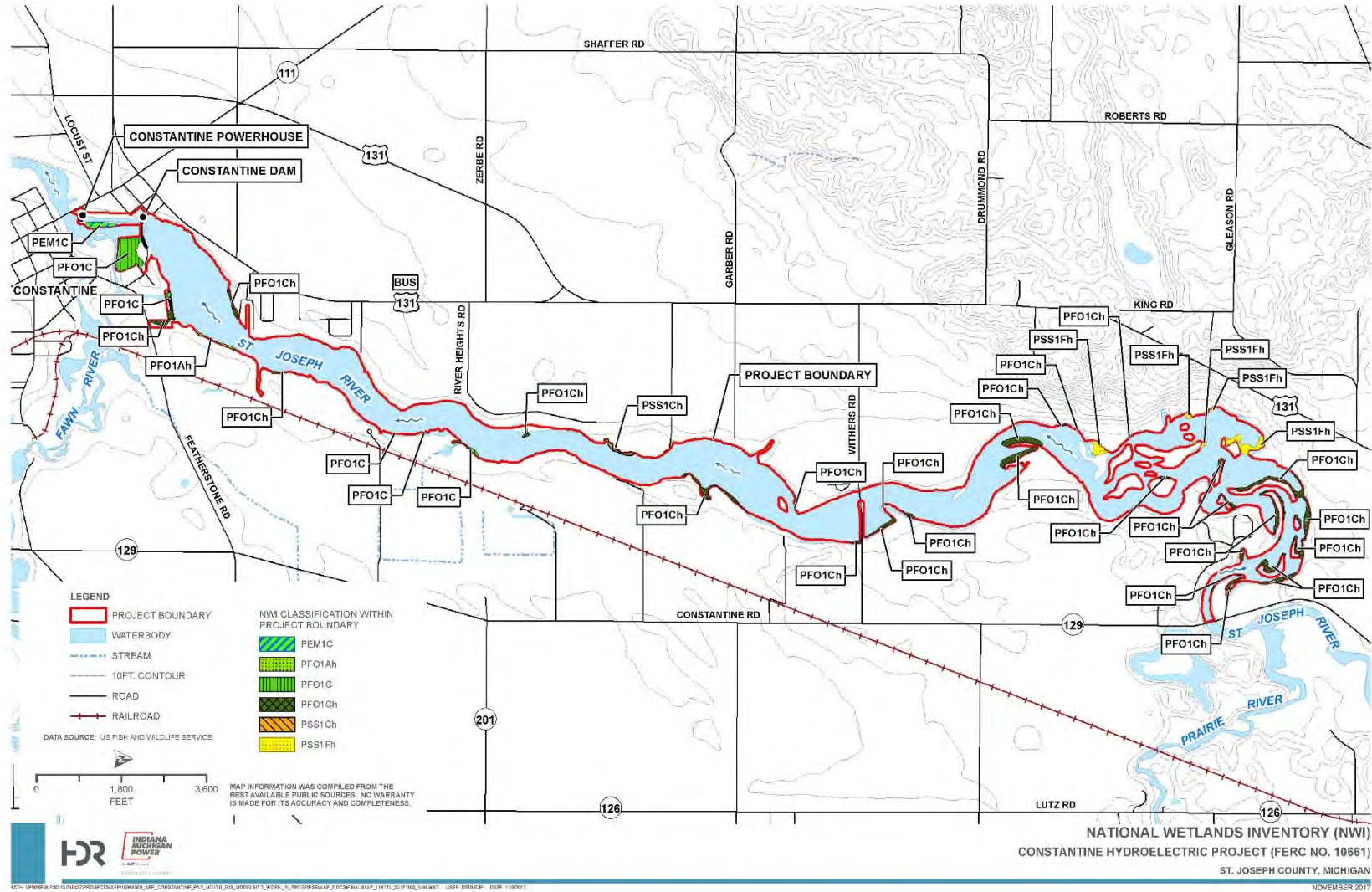
Photo 5.6-6
Example of a Heavy Infestation of Eurasian Watermilfoil
Observed in the Constantine Project Reservoir in 2017



5.6.2 Wetland and Riparian Wildlife

Information on specific wildlife known to occur in wetland and riparian habitats in the Project vicinity is not available. However, many species likely to occur within the Project vicinity typically use wetland or riparian habitats at some point in their lives. Many of the species mentioned in Section 5.5 may utilize riverine and lacustrine habitat within the Project boundary for permanent, temporary, or transient uses.

**Figure 5.6-4
USFWS Wetlands in the Vicinity of the Project**



5.6.3 Wetland, Riparian Zone, and Littoral Maps

A map of wetland habitats existing in the Project vicinity is presented in Figure 5.6-4. Table 5.6-1 defines the National Wetland Inventory (NWI) classification system associated with the wetlands maps (USFWS NWI undated) and provides the available acreage of each classification of wetlands within the Project vicinity.

**Table 5.6-1
National Wetlands Inventory Classification System and Estimated Acreage**

Wetland Code	System	Class	Subclass	Regime	Qualifier	Estimated Acres
PEM1C	Palustrine	Emergent	Persistent	Seasonally Flooded	None	1.4
PFO1Ah	Palustrine	Forested	Broad-Leaved Deciduous	Temporary Flooded	Diked/ Impounded	0.5
PFO1C	Palustrine	Forested	Broad-Leaved Deciduous	Seasonally Flooded	None	7.6
PFO1Ch	Palustrine	Forested	Broad-Leaved Deciduous	Seasonally Flooded	Diked/ Impounded	20.8
PSS1Ch	Palustrine	Scrub-Shrub	Broad-Leaved Deciduous	Seasonally Flooded	Diked/ Impounded	0.8
PSS1Fh	Palustrine	Scrub-Shrub	Broad-Leaved Deciduous	Semipermanently Flooded	Diked/ Impounded	4.7

Source: USFWS NWI undated.

5.6.4 Estimates of Wetland, Riparian Zone, and Littoral Acreage

5.6.4.1 Wetland Acreage

The NWI wetlands in the vicinity of the Constantine Project, excluding the reservoir, encompass approximately 35.8 acres.

5.6.4.2 Littoral and Riparian Zone Acreage

The littoral zone, in the context of a large river system, is the habitat between about a half-meter of depth and the depth of light penetration (Wetzel 1975). The littoral width varies based on the geomorphology and rate of sedimentation of the stretch of river (Wetzel 1983). Based on the NWI maps and review of aerial photography of the Project area, some potential littoral habitats for wildlife were identified within the island complex approximately 4 miles upstream from the Constantine Dam.

For the purposes of this section, the term “riparian” shall be used to refer to anything connected or immediately adjacent to the shoreline or bank of the St. Joseph River. Although the term “riparian buffer” generally refers to the naturally vegetated shoreline, floodplain, or upland forest adjacent to a surface water body, the quantification of riparian habitat requires the calculation of a buffer size from which to base the amount of riparian habitat located within a specified area.

The riparian zone serves as the primary interface between riverine and upland habitats, influencing both the primary productivity and food resources within the river. The majority of riparian habitat within the Project boundary is located within the woody wetlands cover type. Table 5.6-2 lists the estimated land use acreages within the Project boundary.

**Table 5.6-2
Estimated Land Use Acreage within the Project Boundary**

Land Use	Estimated Acres
Cultivated Crops	20.3
Deciduous Forest	7.0
High Intensity Development	0.2
Low Intensity Development	3.8
Medium Intensity Development	0.4
Developed Open Space	5.6
Emergent Herbaceous Wetlands	13.8
Hay/Pasture	0.2
Mixed Forest	0.8
Open Water	417.0
Woody Wetlands	114.0

Source: USGS 2014.

5.7 Rare, Threatened, and Endangered Species

As part of the information-gathering process conducted to support the development of this PAD, I&M requested information from the MNFI and USFWS regarding federal and state-listed rare, threatened, or endangered species, critical habitat, sensitive natural communities, and species of special concern within the Project’s vicinity.

5.7.1 Federally Listed Threatened, Endangered, and Candidate Species

I&M conducted a review of federally listed threatened, endangered, and candidate species using USFWS' IPaC online system on August 15, 2017. A total of six threatened, endangered, or candidate species have the potential to occur within the Project boundary (Table 5.7-1).

**Table 5.7-1
Federally Listed Species Potentially Occurring within the Project Boundary**

Common Name	Scientific Name	Status
Indiana bat	<i>Myotis sodalis</i>	Endangered
Mitchell's satyr butterfly	<i>Neonympha mitchellii</i>	Endangered
Northern long-eared bat	<i>Myotis septentrionalis</i>	Threatened
Copperbelly water snake	<i>Nerodia erythrogaster neglecta</i>	Threatened
Eastern massasauga	<i>Sistrurus catenatus</i>	Threatened
Eastern prairie fringed orchid	<i>Platanthera leucophaea</i>	Threatened

Source: USFWS IPaC consultation (USFWS 2017b).

5.7.1.1 Indiana Bat

Indiana bats are found over most of the eastern half of the United States (USFWS 2006). The Indiana bat is small with dark-brown to black fur, usually weighing only one-quarter of an ounce, with a wingspan of 9 to 11 inches. The Indiana bat is similar in appearance to many other related species, but can be distinguished by comparing the structure of the foot and color variations in the fur (USFWS 2006).

Indiana bats hibernate during winter in caves or occasionally in abandoned mines. They hibernate in cool, humid caves with stable temperatures under 10 degrees Celsius (°C), but above freezing. Very few caves are known to have these characteristics. After hibernation, Indiana bats migrate to their summer habitat in wooded areas where they roost under loose tree bark on dead or dying trees. They forage in or along the edges of forested areas (USFWS 2006).

Indiana bats mate during the fall before they enter hibernation, but fertilization is delayed until the spring after they emerge from the caves. Females migrate to summer colonies where they roost and give birth to a single pup (USFWS 2006).

The Indiana bat is endangered due to human disturbance, cave commercialization and improper gating, summer habitat loss or degradation, and pesticides and environmental contaminants (USFWS 2006).

5.7.1.2 *Northern Long-eared Bat*

The northern long-eared bat is found across much of eastern and north-central United States and all Canadian provinces from the Atlantic Ocean west to the southern Yukon Territory and British Columbia (USFWS 2015). It is a medium-sized bat, measuring 3.0 to 3.7 inches, with a wingspan of 9 or 10 inches. Its fur color can be medium to dark brown on the back and tawny to pale-brown on the underside (USFWS 2015). The bat is distinguished by its longer ears relative to other bats in the genus *Myotis* (USFWS 2015).

The northern long-eared bat spends winters hibernating in caves and mines, preferring hibernacula with very high humidity. During the summer months, the northern long-eared bat prefers to roost singly or in colonies underneath bark, in cavities, or in the crevices of live or dead trees. Breeding begins in late summer or early fall when males swarm near hibernacula. After a delayed fertilization, pregnant females migrate to summer colonies where they roost and give birth to a single pup. Young bats start flying 18 to 21 days after birth, and adult northern long-eared bats can live up to 19 years (USFWS 2015).

Northern long-eared bats emerge at dusk and fly through the understory of forested hillsides feeding on moths, flies, leafhoppers, caddisflies, and beetles. They also feed by gleaning motionless insects from vegetation and water (USFWS 2015).

The most severe and immediate threat to the northern long-eared bat is white-nose syndrome. As a result of this disease, numbers have declined by 99 percent in the northeast. Other significant sources of mortality include impacts to hibernacula from human disturbance. Loss or degradation of summer habitat as a result of highway or commercial development, timber management, surface mining, and wind facility construction and operation can also contribute to mortality (USFWS 2015).

5.7.1.3 *Copperbelly Water Snake*

The copperbelly water snake is found in two geographically separated areas. The northern population segment includes southern Michigan, northeastern Indiana, and northwestern Ohio. Surveys of this population segment over the last 20 years have shown a continuing decline in the overall number of snakes. At present, only five small sub-populations persist within the tri-state area. The southern population, that includes portions of southern Indiana, southern Illinois, and northwestern Kentucky, is not protected by the Endangered Species Act (USFWS 2013).

The copperbelly water snake is a non-venomous snake that feeds mainly on frogs and tadpoles and grows approximately 2 to 4 feet in length. It has a solid dark (usually black) back with a bright orange-red belly. Females generally grow larger than males, with most copperbellies over 30 inches being females (USFWS 2013).

Copperbelly water snakes prefer shallow wetlands or floodplain wetlands surrounded by forested uplands. Seasonally flooded wetlands without fish are favored foraging areas, and copperbellies frequently move from one wetland to another. Copperbellies hibernate, often in crayfish burrows, in forested wetlands and immediately adjacent to forested uplands and remain underground from late October until late April (USFWS 2013).

Only a couple hundred snakes remain in the northern population segment. This ongoing decline can be attributed, in part, to habitat loss and fragmentation, collection, and predation (USFWS 2013).

5.7.1.4 *Eastern Massasauga*

Eastern massasaugas are known to occur in 10 states and 1 Canadian province, from central New York and southern Ontario to south-central Illinois and eastern Iowa. Historically, the snake's range covered this same area, but within this large area the number of populations and numbers of snakes within populations have steadily declined. Generally, only small, isolated populations remain. The eastern massasauga is listed as endangered, threatened, or a species of concern in every state and province where it is found (USFWS 2016).

Massasaugas are generally small snakes with thick bodies, heart-shaped heads, and vertical pupils with an average adult length of about 2 feet. Adult massasaugas are gray or light brown with large, light-edged chocolate brown blotches on the back and smaller blotches on the sides. Young snakes have the same markings, but are more vividly colored (USFWS 2016).

Massasaugas live in wet areas including wet prairies, marshes, and low areas along rivers and lakes. They also use adjacent uplands during part of the year in many areas. They often hibernate in crayfish burrows but may also be found under logs and tree roots or in small mammal burrows (USFWS 2016).

Like all rattlesnakes, massasaugas bear live young. Depending on their health, adult females may bear young every year or every other year. When food is especially scarce they may only have young every three years. Most massasaugas mate in late summer and give birth about a year later with litter sizes ranging from 5 to 20 young (USFWS 2016).

The eastern massasauga has been listed as threatened due to human eradication based on fear, habitat loss, and lack of management and improper timing of management (USFWS 2016).

5.7.1.5 *Mitchell's Satyr Butterfly*

The Mitchell's satyr butterfly is one of the most geographically restricted eastern butterflies. Historically, the Mitchell's satyr was found in New Jersey, Ohio, Michigan, Indiana, and possibly Maryland. However, currently, the butterfly can be found in only 13 locations in Michigan and 2 locations in Indiana (USFWS 1999a). The Mitchell's satyr's habitat is restricted to fen wetlands which are rare, low-nutrient systems that receive carbonate-rich groundwater from seeps and springs (USFWS 1999a).

This butterfly is medium sized with a 1-¾-inch wingspan. It has an overall rich brown color and a distinctive series of orange-ringed black circular eyespots with silvery centers on the lower surfaces of both pairs of wings (USFWS 1999a).

There is little is known about the Mitchell's satyr's three life stages. The eggs are likely laid on the young leaves of low, tender plants with the eggs hatching into caterpillars in about a week. The caterpillar grows throughout the year, shedding its skin many times. The fourth stage caterpillar hibernates under the snow and emerges in the spring. The caterpillar eventually makes a cocoon and then emerges as an adult butterfly, only living approximately two weeks (USFWS 1999a).

The greatest threat to the Mitchell's satyr is habitat destruction. Pesticides, fertilizer, and nutrient runoff from adjacent agriculture, including livestock production, also pose a threat to the butterfly's habitat. It is also believed that some populations have been eliminated by butterfly collectors (USFWS 1999a).

5.7.1.6 *Eastern Prairie Fringed Orchid*

The eastern prairie fringed orchid is primarily distributed in the mid-western United States and Canada, from Oklahoma to Ontario, with a limited distribution in the northern mid-Atlantic and New England regions (North American Orchid Conservation Center 2017).

This plant ranges from 8 to 40 inches tall and has a leafy stem with a flower cluster called an inflorescence. Each plant has one single flower spike composed of 5 to 40 white flowers. Each flower has a three-part fringed lip that is less than 1 inch long and a nectar spur which is about 1 to 2 inches long (USFWS 2005).

The eastern prairie fringed orchid can be found in moist prairies and meadows, bogs, marshes, and fens (North American Orchid Conservation Center 2017). It requires full sun for optimum growth and flowering and a grassy habitat with little or no woody encroachment. This orchid is a perennial herb with flowering generally beginning from late June to early July and lasting for 7 to 10 days. Seed capsules mature over the growing season and are dispersed by the wind from late August through September (USFWS 2005).

The current decline of this plant is mainly due to the loss of habitat from the drainage and development of wetlands. Succession to woody vegetation, competition from non-native species, and over-collection are other reasons for the decline of this species.

5.7.2 Biological Opinions, Status Reports, and Recovery Plans of Threatened and Endangered Species

Several biological opinions have been developed for the Indiana bat, northern long-eared bat, eastern massasauga, Mitchell's satyr butterfly, and eastern prairie fringed orchid; however, none of these biological opinions are specific to the Project area (USFWS 2017a). No biological opinions have been developed for the copperbelly water snake.

5.7.2.1 Status Reports

No official status reports exist for the Indiana bat, northern long-eared bat, copperbelly water snake, eastern massasauga, Mitchell's satyr butterfly, or eastern prairie fringed orchid. However, the general status of these species, the associated listing, fact sheets, range maps, and other important information is available on the USFWS website.

5.7.2.2 Recovery Plans

Recovery plans have been developed for the Indiana bat (USFWS 2007), copperbelly water snake (USFWS 2008), Mitchell's satyr butterfly (USFWS 1998), and eastern prairie fringed orchid (1999b). The USFWS has not developed recovery plans for the northern long-eared bat and eastern massasauga rattlesnake.

5.7.3 Critical Habitat

When a species is proposed for listing as endangered or threatened under the Endangered Species Act (ESA), the USFWS must consider whether there are areas of habitat believed to be essential to the species' conservation. Those areas may be proposed for designation as critical habitat. Critical habitat is a specific geographic area(s) that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection. Through consultation with the USFWS, no critical habitat has been designated under the ESA for species in the Project vicinity.

5.7.4 Temporal and Spatial Distribution of Federally Listed Threatened and Endangered Species

5.7.4.1 Indiana Bat

Indiana bats are found over most of the eastern half of the United States, but almost half of all Indiana bats hibernate in caves in southern Indiana (USFWS 2006). The Indiana bat is a migratory bat, hibernating in caves and mines in the winter and can migrate long distances to summer habitat. Migratory females may migrate up to 357 miles to form maternity colonies to bear and raise their young. Both males and females return to hibernacula in late summer or early fall to mate and enter hibernation (USFWS 2007).

5.7.4.2 *Northern Long-eared Bat*

The spatial distribution for the northern long-eared bat extends from Montana and Wyoming in the West, south to eastern Texas, across the northern portions of Mississippi, Alabama, Georgia, and North Carolina, north to Maine, and across the Great Lakes. As this species generally winters in local or regional hibernacula, it does not migrate extensive distances and, therefore, does not have a significant temporal distribution.

5.7.4.3 *Copperbelly Water Snake*

The copperbelly water snake is found in southern Michigan, northeastern Indiana, northwestern Ohio, southern Indiana, southern Illinois, and northwestern Kentucky. This species often hibernates in forested wetlands and immediately adjacent forested wetlands from late October until late April (USFWS 2013).

5.7.4.4 *Eastern Massasauga*

Eastern massasaugas are known to occur in 10 states and 1 Canadian province, from central New York and southern Ontario to southcentral Illinois and eastern Iowa (USFWS 2016). They generally occupy wetland habitats in the spring, fall, and winter, but in the summer these snakes migrate to drier, upland sites that range from forest openings to old fields, agricultural lands, and prairies (Beltz 1992).

5.7.4.5 *Mitchell's Satyr Butterfly*

Currently, the Mitchell's satyr butterfly can be found in only 13 locations in Michigan and 2 locations in Indiana (USFWS 1999a). The Mitchell's satyr's habitat is restricted to fen wetlands which are rare, low-nutrient systems that receive carbonate-rich groundwater from seeps and springs (USFWS 1999a).

5.7.4.6 *Eastern Prairie Fringed Orchid*

The eastern prairie fringed orchid is primarily distributed in the mid-western United States and Canada, from Oklahoma to Ontario, with a limited distribution in the northern mid-Atlantic and New England

regions (North American Orchid Conservation Center 2017). This plant can be found in a variety of habitats from mesic prairies to sedge meadows, marsh edges, and even bogs. The plants flower from late June to early July lasting for 7-10 days with seed capsules dispersed by the wind from late August through September (USFWS 2005).

5.7.5 State-listed Threatened, Endangered, and Candidate Species

By letter dated September 11, 2017 (included in Appendix B), the MNFI indicated that three state-listed species have been documented in the vicinity of the Project. The MNFI indicated that the state-threatened purple wartyback mussel (*Cyclonaias tuberculata*), water willow (*Justicia americana*), and the yellow-throated warbler (*Setophaga dominica*) are state-listed species that could potentially occur in the Project area.

MNFI's letter also provided a list of Michigan State-listed plants and animals that have been documented within 1.5 miles of the Project site at one time, but have not been documented there in at least 25 years, and/or there is uncertainty regarding their continued presence. These species are listed in Table 5.7-2. Additionally, MNFI's letter provided a list of special concern species and rare natural communities within 1.5 miles of the Project, which are listed in Table 5.7-3.

5.7.5.1 Purple Wartyback Mussel

According to the MNFI, the state-threatened purple wartyback mussel has been known to occur in the St. Joseph River near the Project site. The purple wartyback mussel inhabits medium to large rivers that have gravel or mixed sand and gravel substrates. Suitable habitat for fish host species must be present for purple wartyback reproduction to be successful. Known hosts for the purple wartyback are the yellow bullhead (*Ameiurus natalis*) and channel catfish, but there may be others. Purple wartybacks can live to over 25 years of age. Freshwater mussels require a fish host to complete their life cycle as eggs are fertilized, and develop into larvae within the gills of the female mussel. These larvae, called glochidia, are released into the water and must attach to a suitable fish host to survive and transform into the adult mussel. The purple wartyback is a summer breeder with fertilized eggs and glochidia released during one summer (MNFI 2017).

Major threats to freshwater mussels are habitat degradation, poor water quality, flow alterations, water temperature changes, heavy metals, organic pollution, sedimentation, and siltation (MNFI 2017).

5.7.5.2 Water Willow

The state-threatened water willow is a mat-forming perennial of river slackwater areas; leaves opposite, narrowly elliptical; flowers pale violet marked with dark purple, borne in axillary clusters near top of plant. It primarily occurs in large river systems and less commonly in lakes. It is almost always

found along muddy banks at the edge of the shore (MNFI 2017). Flowering begins in June and may continue to September depending on location (USDA 2017). This species is found from Texas, Oklahoma, Kansas, Iowa, and Michigan east to New York and Vermont, and south to Florida. It also occurs in northern Ontario and Quebec (USDA 2017).

5.7.5.3 *Yellow-Throated Warbler*

The MNFI indicated that the state-threatened, yellow-throated warbler has been known to occur in the Project area. Michigan's yellow-throated warbler population largely occurs in areas with mature sycamore trees, which are associated with bottomland and river floodplain forests. They have also been found in areas comprised of mature silver maples and American basswood. The yellow-throated warbler usually returns to Michigan in the spring from mid-April to mid-May. Nests are generally placed in sycamores, far from the trunk and a substantial distance from the ground. Most individuals leave the breeding grounds by August (MNFI 2017).

**Table 5.7-2
State-Protected Species with Historical Records within 1.5 Miles of the Project (MNFI 2017)**

Common Name	Scientific Name	State Listing	First Siting of Species	Last Siting of Species	Heritage Conservation Status
Plants					
Fleshy stitchwort	<i>Stellaria crassifolia</i>	Endangered	1890	1890-06-07	S1
Dwarf burhead	<i>Echinodorus tenellus</i>	Endangered	1837	1837-08-11	S1
Cut-leaved water parsnip	<i>Berula erecta</i>	Threatened	1952	1952-07-28	S2
Rosepink	<i>Sabatia angularis</i>	Threatened	1837	1837-08-18	S2
Bog bluegrass	<i>Poa paludigena</i>	Threatened	1890	1890-06-06	S2
Birds					
Cerulean warbler	<i>Setophaga cerulea</i>	Threatened	1992-07-02	1992-07-02	S3

**Table 5.7-3
State Special Concern Species and Rare Natural Communities within 1.5 Miles of the Project (MNFI 2017)**

Common Name	Scientific Name	First Siting of Species	Last Siting of Species	Heritage Conservation Status
Plants				
Missouri rock-cress	<i>Boechnera missouriensis</i>	1890	1890-06-04	S2
Eared foxglove	<i>Agalinis auriculata</i>	1837	1837-08-23	SX
Leadplant	<i>Amorpha canescens</i>	2007-11-07	2013-09-03	S3
False boneset	<i>Brickellia eupatorioides</i>	2009-10-02	2009-10-02	S2
Mussels				
Rainbow	<i>Villosa iris</i>	2009-06	2009-09	S3
Ellipse	<i>Venustaconcha ellipsiformis</i>	1930	2013-07-16	S3
Community				
Rich Forest, Central Midwest Type	<i>Mesic Southern Forest</i>	2009-09-08	2009-10-02	S3

5.8 Recreation and Land Use

5.8.1 Existing Recreation Facilities and Opportunities

The Constantine Project provides several formal (licensed) recreational facilities located upstream and downstream of the Constantine dam that are maintained and operated by I&M and open to the public. The Project amenities include a boat launch, a portage, reservoir fishing access, tailwater fishing access, Americans with Disabilities Act (ADA) accessible portable toilets, and a picnic area.

The tailwater fishing platform is located just downstream of the powerhouse with an associated parking lot with the capacity for approximately 14 vehicles. The Constantine boat launch is located adjacent to the west abutment of the spillway. There is a small fishing dock next to the one-lane boat launch with a parking area for approximately 10 vehicles, and additional space for trailers. Located on the east side of the Constantine dam, there is a portage trail that allows individuals to transport canoes and kayaks around the dam, as well as providing limited access to the reservoir for fishing, and a picnic area. There is no official parking area at the portage site. However, street-side parking is available for approximately 5 vehicles, close to the intersection of Hull Street and Wells Street.

Photo 5.8-1
View from Washington Street Looking East Toward Tailwater Fishing Access



**Photo 5.8-2
Tailwater Fishing Access Below Constantine Powerhouse**



**Photo 5.8-3
Southwest to Northeast View of Boat Launch**



**Photo 5.8-4
West to East View of the Constantine Boat Launch**



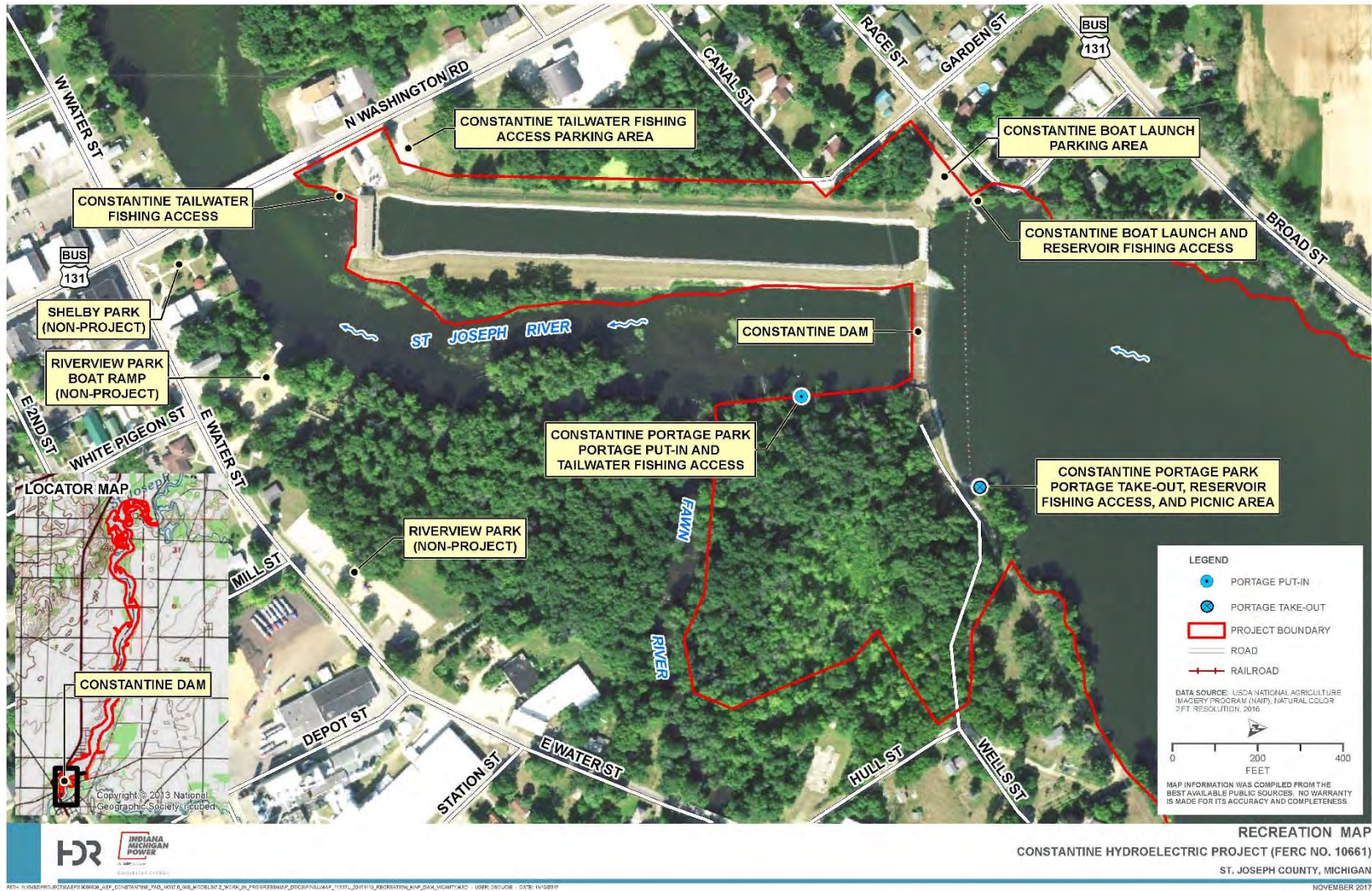
**Photo 5.8-5
Constantine Portage Park Looking North**



**Photo 5.8-6
Constantine Portage Park Looking Southwest**



**Figure 5.8-1
Location Map of Recreation Areas in the Vicinity of the Project**



5.8.2 Current Project Recreation Use Levels and Restrictions

Recreation use levels have been documented as required in the FERC Licensed Hydropower Development Recreation Report (FERC Form 80). As of 2015, the number of annual visits to the recreational areas at the Constantine Project was estimated to be 11,851 daytime and 2,963 nighttime visits. A copy of the most recent FERC Form 80 (2015) has been included as Appendix F to this PAD. None of the licensed recreation facilities appear to be utilized to the maximum capacity, with all sites under 50 percent utilization.

5.8.3 Existing Shoreline Buffer Zones

As a run-of-river facility, the Constantine Project is operated in a way that minimally affects the reservoir level and, therefore has limited impacts on the shoreline. The flashboards are usually in place on the spillway crest, thereby creating a normal reservoir elevation of 782.9 feet. The majority of the area surrounding the Project reservoir is agricultural lands with limited land within the Project boundary. The lower third of the reservoir is largely within pre-existing river banks and is bordered by a fringe of trees, while along the upper two-thirds of the reservoir the river often covers more extensive (up to 1,200 feet) widths of lowland areas (I&M 1988). I&M maintains a boat launch, portage, and reservoir fishing access site upstream of the Project's dam as well as a tailrace fishing area below the powerhouse.

5.8.4 Recreation Needs Identified in Management Plans

Michigan offers a wide range of outdoor recreation activities from the traditional (e.g., camping, hunting, fishing, snowmobiling, and off-road vehicle trails) to the new and emerging (e.g., adventure racing, disc golf, whitewater paddling). Recreation opportunities can be found in the hundreds of state-owned parks, recreation areas, forests, campgrounds, and trails, as well as the thousands of community playgrounds, parks, trails, nature preserves, and beaches, and more than 30 federally owned parks, lakeshores, heritage/historic areas, scenic trails, forests, wilderness areas, wildlife refuges, and marine sanctuaries. Some of these facilities are highly developed with modern infrastructure, and others are more natural, remote places. They are located all over the state, in rural communities as well as in the heart of some of urban centers. Every community in Michigan is within 50 miles of a State Park or Recreation Area and even closer to numerous local and regional parks or recreation spaces (MDNR 2012).

All of these resources play an important role in Michigan's expansive outdoor recreation system, both individually and collectively. They provide numerous social, health, economic, and environmental benefits and are places that continue to attract residents and out-of-state visitors alike (MDNR 2012).

Michigan's Statewide Comprehensive Outdoor Recreation Plan (SCORP) is a five-year strategic plan that shapes investment by the state and local communities in priority outdoor recreation infrastructure and programming. The Plan is designed to evaluate ongoing and emerging outdoor recreation trends, needs, and issues, and establish priority strategies for achieving outdoor recreation goals. The state and its local outdoor recreation partners utilize the SCORP as an ongoing framework and action plan for guiding their outdoor recreation management and policy decisions (MDNR 2012).

In developing the 2013–2017 SCORP update, the MDNR undertook a variety of efforts to engage the public, recreation providers, and other outdoor recreation stakeholders in identifying key recreational assets, priorities, and strategies for the coming five years. These stakeholders provided significant direction on how the state and local communities could better collaborate to approach management of Michigan's entire system of parks and outdoor recreation spaces, and many of these stakeholders will be active partners in implementing the objectives and strategies identified in the SCORP (MDNR 2012).

Outdoor recreation continues to be an important and popular activity for residents of Michigan. Public Sector Consultants conducted a public opinion survey for the 2013-2017 SCORP and found the following:

- Nearly 84 percent of Michigan residents feel that outdoor recreation is very important or moderately important to their household.
- More than three-quarters of respondents are *satisfied* or *very satisfied* with the amount and quality (around 79 and 77 percent, respectively) of outdoor recreation in Michigan.
- Walking outdoors, including dog walking, was identified by 21 percent of users as the most important outdoor activity to them.
- Over 33 percent of those who selected camping and 35 percent of those who selected hunting or trapping as their most important activity are willing to drive more than 6 hours, on average, to participate.
- Almost two-thirds (65 percent) of Michigan outdoor recreation users went outside 51 or more days in the year for outdoor recreation of any type (including dog walking), with about half doing so for more than 100 days. This compares to only 48 percent of adults aged 25 and older at the national level (although dog walking was not included as an outdoor recreation activity) (Outdoor Foundation 2012).
- Over 75 percent of respondents feel that the children in their household participate as much as or more in outdoor recreation than they did as a child.

- 33 percent of all respondents said their participation in outdoor recreation has increased in the last five years.

Table 5.8-1 shows the top ten outdoor recreation activities in Michigan identified by survey participants (Public Sector Consultants 2012).

**Table 5.8-1
Top 10 Outdoor Recreation Activities**

Rank	Type of Activity	Percentage Participating
1	Biking, all types, combined	25
2	Camping	24
3	Fishing	23
4	Walking outdoors, including dog walking	21
5	Hiking, all types, combined	20
6	Play outdoor games/sports (soccer, basketball, baseball, etc.)	17
7	Hunting or trapping	15
8	Swimming, all types, combined	13
9	Boating	11
10	Visit playgrounds	10

Source: MDNR 2012.

5.8.5 Licensee's Shoreline Permitting Policies

The Project's reservoir is owned and operated by I&M. I&M maintains a boat launch, portage, and reservoir fishing access upstream of the dam that provides access to the Project's reservoir. Approximately 2.5 percent of the Project's reservoir is available for public use. There is no shoreline management plan or policy with regard to permitting of piers, docks, or other shoreline facilities.

5.8.6 Specially Designated Recreation Areas

5.8.6.1 *Wild, Scenic, and Recreational Rivers*

No portion of the Project has been designated under the National Wild and Scenic Rivers System.

5.8.6.2 *Nationwide Rivers Inventory*

Approximately 210 miles of the St. Joseph River has been listed by the National Park Service (NPS) under the Nationwide Rivers Inventory (NRI). Sections from the mouth to Berrien Springs Dam

(25 miles) and Berrien Springs Dam to the dam at Jonesville (185 miles) were listed in 1982 and proposed for study for inclusion in the State Natural Rivers System. The Outstandingly Remarkable Value identified by the NPS for this section of the river is recreation (NPS 2009).

5.8.6.3 *Scenic Byways*

The Project is not located in close proximity to a National Scenic Byway.

5.8.6.4 *National Trails System and Wilderness Areas*

No portion of the Project has been designated as wilderness area, recommended for such designation, or designated as a wilderness study area under the Federal Wilderness Act.

5.8.7 Regionally or Nationally Significant Recreation Areas

The Fabius State Game Area is located approximately four and a half miles upstream of the Constantine Project. The Fabius State Game Area is managed by the MDNR. This facility is used primarily for hunting as full access to the property and the St. Joseph River is limited due to terrain and foliage impediments.

5.8.8 Recreational Attractions in the Vicinity of the Project

Additional I&M-Owned Recreational Facilities at Other Projects

The Mottville Hydroelectric Project, which is located approximately seven river miles downstream of the Constantine Project, provides a tailwater fishing platform just downstream of the powerhouse on the western shore of the St. Joseph River and launching, picnic and fishing facilities on the eastern shore. Mill Creek Park, within the reservoir area, provides additional recreation opportunities.

Community Parks

There are several community parks in the vicinity of the Project, including Shelby Park and Riverview Park. Shelby Park is a one-acre park located east of the St. Joseph River with an open space with benches and picnic tables (Michigan Department of Transportation [MDOT] 2008). Riverview Park is also located on the east side of the river within the Village of Constantine. Facilities at Riverview Park include a boat launch, fishing platform, boardwalk, playground, and benches.

The Wahbememe Memorial Park is located in White Pigeon, Michigan, within five miles of the Project. The park is owned and operated by the St. Joseph County Parks Commission. The park is listed on the National Register of Historic Places and is a monument to Chief White Pigeon, who is buried at the site. A monument provided by the Alba Columbia Club in 1909 is located on the site. The park is

maintained by the neighboring Welders Supplies and Gas Inc., under a 1986 agreement with the St. Joseph County Parks Commission. In addition to the Wahbememe Historical Monument, the park features a small grassy area as well as a sitting area. (MDOT 2008).

Photo 5.8-7
Shelby Park on the East Side of the River Directly Across from Powerhouse



**Photo 5.8-8
Riverview Park Picnic Area and Boat Launch on the East Side of the River**



**Photo 5.8-9
Riverview Park Playground on East Side of the River**



U.S. Title Series Annual Boat Races

The U.S. Title Series was founded in 1982 and is recognized as the premier professional outboard racing series in the United States. The U.S. Title Series' guiding vision is to establish a class of outboard racing competitions between the best professional outboard racing teams that boat racing has to offer; promote the sport of powerboat racing by using any and all means available; and develop a series of outboard racing competitions across the country, putting the sport on a national level as any other professional sport (U.S. Title Series undated).

The U.S. Title Series Championship Racing Association hosts annual hydroplane and runabout boat races upstream of the Constantine powerhouse on the Constantine reservoir. The event consists of a 2-3 day program generally with testing and practice laps on Friday and professional racing on Saturday and Sunday. The racing program averages a 3-4 hour time frame each day (U.S. Title Series undated).

Other Recreational Opportunities

The American Legion maintains a boat launch upstream of the Constantine Dam. This site is a popular place for members to launch boats on the Project reservoir, especially during the hydroplane and runabout boat races that are held by the U.S. Title Series Championship Racing Association annually at Constantine American Legion Post 223. The Constantine Project typically experiences the highest peak amenity use during this event (I&M 2015).

5.8.9 Non-Recreational Land Use and Management

Land use within the Project area is primarily agricultural, with scattered single-family homes, multi-family homes, community facilities, and farmsteads in or surrounding the Village of Constantine. Agriculture is the largest land use in St. Joseph County and produces over \$94 million dollars of product, including seed corn, snap beans, potatoes, and pickles. Of the 231,000 acres of agricultural land, 44 percent is irrigated, amounting to 23 percent of all irrigated land in Michigan. More than half of the cropland is dedicated to corn production, predominately seed corn (St. Joseph County 2007).

5.9 Aesthetic Resources

The Constantine Project is located on the west bank of the St. Joseph River in the Village of Constantine, Michigan. The Project consists of a concrete gravity overflow spillway dam, powerhouse, concrete headgate structure containing seven wooden gates, transmission line, and appurtenant facilities (See Section 4).

The 525-acre Project reservoir and the 1,600-foot-long reach of the river between the Project dam and powerhouse visually dominate the area landscape and are the landscape's principle aesthetic

features. The Project's powerhouse, substation, and storage building are located next to the U.S. Route 131 bridge over the St. Joseph River in the Village of Constantine. These facilities are also fully visible from two village parks, one located immediately adjacent to the complex and the other situated directly across the river from the complex. The Project dam and headgate structure, both located about 1,300 feet upstream from the powerhouse, and a connecting headrace canal are concealed from view from these vantage points by the grass-covered embankments that line both sides of the canal and by the woodlands that surround the Project site area (FERC 1993a). The Constantine Project was constructed in 1873 and has been part of the landscape in the community for more than a century.

Article 412 of the current license for the Project required the removal of an old storage building located next to the powerhouse and U.S. Route 131 to improve the quality of the visual resources at the Project. Per license article 412 and the FERC-approved building removal plan, I&M removed the old storage building and landscaped the area to include trees, shrubs, and grass areas to screen the switchyard from the view of passing motorists on U.S. Route 131. Additionally, a fence that originally aligned with the right-of-way along Route 131 was removed and a new fence was installed to separate the powerhouse entrance and switchyard from the publicly accessible areas.

Photo 5.9-1
View of Powerhouse from Riverview Park on East Side of River



5.10 Cultural Resources

In considering a new license for the Project, FERC has the lead responsibility for compliance with applicable federal laws, regulations, and policies pertaining to historic properties, including the

National Historic Preservation Act of 1966 (NHPA), as amended.¹ Section 106 of the NHPA (Section 106)² requires federal agencies to take into account the effects of their undertakings on historic properties and to afford the Advisory Council on Historic Preservation a reasonable opportunity to comment.

The Section 106 process (defined at 36 CFR Part 800) is intended to accommodate historic preservation concerns with the needs of federal undertakings through a process of consultation with agency officials, the SHPO, federally recognized Indian Tribes, and other parties with a potential interest in an undertaking's effects on historic properties. The goals of the Section 106 process are to:

- Identify historic properties that may be affected (directly and/or indirectly) by an undertaking;
- Assess the effects of an undertaking on historic properties; and
- Seek ways to avoid, minimize, or mitigate adverse effects on historic properties through consultation.

Historic properties are defined in 36 CFR Part 800 as any pre-contact or historic period district, site, building, structure, or individual object listed in or eligible for inclusion in the National Register of Historic Places (NRHP). This term includes artifacts, records, and remains that are related to and located within historic properties, as well as properties of traditional religious and cultural importance (often referred to as "traditional cultural properties" or TCPs) that meet the NRHP criteria.

The Secretary of the Interior has established the criteria for evaluating properties for inclusion in the National Register (36 CFR Part 60). In accordance with the criteria, properties are eligible if they are significant in American history, architecture, archaeology, engineering, or culture. The quality of significance is present in historic properties that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

- Are associated with events that have made a significant contribution to the broad patterns of our history; or
- Are associated with the lives of persons significant in our history; or

¹ 54 USC §300101 et seq.

² 54 USC §306108

- Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant or distinguishable entity whose components may lack individual distinction; or
- Have yielded or may be likely to yield information important in prehistory or history.

In anticipation of Project relicensing, HDR conducted a review of existing archaeological study reports and NRHP records to identify previously reported archaeological and historic resources within the Project's vicinity.

5.10.1 Area of Potential Effects

An area of potential effect (APE) is defined as the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking. The Commission has not yet defined an APE for the Project. In the context of the relicensing process, FERC generally defines the APE as follows: "The APE includes all lands within the Project boundary. The APE also includes any lands outside the Project boundary where cultural resources may be affected by Project-related activities that are conducted in accordance with the FERC license."

Because the Project boundary encompasses all lands that are necessary for Project purposes, all Project-related operations, potential enhancement measures, and routine maintenance activities associated with the implementation of a license issued by the Commission are expected to take place within the Project boundary. The proposed APE is consistent with the potential scope of Project effects and the manner in which the Commission has defined the APEs for other hydroelectric relicensings.

5.10.2 Archaeological Resources

In 1989, I&M conducted a Phase I Archaeological Investigation. Background research was queried at the State Historic Preservation Office and the Michigan State Library in Lansing, Michigan. Examination of cultural resource management reports indicated that limited archaeological investigations have been conducted in the area; which may account for the absence of recorded sites in the Project area. A preliminary study of the Project area conducted in 1989 by Louis Berger and Associates Inc. suggested a moderate to high potential of prehistoric archaeological resources, since the Project parcels are near the St. Joseph River. In contrast, the potential for historic archaeological sites was evaluated as moderate to low, based on the distribution of known historic sites in this area (I&M 1990).

Archaeological fieldwork was conducted in the three parcels of the Constantine Project, which included visual inspection, pedestrian survey, and subsurface testing. Fieldwork was completed in May 1990. The archaeological investigation concluded that there were no historic or prehistoric archaeological sites recorded for the Project site.

The visual inspection conducted in this area at the inception of fieldwork revealed that the majority of the area was intensively disturbed, including the station yard and the west bank of the canal. These areas were evaluated as having limited potential for intact cultural deposits, and the archaeological fieldwork of these areas did not extend beyond the initial visual inspection.

There are no proposed modifications to the physical plant or major operational changes for the Project at this time. Therefore, relicensing activities are not expected to have any effect on any archaeological resources in the Project area.

5.10.3 Historic Architectural Resources

No properties listed on or eligible for listing on the NRHP have been identified in the Project boundary. The NRHP-listed Constantine Historic Commercial District is located approximately 400 feet downstream from the Project along river right (across from the powerhouse) and includes 28 contributing commercial and residential structures representing examples of mid-nineteenth to early-twentieth century Greek Revival and Italianate styles. The Constantine Historic Commercial District was listed in the NRHP in 1985. The Art Gallery Building located at 156 Street Washington Street is a contributing resource to the Constantine Historic Commercial District and was also individually listed on the NRHP in 1980.

In addition to the Constantine Historic Commercial District, the Gov. John S. Barry House located at 280 North Washington Street in Constantine was also individually listed in the NRHP in 1972. The house was built by John S. Barry, Michigan's fourth governor, in a vernacular style and is currently operated as a museum. The John S. Barry House is located approximately 800 feet southwest from the Constantine Dam.

5.10.4 Existing Discovery Measures

Article 410 of the existing license for the Project includes measures to protect and manage historic properties:

Article 410. The Licensee, before starting any land-clearing or land-disturbing activities, other than those specifically authorized in this license, shall consult with the State Historic Preservation Officer (SHPO).

If the Licensee discovers previously unidentified archeological or historic properties while constructing or developing project works or other facilities at the project, the Licensee shall stop all land-clearing and land-disturbing activities in the vicinity of the properties and consult with the SHPO.

As discussed above, I&M conducted a Phase I Archaeological Investigation of the Constantine Project in 1990. The investigation determined that there were no historic or prehistoric archaeological sites in the Project area.

5.10.5 Identification of Indian Tribes and Traditional Cultural Properties

By letter dated October 12, 2017, the Commission invited the Lac du Flambeau Band of Lake Superior Chippewa Indians, Menominee Indian Tribe of Wisconsin, Citizen Potawatomi Nation, Forest County Potawatomi Community, Hannahville Indian Community, Prairie Band Potawatomi Nation, Miami Tribe of Oklahoma, Pokagon Band of Potawatomi Indians, Little Traverse Bay Bands of Odawa Indians, and Sault Ste. Marie Tribe of Chippewa Indians to participate in the relicensing process for the Project.

By letters dated October 26, 2017, the Forest County Potawatomi Community and the Miami Tribe of Oklahoma filed comments with regards to the Constantine Project relicensing³. Following their filing on October 26, the Tribal Historic Preservation Officer (THPO) for the Forest County Potawatomi Community reached out to FERC by email on December 28, 2017 expressing an interest in the Project, specifically cultural resources surveys and SHPO comments. FERC contacted the THPO for the Prairie Band of Potawatomi Nation on January 22, 2018 and the THPO requested additional copies of the initial consultation letter and a map of the Project location. The Citizen Potawatomi Nation, the Miami Tribe of Oklahoma, and the Little Traverse Bay Band of Odawa Indians stated that they have no interest in the Project. To date, no Indian Tribe has notified I&M about properties of traditional religious or cultural significance within or adjacent to the Project's boundary, and the Licensee is not aware of any TCPs within the vicinity of the Project.

5.11 Socioeconomic Resources

The Project is located within St. Joseph County, which is 1 of 83 counties in Michigan. The 2010 census reported that approximately 61,295 people reside in St. Joseph County, which encompasses approximately 500 mi² with a population density of 122.4 persons per square mile. The

³ The Forest County Potawatomi Community's comments were filed with the Commission as "Privileged;" accordingly, I&M has not been able to review these comments. The Miami Tribe of Oklahoma indicated in their comments that the Tribe does not object to the relicensing of the Project and is not aware of any cultural or historic sites in the Project area.

estimated 2016 population residing in St. Joseph County is 60,853, which is a 0.7-percent decrease over the seven-year period between 2010 and 2016 (U.S. Census Bureau [USCB] undated). The 2010 census reported that approximately 2,076 people reside within the Village of Constantine (CensusViewer 2012).

From 2011-2015 the median household income for St. Joseph County was \$44,449 which compares to the statewide median household income of \$53,783 for the same time period (USCB undated). The annual unemployment rate for St. Joseph County in August 2017 was 4.4 percent, compared to 4.6 percent unemployment in Michigan (Bureau of Labor Statistics [BLS] 2017b), and a national unemployment rate of 4.2 percent as of September 2017 (BLS 2017a).

From 2014 to 2015, employment in St. Joseph County grew at a rate of 4.15 percent, from 25,283 employees to 26,332 employees. St. Joseph County has approximately 1,154 businesses that employ over 19,000 people. The most common job groups are Production & Transportation (32.1%), Management, Business, Science, and Arts (23.9%), and Sales and Office (19.3%). The most common employment sectors for those who live in St. Joseph County, are Manufacturing (36.4%), Healthcare and Social Assistance (17.1%), and Retail trade (8.7%) (DataUSA 2015).

Section 6

Preliminary Issues, Project Effects, and Potential Studies List

6.1 Consultation to Date

To date, I&M has performed the following consultation activities.

- PAD information questionnaires were distributed to 50 potential Project stakeholders.
- MDEQ was consulted regarding the applicability of the State's Coastal Zone Policy to the Project.
- USFWS and MNFI were contacted regarding federal- or state-listed threatened or endangered species, critical habitat, sensitive natural communities, and species of special concern within the Project's vicinity.

Documentation associated with the consultation conducted by I&M in support of the PAD is provided in Appendix B.

6.2 Project Effects, Studies Needed, and Summary of Relevant Issues for the Project Relicensing

6.2.1 Geology and Soils

6.2.1.1 *Potential Issues*

Shoreline erosion is a common concern at hydroelectric project reservoirs. I&M believes that the existing run-of-river mode of Project operation, in combination with the vegetated nature of the shorelines in the Project boundary provide protection against bank erosion. The continued operation and maintenance of the run-of-river Project associated with power generation is not anticipated to have additional cumulative impacts to the geologic or soil resources. No potential issues related to geology have been raised.

6.2.1.2 *Proposed Studies*

While the run-of-river mode of Project operation provides protection against erosion, I&M recognizes that aspects of the Project's geological setting may contribute to the potential for shoreline erosion. To provide updated information about existing Project conditions, as well as to evaluate the need for any erosion control measures at specific areas of concern, I&M proposes to conduct a Shoreline Stability Assessment at the Project. I&M anticipates that this assessment will consist of a survey of the Project's

reservoir to locate any sites of erosion or shoreline instability. I&M proposes to inventory, map, and photograph any such areas, using a scoring or ranking system (e.g., Bank Erosion Hazard Index) to try to identify areas that have the potential to erode at unnaturally high rates and to prioritize any areas where remedial action may be needed.

6.2.1.3 *Potential Protection, Mitigation, or Enhancement (PM&E) Measures*

No protection, mitigation, or enhancement (PM&E) measures are proposed at this time related to geology and soils.

6.2.2 Water Resources

6.2.2.1 *Potential Issues*

Existing uses of Project waters include municipal and industrial water supply, recreation, and hydroelectric generation. DO and water temperature data were collected at the Project prior to operation in the summer of 1990. Although data met state standards, annual water quality monitoring was required per Article 401 of the existing license in 1993. DO and water temperature data were collected immediately upstream and downstream of the Project in 1995 and 1996. Similarly, these data also met state standards. The lowest DO concentration recorded during monitoring efforts was 6.4 mg/L and concentrations appeared to generally increase by approximately 1.0 mg/L downstream of the Project. Water temperatures at the Project were generally well below state maximum criteria. The three years of water quality data were well within the state water quality standards; therefore, per FERC Order dated April 29, 1997, additional water quality monitoring was not required.

Due to the existing and proposed run-of-river operations and the short retention time of the reservoir, the Project has little to no effect on water quality in the St. Joseph River. Project operation has the potential to locally alter water quality in the bypass reach during periods of minimum flow and high air temperatures.

The St. Joseph River has been identified by USEPA as the biggest contributor of atrazine to Lake Michigan and a significant contributor of sediments and toxic substances such as mercury and PCBs (Friends of the St. Joseph River Association 2005). Sewage overflows and agricultural practices in the river basin contribute to contamination of sediments from pesticides, herbicides, and fertilizers. It is expected that continued operation of the Project will have no effect on sediment contamination in the St. Joseph River.

6.2.2.2 *Proposed Studies*

I&M will coordinate with the MDEQ to obtain a §401 Water Quality Certification in support of relicensing. At this time, I&M proposes to conduct a temperature and DO study from May through October (time at which any potential thermal or DO excursion would occur) at the Project to confirm water quality standards and designated uses are being attained. Locations of monitoring equipment will be established through further consultation with MDEQ and other stakeholders. The scope of this study would be limited to the FERC-approved Project boundary.

To characterize sediments in the Project's reservoir, I&M will conduct sediment contaminant sampling at locations in the reservoir identified in consultation with the MDEQ and other stakeholders. Sediment samples will be analyzed at a qualified laboratory facility to determine the types and concentration of any contaminants in the samples. I&M anticipates that up to six samples will be collected and analyzed (approximately one sample per mile from the six-mile-long reservoir).

6.2.2.3 *Potential PM&E Measure*

No PM&E measures are proposed at this time related to water resources.

6.2.3 Fish and Aquatic Resources

6.2.3.1 *Potential Issues*

Aquatic resources (freshwater fish, mussels, and macroinvertebrates) within the Project area are potentially affected by Project operations and maintenance. Potential fishery resource concerns at the Project primarily deal with bypass flows, entrainment and impingement, and angling opportunities. Fish passage facilities are not currently available at the downstream Mottville, Elkhart, or Twin Branch Projects. Channel catfish, smallmouth bass, and walleye are the most common species found at the Project. There have been no federally listed fish or aquatic species identified to occur in the vicinity of the Project.

In past studies, several species of mussels have been documented upstream and downstream of the Project. According to the MNFI, the state-threatened purple wartyback mussel has been known to occur in the St. Joseph River, near the Project site. The purple wartyback mussel inhabits medium to large rivers that have gravel or mixed sand and gravel substrates. Suitable habitat for fish host species must be present for purple wartyback reproduction to be successful. Known hosts for the purple wartyback are the yellow bullhead and channel catfish, but there may be others. It is expected that continued operation of the Project will have very little to no adverse effects on current distributions of RTE aquatic species.

6.2.3.2 *Proposed Studies*

I&M proposes to conduct late spring/early summer and late summer/early fall fish species composition surveys of the reservoir and bypass reach to collect information on the current fish community present in the Project area. I&M will consult with agencies and other stakeholders to determine appropriate sampling methods and locations. The scope of this study would be limited to the FERC-approved Project boundary. As a component of the fisheries surveys, I&M will collect fish tissue samples during one survey event in the fall. Tissue samples will be analyzed for mercury and PCB concentrations at a qualified laboratory facility.

In addition to baseline fisheries surveys, I&M proposes to conduct a mussel assessment to identify any mussel populations that may be present within the Project area. I&M anticipates that a summer mussel assessment will be conducted at two location downstream from the Constantine dam and at three locations in the Project's reservoir, with specific locations to be identified in consultation with resource agencies and stakeholders.

Based on the detailed entrainment study conducted for the previous relicensing and no significant changes in Project equipment or operations since that time, I&M does not propose to conduct a desktop entrainment study at this time, but will compare the newly collected fisheries data with that previously assessed to confirm species compositions have not changed any assumptions.

6.2.3.3 *Potential PM&E Measures*

No PM&E measures beyond those already in place at the Project are proposed at this time related to fish and aquatic resources.

6.2.4 Wildlife and Botanical Resources (Including Related RTE Resources)

6.2.4.1 *Potential Issues*

The Project has been in operation for over 100 years, and the existing terrestrial environment has developed in response to the current and proposed Project operations. There are no anticipated significant cumulative impacts to wildlife or botanical resources associated with the Project. The continued operation and maintenance of the Project associated with power generation, including current recreational sites is not anticipated to have significant cumulative impacts to terrestrial wildlife or botanical resources.

Article 409 of the current FERC license requires I&M to develop a wildlife management and land use plan. Under the approved Wildlife Management Plan, I&M is required to install and monitor avian

nesting structures within the Constantine Project boundary. A total of eight nesting structures were installed within the Project boundary, including four wood duck boxes and four mallard hen houses.

I&M has continued to maintain and monitor these nesting structures in accordance with the terms of the existing FERC license. None of the eight nesting structures present within the Project boundary were occupied at any time during the 2016 monitoring period, and no nesting structures were occupied in 2015 (GLEC 2015).

One of the eight nesting structures present within the Project boundary was occupied during the 2017 monitoring period, which is more than what was observed in both 2015 and 2016 (GLEC 2016). Many of the nesting structures also may provide shelter for non-target species, although occupancy by target species was not observed in 2017. Given this recent success and the fact that several structures were moved within the last year, GLEC recommended that I&M should continue to maintain nesting structures within the Project boundary.

GLEC also recommended that if poor nesting success is observed in 2018 that I&M should consider reducing the number of structures that are maintained within the Project boundary or moving structures to alternative locations to maximize the probability of nesting success of target species (GLEC 2017a).

The federally endangered Indiana bat and the federally threatened northern long-eared bat may occur within the Project's vicinity. These species could potentially use the Project area for foraging corridors adjacent to the St. Joseph River during the non-hibernating period. No impacts to foraging bats are anticipated from continued Project operation.

I&M maintained and monitored artificial Indiana bat structures for a total of five years (1994-1999) at the Project in accordance with the approved Wildlife Management Plan under Article 409 of the current license. During the monitoring period, there was no evidence that Indiana bat or any other species of bat had used the artificial structures. On July 14, 2000, FERC issued an order amending the Wildlife Management Plan to remove the requirement to maintain the artificial nesting structures for the Indiana bat.

6.2.4.2 *Proposed Studies*

No studies are being proposed. Based on the low nesting success rates reported during previous monitoring periods, I&M will consult with resource agencies regarding the need to maintain and monitor nesting structures.

6.2.4.3 *Potential PM&E Measure*

No PM&E measures are being proposed at this time related to wildlife and botanical resources and terrestrial RTE species.

6.2.5 Wetlands and Riparian Habitat

6.2.5.1 *Potential Issues*

The Project does not regulate river flows. It is not anticipated that wetland or riparian habitats, beyond those already impacted as a result of the original Project construction, will be affected by the Project's continued operation and maintenance.

Invasive species occurring within the Project boundary are purple loosestrife and Eurasian watermilfoil. Article 409 of the license requires I&M to conduct surveys for purple loosestrife and Eurasian watermilfoil within the Project's reservoir. The surveys are to be conducted annually between late July and early August, the time during which Eurasian watermilfoil is at or near peak growth and purple loosestrife is in bloom.

Based on the annual purple loosestrife surveys, it appears that in general the light and heavy infestations within the Project area have increased over time, with moderate infestations remaining relatively stable. Eurasian watermilfoil within the Project area has generally increased since 1998. However, since 2012 the numbers of moderate and heavy infestations of Eurasian watermilfoil have generally decreased.

6.2.5.2 *Proposed Studies*

To characterize wetland and riparian habitat within the Project boundary, I&M will conduct a desktop review of USFWS NWI maps, aerial photographs, and information available from the MDEQ regarding mapped wetlands. Following this desktop review, I&M will field-verify mapped wetlands within the Project boundary.

Due to the ongoing monitoring of invasive species under Article 409 of the existing license and no proposed activities or Project operations that would impact existing resources, no additional studies are being proposed with respect to invasive species.

6.2.5.3 *Potential PM&E Measure*

I&M proposes to continue monitoring purple loosestrife and Eurasian watermilfoil in the Project area and evaluating options to control the potential spread of invasive species throughout the Project.

6.2.6 Recreation and Land Use

6.2.6.1 *Potential Issues*

The Project provides several FERC-approved recreational facilities located upstream and downstream of the Constantine Dam, which include a boat launch, a portage, reservoir fishing access, tailwater fishing access, ADA accessible portable toilets, and picnic area. No potential issues related to recreation and land use have been raised. In addition to the recreational opportunities within the Project boundary, there are various recreational opportunities adjacent to the Project and within the Project vicinity. No issues have been identified relevant to recreation or land use issues.

6.2.6.2 *Proposed Studies*

Although several recreational opportunities exist at the Project, I&M intends to evaluate the need for any improvements to the existing recreational facilities. I&M plans to conduct a recreational assessment of the Project to assess recreational opportunities and potential improvements. The scope of this study would be limited to within the FERC-approved Project boundary.

6.2.6.3 *Potential PM&E Measure*

I&M may propose potential recreational PM&E measures after conducting a recreational assessment of the Project and further consultation with stakeholders.

6.2.7 Aesthetic Resources

6.2.7.1 *Potential Issues*

Per Article 412 of the current license and the FERC-approved building removal plan for the Project, I&M has removed an old storage building located next to the powerhouse and U.S. Route 131 to improve the quality of the visual resources at the Project. The area has also been landscaped to improve the visual quality of the Project area. No additional issues have been identified relevant to aesthetic resources.

6.2.7.2 *Proposed Studies*

No studies are being proposed.

6.2.7.3 *Potential PM&E Measure*

No PM&E measures beyond those already in place at the Project are proposed at this time related to aesthetic resources.

6.2.8 Cultural and Tribal Resources

6.2.8.1 *Potential Issues*

The Project will undergo cultural resources consultation under the Section 106 process. The Section 106 process (defined at 36 CFR Part 800) is intended to accommodate historic preservation concerns with the needs of federal undertakings through a process of consultation with agency officials, the SHPO, federally recognized Indian Tribes, and other parties with a potential interest in an undertaking's effects on historic properties. The Phase I Archaeological Investigation conducted by I&M in 1990 concluded that there were no historic or prehistoric archaeological sites recorded at the Project.

The Licensee believes that the potential for continued operation of Project to impact historic and cultural properties is limited. However, if present, archaeological resources may be impacted as a result from ground-disturbing associated with maintenance activities over the term of the license. Currently this potential impact to cultural and archaeological resources are managed in accordance with Article 410 of the existing license for the Project that requires consultation with SHPO prior to land-clearing or land disturbance and in the event of discovery of any previously unidentified archeological or historic properties.

6.2.8.2 *Proposed Studies*

I&M will assess the potential for Project effects (if any) on identified historic and archeological resources and the need for any additional archaeological site file search, evaluation of Project facilities, and/or Phase I investigation of the Project's APE through consultation with the Michigan SHPO and federally recognized Indian Tribes.

6.2.8.3 *Potential PM&E Measure*

No PM&E measures beyond those already in place at the Project are proposed at this time related to cultural and tribal resources. In the event that resources are identified within the APE that may potentially be impacted by Project operation during the term of the new license, I&M would expect to develop a Historic Properties Management Plan (HPMP) to provide for the protection and management of historic properties within the Project's APE throughout the term of the new license. The HPMP will be prepared in accordance with FERC and the Advisory Council on Historic Preservation's 2002 *Guidelines for the Development of Historic Properties Management Plans for FERC Hydroelectric Projects* and will provide appropriate management measures for historic and archaeological resources within the APE.

6.2.9 Socioeconomic Resources

6.2.9.1 *Potential Issues*

No issues have been identified relevant to socioeconomic resources.

6.2.9.2 *Proposed Studies*

No studies are being proposed. I&M expects that the detailed information to be included in the license application exhibits will provide sufficient data for FERC's analysis of any socioeconomic impacts of relicensing the Project.

6.2.9.3 *Potential PM&E Measure*

No PM&E measures are being proposed related to socioeconomic resources.

6.3 Potential Studies or Information Needs List

I&M respectfully requests that resource agencies, Indian Tribes, and other licensing parties that may request a study consider FERC's study request criteria set forth in 18 CFR §5.9(b) and outlined below:

- Describe the goals and objectives of each study proposal and the information to be obtained;
- If applicable, explain the relevant resource management goals of the agencies or Indian Tribes with jurisdiction over the resource to be studied;
- If the requester is not a resource agency, explain any relevant public interest considerations in regard to the proposed study;
- Describe existing information concerning the subject of the study proposal and the need for additional information;
- Explain any nexus between Project operations and effects (direct, indirect, and/or cumulative) on the resource to be studied and how the study results would inform the development of license requirements;
- Explain how any proposed study methodology (including any preferred data collection and analysis techniques, or objectively quantified information, and a schedule including appropriate field season(s) and the duration) is consistent with generally accepted practice in the scientific community or, as appropriate, considers relevant tribal values and knowledge; and
- Describe considerations of the level of effort and cost, as applicable, and why any proposed alternative studies would not be sufficient to meet the stated information needs.

Section 7

Comprehensive Plans

In accordance with 18 CFR §5.6(d)(4)(III and IV), HDR, on behalf of I&M, has reviewed the July 2017 FERC List of Comprehensive Plans applicable to Michigan and adopted by FERC under Section 10(a)(2)(A) of the FPA, 16 USC §803(a)(2)(A). Of the 66 comprehensive plans relevant to Michigan, six are being considered applicable to the Project.

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. 1999. St. Joseph River assessment and appendix; St. Joseph River Management Plan. Lansing, Michigan. September 1999.
3. Michigan Department of Natural Resources. Statewide Comprehensive Outdoor Recreation Plan (SCORP): 2013-2017. 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. 2012. North American waterfowl management plan. Department of the Interior. Environment Canada.
6. U.S. Fish and Wildlife Service. 2007. Upper Mississippi River & Great Lakes Region joint venture implementation plan: A component of the North American waterfowl management plan. March 1993.

Based on a review of the six comprehensive plans, HDR, on behalf of I&M, believes that the Project, as currently operated, is consistent with each of these plans. I&M anticipates additional consultation with the relicensing parties to confirm consistency.

Section 8

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Wetzel, R.G. 1983. Limnology: Second Edition. Saunders College Publishing. New York, NY.

APPENDICES

APPENDIX A

PAD QUESTIONNAIRE AND DISTRIBUTION LIST



August 15, 2017

**Subject: Constantine Hydroelectric Project (FERC No. 10661)
Relicensing Pre-Application Document Questionnaire**

To the Attached Distribution List:

Indiana Michigan Power Company (I&M) is the Licensee and operator of the Constantine Hydroelectric Project (FERC No. 10661) (Project) located on the St. Joseph River in St. Joseph County, Michigan. The Project is licensed by the Federal Energy Regulatory Commission (FERC).

The existing FERC license for the Project expires on September 30, 2023. I&M intends to pursue a new license for the Project and is preparing the Pre-Application Document (PAD) required by FERC's relicensing process. I&M has retained HDR, Inc. (HDR) for assistance with the relicensing process, including development of the PAD.

The PAD provides FERC and other entities with existing, relevant, and reasonably available information pertaining to the Project. This information is intended to help identify items of interest and related information needs, develop study requests and study plans, and prepare documents related to analyzing the relicensing application to be prepared by I&M. To prepare the PAD, I&M will use information in its possession and information obtained from others. On behalf of I&M, HDR is currently gathering information to support preparation of the PAD. Consistent with this effort, the purpose of this letter is to:

- 1) Notify interested governmental agencies, local governments, non-governmental organizations, Indian tribes, and individuals of the upcoming relicensing proceeding, and
- 2) Request your help in identifying existing, relevant, and reasonably available information related to the existing Project environment or known impacts or benefits of the Project.

I&M's goal is to produce a final comprehensive PAD by the end of 2017 and to file the PAD with the FERC in 2018. We are asking for your help to identify additional information of which you may be aware. To facilitate the information search, we have prepared the attached Pre-Application Document Information Questionnaire (PAD Questionnaire).

Constantine Hydroelectric Project
Relicensing Pre-Application Document Questionnaire

August 15, 2017

Page 2

I&M is requesting that you provide any relevant information for the PAD. Relevant information would include site-or-region specific studies, data, reports, or management plans on any of the following resource areas:

- Geology and soils
- Recreation and land use
- Water resources
- Aesthetic resources
- Fish and aquatic resources
- Cultural resources
- Wildlife and botanical resources
- Socioeconomic resources
- Wetlands, riparian, and littoral habitat
- Tribal resources
- Rare, threatened, and endangered species

To help ensure that your relevant information and resources are available for inclusion in the PAD, please fill out the attached PAD Questionnaire and return to Sarah Kulpa (of HDR) via email at sarah.kulpa@hdrinc.com or in the enclosed self-addressed, stamped envelope.

HDR intends to include relevant information in the PAD. Therefore, we respectfully request a response within 30 days of receipt of this letter. This will allow time for follow-up contacts that may be necessary. If we do not receive a response from you within 30 days, this will indicate you are not aware of any existing, relevant, and reasonably available information that describes the Project environment or known potential impacts of the Project, and that, unless you are representative of an Indian tribe or federal or state agency, you do not wish to remain on the distribution list for this relicensing process.

We want to thank you in advance for helping identify information that meets the criteria for inclusion in the PAD. We appreciate your assistance and look forward to working with you during the relicensing process. If you have any questions regarding this request or would like additional information, please contact me at sarah.kulpa@hdrinc.com or via phone at (704) 248-3620 or Jonathan Magalski who represents I&M at jmmagalski@aep.com or via phone at (614) 716-2240.

Sincerely,

HDR, Inc.



Sarah Kulpa

Project Manager

Attachment

cc: Jonathan Magalski, on behalf of I&M

Constantine Hydroelectric Project (FERC No. 10661)

Charlene Dwin Vaughn
Advisory Council on Historic
Preservation
401 F Street NW, Suite 308
Washington, DC 20001-2637

Kimberly Bose
Federal Energy Regulatory Commission
888 1st St NE
Washington, DC 20426

FEMA Region 5
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NOAA Fisheries Service
Greater Atlantic Reg'l Fisheries Office
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Natural Resources Conservation Service
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Bloomington, MN 55437

US Department of the Interior
1849 C Street, NW
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Lindy Nelson, US Dept of the Interior,
Philadelphia Region
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US Environmental Protection Agency
77 West Jackson Boulevard (E19-J)
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Liz Pelloso
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US Fish and Wildlife Service
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Bloomington, MN 55437-1458

Lisa Fischer
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East Lansing, MI 48823

US Geological Survey
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US Geological Survey
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Ann Arbor, MI 48105

Aaron Miller
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Gary Peters
US Senate
Hart Senate Office Building
Washington, DC 20510

Michael Reynolds
US National Park Service
1849 C Street, NW
Washington, DC 20240

Dena Sanford, US National Park
Service, c/o Agate Fossil Beds National
Monument
301 River Road
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Kyle Kruger
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Michigan Dept of Environmental
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State Historic Preservation Office
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Michigan Department of Agriculture
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St. Joseph County
PO Box 189
Centreville, MI 49032

Gary Mathers
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115 White Pigeon Street
Constantine, MI 49042

Mark R. Brown
Township of Constantine
425 Centreville Street
Constantine, MI 49042

Keith Shears
Town of Centreville
221 West Main
PO Box 399
Centreville, MI 49032

DISTRIBUTION LIST
Constantine Hydroelectric Project (FERC No. 10661)

Robert Hile
City of Sturgis
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Sturgis, MI 49091

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Sturgis, MI 49091

Donald E. Gloy, Jr.
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16825 Tomahawk Trail
White Pigeon, MI 49099

Tyler Royce
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Korie Blyveis
Cass County Conservation District
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Michigan Environmental Council
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Nottawaseppi Huron Band of the
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Michigan Citizens for Water
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Michigan Loon Preservation
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Millington, MI 48746

Michigan Nature Association
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Okemos, MI 48864

Michigan Audubon Society
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Matt Meersman
Friends of the St. Joe River Association,
Inc.
PO Box 1794
South Bend, IN 46634

Matt Meersman
St. Joseph River Basin Commission
227 West Jefferson Boulevard
1120 County-City Boulevard
South Bend, IN 46601

Constantine Hydroelectric Project (FERC Project No. 10661) Relicensing Pre-Application Document Information Questionnaire

Indiana Michigan Power Company (I&M) is the Licensee and operator of the Constantine Hydroelectric Project (FERC No. 10661) (Project), located along the St. Joseph River in St. Joseph County, Michigan (see attached map). I&M, with assistance from HDR, Inc. (HDR), is beginning the Federal Energy Regulatory Commission (FERC) relicensing process for the Project. Accordingly, I&M is preparing a Pre-Application Document (PAD). The PAD provides FERC and other entities with existing, relevant, and reasonably available information pertaining to the Project.

This information is intended to help identify items of interest and related information needs, develop study requests and study plans, and prepare documents related to analyzing the relicensing application to be prepared by I&M. To prepare the PAD, I&M will use information in its possession and information obtained from others. This PAD Questionnaire will be used by I&M to help identify sources of existing, relevant, and reasonably available information that is not currently in I&M's possession. Comments and/or questions regarding this request may be sent to Sarah Kulpa with HDR via email at sarah.kulpa@hdrinc.com or via phone at (704) 248-3620, or to Jonathan Magalski who represents I&M at jmmagalski@aep.com or via phone at (614) 716-2240.

Please return this questionnaire in the enclosed, self-addressed, stamped envelope within 30 days of receipt to allow for any follow-up contact by I&M's or HDR's representative that may be needed. Not responding within 30 days indicates that you are not aware of any existing, relevant, and reasonably available information that describes the existing Project environment or known potential impacts of the Project.

I&M and HDR respectfully request the following information:

1. Information about person completing the questionnaire:

Name & Title	
Organization	
Address	
Phone	
Email Address	

**Constantine Hydroelectric Project (FERC Project No. 10661)
Relicensing Pre-Application Document Information Questionnaire**

2. Do you or your organization know of existing, relevant and reasonably available information that describes the existing Constantine Hydroelectric Project's environment (i.e., information regarding the St. Joseph River in or close to the Constantine Hydroelectric Project)?

___ Yes (*If yes, please complete 2a through 2e*) ___ No (*If no, go to 3*)

a. If yes, please circle the specific resource area(s) that the information relates to:

- | | |
|--|------------------------------|
| ■ Geology and soils | ■ Recreation and land use |
| ■ Water resources | ■ Aesthetic resources |
| ■ Fish and aquatic resources | ■ Cultural resources |
| ■ Wildlife and botanical resources | ■ Socio-economic resources |
| ■ Wetlands, riparian, and littoral habitat | ■ Tribal resources |
| ■ Rare, threatened & endangered species | ■ Other resource information |

b. Please briefly describe the information referenced above or list available documents (*additional information may be provided on page 4 of this questionnaire*).

c. Where can I&M obtain this information?

**Constantine Hydroelectric Project (FERC Project No. 10661)
Relicensing Pre-Application Document Information Questionnaire**

- d. Please indicate whether there is a specific representative you wish to designate for a potential follow-up contact by I&M's or HDR's representative for the resource area(s) checked above (*additional information may be provided on page 4 of this questionnaire*).

Representative Contact Information

Name	
Address	
Phone	
Email Address	

Name	
Address	
Phone	
Email Address	

- e. Based on the specific resources listed in 2a, are you aware of any specific issues or improvements pertaining to the identified resource area(s)? (*Additional information may be provided on page 4 of this questionnaire.*)

Yes (*please list specific issues below*) No

Resource Area	Specific Issue

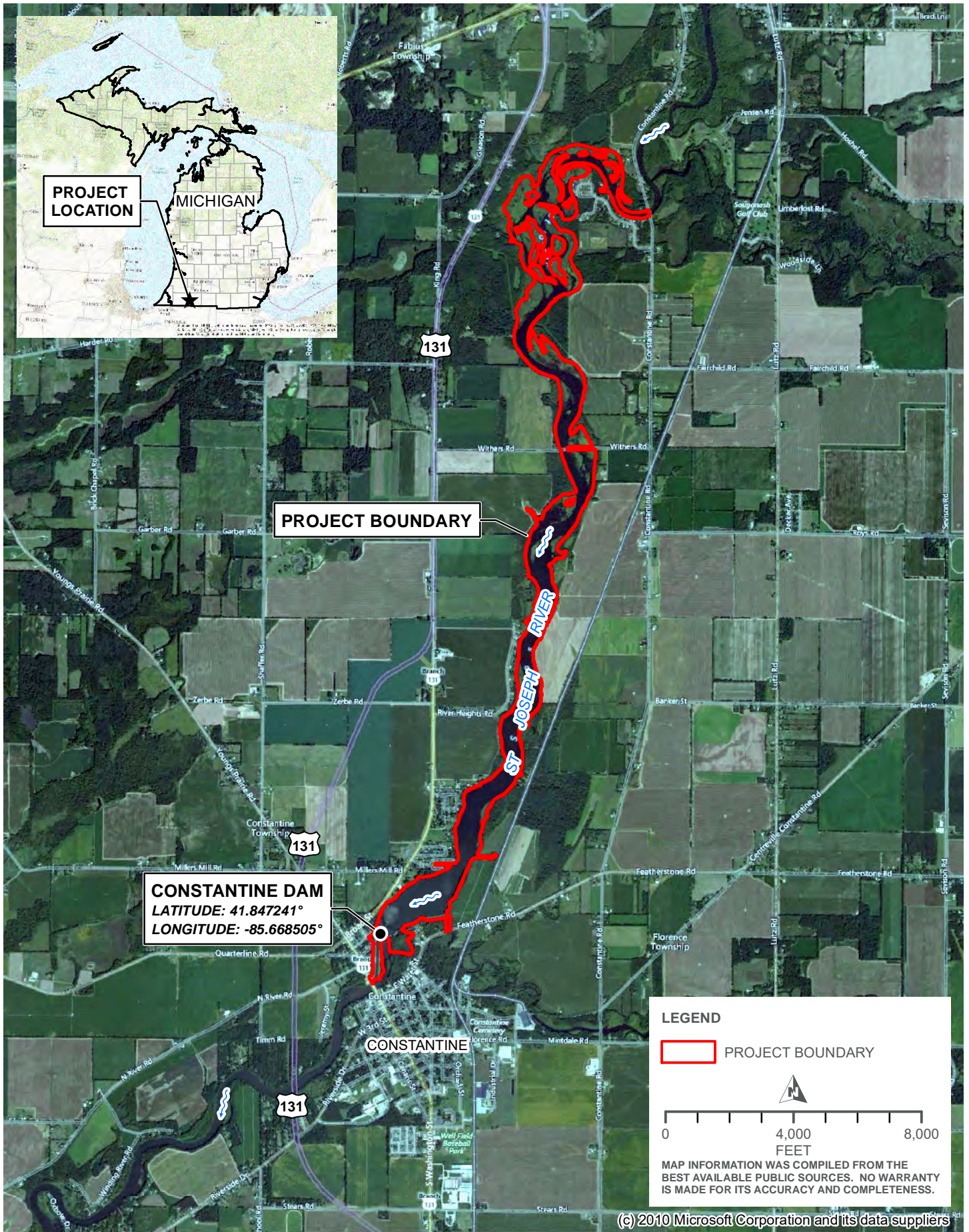
3. Do you or your organization plan to participate in the Constantine Hydroelectric Project relicensing proceeding? Yes No

**Constantine Hydroelectric Project (FERC Project No. 10661)
Relicensing Pre-Application Document Information Questionnaire**

4. We are interested in your comments. If you have comments and/or questions regarding the Constantine Hydroelectric Project or the relicensing process, please provide below. In addition, this questionnaire has been sent to the people/organizations shown on the attached distribution list; please let us know if there is anyone else you believe should receive this questionnaire that is not included on the attached distribution list.

(Comments and/or questions may be sent via email to: sarah.kulpa@hdrinc.com or jmmagalski@aep.com)

As noted above, please return this questionnaire in the enclosed, self-addressed, stamped envelope within 30 days of receipt to allow for any follow-up contact by I&M's or HDR's representative that may be needed. Not responding within 30 days indicates that you are not aware of any existing, relevant, and reasonably available information that describes the existing Project environment or known potential impacts of the Project.



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PROJECT LOCATION MAP
CONSTANTINE HYDROELECTRIC PROJECT (FERC NO. 10661)
ST. JOSEPH COUNTY, MICHIGAN

APPENDIX B
CONSULTATION CORRESPONDENCE AND PAD QUESTIONNAIRE
RESPONSES



August 15, 2017

**Subject: Constantine Hydroelectric Project (FERC No. 10661)
Relicensing Pre-Application Document Questionnaire**

To the Attached Distribution List:

Indiana Michigan Power Company (I&M) is the Licensee and operator of the Constantine Hydroelectric Project (FERC No. 10661) (Project) located on the St. Joseph River in St. Joseph County, Michigan. The Project is licensed by the Federal Energy Regulatory Commission (FERC).

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- 1) Notify interested governmental agencies, local governments, non-governmental organizations, Indian tribes, and individuals of the upcoming relicensing proceeding, and
- 2) Request your help in identifying existing, relevant, and reasonably available information related to the existing Project environment or known impacts or benefits of the Project.

I&M's goal is to produce a final comprehensive PAD by the end of 2017 and to file the PAD with the FERC in 2018. We are asking for your help to identify additional information of which you may be aware. To facilitate the information search, we have prepared the attached Pre-Application Document Information Questionnaire (PAD Questionnaire).

Constantine Hydroelectric Project
Relicensing Pre-Application Document Questionnaire

August 15, 2017

Page 2

I&M is requesting that you provide any relevant information for the PAD. Relevant information would include site-or-region specific studies, data, reports, or management plans on any of the following resource areas:

- Geology and soils
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- Wetlands, riparian, and littoral habitat
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- Rare, threatened, and endangered species

To help ensure that your relevant information and resources are available for inclusion in the PAD, please fill out the attached PAD Questionnaire and return to Sarah Kulpa (of HDR) via email at sarah.kulpa@hdrinc.com or in the enclosed self-addressed, stamped envelope.

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We want to thank you in advance for helping identify information that meets the criteria for inclusion in the PAD. We appreciate your assistance and look forward to working with you during the relicensing process. If you have any questions regarding this request or would like additional information, please contact me at sarah.kulpa@hdrinc.com or via phone at (704) 248-3620 or Jonathan Magalski who represents I&M at jmmagalski@aep.com or via phone at (614) 716-2240.

Sincerely,

HDR, Inc.



Sarah Kulpa

Project Manager

Attachment

cc: Jonathan Magalski, on behalf of I&M

Charlene Dwin Vaughn
Advisory Council on Historic
Preservation
401 F Street NW, Suite 308
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Kimberly Bose
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US Geological Survey
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Lansing, MI 48911-5991

US Geological Survey
1451 Green Road
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Aaron Miller
US House of Representatives
N-993 House Office Building
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Debbie Stabenow
US Senate
713 Hart Senate Office Building
Washington, DC 20510-2204

Gary Peters
US Senate
Hart Senate Office Building
Washington, DC 20510

Michael Reynolds
US National Park Service
1849 C Street, NW
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Dena Sanford
US National Park Service
c/o Agate Fossil Beds Nat'l Monument
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Michigan Department of Agriculture
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Lansing, MI 48933

St. Joseph County
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Centreville, MI 49032

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Mark R. Brown
Township of Constantine
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Keith Shears
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Robert Hile
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Constantine Hydroelectric Project (FERC No. 10661)

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Matt Meersman
St. Joseph River Basin Commission
227 West Jefferson Boulevard
1120 County-City Boulevard
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Pokagon Band of Potawatomi Indians
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Nottawaseppi Huron Band of the
Potawatomi
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Kevin Richard Colburn
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Nature Conservancy of Michigan
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Michigan Citizens for Water
Conservation
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Michigan Loon Preservation Association
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Michigan Nature Association
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Michigan Audubon Society
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Matt Meersman
Friends of the St. Joe River Assoc., Inc.
PO Box 1794
South Bend, IN 46634

Matt Meersman
St. Joseph River Basin Commission
227 West Jefferson Boulevard
1120 County-City Boulevard
South Bend, IN 46601

Constantine Hydroelectric Project (FERC Project No. 10661) Relicensing Pre-Application Document Information Questionnaire

Indiana Michigan Power Company (I&M) is the Licensee and operator of the Constantine Hydroelectric Project (FERC No. 10661) (Project), located along the St. Joseph River in St. Joseph County, Michigan (see attached map). I&M, with assistance from HDR, Inc. (HDR), is beginning the Federal Energy Regulatory Commission (FERC) relicensing process for the Project. Accordingly, I&M is preparing a Pre-Application Document (PAD). The PAD provides FERC and other entities with existing, relevant, and reasonably available information pertaining to the Project.

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Please return this questionnaire in the enclosed, self-addressed, stamped envelope within 30 days of receipt to allow for any follow-up contact by I&M's or HDR's representative that may be needed. Not responding within 30 days indicates that you are not aware of any existing, relevant, and reasonably available information that describes the existing Project environment or known potential impacts of the Project.

I&M and HDR respectfully request the following information:

1. Information about person completing the questionnaire:

Name & Title	
Organization	
Address	
Phone	
Email Address	

**Constantine Hydroelectric Project (FERC Project No. 10661)
Relicensing Pre-Application Document Information Questionnaire**

2. Do you or your organization know of existing, relevant and reasonably available information that describes the existing Constantine Hydroelectric Project's environment (i.e., information regarding the St. Joseph River in or close to the Constantine Hydroelectric Project)?

___ Yes (*If yes, please complete 2a through 2e*) ___ No (*If no, go to 3*)

a. If yes, please circle the specific resource area(s) that the information relates to:

- | | |
|--|------------------------------|
| ■ Geology and soils | ■ Recreation and land use |
| ■ Water resources | ■ Aesthetic resources |
| ■ Fish and aquatic resources | ■ Cultural resources |
| ■ Wildlife and botanical resources | ■ Socio-economic resources |
| ■ Wetlands, riparian, and littoral habitat | ■ Tribal resources |
| ■ Rare, threatened & endangered species | ■ Other resource information |

b. Please briefly describe the information referenced above or list available documents (*additional information may be provided on page 4 of this questionnaire*).

c. Where can I&M obtain this information?

**Constantine Hydroelectric Project (FERC Project No. 10661)
Relicensing Pre-Application Document Information Questionnaire**

- d. Please indicate whether there is a specific representative you wish to designate for a potential follow-up contact by I&M's or HDR's representative for the resource area(s) checked above (*additional information may be provided on page 4 of this questionnaire*).

Representative Contact Information

Name	
Address	
Phone	
Email Address	

Name	
Address	
Phone	
Email Address	

- e. Based on the specific resources listed in 2a, are you aware of any specific issues or improvements pertaining to the identified resource area(s)? (*Additional information may be provided on page 4 of this questionnaire.*)

Yes (*please list specific issues below*) No

Resource Area	Specific Issue

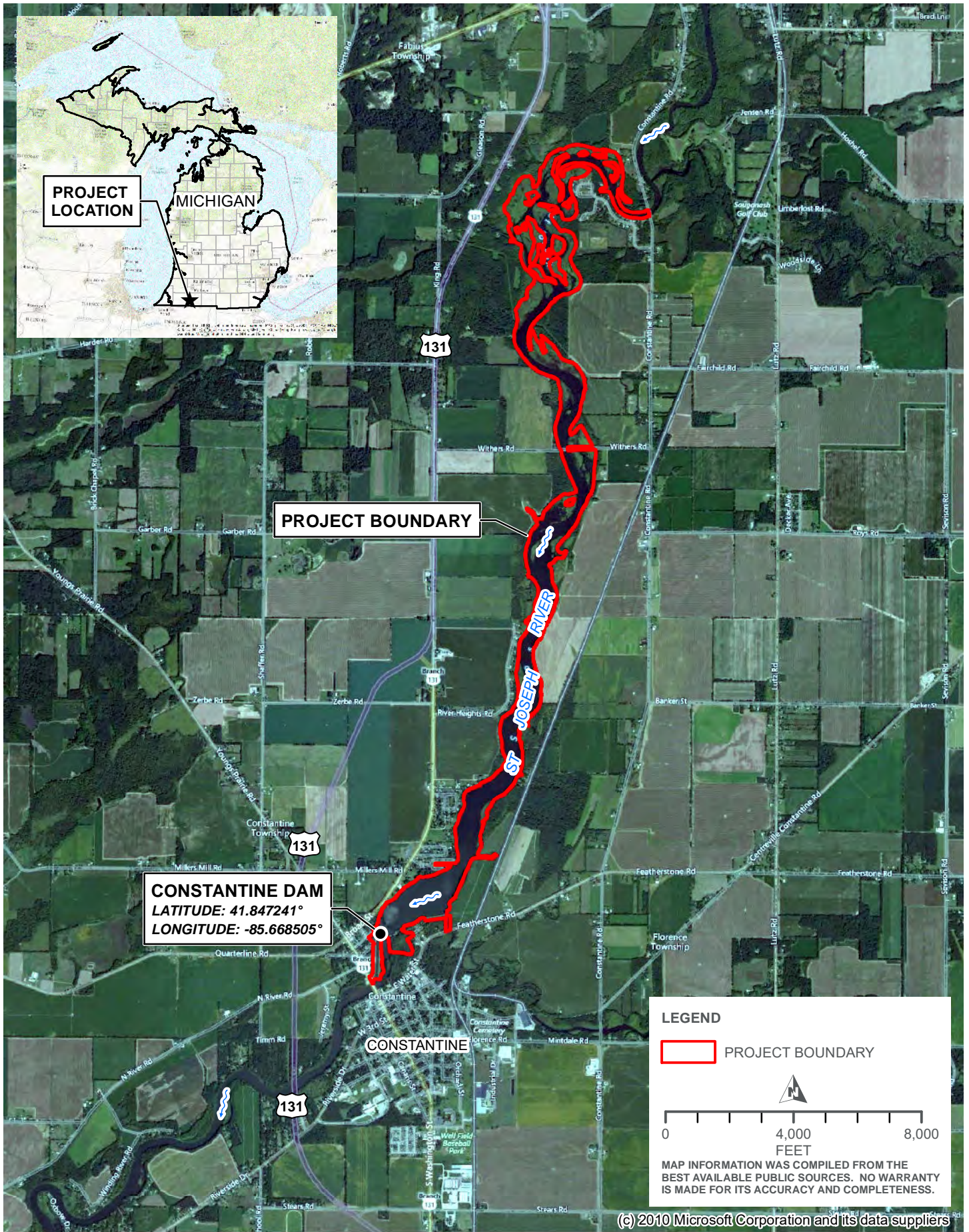
3. Do you or your organization plan to participate in the Constantine Hydroelectric Project relicensing proceeding? Yes No

**Constantine Hydroelectric Project (FERC Project No. 10661)
Relicensing Pre-Application Document Information Questionnaire**

4. We are interested in your comments. If you have comments and/or questions regarding the Constantine Hydroelectric Project or the relicensing process, please provide below. In addition, this questionnaire has been sent to the people/organizations shown on the attached distribution list; please let us know if there is anyone else you believe should receive this questionnaire that is not included on the attached distribution list.

(Comments and/or questions may be sent via email to: sarah.kulpa@hdrinc.com or jmmagalski@aep.com)

As noted above, please return this questionnaire in the enclosed, self-addressed, stamped envelope within 30 days of receipt to allow for any follow-up contact by I&M's or HDR's representative that may be needed. Not responding within 30 days indicates that you are not aware of any existing, relevant, and reasonably available information that describes the existing Project environment or known potential impacts of the Project.



(c) 2010 Microsoft Corporation and its data suppliers



PROJECT LOCATION MAP
CONSTANTINE HYDROELECTRIC PROJECT (FERC NO. 10661)
ST. JOSEPH COUNTY, MICHIGAN



August 15, 2017

Alisa Shull, Chief
United States Fish and Wildlife Service
Midwest Region 3
5600 American Boulevard West, Suite 990
Bloomington, MN 55437-1458

**Subject: Constantine Hydroelectric Project (FERC No. 10661)
Request for Threatened and Endangered Species Information**

Dear Ms. Shull,

On behalf of Indiana Michigan Power Company (I&M), HDR, Inc. (HDR) is gathering information in support of the Pre-Application Document (PAD) for the upcoming Federal Energy Regulatory Commission (FERC) relicensing of the Constantine Hydroelectric Project (FERC No. 10661) (Project). In support of this process, HDR has requested an official species list regarding any threatened or endangered species and any critical habitat within the Project area using the United States Fish and Wildlife Service's (USFWS) IPaC system online.

The Constantine Hydroelectric Project is located on the St. Joseph River in St. Joseph County, Michigan. The attached report was generated from the USFWS' IPaC system and includes a map that shows the area of interest for which the information was requested and the general location of the facility.

It is our intent to include these results in the PAD. Therefore, we respectfully request your concurrence that this information is accurate within 30 days of the date of this letter. If you have any questions or need additional information regarding this Project or its location, please feel free to contact me at (704) 248-3620 or sarah.kulpa@hdrinc.com.

Thank you for your assistance with this request.

Sincerely,
HDR, Inc.

A handwritten signature in blue ink that reads "Sarah Kulpa". The signature is written in a cursive style and is contained within a thin black rectangular border.

Sarah Kulpa
Project Manager

Constantine Hydroelectric Project
Request for Threatened and Endangered Species Information
August 15, 2017
Page 2

Attachment

cc: Jonathan Magalski, on behalf of I&M



United States Department of the Interior



FISH AND WILDLIFE SERVICE
Michigan Ecological Services Field Office
2651 Coolidge Road Suite 101
East Lansing, MI 48823-6360
Phone: (517) 351-2555 Fax: (517) 351-1443

<http://www.fws.gov/midwest/endangered/section7/s7process/step1.html>

In Reply Refer To:

August 15, 2017

Consultation Code: 03E16000-2017-SLI-0677

Event Code: 03E16000-2017-E-01267

Project Name: Constantine Hydroelectric Project

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The attached species list identifies any federally threatened, endangered, proposed and candidate species that may occur within the boundary of your proposed project or may be affected by your proposed project. The list also includes designated critical habitat if present within your proposed project area or affected by your project. This list is provided to you as the initial step of the consultation process required under section 7(c) of the Endangered Species Act, also referred to as Section 7 Consultation.

Section 7 of the Endangered Species Act of 1973 requires that actions authorized, funded, or carried out by Federal agencies not jeopardize federally threatened or endangered species or adversely modify designated critical habitat. To fulfill this mandate, Federal agencies (or their designated non-federal representative) must consult with the Fish and Wildlife Service if they determine their project may affect listed species or critical habitat.

There are several important steps in evaluating the effects of a project on listed species. Please use the species list provided and visit the U.S. Fish and Wildlife Service's Region 3 Section 7 Technical Assistance website at <http://www.fws.gov/midwest/endangered/section7/s7process/index.html>. This website contains step-by-step instructions to help you determine if your project may affect listed species and lead you through the section 7 consultation process.

Under 50 CFR 402.12(e) (the regulations that implement section 7 of the Endangered Species Act), the accuracy of this species list should be verified after 90 days. You may verify the list by visiting the ECOS-IPaC website (<http://ecos.fws.gov/ipac/>) at regular intervals during project planning and implementation and completing the same process you used to receive the attached list.

For all **wind energy projects** and **projects that include installing towers that use guy wires or are over 200 feet in height**, please contact this field office directly for assistance, even if no federally listed plants, animals or critical habitat are present within your proposed project area or may be affected by your proposed project.

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see <http://www.fws.gov/migratorybirds/RegulationsandPolicies.html>.

Although no longer listed under the Endangered Species Act, bald eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 et seq.) and Migratory Bird Treaty Act (16 U.S.C. 703 et seq), as are golden eagles. Projects affecting these species may require measures to avoid harming eagles or may require a permit. If your project is near an eagle nest or winter roost area, see our Eagle Permits website at <http://www.fws.gov/midwest/midwestbird/EaglePermits/index.html> to help you avoid impacting eagles or determine if a permit may be necessary.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/BirdHazards.html>.

In addition to MBTA and BGEPA, Executive Order 13186: Responsibilities of Federal Agencies to Protect Migratory Birds, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit <http://www.fws.gov/migratorybirds/AboutUS.html>.

We appreciate your concern for threatened and endangered species. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
-

- USFWS National Wildlife Refuges and Fish Hatcheries
 - Migratory Birds
 - Wetlands
-

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Michigan Ecological Services Field Office
2651 Coolidge Road Suite 101
East Lansing, MI 48823-6360
(517) 351-2555

Project Summary

Consultation Code: 03E16000-2017-SLI-0677

Event Code: 03E16000-2017-E-01267

Project Name: Constantine Hydroelectric Project

Project Type: DAM

Project Description: Indiana Michigan Power Company (I&M) is the Licensee and operator of the 1.2 megawatt Constantine Hydroelectric Project (FERC No. 10661) (Project) located on the St. Joseph River in St. Joseph County, Michigan. The Project is licensed by the Federal Energy Regulatory Commission (FERC).

The existing FERC license for the Project expires on September 30, 2023. I&M intends to pursue a new license for the Project and is preparing the Pre-Application Document (PAD) required by FERC's relicensing process. As part of the data collection for the PAD, I&M is requesting information regarding rare, threatened and endangered species and critical habitat within the Project area.

Project Location:

Approximate location of the project can be viewed in Google Maps:

<https://www.google.com/maps/place/41.87959257458019N85.65104621179555W>



Counties: St. Joseph, MI

Endangered Species Act Species

There is a total of 6 threatened, endangered, or candidate species on this species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 1 of these species should be considered only under certain conditions. See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

Mammals

NAME	STATUS
Indiana Bat <i>Myotis sodalis</i> There is a final critical habitat designated for this species. Your location is outside the designated critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5949	Endangered
Northern Long-eared Bat <i>Myotis septentrionalis</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Reptiles

NAME	STATUS
Copperbelly Water Snake <i>Nerodia erythrogaster neglecta</i> Population: Indiana north of 40 degrees north latitude, Michigan, Ohio No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7253	Threatened
Eastern Massasauga (=rattlesnake) <i>Sistrurus catenatus</i> No critical habitat has been designated for this species. This species only needs to be considered under the following conditions: <ul style="list-style-type: none"> ▪ All Projects: Project is Within EMR Range Species profile: https://ecos.fws.gov/ecp/species/2202	Threatened

Insects

NAME	STATUS
Mitchell's Satyr Butterfly <i>Neonympha mitchellii mitchellii</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8062	Endangered

Flowering Plants

NAME	STATUS
Eastern Prairie Fringed Orchid <i>Platanthera leucophaea</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/601	Threatened

Critical habitats

There are no critical habitats within your project area under this office's jurisdiction.

USFWS National Wildlife Refuges And Fish Hatcheries

Any activity proposed on [National Wildlife Refuge](#) lands must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuges or fish hatcheries within your project area.

Migratory Birds

Certain birds are protected under the Migratory Bird Treaty Act¹ and the Bald and Golden Eagle Protection Act².

Any activity that results in the take of migratory birds or eagles is prohibited unless authorized by the U.S. Fish and Wildlife Service³. There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures.

-
1. The [Migratory Birds Treaty Act](#) of 1918.
 2. The [Bald and Golden Eagle Protection Act](#) of 1940.
 3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

The migratory birds species listed below are species of particular conservation concern (e.g. [Birds of Conservation Concern](#)) that may be potentially affected by activities in this location. It is not a list of every bird species you may find in this location, nor a guarantee that all of the bird species on this list will be found on or near this location. Although it is important to try to avoid and minimize impacts to all birds, special attention should be made to avoid and minimize impacts to birds of priority concern. To view available data on other bird species that may occur in your project area, please visit the [AKN Histogram Tools](#) and [Other Bird Data Resources](#). To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

NAME	SEASON(S)
Black Tern <i>Chlidonias niger</i> https://ecos.fws.gov/ecp/species/3093	On Land: Breeding
Bobolink <i>Dolichonyx oryzivorus</i>	On Land: Breeding
Least Bittern <i>Ixobrychus exilis</i> https://ecos.fws.gov/ecp/species/6175	On Land: Breeding
Marsh Wren <i>Cistothorus palustris</i>	On Land: Breeding
Rusty Blackbird <i>Euphagus carolinus</i>	On Land: Wintering
Wood Thrush <i>Hylocichla mustelina</i>	On Land: Breeding
Brown Thrasher <i>Toxostoma rufum</i>	On Land: Breeding

Golden-winged Warbler <i>Vermivora chrysoptera</i> https://ecos.fws.gov/ecp/species/8745	On Land: Breeding
Black-billed Cuckoo <i>Coccyzus erythrophthalmus</i> https://ecos.fws.gov/ecp/species/9399	On Land: Breeding
American Bittern <i>Botaurus lentiginosus</i> https://ecos.fws.gov/ecp/species/6582	On Land: Breeding
Pied-billed Grebe <i>Podilymbus podiceps</i>	On Land: Breeding
Blue-winged Warbler <i>Vermivora pinus</i>	On Land: Breeding
Dickcissel <i>Spiza americana</i>	On Land: Breeding
Henslow's Sparrow <i>Ammodramus henslowii</i> https://ecos.fws.gov/ecp/species/3941	On Land: Breeding
Prothonotary Warbler <i>Protonotaria citrea</i>	On Land: Breeding
Upland Sandpiper <i>Bartramia longicauda</i> https://ecos.fws.gov/ecp/species/9294	On Land: Breeding
Red-headed Woodpecker <i>Melanerpes erythrocephalus</i>	On Land: Breeding
Bald Eagle <i>Haliaeetus leucocephalus</i> https://ecos.fws.gov/ecp/species/1626	On Land: Year-round
Peregrine Falcon <i>Falco peregrinus</i> https://ecos.fws.gov/ecp/species/8831	On Land: Breeding
Short-eared Owl <i>Asio flammeus</i> https://ecos.fws.gov/ecp/species/9295	On Land: Wintering
Willow Flycatcher <i>Empidonax traillii</i> https://ecos.fws.gov/ecp/species/3482	On Land: Breeding
Common Tern <i>Sterna hirundo</i> https://ecos.fws.gov/ecp/species/4963	On Land: Breeding

Additional information can be found using the following links:

- Birds of Conservation Concern <http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php>
 - Conservation measures for birds
<http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php>
 - Year-round bird occurrence data
<http://www.birdscanada.org/birdmon/default/datasummaries.jsp>
-

Wetlands

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

FRESHWATER EMERGENT WETLAND

- [PEMC](#)

FRESHWATER FORESTED/SHRUB WETLAND

- [PFO1Ch](#)
- [PFO1C](#)
- [PSS1Ch](#)
- [PSS1Fh](#)
- [PFO1Ah](#)

FRESHWATER POND

- [PUBG](#)

LAKE

- [L1UBHh](#)
- [L2EM2G](#)

RIVERINE

- [R2UBHx](#)
 - [R2UBH](#)
-



August 15, 2017

Keith Creagh, Director
Michigan Department of Natural Resources
PO Box 30028
Lansing, MI 48909

**Subject: Constantine Hydroelectric Project (FERC No. 10661)
Request for Threatened and Endangered Species Information**

Dear Mr. Creagh,

On behalf of Indiana Michigan Power Company (I&M), HDR, Inc. (HDR) is gathering information in support of the Pre-Application Document (PAD) for the upcoming Federal Energy Regulatory Commission (FERC) relicensing of the Constantine Hydroelectric Project (FERC No. 10661) (Project). In support of this process, HDR is requesting information regarding the following within the Project area:

- State-listed threatened or endangered species;
- Species proposed for listing as threatened or endangered, or species of concern;
- Designated or proposed critical habitat; and
- Candidate species.

The Constantine Hydroelectric Project is located on the St. Joseph River in St. Joseph County, Michigan. The attached map shows the area of interest for which the information is being requested and the general location of the facility.

It is our intent to include the results of this request in the PAD. Therefore, we respectfully request a response to this request within 30 days of the date of this letter. If you have any questions or need additional information regarding this Project or its location, please feel free to contact me at (704) 248-3620 or sarah.kulpa@hdrinc.com.

Thank you for your assistance with this request.

Sincerely,
HDR, Inc.

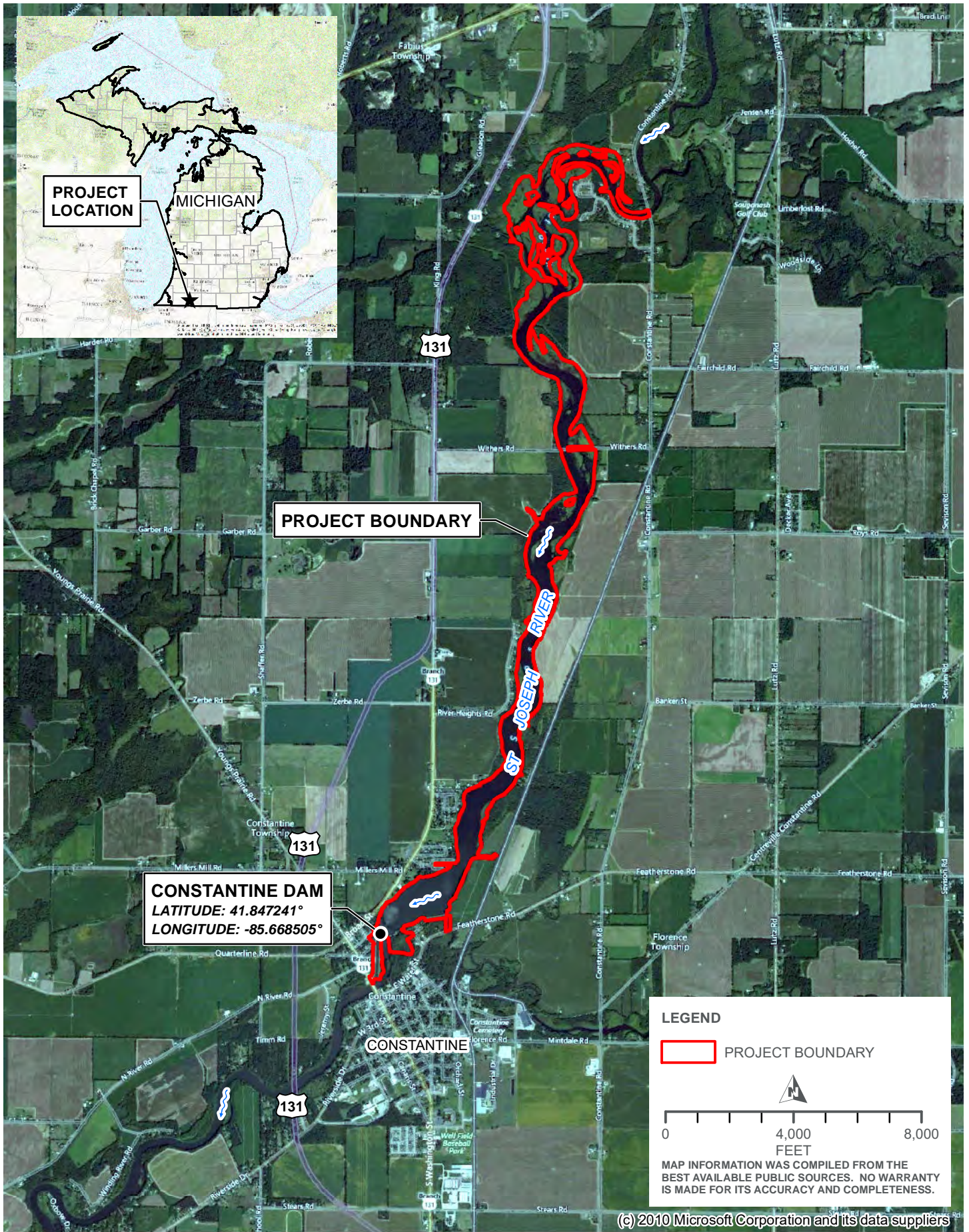
A handwritten signature in blue ink that reads "Sarah Kulpa".

Sarah Kulpa
Project Manager

Constantine Hydroelectric Project
Request for Threatened and Endangered Species Information
August 15, 2017
Page 2

Attachment

cc: Jonathan Magalski, on behalf of I&M



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PROJECT LOCATION MAP
CONSTANTINE HYDROELECTRIC PROJECT (FERC NO. 10661)
ST. JOSEPH COUNTY, MICHIGAN



August 15, 2017

Ronda Wuycheck, Chief
Michigan Department of Environmental Quality
Coastal Zone Management Program
525 West Allegan Street
PO Box 30473
Lansing, MI 48909-7973

**Subject: Constantine Hydroelectric Project (FERC No. 10661)
Coastal Zone Consistency Determination**

Dear Ms. Wuycheck,

On behalf of Indiana Michigan Power Company (I&M), HDR, Inc. (HDR) is gathering information in support of the Pre-Application Document (PAD) for the upcoming Federal Energy Regulatory Commission (FERC) relicensing of the Constantine Hydroelectric Project (FERC No. 10661) (Project).

Consistent with this effort, HDR is requesting a determination from your office regarding the applicability of the State's Coastal Zone Policies to the Project, which is located on the St. Joseph River in St. Joseph County, Michigan. Based on a review of applicable information, we do not believe that the Project is located within the State's Coastal Zone and are requesting confirmation of this determination from your office. In support of this confirmation, we have included a map indicating the location of this facility.

It is our intent to include the results of the determination in the PAD. Therefore, we respectfully request a response to this determination within 30 days of the date of this letter. If you have any questions or need additional information regarding this Project or its location, please feel free to contact me at (704) 248-3620 or sarah.kulpa@hdrinc.com.

Thank you for your assistance with this request.

Sincerely,
HDR, Inc.

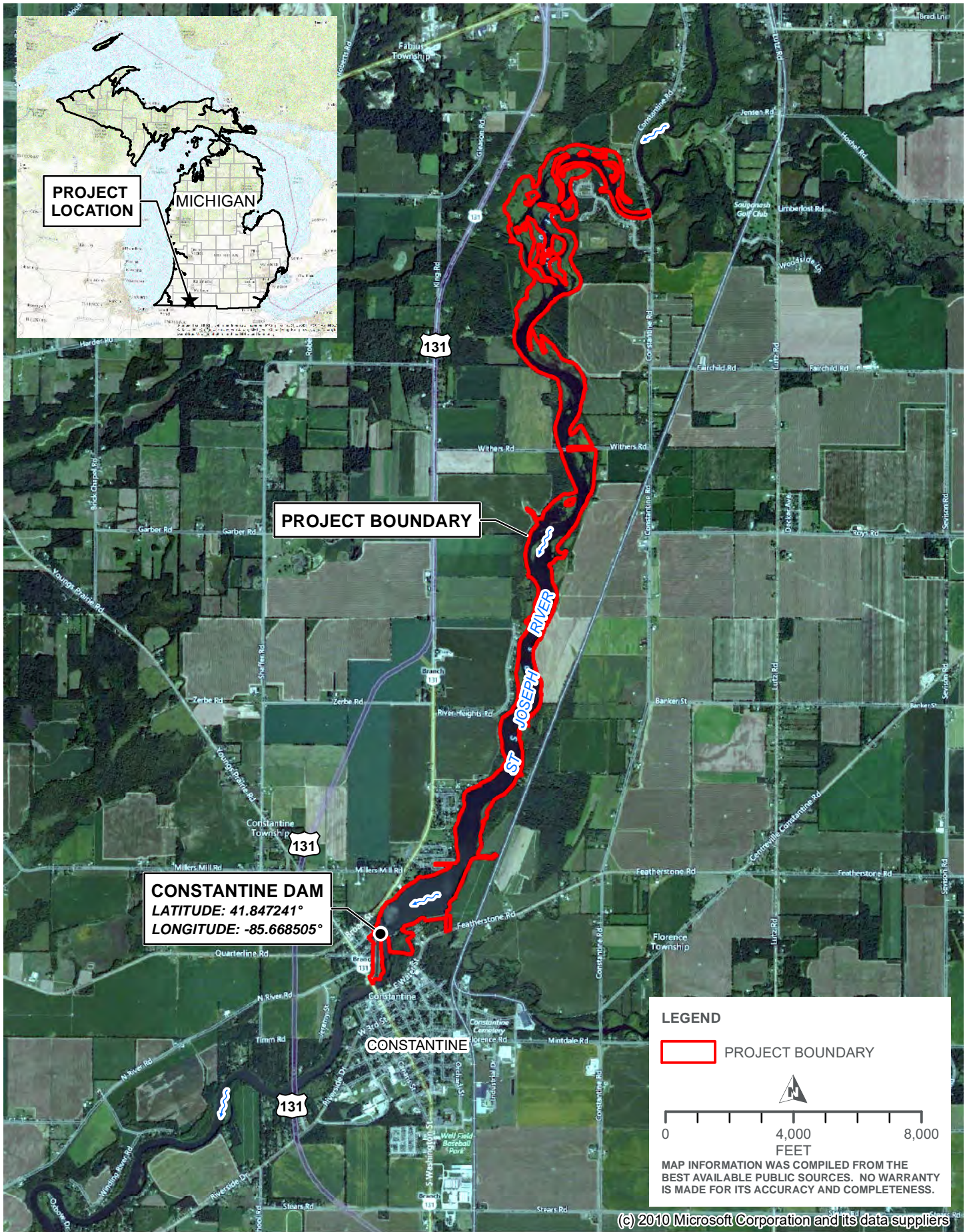
A handwritten signature in blue ink that reads "Sarah E. Kulpa".

Sarah Kulpa
Project Manager

Constantine Hydroelectric Project
Coastal Zone Consistency Determination
August 15, 2017
Page 2

Attachment

cc: Jonathan Magalski, on behalf of I&M



(c) 2010 Microsoft Corporation and its data suppliers



PROJECT LOCATION MAP
CONSTANTINE HYDROELECTRIC PROJECT (FERC NO. 10661)
ST. JOSEPH COUNTY, MICHIGAN



RICK SNYDER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING



C. HEIDI GREETHER
DIRECTOR

August 21, 2017

Sarah Kulpa
Project Manager
HRD, Inc.
440 S Church Street
Suites 900 & 1000
Charlotte, NC 28202-2075

Dear Ms. Kulpa:

SUBJECT: Federal Consistency Review of Proposed Constantine Hydroelectric Project
(FERC No. 10661), St. Joseph County, Michigan

Staff of the Water Resources Division has reviewed this phase of the project for consistency with the Michigan Coastal Management Program (MCMP), as required by Section 307 of the Coastal Zone Management Act, PL 92-583, as amended (CZMA). Thank you for providing the opportunity to review this proposed activity. Our review indicates that portions of this project will impact areas located within Michigan's coastal management boundary and are subject to consistency requirements.

Our review indicates that this project is located outside of Michigan's coastal management boundary. No adverse impacts to coastal resources are anticipated from this proposed activity as described in the information you forwarded to our office. Therefore, this phase of the project is consistent with MCMP.

This consistency determination does not waive the need for permits that may be required under other federal, state or local statutes. Please call me if you have any questions regarding this review.

Sincerely,

Chris Antieau
Great Lakes Shorelands Unit
Water Resources Division
517-290-5732



Danielle Hanson
 Environmental Scientist
 HDR
 6592 E. 34th Lane
 Yuma, AZ 85365

September 11, 2017

Re: Rare Species Review #2027 –Constantine Hydroelectric Project, St. Joseph County, MI

Ms. Hanson:

The location for the proposed project was checked against known localities for rare species and unique natural features, which are recorded in the Michigan Natural Features Inventory (MNFI) natural heritage database. This continuously updated database is a comprehensive source of existing data on Michigan's endangered, threatened, or otherwise significant plant and animal species, natural plant communities, and other natural features. Records in the database indicate that a qualified observer has documented the presence of special natural features. The absence of records in the database for a particular site may mean that the site has not been surveyed. The only way to obtain a definitive statement on the status of natural features is to have a competent biologist perform a complete field survey.

Under Act 451 of 1994, the Natural Resources and Environmental Protection Act, Part 365, Endangered Species Protection, "a person shall not take, possess, transport, ...fish, plants, and wildlife indigenous to the state and determined to be endangered or threatened," unless first receiving an Endangered Species Permit from the Michigan Department of Natural Resources (MDNR), Wildlife Division. Responsibility to protect endangered and threatened species is not limited to the lists below. Other species may be present that have not been recorded in the database.



MSU EXTENSION
Michigan Natural
Features Inventory

PO Box 13036
 Lansing MI 48901

(517) 284-6200
 Fax (517) 373-9566

mnfi.anr.msu.edu
 MSU is an affirmative-
 action, equal-opportunity
 employer.

Several legally protected species have been documented within 1.5 miles of the project site and it is **possible** that negative impacts will occur. Keep in mind that **MNFI cannot fully evaluate this project without visiting the site.** MNFI offers several levels of Rare Species Reviews, including field surveys which I would be happy to discuss with you.

Sincerely,

Daria A. Hyde

Daria A. Hyde
 Conservation Planner/Zoologist
 Michigan Natural Features Inventory

Comments for Rare Species Review #2027: It is important to note that it is the applicant's responsibility to comply with both state and federal threatened and endangered species legislation. Therefore, if a state listed species occurs at a project site, and you think you need an endangered species permit please contact: Lori Sargent, Nongame Wildlife Biologist, Wildlife Division, Michigan Department of Natural Resources, P.O. Box 30444, Lansing, MI 48909, 517-284-6216, or SargentL@michigan.gov. If a federally listed species is involved and, you think a permit is needed, please contact Carrie Tansy, Endangered Species Program, U.S. Fish and Wildlife Service, East Lansing office, 517-351-8375 or carrie_tansy@fws.gov. Please consult MNFI's [Rare Species Explorer](#) for additional information regarding the listed species.

Federally Endangered

Indiana Bat - although there are no documented occurrences, there appears to be suitable habitat within the standard 1.5 mile search buffer. Indiana bats (*Myotis sodalis*) are found only in the eastern United States and are typically confined to the southern three tiers of counties in Michigan. Indiana bats that summer in Michigan winter in caves in Indiana and Kentucky. This species forms colonies and forages in riparian and mature floodplain habitats. Nursery roost sites are usually located under loose bark or in hollows of trees near riparian habitat. Indiana bats typically avoid houses or other artificial structures and typically roost underneath loose bark of dead elm, maple and ash trees. Other dead trees used include oak, hickory and cottonwood. Foraging typically occurs over slow-moving, wooded streams and rivers as well as in the canopy of mature trees. Movements may also extend into the outer edge of the floodplain and to nearby solitary trees. A summer colony's foraging area usually encompasses a stretch of stream over a half-mile in length. Upland areas isolated from floodplains and non-wooded streams are generally avoided.

Conservation strategies: The suggested seasonal tree cutting range for Indiana bat is between October 1 and March 31 (i.e., no cutting April 1-September 30). This applies throughout the Indiana bat range in Michigan.

Table 1: Legally protected species within 1.5 mile of RSR #2027

ELCAT	SNAME	SCOMNAME	USESA	SPROT	G_RANK	S_RANK	FIRSTOBS	LASTOBS
Plant	<i>Stellaria crassifolia</i>	Fleshy stitchwort		E	G5	S1	1890	1890-06-07
Plant	<i>Echinodorus tenellus</i>	Dwarf burhead		E	G5?	S1	1837	1837-08-11
Plant	<i>Berula erecta</i>	Cut-leaved water parsnip		T	G4G5	S2	1952	1952-07-28
Plant	<i>Sabatia angularis</i>	Rosepink		T	G5	S2	1837	1837-08-18
Plant	<i>Poa paludigena</i>	Bog bluegrass		T	G3	S2	1890	1890-06-06
Animal	<i>Setophaga cerulea</i>	Cerulean warbler		T	G4	S3	1992-07-02	1992-07-02
Animal	<i>Cyclonaias tuberculata</i>	Purple wartyback		T	G5	S2	2006-09-25	2006-09-25
Plant	<i>Justicia americana</i>	Water willow		T	G5	S2	2006-09-26	2006-09-26
Animal	<i>Setophaga dominica</i>	Yellow-throated warbler		T	G5	S3	1997-05-16	1997-05-16

Of concern: The state threatened **purple wartyback mussel** (*Cyclonaias tuberculata*) has been known to occur in the St. Joseph River, near the project site in Sec. 26, T7S R12W. The purple wartyback mussel inhabits medium to large rivers that have gravel or mixed sand and gravel substrates. Suitable habitat for fish host species must be present for purple wartyback reproduction to be successful. Known hosts for the purple wartyback are the yellow bullhead (*Ameiurus natalis*) and channel catfish (*Ictalurus punctatus*), but there may be others. If allowed, purple wartybacks likely live to over 25 years of age. Freshwater mussels (Unionidae) require a fish host to complete their life cycle. Eggs are fertilized and develop into larvae within the gills of the female mussel. These larvae, called glochidia, are released into the water and must attach to a suitable fish host to survive and transform into the adult mussel. The purple wartyback is a summer breeder with fertilized eggs and glochidia released during one summer.

Management and Conservation: Like other mussels, threats are varied and include: habitat degradation, poor water quality, flow alterations, water temperature changes, heavy metals, organic pollution, sedimentation, and siltation. Maintenance or establishment of vegetated riparian buffers can help protect mussel habitats from many of these threats. Control of zebra mussels is critical to preserving native mussels. As with all mussels, fish host requirements also need to be considered. Due to the unique life cycle of unionids, fish hosts must be present in order for reproduction to occur. The loss of habitat for these hosts can cause the extirpation of unionid populations. Barriers to the movement of fish hosts such as dams and impoundments also prevent unionid migration and exchange of genetic material among populations that helps maintain genetic diversity within populations.

Of concern: The state threatened **water willow** (*Justicia americana*) is a mat-forming perennial of river slackwater areas; leaves opposite, narrowly elliptical; flowers pale violet marked with dark purple, borne in axillary clusters near top of plant. It primarily occurs in large river systems and less commonly in lakes. It is almost always found along muddy banks at the edge of the shore.

Management and Conservation: Water-willow requires the protection of hydrology. Changing the course of rivers or adding impoundments negatively impacts this species. Agricultural run-off also likely has negative impacts.

Of concern: The state threatened **yellow-throated warbler** (*Setophaga dominica*) has been known to occur in the area. Michigan's yellow-throated warbler population is closely associated with mature sycamore trees, which are associated with bottomland and river floodplain forests. They have also been associated with mature silver maples and American basswood. The yellow-throated warbler is one of the earliest to return to Michigan in the spring, arriving in the state from mid-April to mid-May. Nests are generally placed in sycamores, far from the trunk and a substantial distance from the ground. Most individuals leave the breeding grounds by August. This warbler is an opportunistic feeder that gleans or "flycatches" a wide range of insect species.

Management and Conservation: Preserve and expand existing floodplain habitat and reduce human encroachment into the floodplain. This includes no logging of sycamores within the floodplain and very limited logging of other species outside of the nesting season. Maintain a natural stream channel with soft, vegetated banks so it can meander and periodically overtop its banks which will allow regeneration of the sycamores that the bird relies on for nesting. Reducing the levels of pollution in the streams may also increase prey abundance and reduce any toxic effects on the birds. Any construction activities within 1/2 mile of known breeding locations should be scheduled for the non-breeding season (August to March).

Table 2: Special concern species and rare natural communities within 1.5 miles of RSR #2023

ELCAT	SNAME	SCOMNAME	USES A	SPROT	G_RANK	S_RANK	FIRSTOBS	LASTOBS
Plant	<i>Boechea missouriensis</i>	Missouri rock-cress		SC	G5T3?Q	S2	1890	1890-06-04
Plant	<i>Agalinis auriculata</i>	Eared foxglove		X	G3	SX	1837	1837-08-23
Plant	<i>Boechea missouriensis</i>	Missouri rock-cress		SC	G5T3?Q	S2	1890	1890-06-04
Plant	<i>Amorpha canescens</i>	Leadplant		SC	G5	S3	2007-11-07	2013-09-03
Community	<i>Mesic Southern Forest</i>	Rich Forest, Central Midwest Type			G2G3	S3	2009-09-08	2009-10-02
Animal	<i>Villosa iris</i>	Rainbow		SC	G5Q	S3	2009-06	2009-09
Animal	<i>Venustaconcha ellipsiformis</i>	Ellipse		SC	G4	S3	1930	2013-07-16
Plant	<i>Brickellia eupatorioides</i>	False boneset		SC	G5	S2	2009-10-02	2009-10-02

Species of special concern are not protected under state endangered species legislation, but are considered to be rare in Michigan and should be protected to prevent future listing.

Of concern: The special concern **rainbow mussel** (*Villosa iris*) has been known to occur in the St. Joseph River and the Prairie River near the project site. Rainbow mussels inhabit small to medium streams in coarse sand or gravel where moderate currents prevail. Freshwater mussels (*Unionida*) require a fish host to complete their life cycle. Eggs are fertilized and develop into larvae within the gills of the female mussel. These larvae, called glochidia, are released into the water and must attach to a suitable fish host to survive and transform into the adult mussel. Likely fish hosts include smallmouth bass, green sunfish, largemouth bass, rainbow darter, and yellow perch.

Management and Conservation: Like other mussels, threats to the rainbow include: natural flow alterations, siltation, channel disturbance, point and non-point source pollution, and exotic species. Maintenance/establishment of vegetated riparian buffers can help protect mussel habitats from many threats. Control of zebra mussels is critical to preserving native mussels. And as with all mussels, protection of their hosts' habitat is also crucial.

Of concern: The special concern **ellipse mussel** (*Venustaconcha ellipsiformis*) has been documented in the Prairie River which flows into the St. Joseph River near the project site. The ellipse occurs in the swift currents of riffles or runs of clear, small to medium sized streams in gravel or sand and gravel substrates. **The host fish is unknown.** The ellipse is known only from the Midwest United States and has declined considerably in its historic distribution and abundance due to habitat alterations, modification in river flows, and pollution.

Management and Conservation: Like other mussels, threats to the ellipse include: natural flow alterations, siltation, channel disturbance, point and non-point source pollution, and exotic species. Maintenance or establishment of vegetated riparian buffers can help protect mussel habitats from many of their threats. Control of zebra mussels is critical to preserving native mussels. And as with all mussels, protection of their hosts' habitat is also crucial.

Of concern: The special concern **leadplant** (*Amorpha canescens*) inhabits prairies, dry bluffs and hills, sandy roadsides and clearings. Its leaves are pinnately compound, leaflets pubescent, 1-2 cm; flowers small, purple, in dense terminal spikes. Flowering occurs in June and July.

Management and Conservation: The habitat of this species has been severely degraded and diminished. This species likely requires natural disturbances associated with prairie habitat such as prescribed fire and brush removal. Prevent invasive species from entering the site.

Of concern: The special concern **false boneset** (*Kuhnia eupatorioides*) has been known to occur in the vicinity of the project area. This plant is a tall forb (1 m); leaves narrowly lanceolate, dotted with glands beneath, mostly sessile; flowers creamy-white, borne in terminal clusters. **False boneset inhabits sandy fields, prairies, disturbed areas including roadsides and bluffs.** Flowering occurs from late July to October.

Management and Conservation: Prescribed burns are necessary to maintain prairie habitat for this species.

Codes for Tables:

State Protection Status Code Definitions (SPROT)

E: Endangered
T: Threatened
SC: Special concern

Federal Protection Status Code Definitions (USESA)

LE = listed endangered
LT = listed threatened
LELT = partly listed endangered and partly listed threatened
PDL = proposed delist
E(S/A) = endangered based on similarities/appearance
PS = partial status (federally listed in only part of its range)
C = species being considered for federal status

Global Heritage Status Rank Definitions (GRANK)

The priority assigned by [NatureServe](#)'s national office for data collection and protection based upon the element's status throughout its entire world-wide range. Criteria not based only on number of occurrences; other critical factors also apply. Note that ranks are frequently combined.

G1 = critically imperiled globally because of extreme rarity (5 or fewer occurrences range-wide or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extinction.

G2 = imperiled globally because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extinction throughout its range.

G3: Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range (e.g. a single western state, a physiographic region in the East) or because of other factor(s) making it vulnerable to extinction throughout its range; in terms of occurrences, in the range of 21 to 100.

G4: Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.

G5: Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery.

Q: Taxonomy uncertain

State Heritage Status Rank Definitions (SRANK)

The priority assigned by the Michigan Natural Features Inventory for data collection and protection based upon the element's status within the state. Criteria not based only on number of occurrences; other critical factors also apply. Note that ranks are frequently combined.

S1: Critically imperiled in the state because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extirpation in the state.

S2: Imperiled in state because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extirpation from the state.

S3: Rare or uncommon in state (on the order of 21 to 100 occurrences).

S4 = apparently secure in state, with many occurrences.

S5 = demonstrably secure in state and essentially ineradicable under present conditions.

SX = apparently extirpated from state.

Rare Species Review #2027
Constantine Hydroelectric Project FERC No. 10661
St. Joseph County, MI
September 11, 2017

For projects involving Federal funding or a Federal agency authorization

The following information is provided to assist you with **Section 7 compliance** of the Federal Endangered Species Act (ESA). The ESA directs all Federal agencies "to work to conserve endangered and threatened species. Section 7 of the ESA, called "Interagency Cooperation, is the means by which Federal agencies ensure their actions, including those they authorize or fund, do not jeopardize the existence of any listed species."

The project falls within the range of six (6) federally listed/proposed species which have been identified by the U.S. Fish and Wildlife Service (USFWS) to occur in **St. Joseph County, Michigan**:

Federally Endangered

Indiana Bat - although there are no documented occurrences, there appears to be suitable habitat within the standard 1.5 mile search buffer. Indiana bats (*Myotis sodalis*) are found only in the eastern United States and are typically confined to the southern three tiers of counties in Michigan. Indiana bats that summer in Michigan winter in caves in Indiana and Kentucky. This species forms colonies and forages in riparian and mature floodplain habitats. Nursery roost sites are usually located under loose bark or in hollows of trees near riparian habitat. Indiana bats typically avoid houses or other artificial structures and typically roost underneath loose bark of dead elm, maple and ash trees. Other dead trees used include oak, hickory and cottonwood. Foraging typically occurs over slow-moving, wooded streams and rivers as well as in the canopy of mature trees. Movements may also extend into the outer edge of the floodplain and to nearby solitary trees. A summer colony's foraging area usually encompasses a stretch of stream over a half-mile in length. Upland areas isolated from floodplains and non-wooded streams are generally avoided.

Conservation strategies: The suggested seasonal tree cutting range for Indiana bat is between October 1 and March 31 (i.e., no cutting April 1-September 30). This applies throughout the Indiana bat range in Michigan.

Mitchell's Satyr Butterfly - there doesn't appear to be suitable habitat within the standard 1.5 mile search buffer. The state and federally endangered **Mitchell's satyr butterfly** (*Neonympha mitchellii mitchelliis*) restricted to calcareous wetlands known as prairie fens. In Michigan, this habitat is characterized by scattered tamaracks, poison sumac, and dogwood with a ground cover of sedges, shrubby cinquefoil, and a variety of herbaceous species with prairie affinities. Adult Mitchell's satyr butterflies are active two to three weeks each summer, with males emerging before females. Adult flight dates are from mid-June to mid-July. Larvae hibernate near the bottom of a sedge. The larval food plant is thought to be several species of sedge. The caterpillar is green with white stripes.

Federally Threatened

Copperbelly Water Snake – although there are no documented occurrences, there appears to be suitable habitat within the standard 1.5 mile search buffer. Copperbelly water snakes (*Nerodia erythrogaster neglecta*) are usually found in or near shrub swamps, ponds, lakes, oxbow sloughs, fens, and slow-moving streams. They can also be found in mature or second-growth woodlands and in more open habitats adjacent to wetland areas. In spring these snakes often inhabit the open edges of shallow ponds and buttonbush swamps and frequently

bask on shoreline vegetation, muskrat lodges, or woody debris. When temperatures rise and these seasonal waters begin to dry up in early summer, the snakes migrate to permanent waters (lake and stream edges), often using fairly dry wooded or grassy upland corridors. They may become largely nocturnal during hot weather.

Unlike the northern water snake (*Nerodia sipedon*), this species may spend considerable periods of time in relatively dry habitats away from water, apparently by choice as well as necessity. Declining temperatures in fall appear to trigger migration to hibernation sites. Copperbelly water snakes are typically dormant from late October or November until sometime in April. They usually seek shelter in burrows or debris piles that are higher than the nearby wetlands. These snakes are migratory, moving from seasonally wet areas in spring and fall to permanently wet areas in summer. Please inform field crews that snakes should not be killed, harmed, or harassed. Any copperbelly water snake sightings should be reported to this office.

Northern Long-eared Bat - Although no known hibernacula or roost trees have been documented within 1.5 miles of the project area, this activity occurs within the designated **WNS zone** (i.e., within 150 miles of positive counties/districts impacted by WNS). In addition, suitable habitat does exist in and outside of our 1.5 mile search buffer. The USFWS has prepared a [dichotomous key](#) to help determine if this action may cause prohibited take of this bat. Please consult the USFWS [Endangered Species Page](#) for more information.

Northern long-eared bat (*M. septentrionalis*) numbers in the northeast US have declined up to 99 percent. Loss or degradation of summer habitat, wind turbines, disturbance to hibernacula, predation, and pesticides have contributed to declines in Northern long-eared bat populations. However, no other threat has been as severe to the decline as White-nose Syndrome (WNS). WNS is a fungus that thrives in the cold, damp conditions in caves and mines where bats hibernate. The disease is believed to disrupt the hibernation cycle by causing bats to repeatedly awake thereby depleting vital energy reserves. This species was federally listed in May 2015 primarily due to the threat from WNS.

Also called northern bat or northern myotis, this bat is distinguished from other *Myotis* species by its long ears. In Michigan, northern long-eared bats hibernate in abandoned mines and caves in the Upper Peninsula; they also commonly hibernate in the Tippy Dam spillway in Manistee County. This species is a regional migrant with migratory distance largely determined by locations of suitable hibernacula sites.

Northern long-eared bats typically roost and forage in forested areas. During the summer, these bats roost singly or in colonies underneath bark, in cavities or in crevices of both living and dead trees. These bats seem to select roost trees based on suitability to retain bark or provide cavities or crevices. Common roost trees in southern Lower Michigan included species of ash, elm and maple. Foraging occurs primarily in areas along woodland edges, woodland clearings and over small woodland ponds. Moths, beetles and small flies are common food items. Like all temperate bats this species typically produces only 1-2 young per year.

Conservation strategies: When there are no known roost trees or hibernacula in the project area, we encourage you to conduct tree-cutting activities and prescribed burns in forested areas during October 1 through March 31 when possible, but you are not required by the ESA to do so. When that is not possible, we encourage you to remove trees prior to June 1 or after July 31, as that will help to protect young bats that may be in forested areas, but are not yet able to fly.

Eastern Prairie Fringed Orchid - there does not appear to be suitable habitat within the 1.5 mile search buffer. The **Eastern prairie fringed orchid** (*Platanthera leucophaea*) occurs in a wide variety of habitats, from mesic prairie to wetlands such as sedge meadows, marsh edges, even bogs. It requires full sun for optimum growth and flowering and a grassy habitat with little or no woody encroachment. The white blossoms produce a heavy

fragrance at dusk that attracts many moths, including the primary pollinators of *P. leucophaea*, hawkmoths (Lepidoptera: Sphingidae). Hawkmoths are likely co-adapted pollinators, since their tongues are long enough to reach the nectar that lies deep in the spur of the flower. Capsules mature in September, releasing hundreds of thousands of airborne seeds. Plants may not flower every year but frequently produce only a single leaf above ground, possibly even becoming dormant when conditions are unsuitable, such as the onset of drought.

Federal Candidate Species

Eastern Massasauga Rattlesnake - although there are no documented occurrences, there appears to be suitable habitat within the standard 1.5 mile search buffer. Michigan's only venomous snake is found in a variety of wetland habitats including bogs, fens, shrub swamps, wet meadows, marshes, moist grasslands, wet prairies, and floodplain forests. **Eastern massasaugas** (*Sistrurus catenatus catenatus*) occur throughout the Lower Peninsula, but are not found in the Upper Peninsula. Populations in southern Michigan are typically associated with open wetlands, particularly prairie fens, while those in northern Michigan are better known from lowland coniferous forests, such as cedar swamps. These snakes normally overwinter in crayfish or small mammal burrows often close to the groundwater level and emerge in spring as water levels rise. During late spring, these snakes move into adjacent uplands they spend the warmer months foraging in shrubby fields and grasslands in search of mice and voles, their favorite food.

Often described as "shy and sluggish", these snakes avoid human confrontation and are not prone to strike, preferring to leave the area when they are threatened. However, like any wild animal, they will protect themselves from anything they see as a potential predator. Their short fangs can easily puncture skin and they do possess potent venom. Like many snakes, the first human reaction may be to kill the snake, but it is important to remember that all snakes play vital roles in the ecosystem. Some may eat harmful insects. Others like the massasauga, consider rodents a delicacy and help control their population. Snakes are also a part of a larger food web and can provide food to eagles, herons, and several mammals.

Any sightings of these snakes should be reported to the Michigan Department of Natural Resources, Wildlife Division. Reports can be submitted online at: [Eastern Massasauga Observation Report](#). If possible, a photo of the live snake is also recommended. As a species of special concern, the massasauga is not protected under state or federal endangered species legislation, but it is becoming rare throughout its range and it **is protected under the authority of the Department of Natural Resources Director's Order, Regulations on the Take of Reptiles and Amphibians, dated October 12, 2001 (section 324 of PA 451)**. Efforts to minimize impacts to the species now may eliminate the need to list the species in the future.

USFWS Section 7 Consultation Technical Assistance can be found at:
<http://www.fws.gov/midwest/endangered/section7/sppranges/michigan-cty.html>

The website offers step-by-step instructions to guide you through the Section 7 consultation process with prepared templates for documenting "no effect." as well as requesting concurrence on "may affect, but not likely to adversely affect" determinations.

Please let us know if you have questions.

Daria Hyde
Conservation Planner/Zoologist
hydeda@msu.edu
517-284-6189



United States Department of the Interior

FISH AND WILDLIFE SERVICE

2651 Coolidge Road, Suite 101
East Lansing, Michigan 48823-6360



IN REPLY REFER TO:

September 11, 2017

Ms. Sarah Kulpa
HDR, Inc.
440 South Church Street
Suites 900&1000
Charlotte, North Carolina 28202-2075

Re: Constantine Hydroelectric Project (FERC No. 10661) Request for Concurrence on Threatened and Endangered Species Information

Dear Ms. Kulpa:

Thank you for your letter from August 15, 2017, requesting our concurrence that you have received an accurate report on federally threatened and endangered species and any critical habitat within the project's area of interest. The project is located on the St. Joseph River in St. Joseph County, Michigan.

The generated species list from IPaC outlined six species currently listed under the Endangered Species Act. We concur that the species list is accurate. If the project is modified or new information becomes available that indicates listed species or critical habitat may be within the project area, you should ask for an updated official species list.

We appreciate the opportunity to cooperate with you in conserving threatened and endangered species. If you have any questions regarding these comments, please contact Lisa Fischer, of this office, at (517) 351-5293 or lisa_fischer@fws.gov.

Sincerely,

Scott Hicks
Field Supervisor



United States Department of the Interior

FISH AND WILDLIFE SERVICE

2651 Coolidge Road, Suite 101
East Lansing, Michigan 48823-6360



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Sincerely,

Scott Hicks
Field Supervisor

Constantine Dam Hydroelectric Project, FERC Project No. P-10661

Pre-Application Document Information Questionnaire for FERC Licensing

Indiana Michigan Power Company (I&M) is the Licensee and operator of the Constantine Hydroelectric Project (FERC No. P-10661) (Project), located along the St. Joseph River in St. Joseph County, Michigan. I&M, with assistance from HDR, Inc. (HDR), is beginning the Federal Energy Regulatory Commission (FERC) relicensing process for the Project, and HDR is providing assistance with preparation of a Pre-Application Document (PAD). The PAD provides the Federal Energy Regulatory Commission (FERC) and other entities with existing, relevant, and reasonably available information pertaining to the Project.

This information is intended to help identify items of interest and related information needs, develop study requests and study plans, and prepare documents related to the relicensing application. To prepare the PAD, I&M/HDR will use information in its possession and information obtained from others. This PAD Questionnaire will be used to help identify sources of existing, relevant, and reasonably available information that is not currently in I&M/HDR's possession.

Comments and/or questions regarding this request may be sent to Sarah Kulpa with HDR via email at sarah.kulpa@hdrinc.com or via phone at (704) 248-3620, or to Jonathan Magalski who represents I&M at jmmagalski@aep.com or via phone at (614) 716-2240.

- Contact Information for person completing the questionnaire:

Name & Title:	<u>Liz Pelloso, wetland/environmental scientist</u>
Organization:	<u>USEPA Region 5 – NEPA Implementation Section</u>
Address:	<u>77 W Jackson Blvd (E19-J)</u> <u>Chicago, IL 60604</u>
Phone:	<u>312-886-7425</u>
Email Address:	<u>pelloso.elizabeth@epa.gov</u>

- Do you know of any reasonably available materials or information related to the Project or the Project's environment?

Yes (If yes, please complete 2.a. thru 2.e.) No (If no, please go to 3.)

a. Please indicate the specific resource area(s) for which you have information:

- | | |
|---|---|
| <input type="checkbox"/> Geology and soils | <input type="checkbox"/> Recreation and land use |
| <input checked="" type="checkbox"/> Water resources | <input type="checkbox"/> Aesthetic resources |
| <input type="checkbox"/> Fish and aquatic resources | <input type="checkbox"/> Cultural resources |
| <input type="checkbox"/> Wildlife and botanical resources | <input type="checkbox"/> Socio-economic resources |
| <input type="checkbox"/> Wetlands, riparian, and littoral habitat | <input type="checkbox"/> Tribal resources |
| <input type="checkbox"/> Rare, threatened & endangered species | <input type="checkbox"/> Other resource information |

b. Please briefly describe the information or list available documents: *(Additional information may be provided on a separate page.)*

The St. Joseph River is listed as impaired on the Clean Water Act Section 303(d) list of impaired waterbodies in Michigan. Several impairments exist.

c. Where and how can HDR obtain this information?

EPA recommends you access and use several of our databases to obtain environmental information pertaining to the project area:

- NEPAassist: <https://www.epa.gov/nepa/nepassist>
- WATERS: <https://www.epa.gov/waterdata/waters-watershed-assessment-tracking-environmental-results-system>
- Envirofacts: <https://www3.epa.gov/enviro/>
- EJSscreen: <https://www.epa.gov/ejscreen>
- Enviromapper: <https://www.epa.gov/emefdata/em4ef.home>
- Clean Water Act Section 303(d) impaired waters: <https://www.epa.gov/exposure-assessment-models/303d-listed-impaired-waters>
- NAAQS: <http://www.epa.state.oh.us/dapc/general/naaqs.aspx> and <https://www.epa.gov/green-book>

EPA also suggests I&M/HDR undertake early coordination as follows:

- Coordination with the U.S. Fish and Wildlife Service to determine if the project will have any detrimental effects on federally listed threatened or endangered species or their critical habitat.
- Initiation of a Rare Species Review with the Michigan Natural Features Inventory (MNFI). A Rare Species Review involves a refined review of the rare species in the immediate vicinity of your project. The Rare Species Review corresponds to the Endangered Species Assessment previously provided by the Wildlife Division of the Michigan Department of Natural Resources (MDNR), as MDNR ceased to accept review requests to the Environmental Review (ER) Program after

September 16, 2011. These consultations are required to determine if any Federally- or state-listed endangered or threatened species are present within the project boundaries, and if project implementation would or could detrimentally affect any listed species or their critical habitat. As on-site surveys vary by species, and in certain instances must be completed during specific short seasonal timeframes, EPA strongly encourages timely coordination with USFWS and MNFI.

- d. Please provide the names of other persons in your organization whom you wish to designate for a potential follow-up contact by HDR's representative for the resource area(s) checked above. If you know of others who are not part of your organization but who may have relevant information, please provide their name(s) and contact information as well. ***(Additional contacts may be provided on a separate page.)***

Representative Contact Information

Name & Title: Ken Westlake, Chief, NEPA Implementation Section
Organization: USEPA Region 5 – NEPA Implementation Section
Address: 77 W Jackson Blvd (E19-J)
Chicago, IL 60604
Phone: 312-886-2910
Email Address: westlake.kenneth@epa.gov

- e. Based on the resources listed in 2a., are you aware of any specific issues pertaining to the identified resource area(s) such as water quality, wildlife habitat, endangered species or cultural resources that may be affected by the Project operations? ***(Additional information may be provided on a separate page.)***

Yes *(Please list specific issues below)* No

Resource Area	Specific issue
The St. Joseph River is already listed as impaired.	The project should not further degrade water quality.

3. Do you or your organization plan to participate in the Dam licensing process?

Yes (*Please list specific issues below*) No

We are interested in your comments. If you have comments and/or questions regarding the Project, the Pre-Application Document, or FERC licensing, please note them below:

EPA will participate by reviewing NEPA documents required to be completed by FERC.
Please send future NEPA documents to EPA's NEPA program in Chicago for review.
This request was received by EPA R5's NEPA Program via US Mail on 8/24/2017.
Today's date: 9/20/2017



RICK SNYDER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
LANSING



KEITH CREAGH
DIRECTOR

September 20, 2017

Ms. Sarah Kulpa
Project Engineer
HDR
440 S. Church Street, Suites 900 & 1000
Charlotte, NC 28202-2075

**RE: CONSTANTINE HYDROELECTRIC PROJECT (FERC NO. 10661) RELICENSING PAD
INFORMATION REQUEST**

Dear Ms. Kulpa,

The Michigan Department of Natural Resources (Department) is in receipt of your information request for the relicensing of the Constantine Hydroelectric Project (project) on the Saint Joseph River, Saint Joseph County, Michigan. From your we will try to direct you to sources to help you move forward on relicensing the Constantine Hydroelectric Project.

I have enclosed a copy of the MDNR Fisheries Division's relicensing study guidelines to help you determine what items you will need to begin preparing for the licensing process from our perspective.

For the fisheries resources related to the project, I suggest you contact Mr. Brian Gunderman, Southern Lake Michigan Management Unit Supervisor at our Plainwell Office (269-685-6851 or GundermanB@michigan.gov). Mr. Gunderman can provide you more specific fisheries information for the vicinity of the project. In addition, you may want to review the Saint Joseph River Assessment. You can download a copy from the following site:

www.michigandnr.com/PUBLICATIONS/PDFS/ifr/ifrlibra/Special/Reports/sr24.pdf

For specific recreational needs, you can contact Parks and Recreation Division. For more general information on recreation trends and needs, The Michigan Statewide Comprehensive Outdoor Recreation Plan 2013–2017 can be found online at:

http://www.michigan.gov/documents/dnr/SCORPfnlrprt_513881_7.pdf

For the current and existing recreational facilities and use, you will need to acquire that information from the project owner.

Ms. Sarah Kulpa, Project Manager, HDR
Constantine Hydroelectric Project Information Request

September 20, 2017
Page 2

For wildlife resources you will need to contact Wildlife Division for any plans or species of concern to the Department. You should be able to get that information from the Plainwell Customer Service Center, Plainwell, Michigan (269-685-6851).

For endangered species distribution or communities of special concern in the area, you should contact Michigan Natural Features Inventory (<https://mnfi.anr.msu.edu>) . They should be able to help you determine if any endangered or species of special concern are in the area of influence of the project.

For soils and geology, you'll need to contact the Soil Conservation Service and review their soil maps. They may also have information on underlying geology.

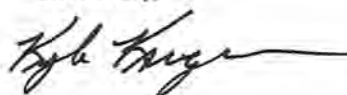
Wetland determinations can be acquired through the US Fish and Wildlife Service. I believe they have resources on wetland delineation online.

For coastal zone management, you'll have to contact Michigan Department of Environmental Quality (MDEQ) and the Army Corps of Engineers. They should be able to inform you where the delineations between regulatory authorities are drawn.

You will also need to contact MDEQ for the requirements monitoring water quality and any studies you may need to conduct for applying for the Water Quality Certification that FERC will require for the license.

If you have any further questions or need clarification, please feel free to contact me at: Michigan Department of Natural Resources, Mio Field Office, 191 S. Mt. Tom Rd., Mio, MI 48647.

Sincerely,



Kyle Kruger
Senior Fisheries Biologist
Habitat Assessment Unit
FISHERIES DIVISION
(989) 826-3211 x 7073

cc Brian Gunderman, Fisheries, Plainwell
Enclosures

Michigan Department of Natural Resources
Recommended Review Criteria
And Study Guidance
For the Federal Energy Regulatory Commission
Licensing Process
2003

MICHIGAN DEPARTMENT OF NATURAL RESOURCES RECOMMENDED
REVIEW CRITERIA AND STUDY GUIDANCE
FOR THE FEDERAL ENERGY REGULATORY COMMISSION LICENSING PROCESS
February 4, 2003

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The following are Michigan Department of Natural Resources (MDNR) review criteria, data needs and study guidelines for the Federal Energy Regulatory Commission (FERC) licensing process. These guidelines are intended to facilitate the FERC licensing and re-licensing process by informing licensees of MDNR positions and by detailing studies that will fulfill and facilitate this process. These criteria and study guidelines are not binding on the applicant and are intended to be used in conjunction with applicable FERC licensing statutes, rules, and regulations. These criteria and guidelines were developed in 1986, and revised in 1988, 1989, 1990, 1991, 1992, 1994, 1996, 1998, 2001, and 2003. This document will be reviewed and resubmitted to FERC on an annual basis.

MDNR Positions

1) Plant Operation

A) Daily Operation

- i) Facilities with Riverine Tailwaters - We will recommend to FERC that the project(s) be operated as a run-of-river project (instantaneous inflow equals instantaneous outflow). The project will be limited to pond levels fluctuating $\leq 3''$ over the entire year.
- ii) Facilities with Reservoir Tailwaters - We may recommend that FERC allow some minimal peaking operations with site-specific minimum flow and ramping rate requirements.

B) Operational Verification

We will recommend that data to verify the operation of the plant be provided and funded by the licensee. This will be accomplished using continuous gage stations on the reservoir to determine instantaneous headwater elevation, and continuous gage stations below the reservoir to determine instantaneous tailwater elevation. To provide independent data on project operation, we will recommend that the licensee fund the installation and maintenance of the appropriate number of United States Geological Survey (USGS) gages in the vicinity of the project. We may also recommend to FERC additional site-specific needs on a case by case basis.

2) Habitat

A) Comparative Aquatic Habitat Studies

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We will recommend to FERC that all facilities with riverine tailwaters that choose not to operate their facilities as run-of-river operations conduct the following studies:

- Instream Flow Incremental Methodology (IFIM) studies on downstream river reaches for a comparative analysis of aquatic habitat under the proposed project operation(s) to run-of-river project operation
- Habitat Evaluation Procedures (HEP) studies on the reservoir to compare reservoir habitat under the proposed project operation(s) to run-of-river project operation

These studies are to assure that the appropriate amount of data is collected for an analysis of all operating scenarios. However, we will recommend run-of-river operation at all facilities to FERC in our final comments.

3) Fisheries

A) Fish Passage

We will recommend to FERC that appropriately designed, constructed, and operated fish passage facilities (for anadromous or other migratory fish species) be provided at all FERC projects. The recommendations for fish passage will consist either of fish passage facility construction and operation by the FERC licensee or dam removal. These recommendations will include time frames that may range from immediate to future implementation, depending upon the management goals for the river system. We will recommend that all passage and protective devices be evaluated for their effectiveness. MDNR may recommend that an escrow account be established to provide funds for the fish passage facility design and construction.

The purpose of fish passage is to: 1) regain access to spawning areas; 2) allow for the establishment of self-sustaining fish stocks; and 3) establish "special" fisheries of either state-wide or regional importance. In addition to upstream passage, downstream protection will be required at all projects.

B) Turbine and Spillway Entrainment and Mortality

We will recommend to FERC that the project be operated in a manner such that the entrainment and subsequent turbine and spillway mortality of fish will be minimized. To meet this request, the licensee can either immediately install protective devices to prevent entrainment and mortality or may decide to determine the extent of the problem via studies. The

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results of all studies and protective devices will be evaluated to determine minimum mitigation measures and effectiveness.

4) Woody Debris Transport and Management

We will recommend to FERC that the licensee develop a plan to improve aquatic habitat by maintaining and increasing the amount of large woody debris and vegetative material at the project. This woody debris plan shall be consistent with FERC boating safety requirements and any fish/watershed management plans.

5) Wildlife

We will recommend to FERC that all projects maintain and enhance wildlife resources found on their lands and develop plans to implement wildlife management.

6) Recreation

We will recommend to FERC that all project lands be open to public access. Project lands shall include boat launching facilities on the reservoir, fishing access sites and related facilities on the tailwater area, a safe marked canoe portage around the dam, and other facilities which MDNR views as necessary to optimize recreation on the project. All facilities should conform to the Americans with Disabilities Act (ADA).

All new recreation facilities should be constructed and maintained by the licensee. If public recreation facilities exist on the project, MDNR will recommend to FERC that the licensee provide maintenance funds or actual maintenance for those sites. If only private or leased facilities exist, MDNR will recommend to FERC that the licensee purchase the land and associated facilities. If this cannot be accomplished, MDNR will recommend that the licensee either purchase easements of lands or provide for free access to the project. The licensee always has the option to purchase and operate outright any recreational facility that it intends to use to satisfy FERC requirements. All recreational facilities used to meet FERC licensing requirements should be free of charge for public use.

7) Water Quality

Prior to development of a 401 water quality certification, we will recommend to FERC that flows for the facility, in addition to minimum flow, be maintained to alleviate any water quality problems that may be

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identified as having an adverse effect on restoring and maintaining productive aquatic resources.

The conditions that are established in the Section 401 certificate should govern the project operation in respect to water quality.

8) Coastal Zone

Federal Consistency is the Coastal Zone Management Act requirement that federal actions that have reasonably foreseeable effects on any land or water use or natural resource of the coastal zone (also referred to as coastal uses or resources, or coastal effects) must be consistent with the enforceable policies of a coastal state's federally approved Coastal Management Program.

Typically the Coastal Zone buffer extends not less than 1000' landward from the ordinary high water mark of the Great Lakes, but in many cases it extends significantly further inland (including coastal lakes and large river systems). The coastal zone does include the water areas around the coast such as rivers and lakes.

9) Mitigation Plan

We recommend to FERC that the licensee develop a mitigation plan to alleviate any adverse impacts and compensate for the loss of riverine habitat caused by plant operation. This plan should include a continuous program of analyzing and monitoring all planning, construction, and operational activities with respect to adverse impacts on the river ecosystem. We will also recommend that the licensee implement all measures necessary to correct any harmful effects identified during this ongoing monitoring program as a result of constructing, rehabilitating, operating, and maintaining the project.

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Overview of Project Information and Impact Data Needs

- 1) Plant Operation and Engineering
 - A) Present plant design of all facilities
 - B) Daily operation and maintenance records
 - D) Plant hydraulic characteristics

- 2) Fisheries (Aquatic) Habitat
 - A) Hydrographic maps of the reservoir and the tailwater areas, to include 500 meters downstream of the project
 - B) An aquatic habitat inventory, may include IFIM and HEP studies if required by the proposed project
 - C) A determination of the impact of plant operation on habitat availability and quality

- 3) Fisheries Data
 - A) Fisheries community inventory of the riverine and pond areas, to include endangered, threatened, and sensitive species
 - B) The adequacy of the any existing fish passage facility
 - C) The impact of plant operations on the existing fish passage structure
 - D) If the project proposes to study the facility entrainment/mortality problem, a two-stage study plan should be used to examine the extent of the problem: 1) A reconnaissance study to determine the gross extent of facility entrainment and mortality, which should include turbines and spillways; and 2) If necessary, a more intensive study to keenly determine facility entrainment and mortality of fish. Our guidelines for these studies are attached in Appendix 4.
 - E) Aquatic habitat management plans

- 4) Wildlife (Terrestrial) Habitat
 - A) Terrestrial and wetland habitat inventory
 - B) Determination of the impact of plant operation on habitat availability and quality
 - C) Forest management plans of the project area
 - D) Topographical maps which show all project lands

- 5) Wildlife
 - A) Wildlife community inventory of the riverine and pond areas, including endangered, threatened, and sensitive species
 - B) Wildlife management plans in the project area, as determined by MDNR personnel

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6) Recreation

- A) Inventory of recreational facilities in the project area, including written descriptions, maps, and diagrams of locations. This information will be used by MDNR to evaluate adequacy of facilities.

7) Water Quality

- A) All NPDES permits, Act 307, and Super Fund sites in the drainage basin should be identified
- B) All water management models and plans should be detailed
- C) The impact of the proposed project operation on water quality should be determined

8) Coastal Zone

- A) Federal and State Consistency must be determined under the Coastal Zone Management Act.
- B) Lands which fall within the Coastal Zone buffer should be identified.

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Project Operation and Engineering Information

Project Design Information

- 1) The present plant design for all facilities should include the following details:
 - A) Plant engineering designs
 - B) Type, number, kW, blade number, RPM, and design of turbines
 - C) Elevation, peripheral velocity, and diameter of the runners
 - D) Minimum and maximum blade clearance between runner and wicket gates for Francis Type Units, and runner and the ring for Kaplan Type Units
 - E) Cavitation at the plant
 - F) Project map which includes all lands, roads (including condition), and right of ways
 - G) An updated turbine output-water use and spillway/gate rating curves for all project components

Daily Operation and Maintenance Records

- 1) The present daily operation of facilities should include :
 - A) kW
 - B) Wicket gate openings
 - C) Efficiency
 - D) Hours of use of each unit
 - E) Bypass gate openings for the previous and current year, as well as low, average, and high water years
 - F) Use mean, minimum, and maximum daily data for kW, wicket gate openings, efficiency, each unit's hours of use, and openings of bypass gates. This information should be used to calculate weekly mean values as well as mean weekly minimum and maximum values.
- 2) A record for the last 5 years of plant outages and length of outages
- 3) Any plans for plant operation automation, construction, major maintenance, or plant retirement
- 4) An estimation of the longevity of the existing facilities including powerhouse(s), penstock(s), reservoir(s) capacity, dam(s)
- 5) All dam safety reports should be summarized and made available to MDNR.

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Project Hydrology Information

- 1) The daily fluctuation in the tailwater, any by-passed side channels, and reservoir should be reported for the previous year as well as average, high, and low water years. This should be reported in terms of discharge and elevation using mean, minimum, and maximum daily data to calculate weekly mean values, and mean weekly minimum and maximum values.
- 2) Monthly flow duration curves should be estimated for the river "without" plant operation and "with" plant operation for the assessment of minimum flow needs.
- 3) The operational compliance plan for all project operating conditions needs to be thorough and should include continuous (at least hourly basis) monitoring water level gages in the reservoirs, headwater, and tailwater areas. Specifications for all gaging equipment should be completely described and submitted along with the provisions to provide for both the establishment and maintenance of a new continuous monitoring USGS gage or the maintenance of one existing continuous monitoring USGS gaging at each operating facility of the project. Plans should also include procedures for calibration and maintenance of gages. All other site-specific needs as determined by MDNR should also be documented in the compliance plan.

Fisheries (Aquatic) Habitat Information

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Study Area

1. To include all reservoirs and stream reaches (including tributaries) from one-quarter mile above the high water level of the uppermost reservoir on the system to the downstream site of no project influence, as defined as follows:
 - A. Mainstem of the River- From a point one-quarter of a mile upstream of the normal high water mark of the impoundment and downstream to the normal high water mark of the dam on the river. If the project has acceptable data that indicates that project influence zone is less than the recommended zone, the zone may be adjusted to reflect these changes in influence zone boundary after consultation and concurrence from the MDNR.

Hydrographic Maps

1. Hydrographic maps of the reservoir, any de-watered river reach, and the tailwater areas (to include 500 meters downstream of the facility) are required of all sites with transects every 10 meters. If recent existing maps are available, data verification studies can be substituted for mapping with MDNR concurrence. Additional FERC study justification is in Appendix 1.

Maps should delineate the following habitat inventory data:

- A. Reservoirs - Predominant substrate (as classified using the Modified Wentworth Scale) and emergent and submergent plant beds (classified by dominant plant species complex) should be mapped on the hydrographic maps at all water levels. Other structure items such as logs, log complexes, and rock piles should also be denoted on the reservoir map.
- B. Tailwater areas - Predominant substrate (as classified using the Modified Wentworth Scale) and emergent and submergent plant beds (classified by dominant plant species complex) should be mapped on the hydrographic maps at all water levels. Other structure items such as logs, log complexes, and rock piles should also be denoted on the tailwater map.
- C. Other Project Impacted River Reaches - Predominant substrate, aquatic vegetation, and approximate mean depths should be indicated on river maps for all water levels.

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Aquatic Habitat Inventory

1. Comparative Riverine Habitat Studies - Comparative riverine habitat studies will be recommended at all sites with riverine tailwaters that will not be operated as run-of-river facilities and that have no by-passed river reaches. The objective of this study is to compare resource impacts of the proposed project operation(s) to run-of-river operations. IFIM studies will be recommended at all sites unless another methodology is accepted by the MDNR. Additional study justification is in Appendix 2.

The following guidelines should be followed in development of an IFIM study plan:

- A) The IFIM study plan will require close agency coordination on the following items:

- i. Study Purpose

- ii. Study Boundaries - The IFIM study boundaries should include all riverine tailwaters to the next lake or impoundment. In addition, we recommend that a pre-study be conducted determine the extent of downstream water fluctuations from each hydroelectric facility operations. This will be used to delineate modeling boundaries on the river.

- iii. Time Constraints –on dates for critical decisions and field studies.

- iv. Specific Study Objectives - Concurrence with MDNR needs to occur on the type of study and expected results. We suggest the following as an objective statement:

The objective of this study is to determine the optimal flow regime from the hydroelectric facility to protect and enhance the aquatic resources of the river system. The IFIM study should provide recommendations that, at a minimum, protect the instantaneous needs of the aquatic community and provide data on the habitat usability of the river system(s) under a number of alternative operational schemes, including the proposed peaking operation and the strict run-of-river (instantaneous inflow equals instantaneous outflow) modes.

- v. Target Species - We need to discuss the target species desired and come to an agreement on those species.

- vi. Methodology - After agreeing upon the target species, we need to determine what habitat suitability criteria are available, which curves will

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be used, if any modifications are needed, and what data is needed. Decisions will also need to be made jointly on which models will be used in the study. We recommend that the attached two-flow analysis guidelines be followed to examine peaking impacts (Appendix 3).

- vii. Hydrologic Baseline - After compilation of all available data on the river system, we need to jointly discuss and determine the "base" hydrologic conditions for present conditions.
- viii. Stream Segmentation and Study Area Selection - We need to scope the river system and determine the logical study boundaries for each segment from a macro and microhabitat perspective. We need to determine and agree where microhabitat and macrohabitat measures are to be taken.

B) We recommend that the IFIM scoping document be organized in the following manner:

i. Introduction - To include:

- Purpose of the study
- Study objectives
- Existing management objectives for each section of river
- Important background data
- Existing flow agreements

ii. Study Plan - To include:

- general approach
- Study area and reaches with detailed maps and reasoning

iii. Study Tasks - To include:

- Study area reconnaissance and macrohabitat segmentation
- Habitat characterization and reach selections
- Hydraulic data acquisition (includes transect selection and placement procedures with maps, candidate transect location, measurement methods and materials which include target measurement discharges, anticipated logistics and field activities schedule, acquisition and handling of field data)
- Hydraulic modeling approach (includes microhabitat simulations, evaluation species/life species and suitability criteria, models used and two flow analysis technique)
- Data analysis and reporting (includes model output composites and report preparation)

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- iv. Study Schedule
 - v. Study Plan Agreement
2. Comparative Reservoir Level Fluctuation Studies - Comparative Reservoir level fluctuation and habitat studies will be recommended at all sites that are not to be operated as run-of-river facilities. The study objective is to compare resource impacts of the proposed project operation(s) to run-of-river operations. Habitat Evaluation Procedures (HEP) methodology, to predict changes in fish community structure based on habitat changes, will be recommended at all sites unless another methodology is accepted by the MDNR. Additional justification is attached as Appendix 2.
 3. By-passed River Channel Minimum Flow Studies - On all projects that have by-passed river channels, we recommend that minimum flow studies be conducted on all by-passed river channels. IFIM studies will be recommended at all sites unless another methodology is accepted by the MDNR. Additional justification is attached as Appendix 2.
 4. All aquatic habitat management plans should be identified

Fisheries

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Aquatic Species Inventory

1. For all aquatic species, subdivide the systems by reservoirs and streams. Identify the relative abundance and species composition of each system using all available data sources which should include MDNR Fisheries, Michigan Department of Environmental Quality (MDEQ) Surface Water Quality Division, U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency, Scientific Publications, and Universities. If acceptable survey data is unavailable, the necessary surveys will be conducted according to MDNR standards.

Threatened, Endangered, and Sensitive Species

1. Species to include all Federal listed, proposed, candidate, endangered, or threatened species. The list should also include Federal species of management concern, State-listed endangered or threatened species, and State species of special concern
2. For all species, determine whether they are present and map their location if possible. If existing surveys are unavailable, new surveys should be conducted according to MDNR standards. Surveys should be limited to identifying those species likely to occur within the available habitat types.

Upstream Fish Passage Device Inventory and Guidelines

1. All currently installed fish passage devices, both upstream and downstream, should be documented with operational designs included.
2. The current use of all upstream and downstream fish passage facilities should be described and include the fish species and number using the facility for all years that data are available.
3. The current project impact on any upstream or downstream fish passage facility should be documented. Additional studies on the adequacy of the facility may be required on a site-specific basis.
4. Fish passage designs, which should include upstream and downstream passage as well as prevention of turbine entrainment, will be recommended at some facilities as elected by MDNR. All passage designs should be developed using the fish species of interest as determined by MDNR. We will recommend that all passage devices be evaluated for their effectiveness.

Downstream Fish Passage Guidelines

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1. We will recommend to FERC that plant operation minimize entrainment and subsequent turbine and spillway mortality of fish. The project can either immediately install protective devices to prevent entrainment and mortality or decide to determine entrainment and mortality via studies. We will recommend that all passage and protective devices be evaluated for their effectiveness along with minimum mitigation for any fish losses.
2. We recommend that the any turbine entrainment and mortality study follow the attached MDNR guidelines (Appendix 4). Additional justification for this study is provided in Appendix 5.

Woody Debris Transport and Management

1. We will recommend to FERC that the woody debris plan include procedures for:
 - A) Passing large woody debris and vegetative material collected near the project trashracks and log booms into each project's tailrace
 - B) Leaving currently existing instream and impoundment large woody debris unless it directly interferes with safe project operation
 - C) Installing instream or impoundment structures for fish habitat or addition of large woody debris to the river below the projects when opportunities arise.

Wildlife (Terrestrial) Habitat Information

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Study Area

1. For terrestrial species and associated habitat, include all lands within the project boundaries and influence zone.
2. For wetland and aquatic species, include reservoirs and stream reaches from one-quarter mile above the high water level of the uppermost reservoir on the system to the downstream site of no project influence, as defined as follows:
 - A. Mainstem of the River- From a point one-quarter of a mile upstream of the normal high water mark of the impoundment and downstream to the normal high water mark of the dam on the river. If the project has acceptable data that indicates that project influence zone is less than the recommended zone, the zone may be adjusted to reflect these changes in influence zone boundary after consultation and concurrence from the MDNR.
3. For fish-eating birds including, but not limited to bald eagles, ospreys, herons, and other colonial nesting birds, incorporate an area of one mile on either side of the stream reaches and reservoirs defined under item 2.A.

Terrestrial Habitat Inventory

1. Collect and map terrestrial habitat data using MDNR approved classification systems. Provide percentage and acreage of each habitat type in the application
2. Collect and map wetland habitat data using USFWS mapping system (Cowardin et al.). Provide percentage and acreage of each wetland type in the application
4. Identify all forest management plans and terrestrial management plans

Shoreline Management Plan

1. Create a detailed shoreline management plan for licensee-owned lands and easements abutting project waters (within 1000 feet of the high water elevation for lakes and within 300 feet of the high water elevation for streams) that are determined to be needed for project-related purposes, such as providing public access for recreation or protecting sensitive, unique, or scenic areas. The plan shall include, but need not be limited to:
 - (1) a description of those lands covered by the plan including a drawing or map showing their location relative to project facilities or project waters (those lands shall be included within the project boundary);

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- (2) for each parcel of shoreline covered by the plan, a description of how the land will be managed and used;
- (3) a critical habitat inventory of the shoreline;
- (4) development of strategies and methods to educate property owners and reservoir users about the beneficial values of shoreline vegetation and shallow water habitats;
- (5) a discussion of how the plan addresses the following considerations: selection of lands that are largely undisturbed and free from any observable past alterations that may have impaired their ability to provide the necessary protection and enhancement of wildlife and plant species; selection of additional lands to provide additional buffering capacity against adjacent land disturbances in ecologically sensitive areas; and selection of lands that would protect existing upper-canopy trees and their suitability for raptor use;
- (6) development standards which include a setback of 200 feet from ordinary high water mark for all structures except piers, boat hoists, and boathouses; shoreline vegetation removal in the 35 foot strip adjacent to the ordinary high water mark will be limited; no more than 30 feet in any 100 feet may be clear cut (clear cut zone is limited to 10 feet in width); only 30% of the vegetation between 35 and 75 feet of the ordinary high water mark may be removed; and require that land uses be screened as viewed from the water and that the scenic beauty of the shoreline be maintained
- (7) an implementation schedule.

The licensee shall prepare the plan after consultation with the Michigan Department of Natural Resources (MDNR), the U.S. Fish and Wildlife Service (USFWS), and the Wisconsin Department of Natural Resources (WDNR) and U.S. Forest Service (USFS) where applicable.

Wildlife

Wildlife Species Inventory

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1. For wetland and aquatic species, subdivide the reservoirs and stream reaches into segments. Identify the relative abundance (common, uncommon, absent) of species in each area. Species should include water birds (seasonal designations will be needed for migratory use), marsh birds and the following mammals: otter, mink, muskrat and beaver. In particular, efforts should be made to determine the number of furbearers, water birds, and marsh birds breeding in the project influence zone and the nest or den locations. All existing data bases maintained by MDNR, WDNR (where applicable), USFWS, EPA, Michigan Breeding Bird Atlas, and universities should be examined and data compiled for this section. If no surveys exist, then field surveys should be conducted according to MDNR standards.
2. The following information may be recommended to evaluate timber management or other changes proposed to terrestrial habitat depending upon the project characteristics:
 - a) The relative abundance of the following management indicator species: black throated green warbler, chestnut-sided warbler, eastern bluebird, pileated woodpecker, ruffed grouse, and white-tailed deer
 - b) The relative abundance of owls and raptors not previously identified as threatened or sensitive

Threatened, Endangered and Sensitive Species

1. Species to include all Federal listed, proposed, candidate, endangered, or threatened species. The list should also include Federal species of management concern, State-listed endangered or threatened species, and State species of special concern
2. For all species, determine whether they are present and map their location if possible. If existing surveys are unavailable, new surveys should be conducted during the reproductive season (e.g., nesting, flowering) appropriate to each species. Surveys should be limited to identifying those species likely to occur within the available habitat types.

Bald Eagle Information

1. Map both active and inactive nest sites

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2. Identify available habitat (described as relatively undisturbed areas with super-canopy trees)
3. Identify potential habitat areas within project boundaries, this will include areas where timber management could be used to develop appropriate habitat
4. Conduct a winter survey to determine over-wintering use and roost sites
5. Conduct a nest watch program during breeding seasons on at least two active nest sites per river system in order to determine the following information:
 - Extent of human disturbance to nest (identified by distance to nest site)
 - Food base (species and relative abundance)
 - Foraging locations on the reservoir or river systems
 - Roost sites, especially those used for foraging
6. For all other nest sites, including inactive nests, determine the extent of human disturbance by analyzing distances to roads, trails, rights of way, and other human activities

Recreation Information

Study Area

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1. To include all reservoirs and stream reaches (including tributaries) from one-quarter mile above the high water level of the uppermost reservoir on the system to the downstream site of no project influence, as defined as follows:
 - A. Mainstem of the River- From a point one-quarter of a mile upstream of the normal high water mark of the impoundment and downstream to the normal high water mark of the dam on the river. If the project has acceptable data that indicates that project influence zone is less than the recommended zone, the zone may be adjusted to reflect these changes in influence zone boundary after consultation and concurrence from the MDNR.
2. Project county areas for certain sections of the off-site inventory. This should include surrounding counties.

Data Needs

- 1) For the above project area, the following information is needed for each recreation site (developed and undeveloped):
 - a) Map location
 - b) Map key should indicate:
 - 1) Type of facility (see list below)
 - 2) Provider of facility (State, Company, Private)
 - 3) Size of facility (area, capacity)
 - 4) Level of use (heavy, light)
 - 5) Condition of site
 - c) Summary table of facility type, condition, and provider
 - d) Non-company facilities in the project boundary and their relationship (if any) to the company
 - e) Commercial operators in the project boundary (e.g., liveries, bait shops, campgrounds serving the project area) and their name, location, size, etc.
- 2) A general description of relevant off-site recreation facilities within the county or counties where the project is located, along with a table of numerical totals of facilities and a description of major off site facilities. This description is for the purpose of examining overall recreational use, availability of similar recreational opportunities, and recreational experience demand of the facility influence zone.

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- 3) Identify any recreation plans that the licensee has written for the project.
- 4) Identify and summarize all existing data on recreational resources in the project influence area. Data sources include MDNR, Wisconsin Department of Natural Resources (WDNR) where applicable, U.S. Fish and Wildlife Service (USFWS), U.S. Environmental Protection Agency (EPA), local governments, and universities.
- 5) A study will need to be conducted to determine the present and future use of all recreation facilities.

Recreation Facility Type Categories

Shore fishing site
Fishing dock or pier
Boat launch with ramp
Carry-in small boat access
Canoe portage
Beach for swimming or sunbathing
Trail (ORV, hiking, horse, fishing, other)
ORV/snowmobile area
Picnic sites
Campsites
Playgrounds
General use site (use for a variety of purposes)
Support facilities (rest rooms, fish cleaning stations etc.)
Other

APPENDIX 1. MDNR Justification for Mapping Studies

The following is the Michigan Department of Natural Resources (MDNR) justification for the recommended habitat mapping and hydrographic study at your facilities. This document fulfills the requirement of Subpart B, Section 16.8

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(i)-(vi) of the recently adopted FERC rules governing resource agency recommendations for necessary studies and information relating to a recommendation for the comparative habitat study.

Data Recommended For Analysis of Issue by MDNR

1. Provide quantitative data that documents the extent of each habitat type in the tailwater and the reservoir. If the above information is not available, then the applicant should arrange to collect the information.

Determination Basis of Resource Issue

Hydropower operations impact our water resources by: 1) altering normal stream flows for generating purposes; 2) de-watering river channels by diversion or peaking operations; and 3) fluctuating reservoir levels for either peaking operations or for storage purposes. All of the above influences could be found at your project. The impacts of hydro operations that potentially could exist at your facility include the flushing of riverine reaches by generating with flood flows during the peak power periods and de-watering of riverine reaches at other periods. The de-watering of riverine habitat reduces the algae and aquatic plant life which are important as food for aquatic insects and which provide important fish nursery areas. Further, it reduces fish growth and survival by reducing available habitat and stranding fish, and changes the benthic invertebrate community to smaller, less useful, fish foods. The fluctuations cause downstream erosion and sedimentation that destroys fish habitat and can disrupt fish migratory patterns. In addition, hydro operations cause reservoir fluctuations that de-water and disrupt fisheries habitat, which could be up to 3 foot on a daily basis, in the same fashion as the tailwater habitats.

MDNR needs quantitative habitat data to examine the severity and extent of habitat loss under any proposed operational mode. Without a baseline map of depth contours and habitat types in the impoundments and tailwaters, it is impossible for our agency to determine the impacts of the present or proposed operational modes. These maps will provide the background data for recommendations on operations at the projects that will adequately protect this river system.

Fisheries Goals and Objectives

MDNR's overall aquatic habitat protection goal is:

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To minimize and mitigate the negative impacts of hydroelectric facilities by operating these projects in a fashion that offers aquatic resources and users near natural riverine and reservoir conditions, protects and maintains aquatic environments and fish communities and rehabilitates those now degraded.

- 1) Riverine tailwater facilities to be operated in a run-of-river mode
- 2) Reservoir tailwater facilities to be operated with minimal tailwater and headwater fluctuation
- 3) Bypassed and/or diverted river facilities to be operated in a manner which maintains healthy aquatic resources of the river

Michigan's river systems provide a significant fishery and public trust resource. The fisheries resource includes important populations of game fish which include largemouth bass, smallmouth bass, northern pike, walleye, bluegills, yellow perch, black crappie, rock bass, channel catfish, suckers (including redhorse) and bullheads. The habitat availability for aquatic species is limited by the operational mode of project.

Our specific fisheries habitat goal at your facility is to protect and enhance the fish communities in the river and tributaries by maximizing and stabilizing available aquatic habitat. In our agency's professional opinion, this is best accomplished by recommending run-of-river-operating conditions. Run-of-river is defined as instantaneous inflow to the project impoundment equals instantaneous outflow downstream of the project tailwater.

Study Methodology Appropriateness

The recommended study methodologies for predominant habitat type inventory and hydrographic maps of the impoundment and tailwater are essential. This baseline data will allow MDNR the opportunity to examine the impacts of water development and to recommend further study plans if necessary. This standard baseline information will also produce documentation of habitat types and depth contours that are needed to analyze the impacts of hydro projects.

Study Data Utilization

This study will provide initial data on the potential availability of fish habitat under a range of operating modes. This information will serve as qualifying data for our

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recommendations regarding IFIM and HEP study designs, if necessary. Ultimately, this data will allow for the determination of the operational mode under which the project will best protect the aquatic environment.

Our goals for protection and enhancement of the fish community call for the prevention of resource damage from hydroelectric generation and the optimal long term maintenance of the riverine fish community by maximizing and stabilizing the amount of available aquatic habitat. These data would provide the necessary background data to make the appropriate project operation recommendations to protect aquatic habitat in this river system.

APPENDIX 2. MDNR Justification for Comparative Habitat Studies

For those projects that propose peaking operation, the following is the Michigan Department of Natural Resources (MDNR) justification for the recommended

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comparative habitat studies using Instream Flow Incremental Methodology (IFIM) and Habitat Evaluation Procedures (HEP). This explanation fulfills the requirement of Subpart B, Section 16.8 (i)-(vi) of the recently adopted FERC rules governing resource agency recommendations for necessary studies and information relating to a recommendation for the comparative habitat study.

Data Recommended For Analysis of Issue by MDNR

1. Provide quantitative data that documents habitat availability in the tailwater and the reservoir under the proposed operational mode, run-of-river, and other operational modes. If the above information is not available, then the applicant should arrange to collect the information.

Determination Basis of Resource Issue

At a minimum, hydropower operations impact our water resources by: 1) altering normal stream flows for generating purposes; 2) de-watering river channels by diversion or peaking operations; and 3) fluctuating reservoir levels for either peaking operations or for storage purposes. The impacts of peaking and semi-peaking operations include the flushing of riverine reaches by generating with flood flows during the peak power periods and de-watering of riverine reaches at other periods. The de-watering of riverine habitat reduces the algae and aquatic plant life that are important as food for aquatic insects and provide important fish nursery areas. Further, it reduces fish growth and survival by reducing available habitat, stranding fish, and changing the benthic invertebrate community to smaller, less useful, fish foods. The fluctuations cause downstream erosion and sedimentation that destroy fish habitat and can disrupt fish migratory patterns. In addition, peaking operations cause reservoir and tailwater fluctuations (up to 3 foot per day), resulting in de-watered and disrupted fisheries habitat.

The resource agencies have requested that all hydro projects operate in a run-of-river mode, defined as instantaneous inflow equals instantaneous outflow, with essentially no pond elevation fluctuation. If you decide to operate your project in a peaking mode, the MDNR will need quantitative habitat data to examine the severity and extent of habitat loss under the proposed operational mode of semi-peaking. Both IFIM and HEP allow for meaningful comparisons of operational strategies and will provide the background data for recommendations on the project operation that will adequately protect this river system.

Fisheries Goals and Objectives

The Michigan Department of Natural Resources' overall aquatic habitat protection goal is:

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To minimize and mitigate the negative impacts of hydroelectric facilities by operating these projects in a fashion that offers aquatic resources and users near natural riverine and reservoir conditions, protects and maintains aquatic environments and fish communities and rehabilitates those now degraded.

- 1) Riverine tailwater facilities to be operated in a run-of-river mode
- 2) Reservoir tailwater facilities to be operated with minimal tailwater and headwater fluctuation
- 3) Bypassed and/or diverted river facilities to be operated in a manner which maintains healthy aquatic resources of the river

Michigan's river systems provide a significant fishery and public trust resource. The fisheries resource includes important populations of game fish which include largemouth bass, smallmouth bass, northern pike, walleye, bluegills, yellow perch, black crappie, rock bass, channel catfish, suckers (including redhorse) and bullheads. The present habitat availability would be limited by any proposed peaking operational mode at the project.

Our specific fisheries habitat goal at your facility is to protect and enhance the fish community in the river and its tributaries by maximizing and stabilizing available aquatic habitat. This is best accomplished by recommending run-of-river-operating conditions. Run-of-river is defined as instantaneous inflow to the project impoundment equals instantaneous outflow downstream of the project tailwater

Study Methodology Appropriateness

The recommended study methodologies IFIM and HEP are commonly used techniques to examine the impacts of water development. Both methodologies will produce documentation on habitat availability under a range of operational strategies that are needed to analyze the impacts of these facilities.

Study Data Utilization

This study will provide data on the potential availability of fish habitat under a range of operating modes that will provide for meaningful comparisons of the options available to the resource agencies and the city. These data will provide the basis for our recommendations on which operation of the project will best protect the aquatic environment.

Our goals of protection and enhancement of the fish community would be furthered by the prevention of resource damage from hydroelectric generation

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and provide for the optimal long term maintenance of the riverine fish community by maximizing and stabilizing the amount of available aquatic habitat. This study would provide the necessary data to make the appropriate project operation recommendations to protect aquatic habitat in this river system.

APPENDIX 3. MDNR IFIM Two Flow Analysis Guidelines October 1990

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Peaking operations cause impacts at both the low and high flow events. Low flow events mainly limit habitat by reducing both stream depth (de-watering habitat and stranding organisms) and water velocity. High flow events mainly limit habitat by increasing velocities beyond that used by organisms. The use of optimal flows from HABTAT and/or HABTAV for benthos and fish habitat only addresses low flow impacts, thus two flow analyses are needed to examine operational impacts at low and high flows. The following guidelines are for two-flow peaking analysis as discussed in Milhous et al. (1989).

Recommended Analytical Methodology

The intent in this type of study is to: 1) determine the actual peaking impact when movements ranges are known or to bracket the peaking impact when the actual movement ranges for species in question is unknown; and 2) compare the peaking operation to run-of-river conditions. Run-of-river should be simulated using the average daily discharge at peaking operations. The bracketing should be done by documenting the most conservative and liberal estimate of peaking impacts from both life stage (the movement question) and study area perspectives (independence of study reach question).

Two approaches to handle movement concerns for individual life stages should be used and are dependent upon whether the life stage or species was classified as a mobile or non-mobile. Non-mobile life stages and species are benthos, spawning and fry. Juvenile and adult life stages are should be classified as mobile. Recreational activities should also be classified as mobile. These approaches follow the procedures in Milhous et al. (1989) and communications with Milhous and Bartholow (personal communication, 1990). These approaches are described below:

Non-mobile species and life stages Peaking impacts on non-mobile life stages should be determined using the HABEF program. This program uses output files from HABTAT or HABTAV and examines WUA for each cell at both the generation and base flow. The lowest WUA of the two flows is then assigned to the cell for the summation of WUA for the reach. This approach assumes that no migration or movement occurs between cells, a realistic assumption for the non-mobile life stages and species. Run-of-river WUA should be determined using HABTAT or HABTAV results for the particular flow of interest. WUA percentage loss estimates for both the reach and whole study area should be calculated by dividing the appropriate peaking WUA (as determined by HABEF) by the appropriate run-of-river WUA (as determined by HABTAT) at each possible peaking discharge and multiplying these figures by 100.

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Mobile life stages The impacts on mobile life stages with unknown home ranges should be determined using a combination of HABEF output and a comparison of whole reach generation and base flow WUA from HABTAT or HABTAV. The impacts should be bracketed by presenting the results of the two extremes of movement which are: 1) no migration between cells or reaches as modeled by HABEF; and 2) complete migration through the entire reach as modeled by comparing HABTAT or HABTAV WUA results for generation and base flow for each case and using the minimum value of the two to represent the peaking impact. The actual impact has to be somewhere within this impact window between these two scenarios as it is unlikely that juvenile and adult fish will not move at all in response to changes in stage and flow, and it is equally unlikely that fish will travel through an entire reach multiple times per day in response to the changes in stage and flow.

The individual reach WUA estimate of peaking impacts that allows total movement within the reach should be determined using the minimum of generation and base flow WUA from HABTAT or HABTAV for a given reach. The no migration within a reach case WUA should be determined using HABEF output for a given reach as described above for the non-mobile species and life stages. Individual reach run-of-river WUA and percent loss for a individual reach should be determined as described above for the non-mobile species and life stages.

When the actual home ranges are known and are not greater than the cross sectional distance of the transects, then HABTAM can be used as the best estimate of the peaking impact. Individual reach run-of-river WUA and percent loss for a individual reach should be determined as described above for the non-mobile species and life stages.

Literature Cited

Milhous, R.T., M.A. Updike, and D.M. Schnieder. 1989. Physical Habitat Simulation System Reference Manual - Version II. Instream Flow Information Paper No. 26. U.S. Fish and Wildlife Service Biological Report 89 (16). v.p.

APPENDIX 4. MDNR Fish Entrainment and Turbine Mortality Study Plan Guidelines

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The Michigan Department of Natural Resources (MDNR) has determined that a study to quantify the magnitude of potential turbine-induced injury or mortality on the fishery resources is needed. The overall study has been broken down into two main components: monitoring fish entrainment and mortality rates and controlled turbine mortality experiments. The fish entrainment and mortality rate study (Phase 1) should be conducted initially. Based on the results of Phase 1 studies, the need for a more formalized turbine mortality study (Phase 2) will be determined. A phased approach to addressing the turbine mortality issue will preclude a potential applicant from conducting a, perhaps, unnecessary turbine mortality study. The MDNR may accept a potential applicant's proposal to conduct Phase 1 and Phase 2 studies concurrently, however. The MDNR may recommend that components of the studies be redone if the studies are not conducted as agreed to or if the results are not representative.

The potential applicant may opt to implement fish protective measures at the outset of after Phase 1 studies. In this case, the potential applicant will be required to conduct studies to develop appropriate mitigation measures. In all cases, licensees will be required to monitor the effectiveness of fish protective or mitigation measures once they are implemented. These studies will need to be coordinated with the MDNR.

The guidelines presented below identify the critical elements that must be included in a detailed plan of study developed by the potential applicant. Specific details, such as design of sampling equipment, sampling schedules, etc., will require coordination with the MDNR. The final study plan must be approved by the MDNR before studies are begun.

This document contains exact technical specifications that should be used to design an entrainment study. These specifications should be used in obtaining bid and study designs from consultants. These specifications are minimum specifications subject to discussion only when site-specific conditions warrant.

Phase 1 - Assessment of Fish Entrainment and Preliminary Mortality Rates

All entrainment studies should be designed to meet the following specific data objectives:

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1. Estimates of the total number of each fish species (greater than one and a half inches) passing through the project during the study;
2. Estimates of the size distribution of fish entrained;
3. Estimates of the vertical and horizontal distribution of fish passing through the intake in one meter increments (pertains to hydroacoustic studies only); and
4. Estimates of the daily and hourly fish passage numbers through each turbine.

When an applicant is requested to perform an entrainment study, the protocol should be as follows:

1. Agency study specifications (this document) are provided to the applicant. MDNR and applicants may hold initial meetings to clarify the design or address specific concerns. Applicants should use the agency specifications as basis for obtaining consultants bids or scopes of work.
2. Applicant or consultant perform proof-of-concept study (POC) to verify that the procedures, equipment, and analyses proposed by the consultant will, in fact, provide the information promised
3. MDNR and applicant meet to review POC study results and develop scope of work for the entrainment study
4. Applicant conducts the entrainment study according to an agency-approved scope of work

Proof of Concept Study (POC)

To verify that the proposed study design will provide the data required for evaluating entrainment, a "proof-of-concept" (POC) study is required. The purpose of the POC is to determine the appropriate methodology to use at the site to determine entrainment. If hydro acoustics are proposed, then the POC should be designed to determine whether entrainment can be accurately estimated using this methodology and include tracking of live test fish. Ground truth netting should be used in the POC study to show an initial relationship between hydro acoustic sampling and tailwater netting. If a netting only study is proposed, the POC should show that entrainment can be accurately estimated using this method.

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The POC study should be conducted for at least a two-week period to verify the applicability of the methodology selected. This study must be completed and reviewed by MDNR prior to the initiation of the scope of work. Each POC study must specifically address all of the technical and design parameters that are listed below. The procedures used must be fully documented.

A test-netting program must be conducted over a two-week period. This should include the installation and monitoring of the nets described below, a net efficiency study, and a visual evaluation by a SCUBA diver to confirm that the net support system is adequate and that the tailrace area is free of any obstructions that could tear the net or effect net fishability. Measures should be taken to prevent downstream infiltration of fish in areas where the net seal is not sufficient. In particular, the bottom seal should be examined as this is the area where infiltration problems usually occur.

The tailwater net efficiency study should include the introduction of at least 150 marked fish of various sizes and species into the turbine(s). A recapture rate of at least 70% of these fish is necessary to show that the nets are fishing properly. MDNR representatives should be notified prior to this test so they may observe and evaluate the operation.

Actual Entrainment Study

The following specific technical and design parameters must be incorporated into all studies. If site-specific conditions warrant the modification of these parameters, full justification and details of alternative methods must be provided to the MDNR. The MDNR must approve any deviation from the original plan of study prior to the start of the study.

If a hydro acoustic assessment is proposed:

1. Transducers should be placed so that at least 50% of the intake openings in all turbine bays that are sampled. Each transducer should operate for a period of no less than thirty minutes every hour. Near and far field dead zones must be fully measured and accounted for in consideration of the 50% coverage and vertical distribution requirements. Monitoring must be conducted 24 hours a day for at least one full year.
2. Single beam transducers should be used because they are less sensitive to noise and provide wide coverage. However, one dual beam transducer per site is needed to develop a target strength distribution and effective beam angle.
3. The pulse width used should be 0.5 milliseconds or less

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4. A scientific echo sounder with a frequency of at least 400 kHz should be used
5. An accurate 40 log R Time Varied Gain (TVG) must be used to account for range-related signal loss
6. The echo signal processor-sampling rate must be no less than 15,000 samples per second
7. The pulse repetition rate must be 10-15 pulses per second to ensure that targets will be fully tracked
8. All transducers and equipment will be properly calibrated. The actual equipment used in the study must be calibrated using standard Naval Lab hydrophones before and after the study. If the study lasts more than one year, this calibration should be conducted annually. In situ calibration should be conducted at the start and end of the study as well as every three months during the study. This calibration consists of cable and transducer impedance measurements, TVG shape, and standard target return. All calibration measurements must be maintained and reported with the study results.
9. Studies must use the echo-counting analysis technique unless the proportion of multiple targets exceeds 5%. Echo integration techniques are not recommended and are rarely necessary.
10. All data extrapolations and calculations must use the effective beam width as measured at calibration based on the target strengths appropriate for the species and sizes of fish expected to be seen at that site. Calculations based on manufacturers nominal beam widths are not acceptable.
11. Instrument specifications must be provided to the MDNR and copies of all equipment manuals must be available upon request.
12. Target-tracking/recognition processing can be used to differentiate fish from noise and debris. All tracking parameters, including filters must be agreed on up front in the scope of the work. In situ field measurements of representative fish targets should be conducted as part of the POC study.
13. A direct fish-counting fish flux estimation procedure is recommended because it directly incorporates target tracking. However, a mean density analysis procedure may be used if acceptable target recognition

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- adjustments can be incorporated. In situ field trials may be needed to determine the efficacy of the two methods.
14. Target strength distributions and length relationships used to develop length distributions and effective beam width calculations must be fully documented. In situ lab measurements of batches of representative species and size fish should be conducted as part of the POC study. Correct all-aspect equations should be used where appropriate.
 15. Site-specific noise levels must be adequately measured and mapped for each turbine bay. This should be conducted as part of the POC study. These should be incorporated into transducer placement plans and detection level estimates. The minimum effective detection threshold should be a signal return corresponding to a fish 1.5" in length.
 16. All data extrapolation procedures must be fully documented prior to study initiation and use statistically valid procedures.
 17. All hydro acoustics sampling must be accompanied by an appropriate level of tailwater netting (see below) to determine size ranges and species composition of fish seen in the hydro acoustics.
 18. Hydro acoustics entrainment estimates must be correlated to net catch. Discrepancies suggest a design or configuration deficiency and should be addressed prior to study start. Calculations must be done at a minimum on a monthly basis with analysis of hourly counts on the time step, so those problems can be detected and corrected. These calculations should be included in the bimonthly reports.

Criteria for netting:

1. If a netting only study is proposed, at least 72 hours of netting at each unit should be done each week during the ice-free period (April-October). During winter months (November-March), 72 hours of sampling should be conducted on a biweekly basis assuming safe sampling conditions exist. If netting is done to ground truth hydroacoustics, a minimum of 24 hours should be done each week, April-October, and 24 hours biweekly, November-March. Sampling effort should be stratified on a weekly basis to make sure there is adequate coverage of all time periods.
2. The recovery net(s) should be constructed of dark colored (to minimize fish avoidance) 1/4 inch bar mesh, knotless nylon, with a removable live box attached to the cod end of the net. A fyke net should be incorporated into the net, near the live box, to prevent escapement. The effects of the

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recovery net(s) and live box on the mortality or injury of fish must be determined through suitably designed experiments. Divers should inspect all nets to ensure nets are fishing according to specifications. Nets should be appropriately marked immediately following inspection so that proper placement can be gauged each time the net is installed.

3. The recovery net(s) should sample the entire turbine discharge. A marked fish study should be conducted to determine the capture efficiency of the recovery net(s) and to obtain preliminary turbine mortality estimates. The capture efficiency of the net(s) must be quantified by releasing known lot sizes of marked live and dead fish at the intake. At least two capture efficiency/turbine mortality bouts should be done in addition to the bout conducted during the POC study. Species should be determined in consultation with the MDNR. The capture efficiency of the recovery net(s) must be based on the release and subsequent recovery of marked live and dead fish. Preliminary estimates of turbine mortality will be based on the release of marked live fish; live fish used in the preliminary turbine mortality study may be used concurrently as part of the study to quantify capture efficiency of the recovery net(s). The two size classes of each species, juvenile and adult, as defined in consultation with the MDNR, should be used. Three groups of fish of each species and size group are needed for these studies: 1) a control group of 10 fish per species and size class to examine handling and marking mortality, 2) a net control group of 10 fish per species and size class to examine net mortality, and 3) a test group of 50 fish per species and size class to examine turbine passage and net efficiency. Fish may be of hatchery, wild, or commercial catch origin.

Suitably designed assemblies to introduce live and dead fish at the turbine intake must be used. Fish must be released at an appropriate location within the intake chamber to ensure entrainment of all released fish.

All fish used in the marked fish studies should be held for a minimum of 48 hours to determine latent mortality.

4. If more than one operational turbine unit exists, selection of the units to be sampled should be done through consultation with the MDNR, but with the overall goal of estimating entrainment to $\pm 10\%$.
5. Installed nets should be flushed before the tests begin to remove as many "resident" fish as possible from the draft tube/tailwater area.
6. The species, size, and condition (live, dead, or injured) of all captured fish should be recorded. A randomly selected 10 percent of all fish used in the marked fish studies should be examined for internal injuries. Voucher

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samples of each species captured should be preserved so that MDNR can verify species identifications.

For all studies:

1. Environmental variables - data that should be recorded during the collection of each sample include a total river discharge (in cubic feet per second), percent gate opening (load level) and discharge (in cfs) of each sampled unit and of other operational turbine units, water temperature, dissolved oxygen, and transparency (Secchi disk), and other variables as identified by the MDNR. Also a velocity vs. depth profile to include vertical and horizontal velocity profiles should be obtained from directly upstream of the trash racks during low, average, and high water discharges.
2. Data analysis - a description of all statistical tests proposed for data analyses, including assumptions and how such assumptions will be addressed, significance levels, confidence levels, etc. must be provided and approved by the MDNR prior to study initiation.
3. Reports
 - A. Written progress reports should be provided to the MDNR on a bimonthly basis throughout the study period, and should include a description of any intentional or unintentional deviations from the approved study plan.
 - B. Reports should contain the following data:
 1. Hydro acoustic data
 - a. Amount of time sampled by day and explanations of any down time in sampling
 - b. Total daily fish passage
 - c. Daily fish passage by hour
 - d. Fish passage by location in the water column and across the intake structure
 - e. Fish passage by size
 2. Netting data
 - a. Amount of time sampled by day and explanation of any down time in sampling
 - b. All fish data should be broken down by species and should include numbers and size (length)

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- c. Data should be presented to on an hourly, daily, monthly and annual basis, and by net location.
 - d. All fish with external and internal turbine passage damage should be documented
3. Environmental and Plant Parameters
- a. Daily mean and hourly river flow in cubic feet per second (cfs)
 - b. Daily mean and hourly river temperature (°F) and dissolved oxygen (mg/l)
 - c. Daily mean and hourly headwater level
 - d. An hourly description of plant operation (units operating, each unit's discharge, % gate opening and Kw)
 - e. A daily summary of weather
- C. A final study report is to be submitted to the MDNR within three (3) months after completion of the study.
- D. The MDNR will provide written comments within three (3) months after receipt of the final report and will include any recommendations for further study, i.e., Phase 2, or for the need of appropriate fish exclusion or mitigation measures.

Phase 2 Study- Assessment of Turbine Mortality and Injury to Fish

This study is designed to develop intensive data on actual turbine-induced injury and mortality, based on the release and recovery of known lot sizes of marked

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test and control fish. Phase 2 studies are needed to more accurately quantify the occurrence and extent of turbine-related impacts to entrained fish.

1. Fish species of concern - target species and sizes to be studied will be determined through further consultation with the MDNR.
2. Sampling equipment
 - A. Suitably designed assemblies to introduce test and control fish at the turbine intake and discharge must be used. Test fish must be released at an appropriate location within the intake chamber to ensure entrainment of all released fish.
 - B. Total recovery net(s), if used, are to be located in the tailrace(s) as described above.
 - C. Ichthyoplankton sampling equipment details will be provided by the MDNR if ichthyoplankton studies are deemed necessary.
3. Sampling protocol
 - A. Fish injury and mortality experiments should be appropriately frequency as determined through consultation with the MDNR. In addition, the experimental design should include provisions for adequate sample sizes and an adequate number of replicates. Experiments should be conducted over the full range of normal project operating conditions, e.g., peak and off-peak.
 - B. Live test and control fish selected from the same lot of fish should be acclimated to the project water for at least 24 hours. A third group of fish not subjected to the test and control procedures, selected from the same lot of control fish, should be held separately in holding cages in the tailrace to permit an assessment of non-test impacts.
 - C. The effects of the fish introduction assemblies, the recovery net(s), and fish marking techniques (e.g., fin clipping, dye immersion) on the injury and mortality of test and control fish must be determined.
 - D. The condition of captured fish should be categorized according to the following criteria.
 - Live with no visible external injury
 - Live with obvious external injury
 - Dead with no visible external injury
 - Dead with obvious external injury

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Live test and control fish (with and without apparent external injury) recovered from the recovery net(s) should be held 48 hours in suitably designed holding cages secured in the tailrace to determine latent mortality of fish. Fish should be segregated by species and size to minimize stress and predation.

- E. The number, species, condition, and size of all fish released and recovered in each trial must be recorded.
- 4. Environmental variables - see above
- 5. Data analysis - see above
- 6. Reports - see above. The MDNR will provide written comments within three (3) months after receipt of the final report and will include any recommendations for the need for appropriate fish exclusion or mitigation measures.

APPENDIX 5. MDNR Turbine Entrainment and Mortality Study Justification

The following is the Michigan Department of Natural Resources (MDNR) justification for the recommended turbine entrainment and mortality study at your facility. This document fulfills the requirement of Subpart B, Section 16.8 (i)-(vi)

MICHIGAN DEPARTMENT OF NATURAL RESOURCES RECOMMENDED
REVIEW CRITERIA AND STUDY GUIDANCE
FOR THE FEDERAL ENERGY REGULATORY COMMISSION LICENSING PROCESS
February 4, 2003

of the recently adopted FERC rules governing resource agency recommendations for necessary studies and information relating to a recommendation for a standard turbine mortality/entrainment study.

Data Recommended For Analysis of Issue by MDNR

1. Provide quantitative estimates of the number, species composition and size distribution of fish being entrained at the project; or acceptable quantitative estimates of the above parameters from a comparable project; or acceptable quantitative evidence that installed protective devices are preventing fish entrainment.
2. Provide quantitative estimates of the mortality rate of fish being entrained at the project and the source of the mortality (turbine mortality, impingement on intake screens, etc.); or acceptable quantitative estimates of the above parameters from a comparable project; or acceptable quantitative evidence that installed protective devices are preventing fish mortalities.

If the above information is not available, then the applicant should arrange to collect the information using recommended survey procedures provided by the MDNR.

Determination Basis of Resource Issue

Numerous studies have been conducted to determine the extent of fish entrainment at hydroelectric projects nationwide with many of them summarized in Eicher et al. 1987. Unfortunately, most of these studies have been conducted at West Coast facilities and deal with migrating salmonid smolts. A number of entrainment studies have also been done on the east coast, targeting on anadromous species such as shad, striped bass, alewife, blueback herring and Atlantic salmon. These studies have shown that mortalities can be significant and range between 5-90% per facility. Very few entrainment studies have been done in the Midwest, where the hydroelectric facilities and their design, fish community composition and fish sizes are very different from those examined in the literature. Thus, little is known concerning turbine entrainment and mortality in the Midwest.

In the past, many fisheries biologists felt that the fish species indicative of Midwestern rivers were fairly sedentary and did not move long distances. These "resident" fish have recently been found to move long distances putting themselves at risk from turbine mortality. Studies by WDNR personnel on walleye in the Mississippi River, smallmouth bass in the Embarrass River, and channel catfish in the lower Wisconsin River all have shown movement of each of these species in excess of 30 miles over one year. In addition, studies on the

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February 4, 2003

threatened lake sturgeon in the Menominee River by Tom Thuemler have shown yearly movements of at least 20 miles with some radio tagged fish moving through hydroelectric facilities.

Summaries of the few recent entrainment studies on Midwestern rivers have shown large amounts of movement through hydroelectric facilities. The Morrow Dam Study, using tailwater netting, on the Kalamazoo River in Michigan estimated 45,987 fish passing the facility consisting of 21 species, ranging in size from 1.8 to 32.4 inches, in 6.5 months of sampling. Hydro acoustic studies at the Park Mill facility on the Menominee River showed daily movements of from 216 to 10,017 fish and hydro acoustic/netting studies at the Vanceburg hydroelectric plant on the Ohio River estimated hourly movement at from 282 to 6,000 fish.

The magnitude of resident Midwestern fish movements, available Midwestern data on entrainment and the wide range of known fish mortalities have led us to determine that turbine entrainment and mortality occurs at our facilities. Legally, all fish are property of the State of Michigan, under Public Act 165 of 1929 and any fish killed by any non-legal means are to be compensated for. Therefore, we are requesting a turbine entrainment and mortality study be conducted at your facility to determine the nature and degree of mortality, and to determine the necessary mitigation for those losses.

Fisheries Goals and Objectives

The overall Michigan Department of Natural Resources' goal on hydroelectric facility entrainment and mortality is:

To minimize and mitigate for the loss of fish at every hydroelectric facility from either turbine or spillway passage to protect and maintain fish communities, and rehabilitate those now degraded.

Michigan's river systems provide a significant fishery and public trust resource. The fisheries resource includes important populations of game fish which include largemouth bass, smallmouth bass, northern pike, walleye, bluegills, yellow perch, black crappie, rock bass, channel catfish, suckers (including redhorse) and bullheads. Our fisheries goal in respect to entrainment and mortality at your facilities is to protect and enhance the fish community in the river and its tributaries by minimizing and mitigating for fish losses from hydroelectric facility entrainment and mortality.

Study Methodology Appropriateness

In order to adequately determine turbine entrainment and mortality a direct sampling system is needed. The joint agency, MDNR, WDNR and the U.S. Fish

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February 4, 2003

and Wildlife Service, sampling guidelines use a two-phase approach. Phase I is designed to determine entrainment and to estimate the magnitude of mortality. If mortality is found to be a problem then more detailed mortality studies are recommended as part of Phase II. Our hope and intent is that most of the studies should stop at Phase I, instead of requiring both phases to be done at once.

This overall methodology is preferable and less costly than trying to determine whole system effects. Whole system effects would require detailed and long-term population dynamics of each member of the fish community. Turbine entrainment and mortality data would still need to be collected and compared to natural mortality and year class strengths. By using just direct sampling techniques, mitigation measures can be more easily determined, and the very large and costly sampling effort can be avoided. This overall methodology also follows the methodology the State of Michigan uses to determine mitigation for fish kills. For example, if farmer X kills fish in drain A, we require direct compensation for those fish killed not a river system wide impact statement as these fish are property of the State of Michigan killed in an illegal method. We view turbine mortality as a chronic fish kill situation.

This overall methodology has been used before in numerous turbine mortality studies including Morrow Pond, Park Mill and Vanceburg studies. The actual methodologies recommended, hydro acoustics and tailwater netting, are commonly used as can be seen in the review by Eicher et al. (1987).

Study Data Utilization

This study will provide data on the numbers entrained and the mortality of each member of the fish community of the river and its tributaries at your hydroelectric facility. These data will then be converted to a mitigation value by either a lost angler day determination or some other acceptable technique. These mitigation values will be used to determine if the problem is severe enough to require screening, which is always an alternative to the study, or some other mitigation to replace the lost resource value.

Our goals of protection and enhancement of the coolwater fish community would be furthered by the replacement of lost resource values from hydroelectric generation if the losses are not severe enough to warrant protective devices or the complete exclusion of fish, by protective devices, if the losses are significant. Thus, no net loss of the fisheries resource value would occur in either case because of the results of this study.

Literature Cited

MICHIGAN DEPARTMENT OF NATURAL RESOURCES RECOMMENDED
REVIEW CRITERIA AND STUDY GUIDANCE
FOR THE FEDERAL ENERGY REGULATORY COMMISSION LICENSING PROCESS
February 4, 2003

Eicher, G.J., M.C. Bell, C.J. Campbell, R.E. Craven and M.A. Wert. 1987.
Turbine Related Fish Mortality: Review and Evaluation of Studies. Electric
Power Research Institute Report No. AP-5480.

Constantine Hydroelectric Project (FERC Project No. 10661) Relicensing Pre-Application Document Information Questionnaire

Indiana Michigan Power Company (I&M) is the Licensee and operator of the Constantine Hydroelectric Project (FERC No. 10661) (Project), located along the St. Joseph River in St. Joseph County, Michigan (see attached map). I&M, with assistance from HDR, Inc. (HDR), is beginning the Federal Energy Regulatory Commission (FERC) relicensing process for the Project. Accordingly, I&M is preparing a Pre-Application Document (PAD). The PAD provides FERC and other entities with existing, relevant, and reasonably available information pertaining to the Project.

This information is intended to help identify items of interest and related information needs, develop study requests and study plans, and prepare documents related to analyzing the relicensing application to be prepared by I&M. To prepare the PAD, I&M will use information in its possession and information obtained from others. This PAD Questionnaire will be used by I&M to help identify sources of existing, relevant, and reasonably available information that is not currently in I&M's possession. Comments and/or questions regarding this request may be sent to Sarah Kulpa with HDR via email at sarah.kulpa@hdrinc.com or via phone at (704) 248-3620, or to Jonathan Magalski who represents I&M at jmmagalski@aep.com or via phone at (614) 716-2240.

Please return this questionnaire in the enclosed, self-addressed, stamped envelope within 30 days of receipt to allow for any follow-up contact by I&M's or HDR's representative that may be needed. Not responding within 30 days indicates that you are not aware of any existing, relevant, and reasonably available information that describes the existing Project environment or known potential impacts of the Project.

I&M and HDR respectfully request the following information:

1. Information about person completing the questionnaire:

Name & Title	Bob Stuber, Fisheries Biologist Michigan Hydropower Relicensing Coalition Consultant
Organization	Michigan Hydro Relicensing Coalition (MHRC)
Address	1620 High Street Traverse City, MI 49684
Phone	231-775-4321

2. Do you or your organization know of existing, relevant and reasonably available information that describes the existing Constantine Hydroelectric Project's

Constantine Hydroelectric Project (FERC Project No. 10661) Relicensing Pre-Application Document Information Questionnaire

environment (i.e., information regarding the St. Joseph River in or close to the Constantine Hydroelectric Project)?

Yes (If yes, please complete 2a through 2e) No (If no, go to 3)

a. If yes, please circle the specific resource area(s) that the information relates to:

- | | |
|--|---|
| <ul style="list-style-type: none">■ Geology and soils■ Water resources■ Fish and aquatic resources■ Wildlife and botanical resources■ Wetlands, riparian, and littoral habitat■ Rare, threatened & endangered species | <ul style="list-style-type: none">■ Recreation and land use■ Aesthetic resources■ Cultural resources■ Socio-economic resources■ Tribal resources■ Other resource information |
|--|---|

b. Please briefly describe the information referenced above or list available documents (*additional information may be provided on page 4 of this questionnaire*).

Michigan Department of Natural Resources St. Joseph River Fisheries Assessment
Fisheries Special Report No. 24 (Wesley and Duffy 1999)

c. Where can I&M obtain this information?

Michigan Department of Natural Resources Fisheries Division Library
(http://www.michigan.gov/dnr/0,4570,7-153-10364_52259_19056---,00.html)

Please also refer to Michigan Department of Natural Resources Fisheries Division correspondence dated September 20, 2017 (Kyle Kruger to Ms. Sarah Kulpa HDR). Listing of issues and areas of study for PAD.

d. Please indicate whether there is a specific representative you wish to designate for a potential follow-up contact by I&M's or HDR's representative for the resource area(s) checked above (*additional information may be provided on page 4 of this questionnaire*).

Constantine Hydroelectric Project (FERC Project No. 10661) Relicensing Pre-Application Document Information Questionnaire

Representative Contact Information

Name	
Address	
Phone	
Email Address	

Name	
Address	
Phone	
Email Address	

- e. Based on the specific resources listed in 2a, are you aware of any specific issues or improvements pertaining to the identified resource area(s)?
(Additional information may be provided on page 4 of this questionnaire.)

Yes (please list specific issues below)
 No

Resource Area	Specific Issue

3. Do you or your organization plan to participate in the Constantine Hydroelectric Project relicensing proceeding? Yes No
4. We are interested in your comments. If you have comments and/or questions regarding the Constantine Hydroelectric Project or the relicensing process, please provide below. In addition, this questionnaire has been sent to the people/organizations shown on the attached distribution list; please let us know if

**Constantine Hydroelectric Project (FERC Project No. 10661)
Relicensing Pre-Application Document Information Questionnaire**

there is anyone else you believe should receive this questionnaire that is not included on the attached distribution list.

(Comments and/or questions may be sent via email to: sarah.kulpa@hdrinc.com or jmmagalski@aep.com)

As noted above, please return this questionnaire in the enclosed, self-addressed, stamped envelope within 30 days of receipt to allow for any follow-up contact by I&M's or HDR's representative that may be needed. Not responding within 30 days indicates that you are not aware of any existing, relevant, and reasonably available information that describes the existing Project environment or known potential impacts of the Project.



FOREST COUNTY POTAWATOMI
NATURAL RESOURCES

5320 WENSAUT LANE • PO BOX 340 • CRANDON, WI 54520 • (715) 478-7222 • Fax: (715) 478-7225

October 26, 2017

Coleen Corballis
Midwest Branch
Division of Hydropower Licensing
Federal Energy Regulatory Commission
888 First Street N.E.
Washington D.C. 20426

Re: Project Number 10661-000-MI, Constantine Hydroelectric Project in the Village of Constantine, St. Joseph County, Michigan.

Dear Ms. Corballis,

Pursuant to consultation under Section 106 of the National Historic Preservation Act (1966 as amended) the Forest County Potawatomi as a Federally Recognized Native American Tribe reserves the right to comment on Federal undertakings, as defined under the act. Thank you for your participation in the process.

This response is regarding the project mention above. The Tribal Historic Preservation Office for the Forest County Potawatomi Community has submitted comments to this project which may contain information exempt from the Freedom of Information Act under Section 304 of the National Historic Preservation Act.

Respectfully,

Michael LaRonge
Tribal Historic Preservation Officer
Natural Resources Department
Forest County Potawatomi Community
5320 Wensaut Lane
P.O. Box 340
Crandon, Wisconsin 54520
Phone: 715-478-7354
Fax: 715-478-7225
Email: Michael.LaRonge@FCPotawatomi-nsn.gov

Miami Tribe of Oklahoma, Miami, OK.
October 26, 2017

Re: Constantine Project No. 10661-000-MI - Comments of the Miami Tribe of Oklahoma

To Whom It May Concern:

Aya, kikwehsitoole - I show you respect. My name is Diane Hunter, and I am the Tribal Historic Preservation Officer for the Federally Recognized Miami Tribe of Oklahoma. In this capacity, I am the Miami Tribe's point of contact for all Section 106 issues.

The Miami Tribe offers no objection to the above-mentioned project at this time, as we are not currently aware of existing documentation directly linking a specific Miami cultural or historic site to the project site. However, as this site is within the aboriginal homelands of the Miami Tribe, if any human remains or Native American cultural items falling under the Native American Graves Protection and Repatriation Act (NAGPRA) or archaeological evidence is discovered during any phase of this project, the Miami Tribe requests immediate consultation with the entity of jurisdiction for the location of discovery. In such a case, please contact me at 918-541-8966 or by email at dhunter@miamination.com to initiate consultation.

The Miami Tribe accepts the invitation to serve as a consulting party to the proposed project. In my capacity as Tribal Historic Preservation Officer I am the point of contact for consultation.

Respectfully,

Diane Hunter
Tribal Historic Preservation Officer
Miami Tribe of Oklahoma
P.O. Box 1326
Miami, OK 74355

**Constantine Hydroelectric Project (FERC Project No. 10661)
Relicensing Pre-Application Document Information Questionnaire**

Indiana Michigan Power Company (I&M) is the Licensee and operator of the Constantine Hydroelectric Project (FERC No. 10661) (Project), located along the St. Joseph River in St. Joseph County, Michigan (see attached map). I&M, with assistance from HDR, Inc. (HDR), is beginning the Federal Energy Regulatory Commission (FERC) relicensing process for the Project. Accordingly, I&M is preparing a Pre-Application Document (PAD). The PAD provides FERC and other entities with existing, relevant, and reasonably available information pertaining to the Project.

This information is intended to help identify items of interest and related information needs, develop study requests and study plans, and prepare documents related to analyzing the relicensing application to be prepared by I&M. To prepare the PAD, I&M will use information in its possession and information obtained from others. This PAD Questionnaire will be used by I&M to help identify sources of existing, relevant, and reasonably available information that is not currently in I&M's possession. Comments and/or questions regarding this request may be sent to Sarah Kulpa with HDR via email at sarah.kulpa@hdrinc.com or via phone at (704) 248-3620, or to Jonathan Magalski who represents I&M at jmmagalski@aep.com or via phone at (614) 716-2240.

Please return this questionnaire in the enclosed, self-addressed, stamped envelope within 30 days of receipt to allow for any follow-up contact by I&M's or HDR's representative that may be needed. Not responding within 30 days indicates that you are not aware of any existing, relevant, and reasonably available information that describes the existing Project environment or known potential impacts of the Project.

I&M and HDR respectfully request the following information:

1. Information about person completing the questionnaire:

Name & Title	Martin J. Rosek State Soil Scientist
Organization	USDA - Natural Resources Conservation Service
Address	3001 Coolidge Road East Lansing, MI 48823
Phone	517-324-5241
Email Address	martin.rosek@mi.usda.gov

**Constantine Hydroelectric Project (FERC Project No. 10661)
Relicensing Pre-Application Document Information Questionnaire**

2. Do you or your organization know of existing, relevant and reasonably available information that describes the existing Constantine Hydroelectric Project's environment (i.e., information regarding the St. Joseph River in or close to the Constantine Hydroelectric Project)?

Yes (*If yes, please complete 2a through 2e*) No (*If no, go to 3*)

a. If yes, please circle the specific resource area(s) that the information relates to:

- | | |
|---|---|
| <input type="checkbox"/> Geology and soils | <input type="checkbox"/> Recreation and land use |
| <input type="checkbox"/> Water resources | <input type="checkbox"/> Aesthetic resources |
| <input type="checkbox"/> Fish and aquatic resources | <input type="checkbox"/> Cultural resources |
| <input type="checkbox"/> Wildlife and botanical resources | <input type="checkbox"/> Socio-economic resources |
| <input type="checkbox"/> Wetlands, riparian, and littoral habitat | <input type="checkbox"/> Tribal resources |
| <input type="checkbox"/> Rare, threatened & endangered species | <input type="checkbox"/> Other resource information |

b. Please briefly describe the information referenced above or list available documents (*additional information may be provided on page 4 of this questionnaire*).

c. Where can I&M obtain this information?

**Constantine Hydroelectric Project (FERC Project No. 10661)
Relicensing Pre-Application Document Information Questionnaire**

- d. Please indicate whether there is a specific representative you wish to designate for a potential follow-up contact by I&M's or HDR's representative for the resource area(s) checked above (*additional information may be provided on page 4 of this questionnaire*).

Representative Contact Information

Name	
Address	
Phone	
Email Address	

Name	
Address	
Phone	
Email Address	

- e. Based on the specific resources listed in 2a, are you aware of any specific issues or improvements pertaining to the identified resource area(s)? (*Additional information may be provided on page 4 of this questionnaire.*)

Yes (*please list specific issues below*) No

Resource Area	Specific Issue

3. Do you or your organization plan to participate in the Constantine Hydroelectric Project relicensing proceeding? Yes No

**Constantine Hydroelectric Project (FERC Project No. 10661)
Relicensing Pre-Application Document Information Questionnaire**

4. We are interested in your comments. If you have comments and/or questions regarding the Constantine Hydroelectric Project or the relicensing process, please provide below. In addition, this questionnaire has been sent to the people/organizations shown on the attached distribution list; please let us know if there is anyone else you believe should receive this questionnaire that is not included on the attached distribution list.

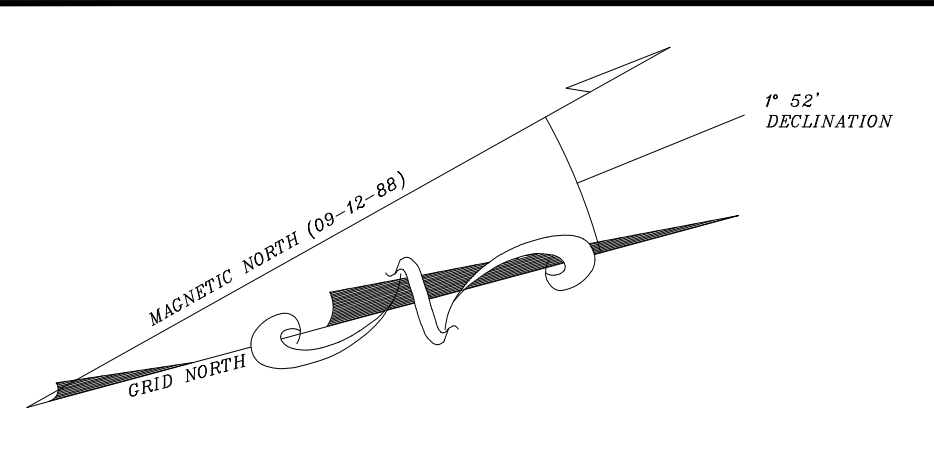
The Natural Resources Conservation Service (NRCS) under Part 523 of the Farmland Protection Policy Act has reviewed the Constantine Hydroelectric Project. This review was conducted with respect to the effect(s) that the proposal may have on prime and/or unique farmland. Since there are no prime and/or unique farmed lands in the proposed projects extent, we have concluded that this proposal will have no negative impact on prime and/or unique farmland.

(Comments and/or questions may be sent via email to: sarah.kulpa@hdrinc.com or jmmagalski@aep.com)

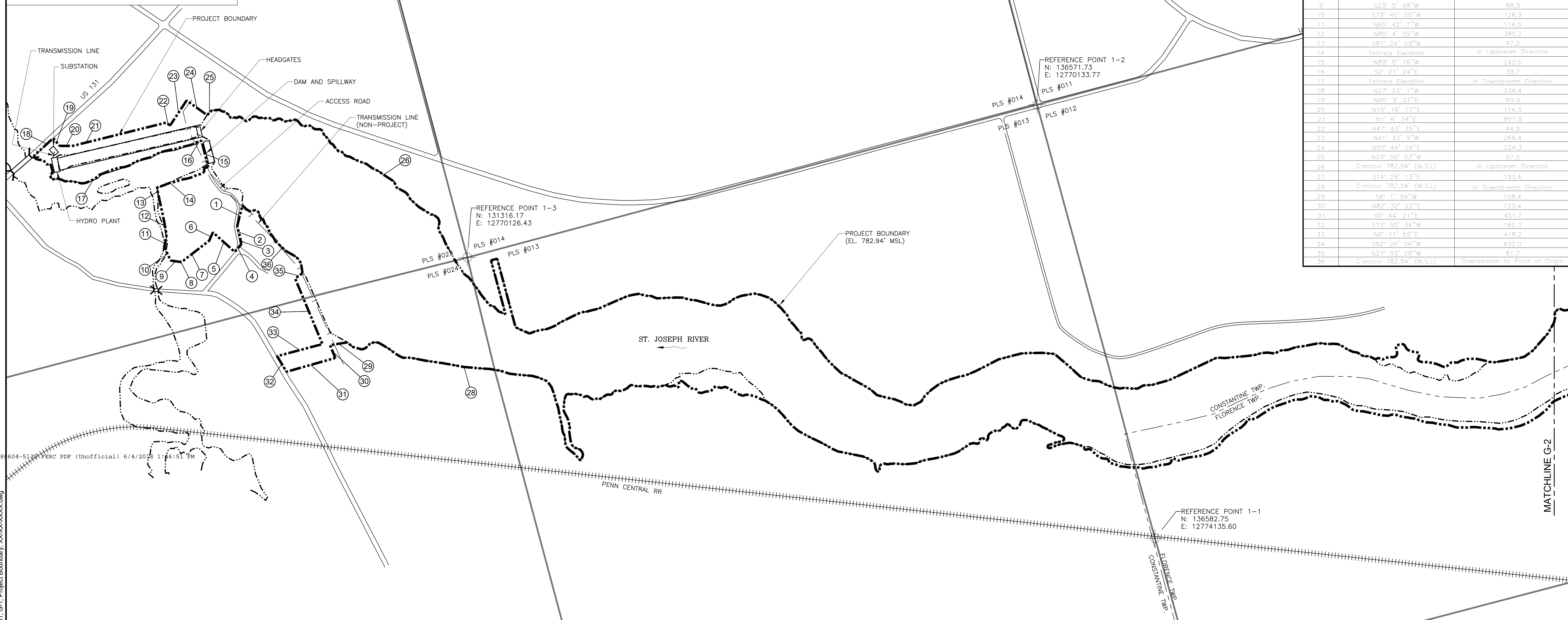
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APPENDIX C

EXISTING PROJECT BOUNDARY (EXHIBIT G)



METES AND BOUNDS TABLE		
Course	Direction	Distance (ft)
1	S60° 58' 30"E	194.1
2	S89° 41' 43"E	105.6
3	S83° 28' 49"E	59.4
4	S33° 53' 29"E	88.6
5	S56° 59' 52"W	260.6
6	S50° 37' 21"E	81.6
7	S22° 36' 4"E	311.3
8	S20° 38' 46"W	8.6
9	S23° 5' 48"W	88.9
10	S79° 45' 55"W	128.9
11	N65° 42' 7"W	114.5
12	N85° 4' 55"W	380.2
13	S81° 24' 59"W	47.2
14	Tailrace Elevation	In Upstream Direction
15	N89° 0' 16"W	242.5
16	S2° 21' 24"E	39.7
17	Tailrace Elevation	In Downstream Direction
18	N27° 23' 1"W	236.4
19	N65° 9' 27"E	89.9
20	N15° 19' 17"E	114.3
21	N1° 6' 34"E	857.9
22	N47° 43' 35"E	44.9
23	N41° 33' 9"W	266.4
24	N50° 44' 16"E	224.3
25	N29° 55' 53"W	57.5
26	Contour 782.94' (M.S.L.)	In Upstream Direction
27	S14° 28' 13"E	193.4
28	Contour 782.94' (M.S.L.)	In Downstream Direction
29	S6° 1' 56"W	158.4
30	N82° 32' 22"E	123.4
31	S0° 44' 21"E	451.7
32	S73° 50' 34"W	182.3
33	N0° 11' 59"E	418.2
34	S82° 26' 56"W	632.0
35	N21° 59' 28"W	81.7
36	Contour 782.94' (M.S.L.)	Downstream to Point of Origin



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LEGEND	
	PROJECT BOUNDARY
	PUBLIC LAND SURVEY (PLS) LINES
	WATERLINES (BASED ON IMAGERY DATED SEPTEMBER 8, 2014)
	TRANSMISSION LINES
	TOWNSHIP
	RR LINE

SURVEYOR STATEMENT

I here by state, to the best of my knowledge and belief, that the project boundary, as shown on this Exhibit G drawing, is depicted within reasonable accuracies, as required in Title 18 CFR Sec. 4.41, which states in part, the "boundary data must be positionally accurate to +/- 40 feet" and "comply with the National Map Accuracy Standards for maps at a 1:24,000 scale." The Project Boundary Line was adjusted, as necessary, to best fit the map graphically and was not field surveyed.

By: *Be Todd, PS* Date: *5/2/16*



NOTES:

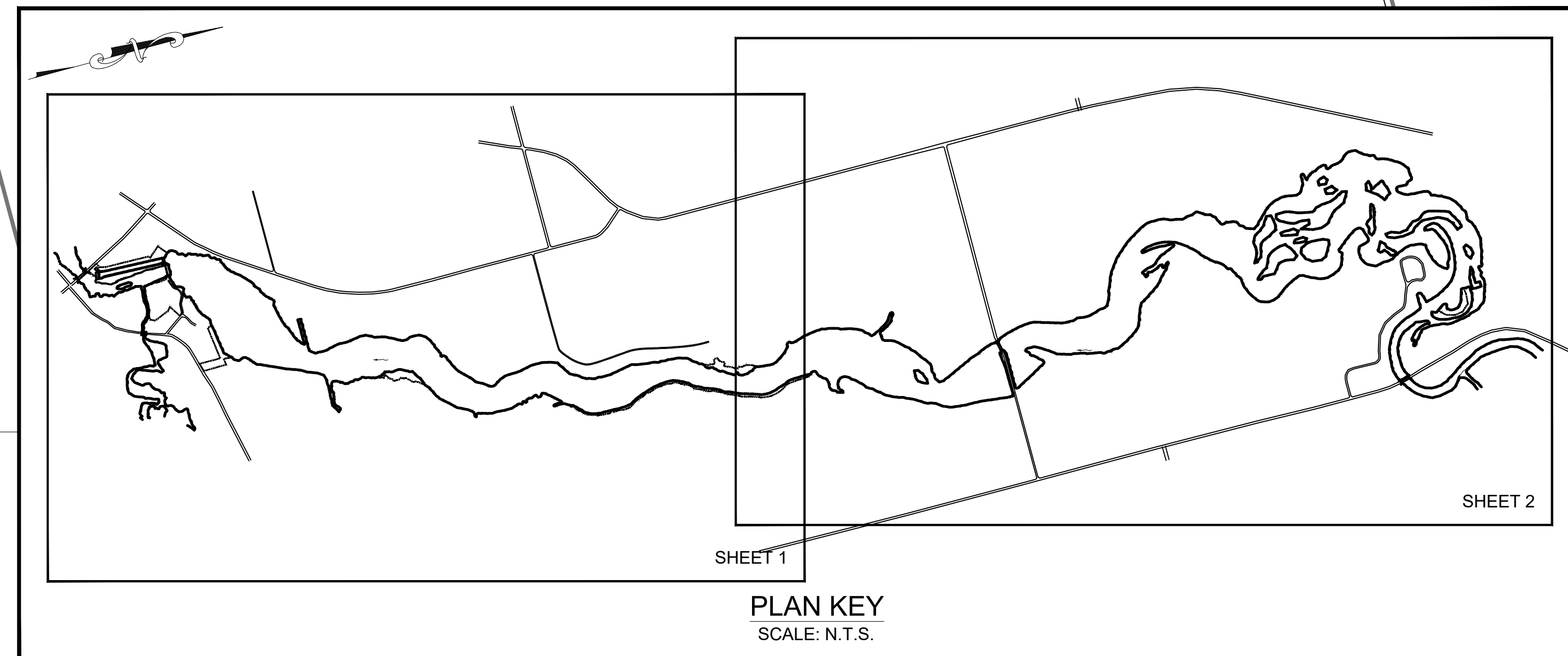
- AEP IS THE OWNER AND OPERATOR OF ALL EXISTING PROJECT FACILITIES AND EITHER OWNS OR HAS RIGHTS TO ALL PROJECT LANDS.
- COORDINATES GIVEN ARE IN NAD83 MICHIGAN STATE PLANE, SOUTH ZONE, US FOOT HORIZONTAL DATUM.
- FERC PROJECT #10661 IS LOCATED IN THE CITY OF CONSTANTINE TWP., COUNTY OF ST. JOSEPH, IN THE STATE OF MICHIGAN.

SCALE IN FEET: 0, 400, 800, 1600
SCALE: 1 inch = 400 ft

PREPARED BY:

Kleinschmidt

141 Main Street P.O. Box 650
Pittsfield, Maine 04967
Telephone: (207) 487-3328
Fax: (207) 487-3124
www.KleinschmidtGroup.com



PLS #012
PLS #007

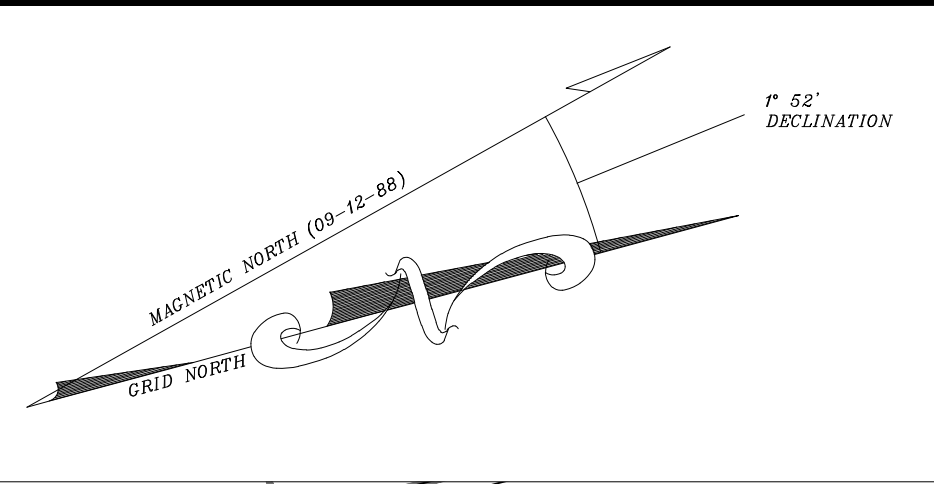
EXHIBIT G SHEET 1 of 2

CONSTANTINE HYDROELECTRIC PROJECT
FERC PROJECT NO. 10661

ST. JOSEPH COUNTY, MICHIGAN

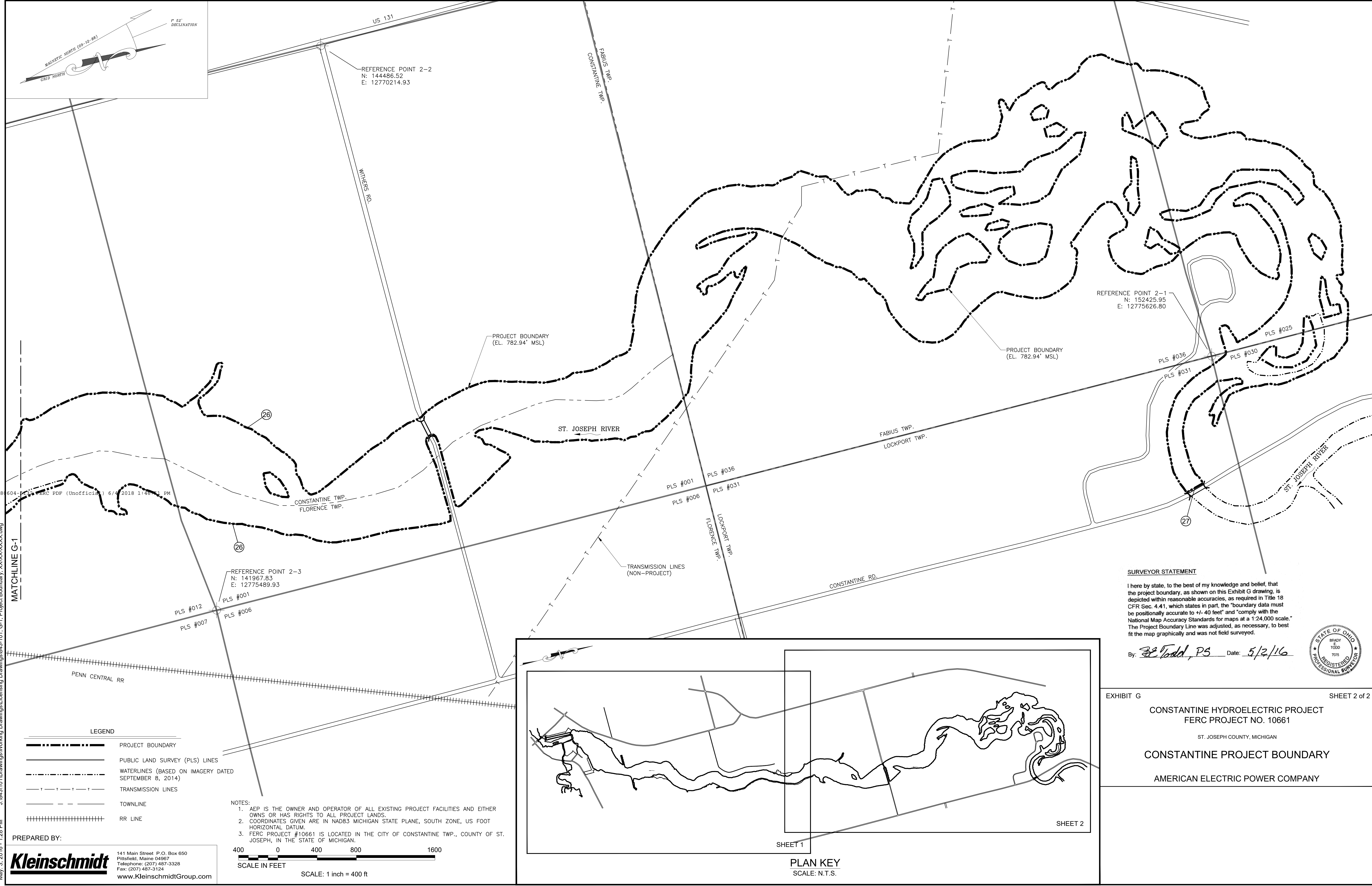
CONSTANTINE PROJECT BOUNDARY

AMERICAN ELECTRIC POWER COMPANY



US 131
 REFERENCE POINT 2-2
 N: 144486.52
 E: 12770214.93

REFERENCE POINT 2-1
 N: 152425.95
 E: 12775626.80



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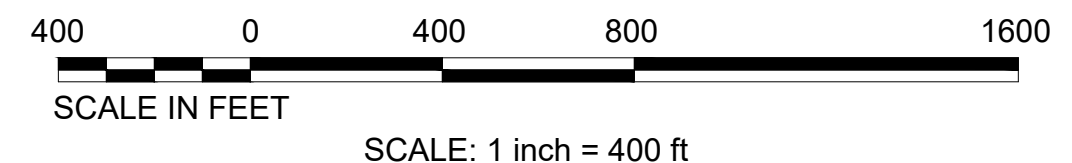
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MATCHLINE G-1

LEGEND

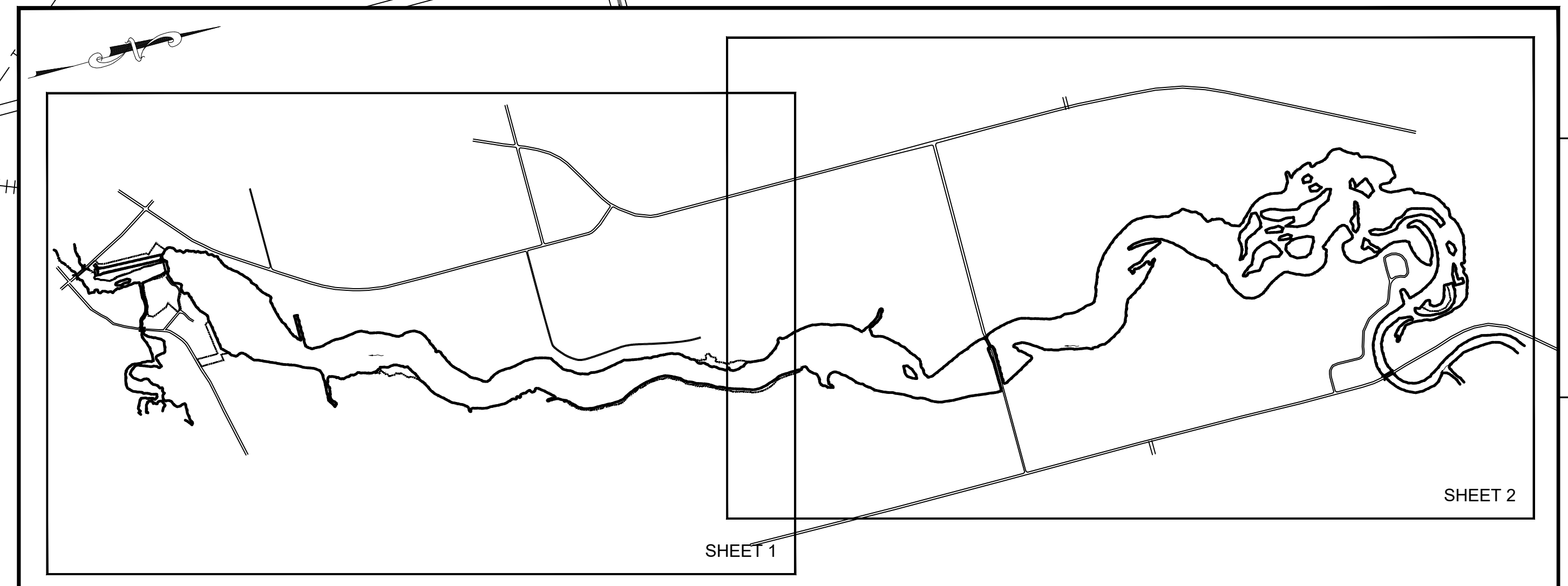
	PROJECT BOUNDARY
	PUBLIC LAND SURVEY (PLS) LINES
	WATERLINES (BASED ON IMAGERY DATED SEPTEMBER 8, 2014)
	TRANSMISSION LINES
	TOWNLINE
	RR LINE

- NOTES:**
1. AEP IS THE OWNER AND OPERATOR OF ALL EXISTING PROJECT FACILITIES AND EITHER OWNS OR HAS RIGHTS TO ALL PROJECT LANDS.
 2. COORDINATES GIVEN ARE IN NAD83 MICHIGAN STATE PLANE, SOUTH ZONE, US FOOT HORIZONTAL DATUM.
 3. FERC PROJECT #10661 IS LOCATED IN THE CITY OF CONSTANTINE TWP., COUNTY OF ST. JOSEPH, IN THE STATE OF MICHIGAN.



PREPARED BY:

141 Main Street P.O. Box 650
 Pittsfield, Maine 04967
 Telephone: (207) 487-3328
 Fax: (207) 487-3124
 www.KleinschmidtGroup.com



SURVEYOR STATEMENT

I here by state, to the best of my knowledge and belief, that the project boundary, as shown on this Exhibit G drawing, is depicted within reasonable accuracies, as required in Title 18 CFR Sec. 4.41, which states in part, the "boundary data must be positionally accurate to +/- 40 feet" and "comply with the National Map Accuracy Standards for maps at a 1:24,000 scale." The Project Boundary Line was adjusted, as necessary, to best fit the map graphically and was not field surveyed.

By: *Brady Todd, PS* Date: *5/2/16*

EXHIBIT G SHEET 2 of 2

CONSTANTINE HYDROELECTRIC PROJECT
 FERC PROJECT NO. 10661

ST. JOSEPH COUNTY, MICHIGAN

CONSTANTINE PROJECT BOUNDARY

AMERICAN ELECTRIC POWER COMPANY

APPENDIX D

**SINGLE LINE ELECTRICAL DIAGRAM AND EXISTING EXHIBIT F
PROJECT DRAWINGS (CEII)**

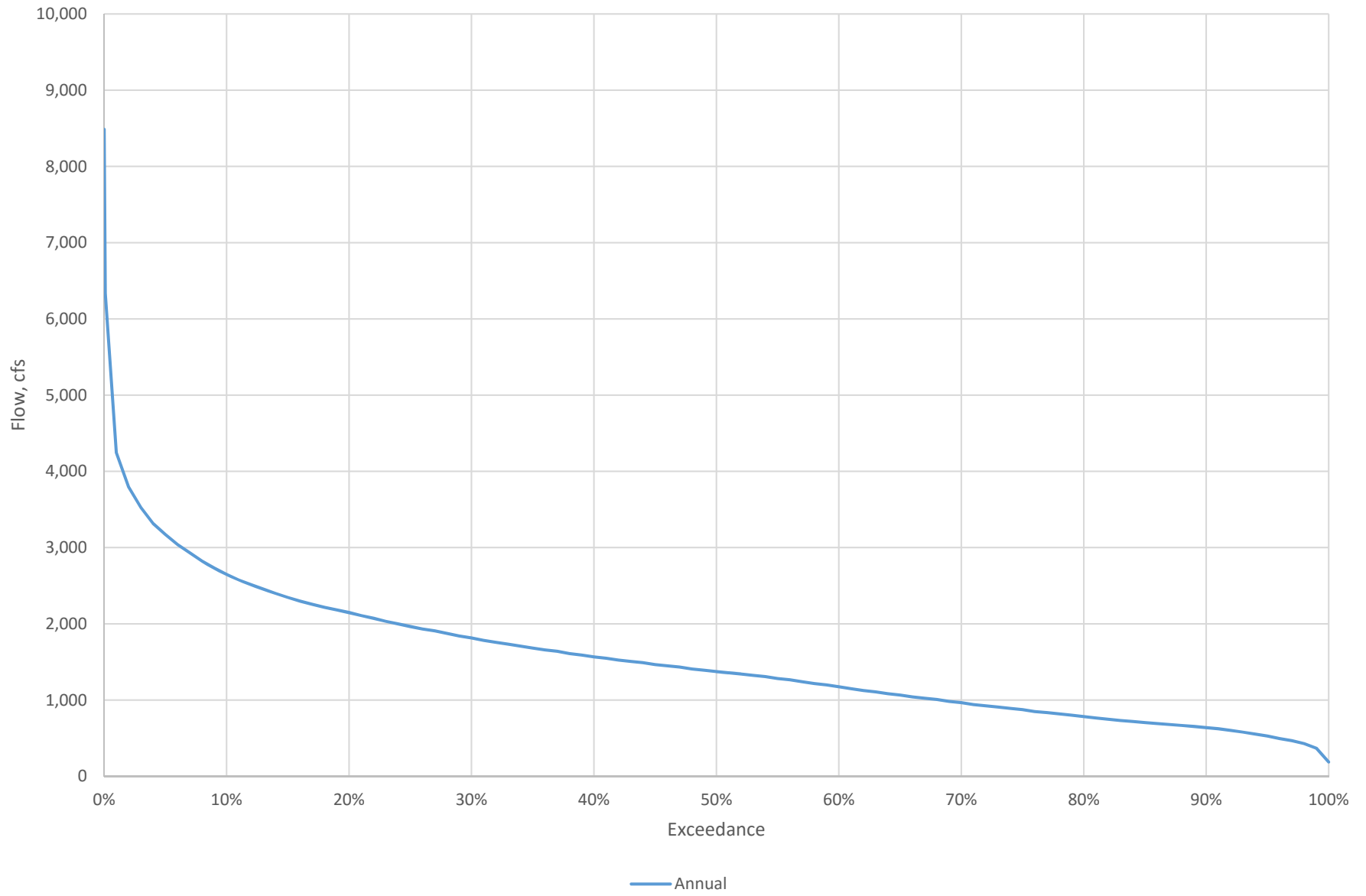
APPENDIX E
FLOW DURATION CURVES

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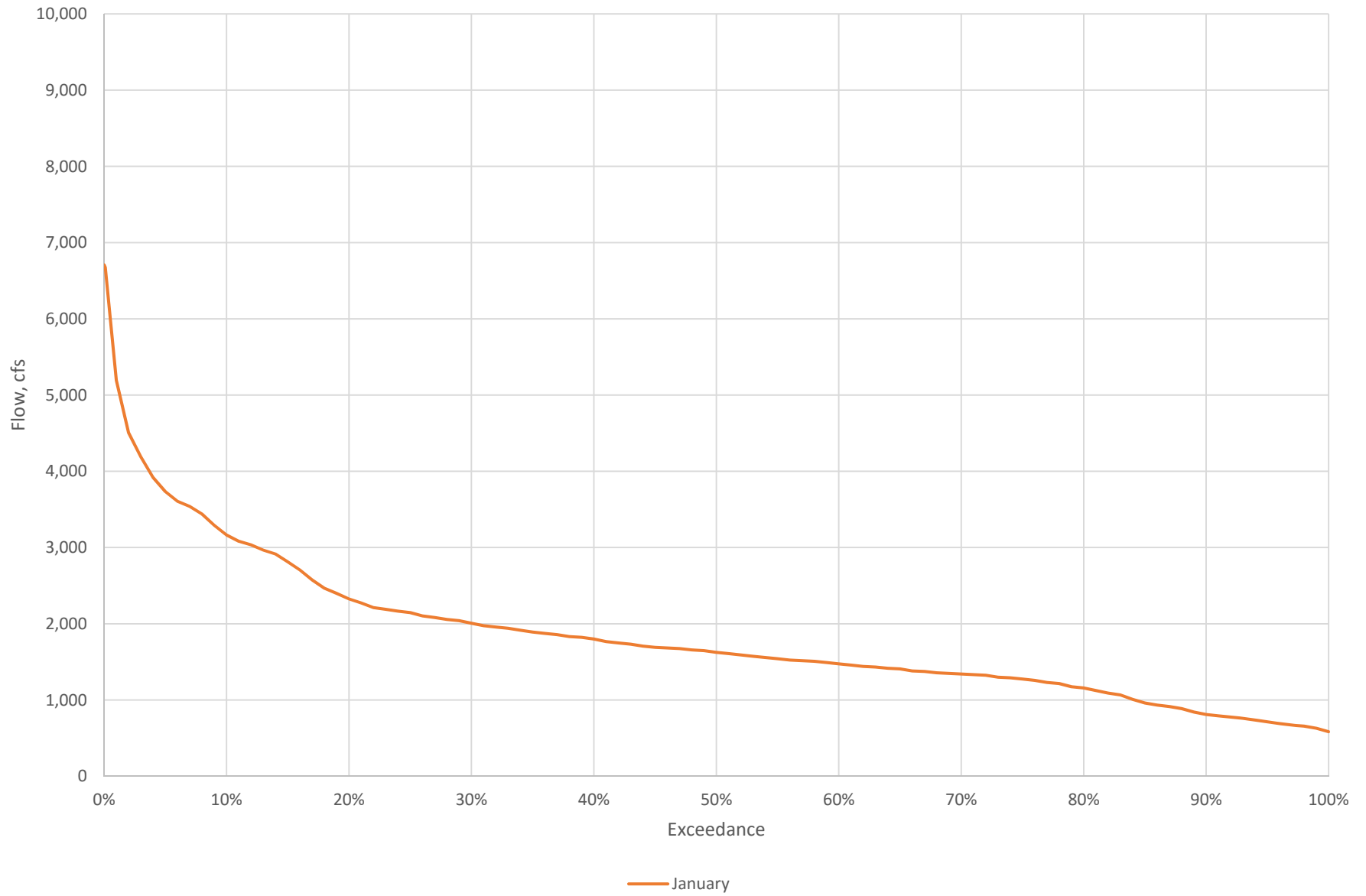
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% Exceedance	Annual	January	February	March	April	May	June	July	August	September	October	November	December
100.00%	187	583	604	637	614	680	306	185	280	287	374	454	549
99.00%	367	627	637	700	858	899	418	271	312	352	438	511	601
98.00%	428	657	651	842	1,008	954	464	298	327	368	470	536	627
97.00%	467	668	661	898	1,033	1,008	515	309	337	390	487	549	653
96.00%	495	693	677	949	1,083	1,033	569	337	368	420	497	567	682
95.00%	528	714	716	1,032	1,132	1,045	596	360	401	431	506	581	704
94.00%	553	734	782	1,122	1,182	1,066	634	372	415	440	517	608	717
93.00%	578	760	832	1,266	1,208	1,099	659	389	425	446	530	625	730
92.00%	601	776	906	1,283	1,249	1,108	672	401	438	456	545	644	742
91.00%	624	791	933	1,332	1,258	1,133	689	419	447	471	559	654	771
90.00%	638	809	974	1,365	1,291	1,141	709	439	458	481	568	662	783
89.00%	655	841	1,017	1,382	1,315	1,166	722	455	467	487	584	674	814
88.00%	666	887	1,038	1,399	1,324	1,174	747	475	476	492	595	686	823
87.00%	679	914	1,074	1,424	1,341	1,206	759	498	479	503	606	693	839
86.00%	691	933	1,091	1,441	1,357	1,224	781	519	485	522	621	704	858
85.00%	705	961	1,124	1,460	1,374	1,233	798	539	491	531	629	732	869
84.00%	720	1,008	1,162	1,482	1,399	1,255	809	548	497	540	635	749	891
83.00%	732	1,066	1,174	1,499	1,407	1,274	821	563	509	551	645	760	899
82.00%	748	1,091	1,199	1,509	1,431	1,283	831	571	519	564	654	787	916
81.00%	765	1,124	1,216	1,524	1,457	1,299	849	581	528	573	659	821	933
80.00%	784	1,158	1,236	1,549	1,474	1,307	858	590	537	587	662	841	949
79.00%	802	1,174	1,256	1,566	1,497	1,316	881	597	545	597	670	849	967
78.00%	819	1,216	1,274	1,582	1,531	1,324	891	601	551	608	677	866	983
77.00%	833	1,230	1,291	1,607	1,557	1,341	906	612	560	616	683	883	1,016
76.00%	849	1,258	1,299	1,616	1,574	1,357	914	627	570	626	688	899	1,041
75.00%	874	1,274	1,307	1,626	1,582	1,374	924	637	578	631	693	916	1,058
74.00%	891	1,291	1,324	1,641	1,599	1,391	941	645	588	636	698	924	1,091
73.00%	908	1,299	1,341	1,656	1,624	1,406	958	658	599	640	702	941	1,124
72.00%	924	1,324	1,357	1,674	1,641	1,424	974	661	608	651	707	958	1,158
71.00%	941	1,332	1,371	1,691	1,657	1,436	999	670	621	657	715	972	1,183
70.00%	966	1,341	1,382	1,713	1,666	1,449	1,016	679	630	664	721	980	1,191
69.00%	983	1,349	1,399	1,732	1,674	1,457	1,024	704	636	668	726	1,008	1,208
68.00%	1,008	1,357	1,416	1,749	1,682	1,466	1,049	707	640	673	733	1,024	1,227
67.00%	1,024	1,374	1,424	1,757	1,699	1,474	1,058	726	644	678	737	1,033	1,249
66.00%	1,041	1,381	1,449	1,782	1,713	1,491	1,074	738	653	683	745	1,041	1,274
65.00%	1,066	1,407	1,461	1,800	1,732	1,492	1,083	748	660	690	752	1,066	1,284
64.00%	1,083	1,416	1,482	1,815	1,757	1,507	1,099	758	667	696	764	1,080	1,299
63.00%	1,108	1,432	1,499	1,838	1,766	1,513	1,113	768	670	698	776	1,091	1,316
62.00%	1,124	1,441	1,507	1,849	1,791	1,532	1,133	778	676	705	784	1,104	1,332
61.00%	1,149	1,457	1,524	1,868	1,815	1,549	1,141	784	681	712	792	1,116	1,341
60.00%	1,174	1,474	1,539	1,907	1,824	1,566	1,163	793	685	718	806	1,129	1,354
59.00%	1,199	1,491	1,549	1,915	1,845	1,582	1,183	804	694	720	817	1,146	1,366
58.00%	1,216	1,507	1,563	1,932	1,857	1,599	1,191	814	701	723	824	1,166	1,374
57.00%	1,241	1,516	1,591	1,949	1,887	1,607	1,208	825	709	725	831	1,183	1,391
56.00%	1,266	1,524	1,607	1,965	1,903	1,624	1,224	841	721	730	841	1,191	1,399
55.00%	1,283	1,541	1,632	1,990	1,920	1,633	1,249	849	729	732	849	1,208	1,408
54.00%	1,307	1,557	1,657	2,010	1,937	1,649	1,262	866	733	739	858	1,216	1,419
53.00%	1,324	1,574	1,674	2,032	1,957	1,657	1,287	883	745	743	871	1,229	1,432
52.00%	1,341	1,591	1,682	2,040	1,970	1,666	1,324	891	754	750	874	1,249	1,448
51.00%	1,357	1,609	1,707	2,075	1,999	1,684	1,341	901	761	757	883	1,266	1,457
50.00%	1,374	1,624	1,724	2,099	2,007	1,703	1,366	924	773	764	891	1,283	1,466
49.00%	1,391	1,647	1,732	2,124	2,032	1,716	1,382	933	782	770	908	1,307	1,482
48.00%	1,407	1,657	1,749	2,141	2,044	1,741	1,391	941	792	778	916	1,328	1,491
47.00%	1,432	1,674	1,790	2,165	2,057	1,757	1,411	952	803	786	927	1,332	1,507
46.00%	1,449	1,682	1,807	2,187	2,074	1,763	1,445	972	811	797	933	1,349	1,516
45.00%	1,466	1,691	1,832	2,199	2,099	1,773	1,466	983	819	805	949	1,357	1,541
44.00%	1,491	1,707	1,849	2,215	2,115	1,782	1,491	999	830	816	966	1,366	1,557
43.00%	1,507	1,732	1,864	2,240	2,127	1,799	1,507	1,008	833	820	983	1,382	1,582
42.00%	1,524	1,749	1,882	2,257	2,157	1,815	1,532	1,033	848	830	991	1,391	1,597
41.00%	1,549	1,766	1,897	2,283	2,182	1,833	1,544	1,041	858	841	999	1,399	1,625
40.00%	1,566	1,799	1,915	2,307	2,190	1,869	1,557	1,049	866	849	1,008	1,411	1,652
39.00%	1,591	1,821	1,924	2,343	2,215	1,896	1,582	1,058	874	858	1,016	1,424	1,682
38.00%	1,610	1,832	1,940	2,357	2,240	1,915	1,616	1,074	874	866	1,033	1,436	1,691
37.00%	1,641	1,857	1,962	2,376	2,274	1,934	1,632	1,091	891	878	1,041	1,452	1,724
36.00%	1,657	1,874	1,974	2,415	2,282	1,978	1,660	1,104	899	891	1,062	1,466	1,737
35.00%	1,682	1,890	1,982	2,440	2,299	1,997	1,691	1,116	908	899	1,081	1,474	1,757
34.00%	1,707	1,915	2,007	2,473	2,307	2,017	1,735	1,124	908	916	1,092	1,482	1,782
33.00%	1,732	1,940	2,015	2,494	2,332	2,036	1,766	1,149	920	933	1,108	1,491	1,807
32.00%	1,757	1,957	2,032	2,507	2,348	2,088	1,793	1,166	933	941	1,122	1,507	1,830
31.00%	1,782	1,974	2,057	2,523	2,384	2,115	1,826	1,174	941	960	1,141	1,516	1,849
30.00%	1,815	2,007	2,090	2,557	2,409	2,140	1,849	1,208	958	974	1,168	1,527	1,882
29.00%	1,840	2,040	2,107	2,582	2,440	2,170	1,874	1,237	966	991	1,187	1,549	1,912
28.00%	1,874	2,057	2,132	2,622	2,473	2,190	1,918	1,258	974	1,008	1,207	1,566	1,932
27.00%	1,907	2,082	2,165	2,648	2,490	2,217	1,951	1,274	984	1,016	1,249	1,582	1,950
26.00%	1,932	2,102	2,182	2,694	2,517	2,257	1,999	1,291	999	1,033	1,261	1,607	1,990
25.00%	1,965	2,147	2,207	2,715	2,557	2,274	2,042	1,305	1,016	1,051	1,291	1,624	2,030
24.00%	1,999	2,165	2,224	2,757	2,600	2,299	2,082	1,324	1,024	1,066	1,307	1,641	2,057
23.00%	2,032	2,190	2,233	2,793	2,640	2,340	2,124	1,332	1,035	1,074	1,316	1,659	2,082
22.00%	2,074	2,212	2,249	2,850	2,657	2,365	2,140	1,354	1,049	1,101	1,324	1,691	2,107
21.00%	2,107	2,274	2,284	2,890	2,682	2,398	2,174	1,374	1,058	1,126	1,366	1,701	2,115
20.00%	2,149	2,325	2,315	2,931	2,708	2,432	2,202	1,391	1,076	1,149	1,391	1,716	2,132
19.00%	2,182	2,398	2,357	2,973	2,750	2,457	2,257	1,416	1,091	1,183	1,436	1,741	2,153
18.00%	2,215	2,465	2,382	3,006	2,807	2,480	2,290	1,449	1,108	1,217	1,457	1,774	2,172
17.00%	2,257	2,574	2,415	3,031	2,868	2,498	2,324	1,482	1,133	1,258	1,491	1,807	2,199
16.00%	2,299	2,705	2,461	3,056	2,958	2,540	2,373	1,519	1,152	1,299	1,532	1,833	2,207
15.00%	2,344	2,812	2,506	3,081	3,008	2,573	2,415	1,552	1,166	1,341	1,566	1,882	2,229
14.00%	2,398	2,915	2,535	3,123	3,048	2,606	2,457	1,590	1,190	1,374	1,591	1,907	2,249
13.00%	2,457	2,967	2,606	3,183	3,140	2,642	2,509	1,659	1,216	1,417	1,607	1,950	2,274
12.00%	2,515	3,036	2,757	3,198	3,168	2,682	2,582	1,712	1,254	1,450	1,695	1,982	2,295
11.00%	2,573	3,081	2,912	3,23									

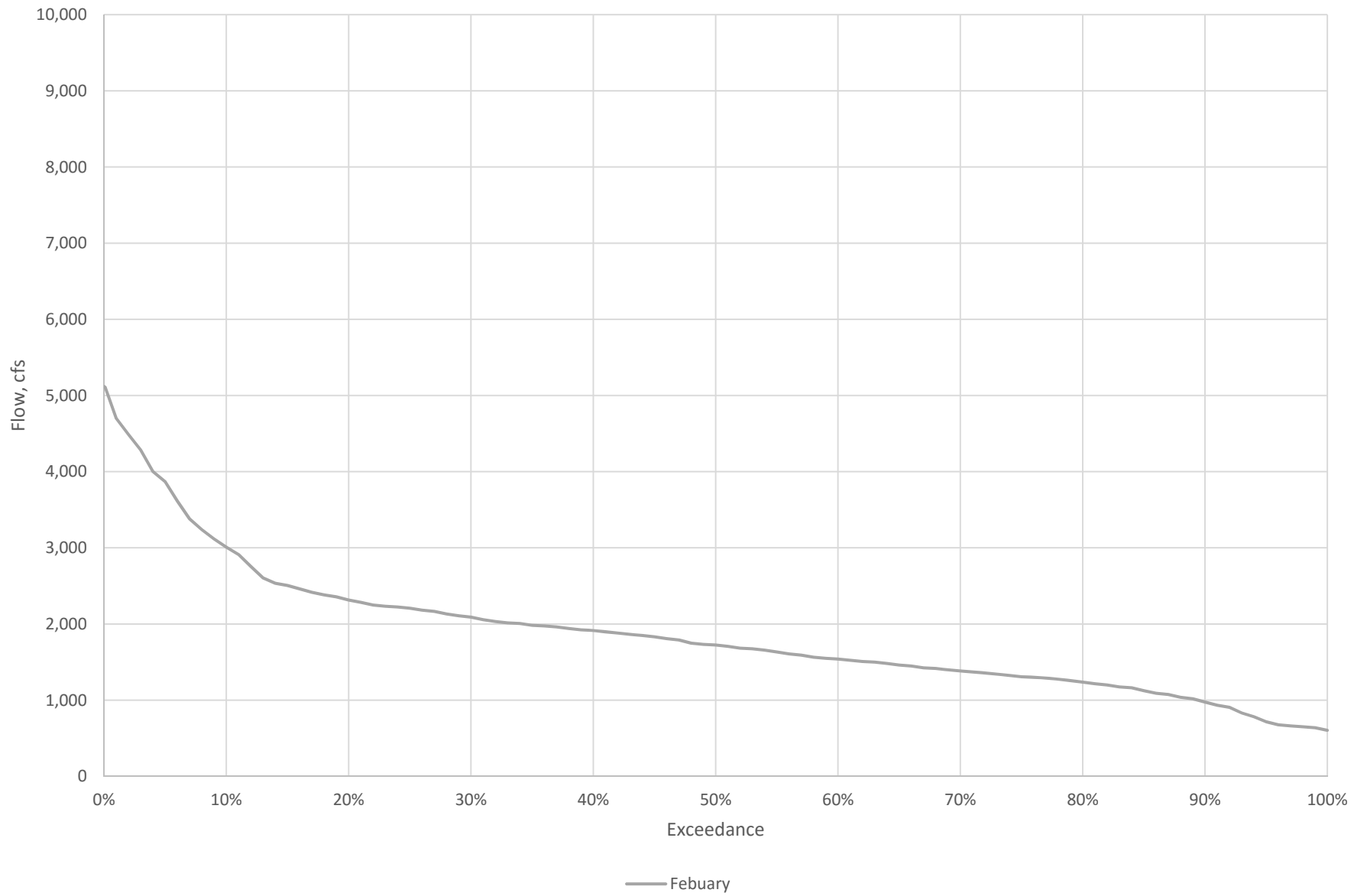
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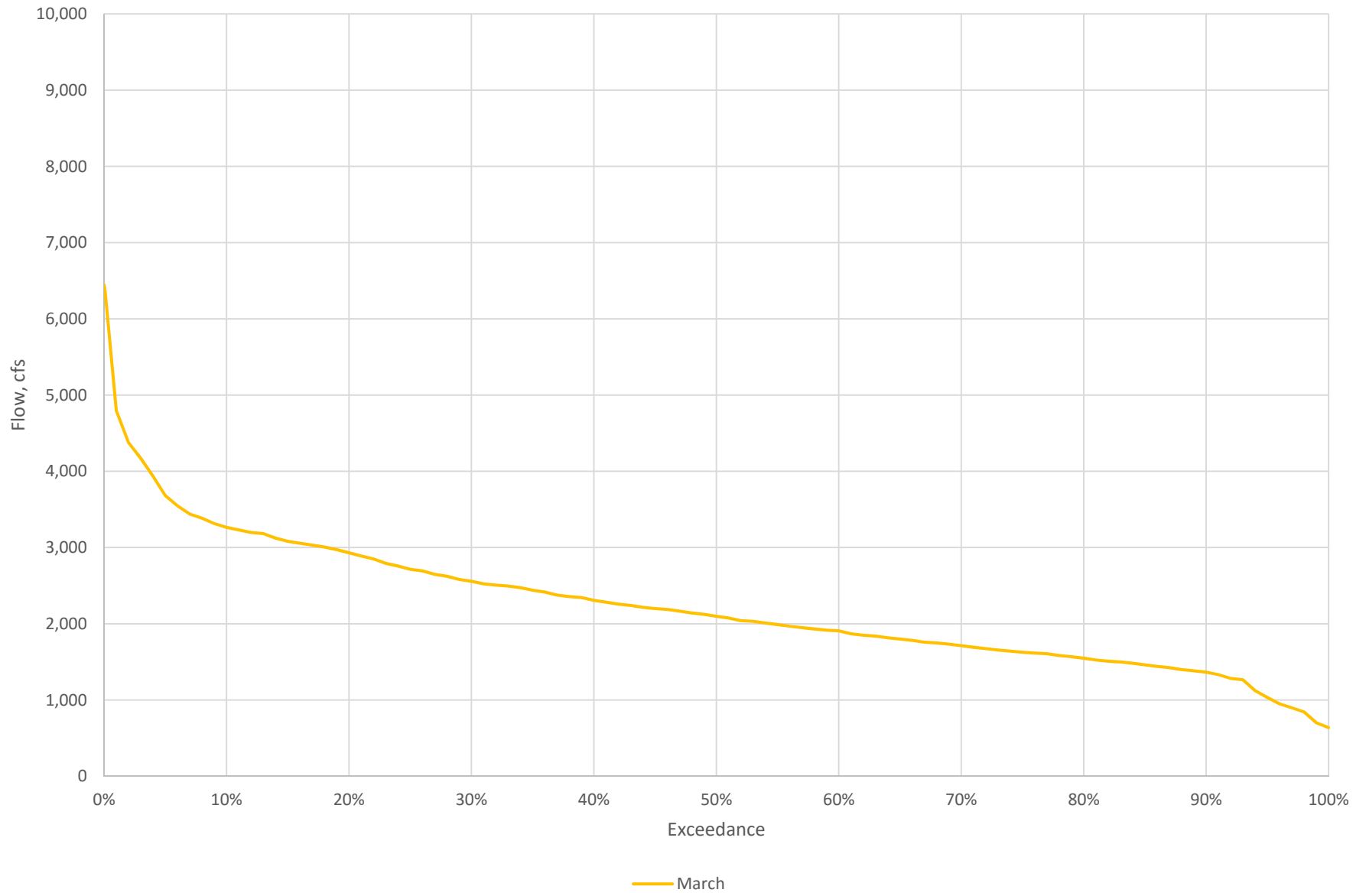
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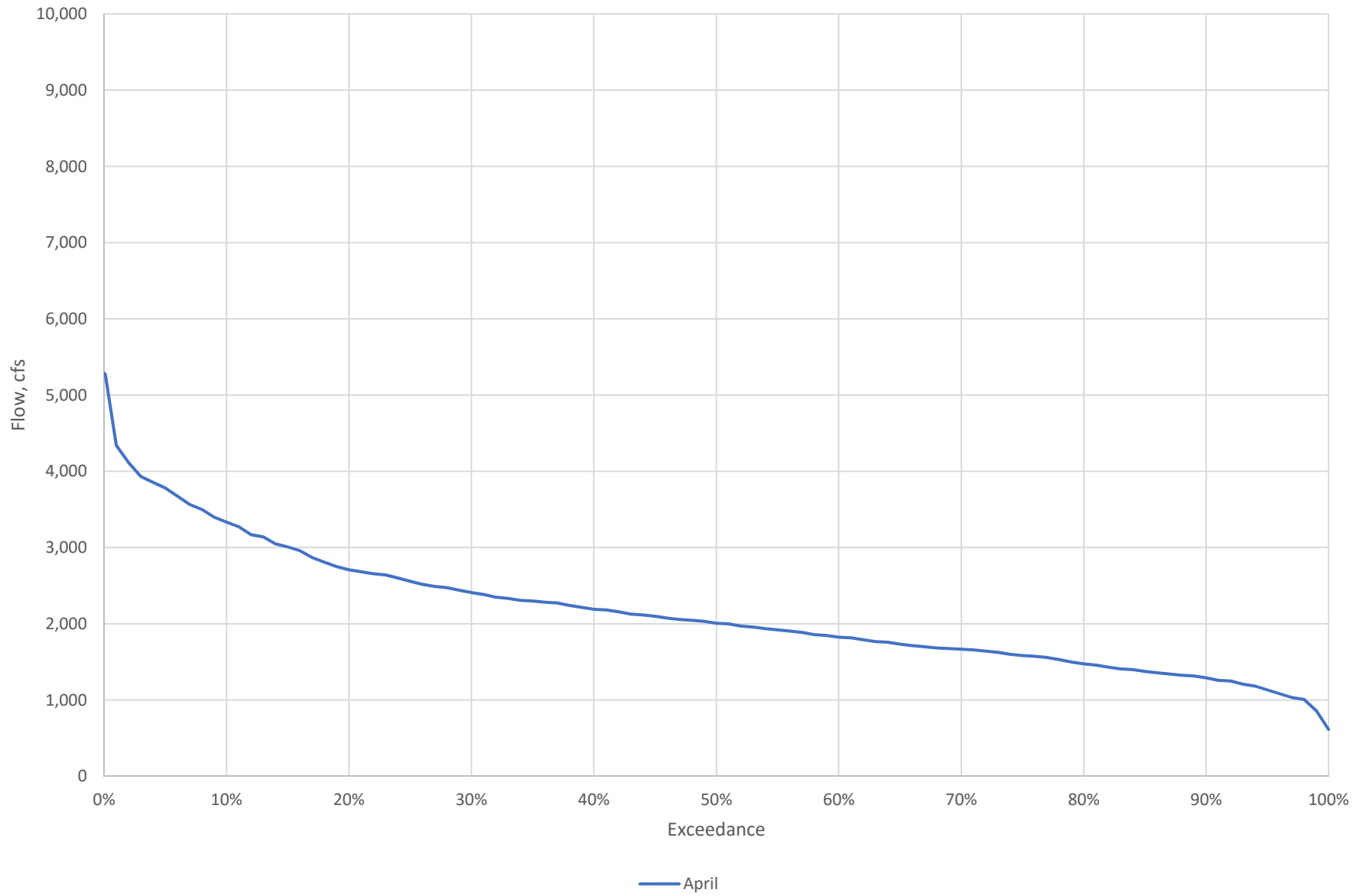
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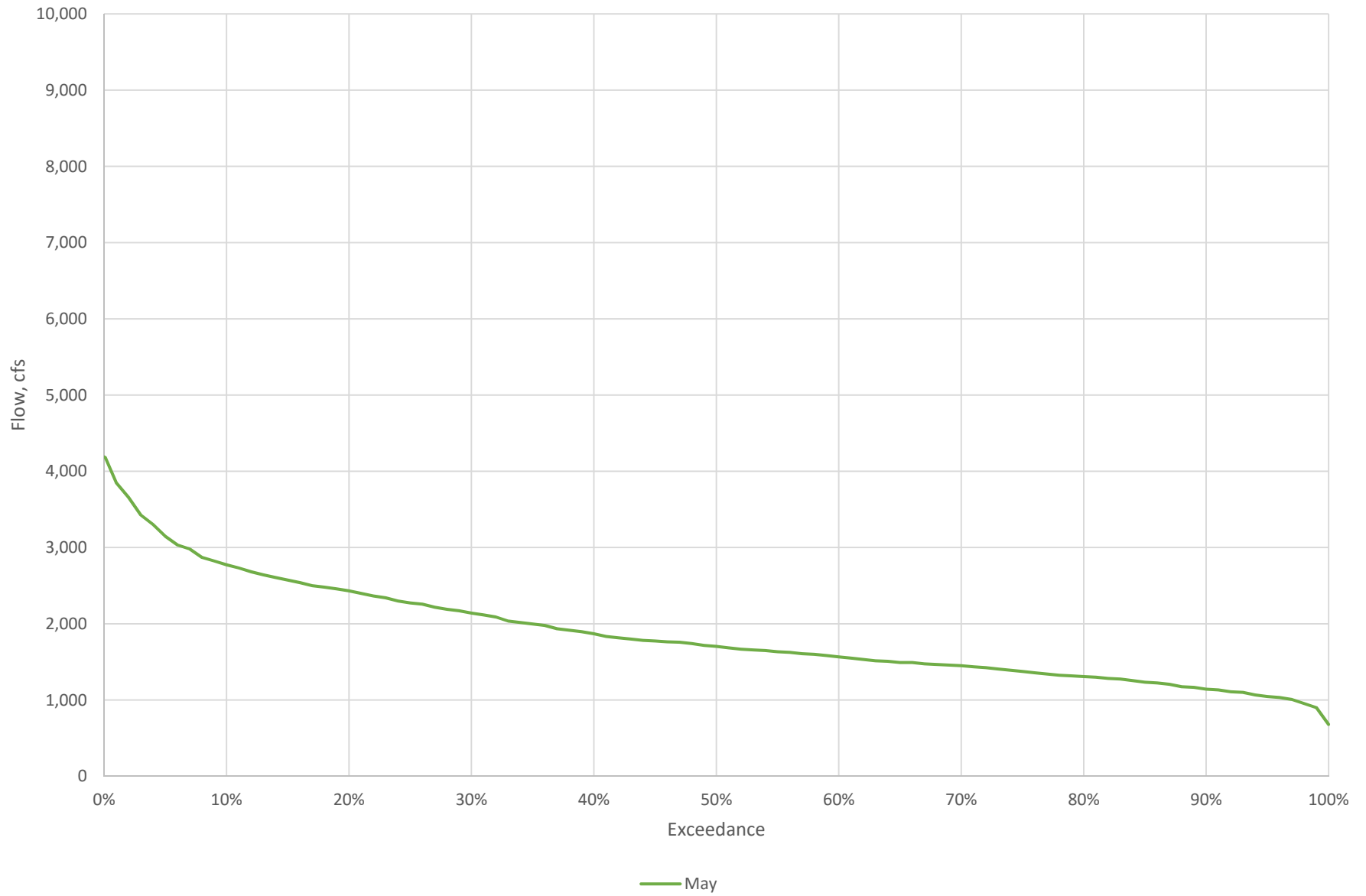
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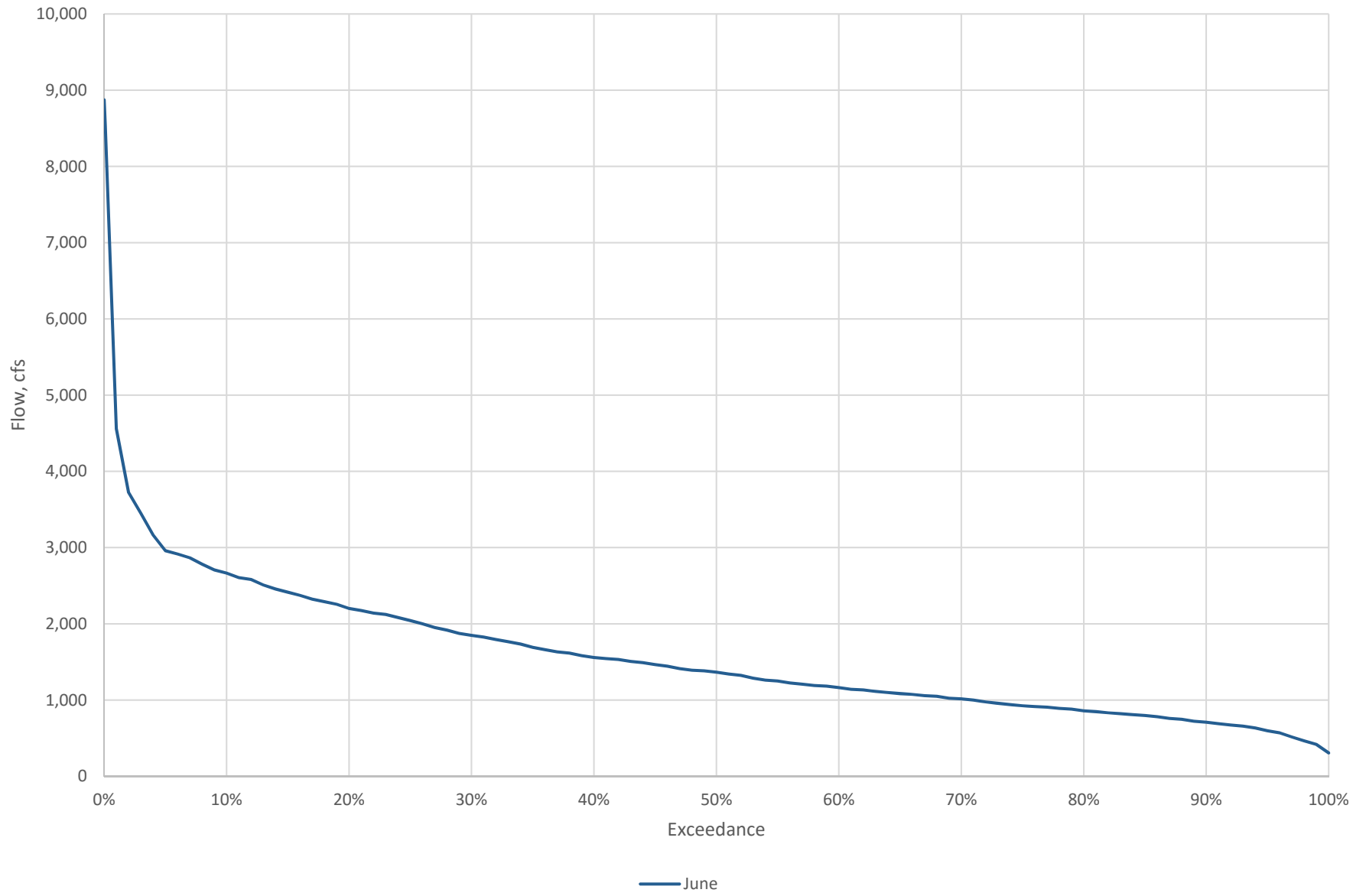
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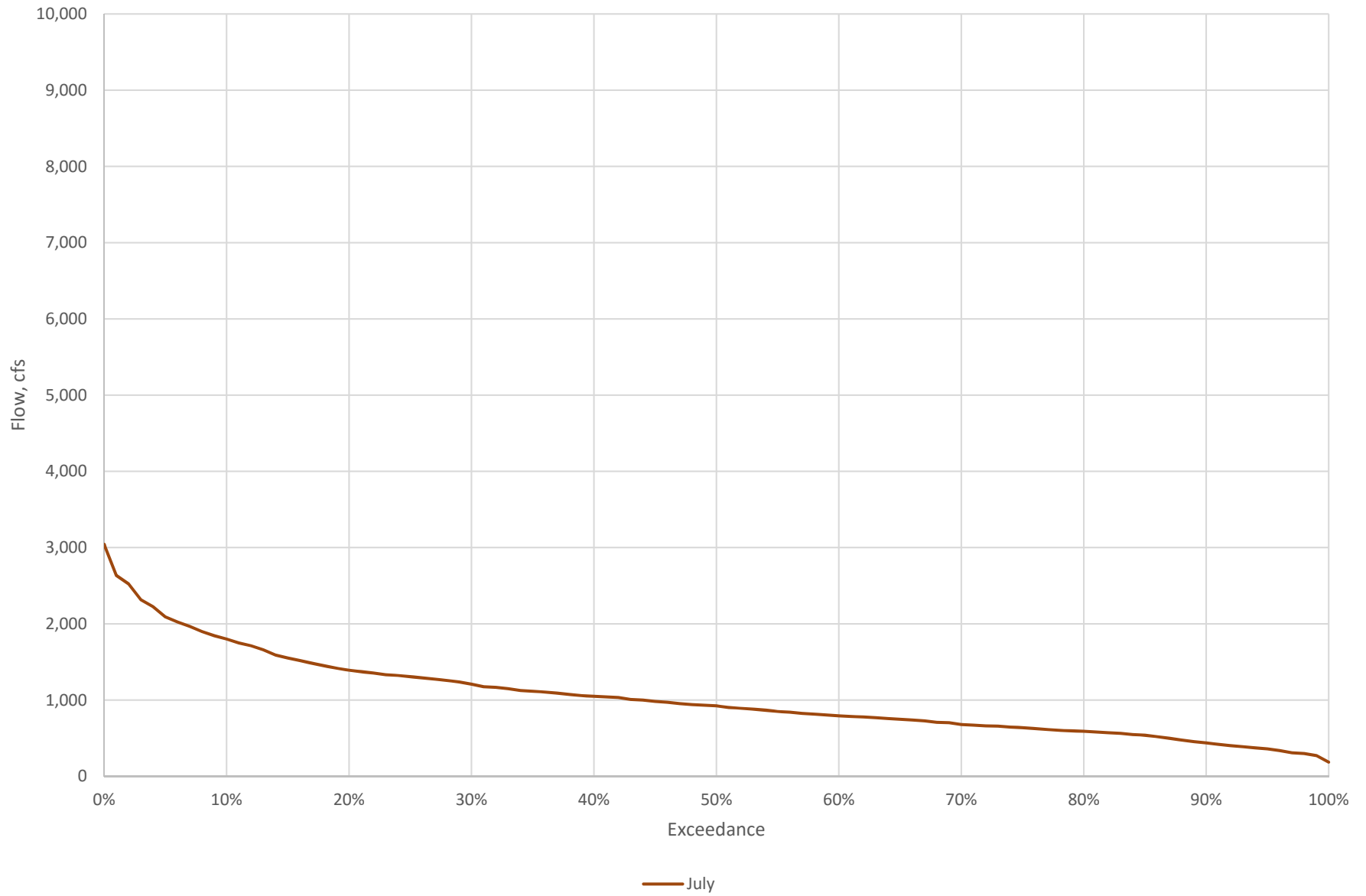
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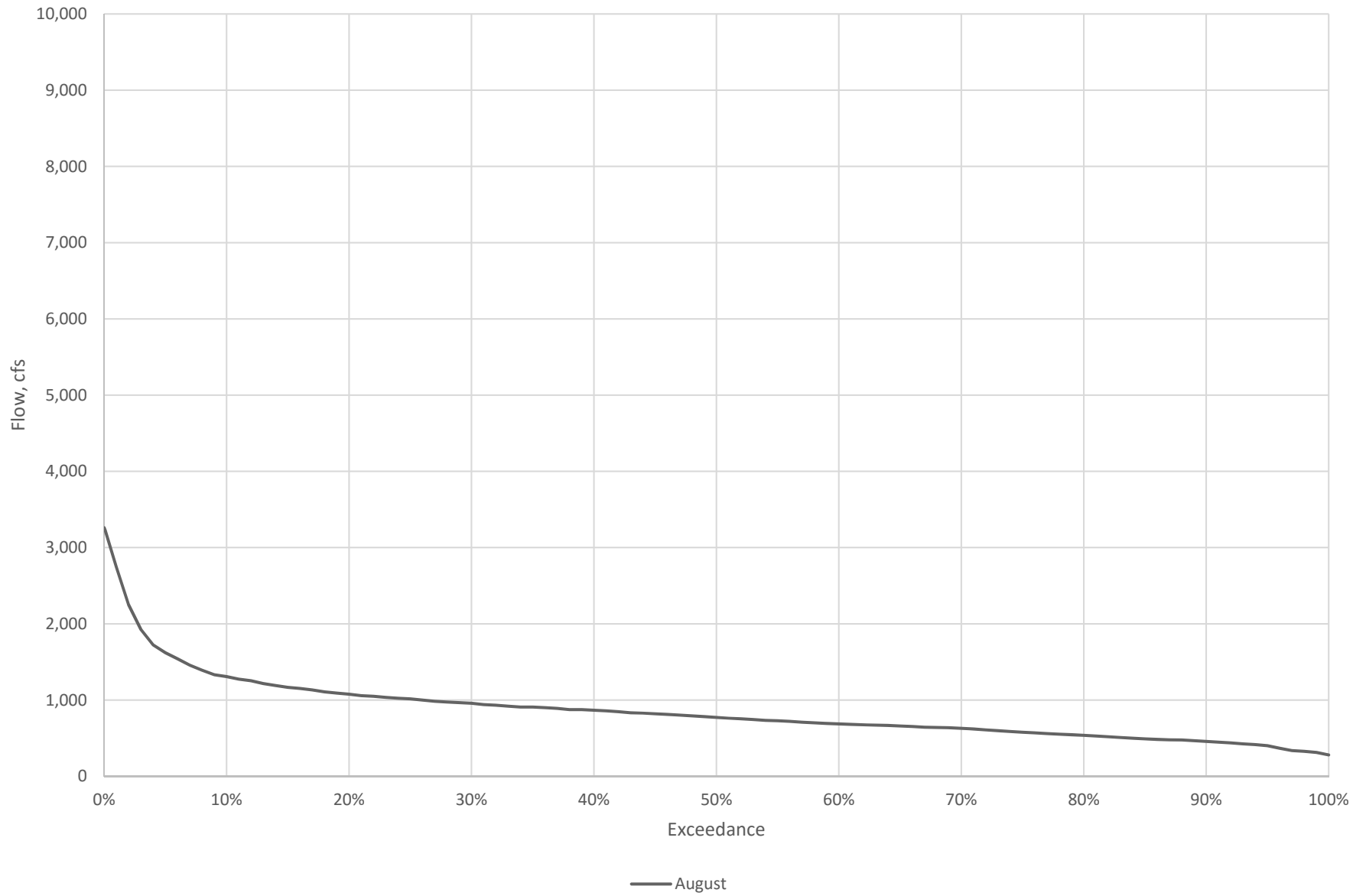
Flow Exceedance Constantine: Water Year 1987-2016



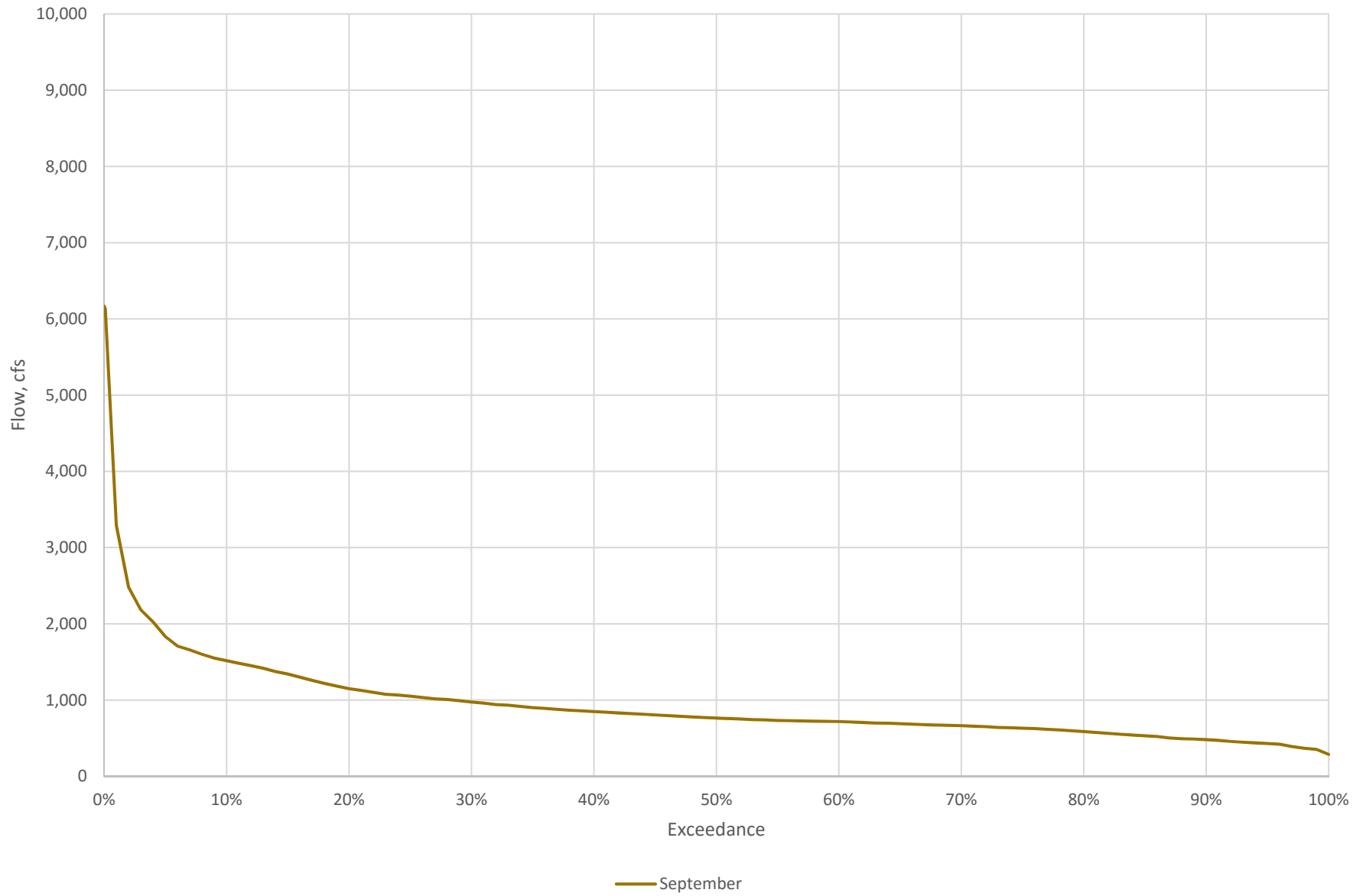
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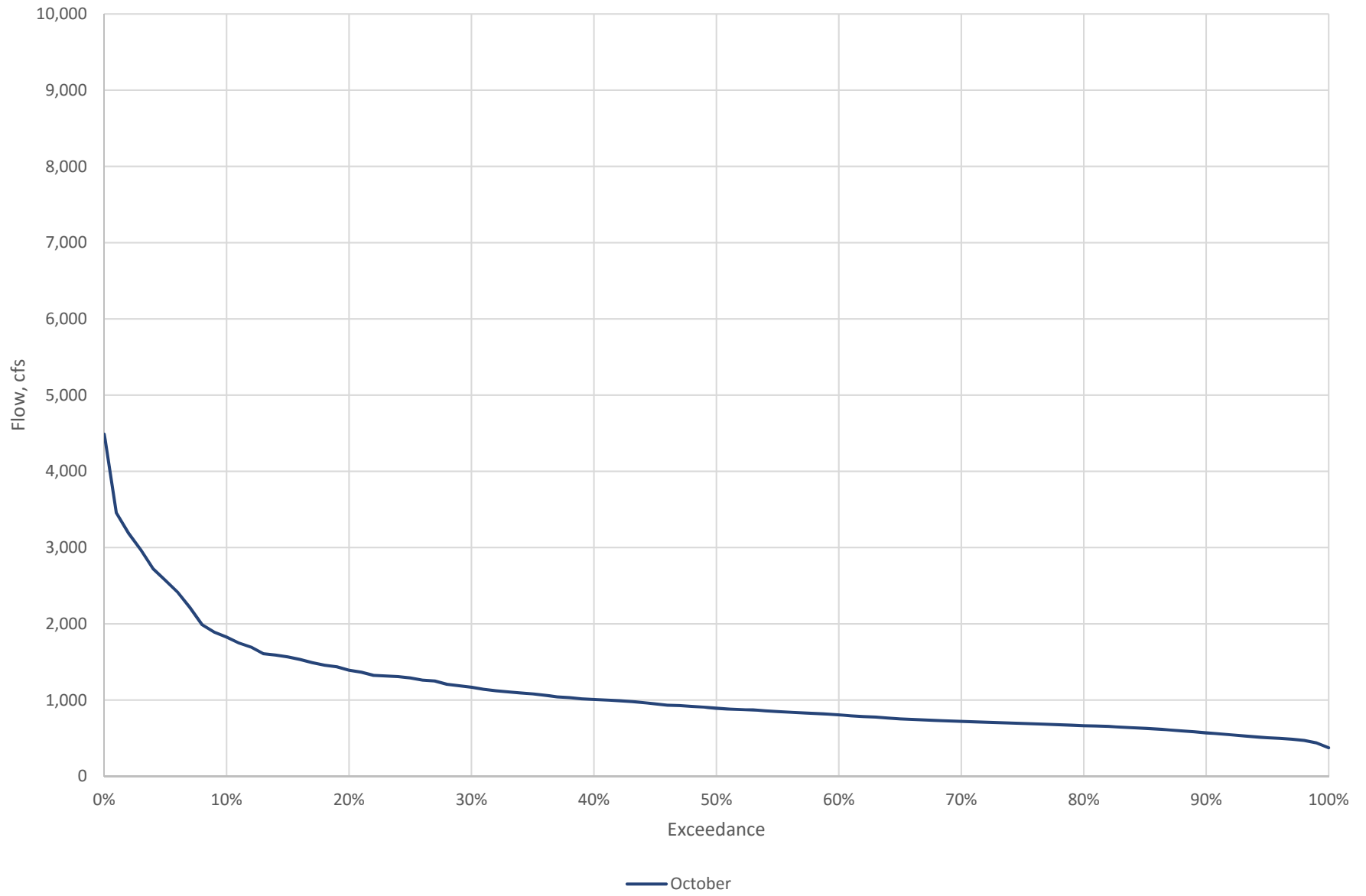
Flow Exceedance Constantine: Water Year 1987-2016



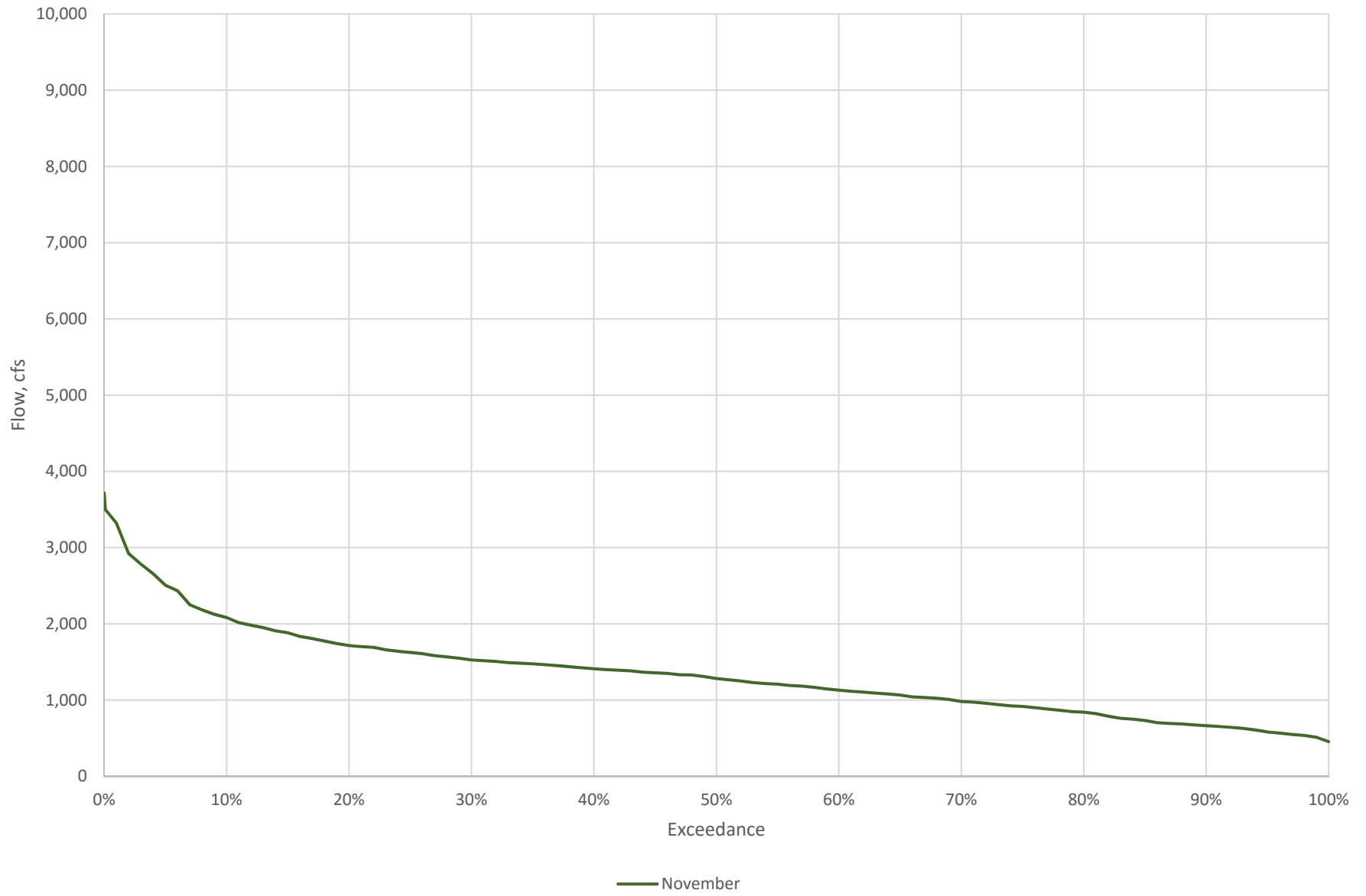
Flow Exceedance Constantine: Water Year 1987-2016



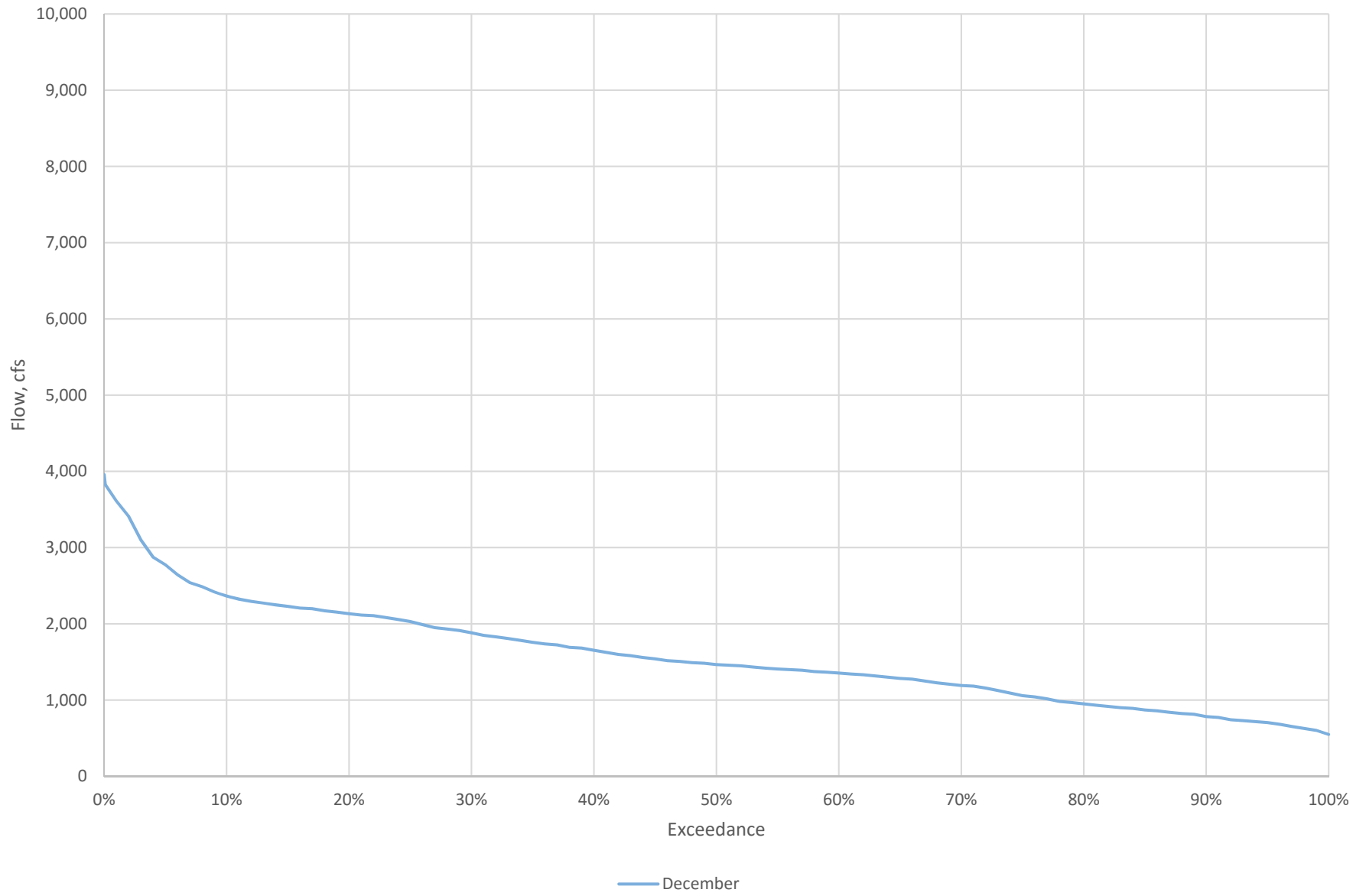
Flow Exceedance Constantine: Water Year 1987-2016



Flow Exceedance Constantine: Water Year 1987-2016



Flow Exceedance Constantine: Water Year 1987-2016



APPENDIX F
FERC FORM 80

Federal Energy Regulatory
Commission (FERC)
FERC Form 80

Licensed Hydropower Development Recreation Report

Form Approved
OMB No. 1902-0106
Expires: 09/30/2016
Burden 3.0 hours

General Information:

This form collects data on recreation amenities at projects licensed by FERC under the Federal Power Act (16 USC 791a-825r). This form must be submitted by licensees of all projects except those specifically exempted under 18 CFR 8.11 (c). For regular, periodic filings, submit this form on or before April 1, 2015. Submit subsequent filings of this form on or before April 1, every 6th year thereafter (for example, 2021, 2027, etc.). For initial Form No. 80 filings (18CFR 8.11(b)), each licensee of an unconstructed project shall file an initial Form No. 80 after such project has been in operation for a full calendar year prior to the filing deadline. Each licensee of an existing (constructed) project shall file an initial Form No. 80 after such project has been licensed for a full calendar year prior to the filing deadline. Filing electronically is preferred. (See <http://www.ferc.gov> for more information.) If you cannot file electronically, submit an original and two copies of the form to the: Federal Energy Regulatory Commission, Office of the Secretary, 888 First St., NE, Washington, DC 20426.

The public burden estimated for this form is three hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing the collection of information. Send comments regarding the burden estimate or any aspect of this collection of information, including suggestions for reducing burden, to: FERC via e-mail DataClearance@ferc.gov; or mail to 888 First Street NE, Washington, DC 20426 (Attention: Information Clearance Officer) and Office of Management and Budget (OMB), via e-mail to oir_submission@omb.eop.gov; or mail to OMB, Office of Information and Regulatory Affairs, Attention: Desk Officer for FERC, Washington, DC 20503. Include OMB Control Number 1902-0106 as a point of reference. No person shall be subject to any penalty for failing to comply with a collection of information if the collection of information does not display a valid control number (44 U.S.C. § 3512 (a)).

Instructions:

- All data reported on this form must represent publicly available recreation amenities and services located within the project boundary.
- To ensure a common understanding of terms, please refer to the Glossary on page 3.
- Report actual data for each item. If actual data are unavailable, then please estimate.
- Submit a completed form for each development at your project.

Schedule 1. General Data

1. Licensee Name: _____		Complete the following for each development if more than one.	
2. Project Name: _____		8. Reservoir Surface Area at Normal Pool (acres): _____	
3. Project Number: _____		9. Shoreline Miles at Normal Pool: _____	
4. Development Name: _____		10. Percent of Shoreline Available for Public Use: _____	
States Development/Project Traverses (List state with largest area within the development/project boundary first):		11. Data Collection Methods (enter percent for each method used; total must equal 100%):	
5. State #1: _____		_____ traffic count/trail count	
6. State #2: _____		_____ attendance records	
7. Type of Project License: Major _____		_____ staff observation	
(check one) Minor _____		_____ visitor counts or surveys	
		_____ estimate (explain)	
For 2014, enter only the licensee's annual recreational construction, operation, and maintenance costs for the development (project). Also, enter the annual recreational revenues for that year.			
Item	Licensee's Annual Recreation Costs and Revenues (In Whole Dollars)		
	Construction, Operation and Maintenance Costs		Recreation Revenues for Calendar Year
12. Dollar Values			
13. Length of Recreation Season: Summer: From (MM/DD) _____ To _____ Winter: From (MM/DD) _____ To _____			
Period	Number of visits to all recreational areas at development/project (in Recreation Days)		
	Annual Total		Peak Weekend Average (see Glossary)
14. Daytime			
15. Nighttime			

Respondent Certification: The undersigned certifies that he/she examined this report; and to the best of his/her knowledge, all data provided herein are true, complete, and accurate.

Legal Name

Title

Area Code/Phone No.

Signature

Date Signed

Reporting Year Ending

Title 18 U.S.C.1001 makes it a crime for any person knowingly and willingly to make to any Agency or department of the United States any false, fictitious or fraudulent statement or misrepresentation as to any matter within its jurisdiction.

Schedule 2. Inventory of Publicly Available Recreation Amenities Within the Project Boundary

16. Enter data for each Recreation Amenity Type (a). For User Free (b) and User Fee (c) enter the number of publicly available recreation amenities, located within the project boundary, regardless of provider. For FERC Approved (d) enter the number of amenities identified under User Free (b) and User Fee (c) for which the licensee has an ongoing responsibility for funding or maintenance (see Glossary for further detail). For Capacity Utilization(f), of the total publicly available amenities (b) + (c), compare the average non-peak weekend use (see Glossary) for each recreation amenity type (during the recreation season, with the highest use, reported on Schedule 1, Item 13) with the total combined capacity of each amenity type and enter a percentage that indicates their overall level of use. For example, if all public boat launches are used to half capacity during the non-peak weekend days, enter 50% (should use exceed capacity for an amenity type, enter the appropriate percentage above 100).

Recreation Amenity Type (a)	Number of Recreation Amenities			Total Units (e)	Capacity Utilization (%) (f)
	User Free (b)	User Fee (c)	FERC Approved (d)		
Boat Launch Areas. Improved areas having one or more boat launch lanes (enter number in column e) and are usually marked with signs, have hardened surfaces, and typically have adjacent parking.				Lanes	
Marinas. Facilities with more than 10 slips on project waters, which include one or more of the following: docking, fueling, repair and storage of boats; boat/equipment rental; or sell bait/food (see Glossary FERC approved).				N/A	
Whitewater Boating. Put-ins/Take-outs specifically designated for whitewater access.				N/A	
Portages. Sites designed for launching and taking out canoes/kayaks and the improved, designated, and maintained trails connecting such sites (enter length of trail in column e).				Feet	
Tailwater Fishing. Platforms, walkways, or similar structures to facilitate below dam fishing.				N/A	
Reservoir Fishing. Platforms, walkways, or similar structures to facilitate fishing in the reservoir pool or feeder streams.				N/A	
Swim Areas. Sites providing swimming facilities (bath houses, designated swim areas, parking and sanitation facilities).				Acres	
Trails. Narrow tracks used for non-automobile recreation travel which are mapped and designated for specific use(s) such as hiking, biking, horseback riding, snowmobiling, or XC skiing (excludes portages, paths or accessible routes; See Glossary).				Miles	
Active Recreation Areas. Playground equipment, game courts/fields, golf/disc golf courses, jogging tracks, etc.				Acres	
Picnic Areas. Locations containing one or more picnic sites (each of which may include tables, grills, trash cans, and parking).				Sites	
Overlooks/Vistas. Sites established to view scenery, wildlife, cultural resources, project features, or landscapes.				Acres	
Visitor Centers. Buildings where the public can gather information about the development/project, its operation, nearby historic, natural, cultural, recreational resources, and other items of interest.				N/A	
Interpretive Displays. Signage/Kiosks/Billboards which provide information about the development/project, its operation, nearby historic, natural, cultural, recreational resources, and other items of interest.				N/A	N/A
Hunting Areas. Lands open to the general public for hunting.				Acres	
Winter Areas. Locations providing opportunities for skiing, sledding, curling, ice skating, or other winter activities.				Acres	
Campgrounds. Hardened areas developed to cluster campers (may include sites for tents, trailers, recreational vehicles [RV], yurts, cabins, or a combination, but excludes group camps).				Acres	N/A
Campsites. Sites for tents, trailers, recreational vehicles [RV], yurts, cabins, or a combination of temporary uses.				N/A	
Cottage Sites. Permanent, all-weather, buildings rented for short-term use, by the public, for recreational purposes.				N/A	
Group Camps. Areas equipped to accommodate large groups of campers that are open to the general public (may be operated by public, private, or non-profit organizations).				Sites	
Dispersed Camping Areas. Places visitors are allowed to camp outside of a developed campground (enter number of sites in clmn. e).				Sites	
Informal Use Areas. Well used locations which typically do not include amenities, but require operation and maintenance and/or public safety responsibilities					
Access Points. Well-used sites (not accounted for elsewhere on this form) for visitors entering project lands or waters, without trespassing, for recreational purposes (may have limited development such as parking, restrooms, signage).				N/A	
Other. Amenities that do not fit in the categories identified above. Please specify (if more than one, separate by commas):					

Glossary of FERC Form 80 Terms

Data Collection Methods. (Schedule 1, Item 11) – If a percentage is entered for the estimate alternative, please provide an explanation of the methods used (if submitted on a separate piece of paper, please include licensee name, project number, and development name)

Development. The portion of a project which includes:

- (a) a reservoir; or
- (b) a generating station and its specifically-related waterways.

Exemption from Filing. Exemption from the filing of this form granted upon Commission approval of an application by a licensee pursuant to the provisions of 18 CFR 8.11(c).

General Public. Those persons who do not have special privileges to use the shoreline for recreational purposes, such as waterfront property ownership, water-privileged community rights, or renters with such privileges.

Licensee. Any person, state, or municipality licensed under the provisions of Section 4 of the Federal Power Act, and any assignee or successor in interest. For the purposes of this form, the terms licensee, owner, and respondent are interchangeable *except where*:

- (a) the *owner* or licensee is a subsidiary of a parent company which has been or is required to file this form; or
- (b) there is more than one owner or licensee, of whom only one is responsible for filing this form. Enter the name of the entity that is responsible for filing this report in Schedule 1, Item 2.1.

Major License. A license for a project of more than 1,500 kilowatts installed capacity.

Minor License. A license for a project of 1,500 kilowatts or less installed capacity.

Non-Peak Weekend. Any weekend that is not a holiday and thus reflects more typical use during the recreation season.

Number of Recreation Amenities. Quantifies the availability of natural or man-made property or facilities for a given recreation amenity type. This includes all recreation resources available to the public within the development/project boundary. The resources are broken into the following categories:

User Free (Schedule 2, column b) - Those amenities within the development/project that are free to the public;

User Fee (Schedule 2, column c) - Those amenities within the development/project where the licensee/facility operator charges a fee;

FERC Approved (Schedule 2, column d) – Those amenities within the development/project required by the Commission in a license or license amendment document, including an approved recreation plan or report. Recreation amenities that are within the project boundary, but were approved by the licensee through the standard land use article or by the Commission through an application for non-project use of project lands and waters, are typically not counted as FERC approved, unless they are available to the public, but may be counted as either user free or user fee resources. The total FERC approved amenities column does not necessarily have to equal the sum of user free and user fee amenities.

Peak Use Weekend. Weekends when recreational use is at its peak for the season (typically Memorial Day, July 4th & Labor Day). On these weekends, recreational use may exceed the capacity of the area to handle such use. Include use for all three days in the holiday weekends when calculating Peak Weekend Average for items 14 & 15 on Schedule 1.

Recreation Day. Each visit by a person to a development (as defined above) for recreational purposes during any portion of a 24-hour period.

Revenues. Income generated from recreation amenities at a given project/development during the previous calendar year. Includes fees for access or use of area.

Total Units (Schedule 2, column e) – Provide the total length, or area, or number that is appropriate for each amenity type using the metric provided.

Trails. Narrow tracks used for non-automobile recreation travel which are mapped and designated for specific use(s) such as hiking, biking, horseback riding, snowmobiling, or XC skiing. Trails are recreation amenities which provide the opportunity to engage in recreational pursuits, unlike paths (means of egress whose primary purpose is linking recreation amenities at a facility) or accessible routes (means of egress which meets the needs of persons with disability and links accessible recreation amenities and infrastructure at a facility).

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Indiana Michigan Power Company

Project No. 10661-050

NOTICE OF INTENT TO FILE LICENSE APPLICATION, FILING OF PRE-APPLICATION DOCUMENT (PAD), COMMENCEMENT OF PRE-FILING PROCESS, AND SCOPING; REQUEST FOR COMMENTS ON THE PAD AND SCOPING DOCUMENT, AND IDENTIFICATION OF ISSUES AND ASSOCIATED STUDY REQUESTS

(July 25, 2018)

- a. Type of Filing: Notice of Intent to File License Application for a New License and Commencing Pre-filing Process
- b. Project No.: 10661-050
- c. Dated Filed: June 4, 2018
- d. Submitted By: Indiana Michigan Power Company
- e. Name of Project: Constantine Project
- f. Location: The Constantine Project is located on the St. Joseph River in the Village of Constantine, Michigan. The project does not occupy federal land.
- g. Filed Pursuant to: 18 CFR part 5 of the Commission's Regulations
- h. Potential Applicant Contact: David Hoffman, Director Field & Support Services, c/o Jonathan Magalski, Environmental Specialist Consultant, American Electric Power Service Corporation, 1 Riverside Plaza, Columbus, Ohio 43215; (614) 716-2240; jmmagalski@aep.com.
- i. FERC Contact: Lee Emery at (202) 502-8379 or e-mail at lee.emery@ferc.gov.
- j. Cooperating agencies: Federal, state, local, and tribal agencies with jurisdiction and/or special expertise with respect to environmental issues that wish to cooperate in the preparation of the environmental document should follow the instructions for filing such requests described in paragraph o below. Cooperating agencies should note the Commission's policy that agencies that cooperate in the preparation of the environmental document cannot also intervene. *See* 94 FERC ¶ 61,076 (2001).

- k. With this notice, we are initiating informal consultation with: (a) the U.S. Fish and Wildlife Service and/or NOAA Fisheries under section 7 of the Endangered Species Act and the joint agency regulations thereunder at 50 CFR part 402 and (b) the State Historic Preservation Officer, as required by section 106, National Historic Preservation Act, and the implementing regulations of the Advisory Council on Historic Preservation at 36 CFR 800.2.
- l. With this notice, we are designating Indiana Michigan Power Company as the Commission's non-federal representative for carrying out informal consultation, pursuant to section 7 of the Endangered Species Act and section 106 of the National Historic Preservation Act.
- m. Indiana Michigan Power Company filed with the Commission a Pre-Application Document (PAD); including a proposed process plan and schedule, pursuant to 18 CFR 5.6 of the Commission's regulations.
- n. A copy of the PAD is available for review at the Commission in the Public Reference Room or may be viewed on the Commission's website (<http://www.ferc.gov>), using the "eLibrary" link. Enter the docket number, excluding the last three digits in the docket number field to access the document. For assistance, contact FERC Online Support at FERCONlineSupport@ferc.gov, (866) 208-3676 (toll free), or (202) 502-8659 (TTY). A copy is also available for inspection and reproduction at the address in paragraph h.

Register online at <http://www.ferc.gov/docs-filing/esubscription.asp> to be notified via e-mail of new filing and issuances related to this or other pending projects. For assistance, contact FERC Online Support.

- o. With this notice, we are soliciting comments on the PAD and Commission's staff Scoping Document 1 (SD1), as well as study requests. All comments on the PAD and SD1, and study requests should be sent to the address above in paragraph h. In addition, all comments on the PAD and SD1, study requests, requests for cooperating agency status, and all communications to and from Commission staff related to the merits of the potential application must be filed with the Commission.

The Commission strongly encourages electronic filing. Please file all documents using the Commission's eFiling system at <http://www.ferc.gov/docs-filing/efiling.asp>. Commenters can submit brief comments up to 6,000 characters, without prior registration, using the eComment system at <http://www.ferc.gov/docs-filing/ecomment.asp>. You must include your name and contact information at the end of your comments. For assistance, please contact FERC Online Support at FERCONlineSupport@ferc.gov. In lieu of electronic

filing, please send a paper copy to: Secretary, Federal Energy Regulatory Commission, 888 First Street, NE, Washington, D.C. 20426. The first page of any filing should include docket number P-10661-050.

All filings with the Commission must bear the appropriate heading: “Comments on Pre-Application Document,” “Study Requests,” “Comments on Scoping Document 1,” “Request for Cooperating Agency Status,” or “Communications to and from Commission Staff.” Any individual or entity interested in submitting study requests, commenting on the PAD or SD1, and any agency requesting cooperating status must do so by **October 2, 2018**.

- p. Although our current intent is to prepare an environmental assessment (EA), there is the possibility that an Environmental Impact Statement (EIS) will be required. Nevertheless, this meeting will satisfy the NEPA scoping requirements, irrespective of whether an EA or EIS is issued by the Commission.

Scoping Meetings

Commission staff will hold two scoping meetings in the vicinity of the project at the time and place noted below. The daytime meeting will focus on resource agency, Indian tribes, and non-governmental organization concerns, while the evening meeting is primarily for receiving input from the public. We invite all interested individuals, organizations, and agencies to attend one or both of the meetings, and to assist staff in identifying particular study needs, as well as the scope of environmental issues to be addressed in the environmental document. The times and locations of these meetings are as follows:

Daytime Scoping Meeting

Date and Time: Wednesday, August 29, 2018 at 9:00 a.m.
 Location: Village Hall
 115 White Pigeon Street
 Constantine, Michigan 49042
 Phone Number: [\(269\) 435-2085](tel:(269)435-2085)

Evening Scoping Meeting

Date and Time: Tuesday, August 28, 2018 at 6:30 p.m.
 Location: Village Hall
 115 White Pigeon Street
 Constantine, Michigan 49042
 Phone Number: [\(269\) 435-2085](tel:(269)435-2085)

Scoping Document 1 (SD1), which outlines the subject areas to be addressed in the environmental document, was mailed to the individuals and entities on the

Commission's mailing list. Copies of SD1 will be available at the scoping meetings, or may be viewed on the web at <http://www.ferc.gov>, using the "eLibrary" link. Follow the directions for accessing information in paragraph n. Based on all oral and written comments, a Scoping Document 2 (SD2) may be issued. SD2 may include a revised process plan and schedule, as well as a list of issues, identified through the scoping process.

Environmental Site Review

The potential applicant and Commission staff will conduct an Environmental Site Review of the project on Tuesday, August 28, 2018, starting at 9:00 a.m. All participants should meet at the Constantine Project powerhouse, located at 155 North Washington Avenue, Constantine, Michigan 49042. Please notify Jonathan Magalski at jmmagalski@aep.com (preferred contact) or at (614) 716-2240 by August 17, 2018, if you plan to attend the environmental site review.

Meeting Objectives

At the scoping meetings, staff will: (1) initiate scoping of the issues; (2) review and discuss existing conditions and resource management objectives; (3) review and discuss existing information and identify preliminary information and study needs; (4) review and discuss the process plan and schedule for pre-filing activity that incorporates the time frames provided for in Part 5 of the Commission's regulations and, to the extent possible, maximizes coordination of federal, state, and tribal permitting and certification processes; and (5) discuss the appropriateness of any federal or state agency or Indian tribe acting as a cooperating agency for development of an environmental document.

Meeting participants should come prepared to discuss their issues and/or concerns. Please review the PAD in preparation for the scoping meetings. Directions on how to obtain a copy of the PAD and SD1 are included in paragraph n of this document.

Meeting Procedures

The meetings will be recorded by a stenographer and will be placed in the public records of the project.

Kimberly D. Bose,
Secretary.

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D.C. 20426
September 27, 2018

OFFICE OF ENERGY PROJECTS

Project No. 10661-050 – Michigan
Constantine Hydroelectric Project
Indiana and Michigan Power Company

Jonathan Magalski
Environmental Consultant Specialist
Indiana Michigan Power Company
1 Riverside Plaza
Columbus, OH 43215

**Reference: Comments on Preliminary Study Plans, Request for Studies, and
Additional Information**

Dear Mr. Magalski:

After reviewing the Constantine Hydroelectric Project's Pre-Application Document, the transcripts of the scoping meetings held on August 28 and 29, 2018, and participating in a project environmental site review on August 28, 2018, we have determined that additional information is needed to adequately assess potential project effects on environmental resources. We have one study request (enclosed in Schedule A) for botanical resources, and recommend that you consider our comments on your preliminary study plans (enclosed in Schedule B). We also have additional information needs (enclosed in Schedule C). Unless otherwise noted, please provide the requested additional information when you file your proposed study plan, which must be filed by November 16, 2018.

Please include in your proposed study plan a master schedule that includes the estimated start and completion date of all field studies, when progress reports will be filed, who will receive the reports and in what format, and the filing date of the initial study report. All studies, including fieldwork, should be initiated and completed during the first study season, and the study reports should be filed as a complete package. If, based on the study results, you are likely to propose any plans for measures to address project effects, drafts of those plans should be filed with your Preliminary Licensing Proposal (or draft license application).

Please note that we may, upon receipt and review of scoping comments/study requests from other entities due October 2, 2018, as well as your proposed study plan, request additional studies or information at a later time.

Project No. 10661-050

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If you have any questions, please contact Lee Emery at (202) 502-8379, or via e-mail at lee.emery@ferc.gov.

Sincerely,

Janet Hutzal, Chief
Midwest Branch
Division of Hydropower Licensing

Enclosures: Schedule A
Schedule B
Schedule C

Schedule A
P-10661-050

Schedule A

Study Requests

After reviewing the information in the Pre-Application Document (PAD), we have identified information that is needed to assess project effects. As required by section 5.9 of the Commission's regulations, we have addressed the seven study request criteria in the study requests that follow.

Botanical Resources Study

§5.9(b)(1) – *Describe the goals and objectives of each study proposal and the information to be obtained.*

The goal of the study is to develop additional information necessary to address the potential effects of project operation and maintenance activities on botanical resources within the project boundary. The results of this study would be used to determine how potential effects can be avoided, minimized, or otherwise mitigated.

The objectives of the botanical resources study are as follows:

- 1) map and/or confirm vegetation types within the project boundary, including age-class and composition of forested areas. Please include the presence of trees with ≥ 5 inches diameter at breast height with exfoliating bark and snags, which are characteristic of Indiana and/or northern long-eared bat habitat;
- 2) identify and map any rare, threatened, or endangered plant species or potential habitats, specifically the federally threatened Eastern prairie-fringed orchid and state threatened water willow; and
- 3) document the presence, abundance, and location of invasive plant species, specifically the presence of emerging invasive plants such as the European frog-bit and pond-water starwort.

§5.9(b)(2) – *If applicable, explain the relevant resource management goals of the agencies or Indian tribes with jurisdiction over the resource to be studied.*

Not applicable.

§5.9(b)(3) – *If the requester is not a resource agency, explain any relevant public interest considerations in regard to the proposed study.*

Sections 4(e) and 10(a) of the Federal Power Act require the Commission to give equal consideration to all uses of the waterway on which a project is located, and what conditions should be placed on any license that may be issued. In making its license decision, the Commission must equally consider the environmental, recreational, fish and

wildlife, and other non-developmental values of the project, as well as power and developmental values.

The Constantine Hydroelectric Project (Constantine Project) provides habitat for a variety of plants and animals. An understanding of the botanical resources within the project boundary would provide information on the type, abundance, and location of habitat potentially affected by continued operation and maintenance of the project. Understanding the project's effects on botanical resources is relevant to the Commission's public interest determination.

§5.9(b)(4) – Describe existing information concerning the subject of the study proposal, and the need for additional information.

In the PAD, Indiana and Michigan Power Company (I&M Power) provides a general discussion of vegetation types common to the ecoregion, but omits a substantive discussion of botanical resources at the project. In addition, I&M Power references information on botanical resources from reports from dating back to 1975; however, the PAD does not provide current information regarding the plants or animals that make use of this habitat. Therefore, we cannot determine the potential project effects on botanical resources in the project boundary.

§5.9(b)(5) – Explain any nexus between project operations and effects (direct, indirect, and/or cumulative) on the resource to be studied, and how the study results would inform the development of license requirements.

Project operation and maintenance activities have the potential to disturb botanical resources in the project boundary that could provide habitat for federally listed endangered or threatened species, including the Indiana and northern long-eared bats. This study would assist in identifying plant species and their habitats within the project and provide baseline information from which to evaluate the effects of continued operation and maintenance of the Constantine Project on those resources.

§5.9(b)(6) – Explain how any proposed study methodology (including any preferred data collection and analysis techniques, or objectively quantified information, and a schedule including appropriate field season(s) and the duration) is consistent with generally accepted practice in the scientific community or, as appropriate, considers relevant tribal values and knowledge.

Field Survey

There would be one field survey with multiple components. The spatial boundaries of the field study area would consist of the project facilities and the riparian corridor upstream and northwest of the project and within the project boundary. A general inventory of plants, including any state listed rare, or federally listed threatened or endangered botanical species, including identifying if the federally threatened Eastern

prairie-fringed orchid and state threatened water willow are present, should be conducted within the field study area. Age class, species composition, and relative density of any forested understory should be recorded, as well as the presence of snags or old-growth hardwoods with sloughing bark, which may provide habitat for Indiana and northern long-eared bats. The invasive species portion of the survey should focus on previously unidentified and/or emerging invasive plant species (e.g., European frog-bit, pond-water starwort), examining disturbed habitats (including areas adjacent to infrastructure and roadside ditches), and natural terrestrial habitats (Constantine Project shoreline) where these particular invasive species are observed or likely to occur in the project boundary. The survey should be conducted during the spring and summer months in which the plant characteristics and features are most identifiable. Occurrences of previously unidentified and/or emerging invasive plant species should be mapped with a handheld GPS unit and depicted on an aerial photograph. Data should be recorded for each invasive species occurrence, including species name, GPS location, approximate density, and area of coverage. Representative photos should be taken and general observations should be noted regarding habitat and site conditions, including type and quality.

The methods described above are consistent with accepted methods for conducting botanical resources surveys.

Report Preparation

I&M Power would prepare a report that summarizes the botanical resources encountered within the project boundary. The report should include emerging or previously unidentified invasive plant species occurrence data, age class and composition of any forested habitat, and mapping of newly identified invasive plant species. Captioned photographs of typical and/or significant habitat conditions should be included in the report. Documentation of threatened or endangered species occurrence should be filed with the Commission as privileged.

§5.9(b)(7) – Describe considerations of level of effort and cost, as applicable, and why any proposed alternative studies would not be sufficient to meet the stated information needs.

The estimated cost of a reconnaissance-level botanical resources survey and the preparation of a report containing the above criteria is approximately \$15,000.

Schedule B
P-10661-050

Schedule B

Comments on Preliminary Study Plans

Based on our review of your preliminary study plans outlined in your Pre-Application Document (PAD), we request the following modifications. Please address our requests in your proposed study plans.

Aquatic Resources

Water Resources

In section 6 of the PAD, *Preliminary Issues, Project Effects, and Potential Studies List*, for Water Resources (section 6.2.2), Indiana and Michigan Power Company (I&M Power) states that project operation has the potential to locally alter water quality in the project bypassed reach during periods of minimum flow and high air temperatures. On page 6-3, I&M Power proposes to conduct a temperature and dissolved oxygen (DO) study from May through October at the project. Furthermore, I&M Power proposes to limit the scope of the study to the project boundary. However, the project bypassed reach is not within the project boundary. The proposed temperature and DO study for the project should include collecting temperature and DO levels in the project bypassed reach because this area is very susceptible to rapid changes in flows that can affect temperature and DO levels that could have adverse effects on fish and aquatic resources residing there.

Fish and Mussels

In section 6.2.3, *Fish and Aquatic Resources*, I&M Power states that the fish baseline survey would occur in the project boundary and mussel baseline surveys would be conducted in two locations downstream from the Constantine dam and at three locations in the project's reservoir. The fish and mussel surveys should also include sampling in the project bypassed reach. The bypassed reach is subject to rapid changes in water volumes and also receives water from the Fawn River. The generally faster flowing waters in the bypassed reach are likely to create favorable habitat conditions for mussels, and therefore have different species than those identified at other sampling sites in project waters where waters are more lentic. In addition, there is a potential for different fish species to occur in the bypassed reach, compared to the project reservoir and tailwater area, because of species contributions from inflows provided by the Fawn River.

Also, describe if the proposed fish and mussel surveys would entail qualitative sampling to determine species presence and quantitative sampling to estimate densities or populations, or both. Using some degree of both methodologies would be useful as it would provide not only an indication of the presence or absence of species present in project waters (i.e., qualitative results) but would provide an estimate of densities or sheer numbers of fish or mussel species collected (i.e., quantitative results).

The proposed fish and mussel surveys should include the following.

Fish

1. Sample similar areas and habitats in project waters that may have been sampled by previous fish sampling efforts conducted in project waters. The results would help to make comparisons of how fish species may or may not have changed since the last sampling efforts.
2. Identify sampling gear that would be used for collecting fish. Describe the overall health of individual fish species collected (e.g., are various fish species showing normal growth patterns or are they stunted), as this information could help inform how project operation may be affect fish populations.
3. Determine if various year classes are present for selected fish species, particularly for game fish, as this information would help to indicate if the fish populations are self-supporting and if there has been a change in the general fish community compositions since the last survey efforts in project waters.
4. Identify various invasive fish species and their abundance in comparison with all fish species captured during the proposed survey, and compare the results with the types and numbers of invasive fish species reported for the previous fish survey conducted in project waters.

Mussels

1. Compare the mussels collected in project waters and the project bypassed reach with previous mussel surveys conducted in project waters and with any mussel data for the lowermost reach of the Fawn River. The results of the mussel survey would help to determine the effects of project operation on habitat for the mussels.
2. Develop a survey protocol that minimizes the disruption of mussels collected and one that returns mussels removed from the stream bottom to the same location after data is collected.
3. Conduct the survey with a qualified malacologist or use a qualified malacologist to be assisting in and/or identifying the mussels collected.

Schedule B
P-10661-050

B-3

Terrestrial Resources

Wetland Survey

In section 6 of the PAD, *Preliminary Issues, Project Effects, and Potential Studies List*, I&M Power proposes to conduct a wetland study to characterize wetland and riparian habitat within the project boundary. I&M Power provides some details on the proposed desktop review of wetlands. However, specific methodology for the field-verification portion were not identified. The wetland survey for the purpose of field verification should include all wetlands within the project boundary.

In addition, the study report should include:

1. maps of the sites, including observed vegetation, soils, hydrologic characteristics, and topography;
2. wetland vegetation data mapped during the survey by community, age class, and distribution class in tabular format; and
3. a narrative description of results and conclusions, including characteristics and acreage of each area of wetland.

Recreation and Land Use

Recreational Assessment

In section 6 of the PAD, *Preliminary Issues, Project Effects, and Potential Studies List*, I&M Power proposes to conduct a recreational assessment of the project facilities. However, I&M Power does not provide information on how recreation facilities would be assessed. The PAD does not include a detailed description of the condition of each recreation site or facility, or of signage related to recreation and public safety near recreation sites. Understanding the condition of the existing project recreation sites and facilities and how these sites and facilities are managed is essential in determining the adequacy of project recreation facilities to meet current and future recreation needs, and is therefore relevant to the Commission's public interest determination.

In the absence of data on facility conditions and signage, we cannot determine if the existing information is adequate for us to assess the adequacy of existing recreation facilities to meet current and future demand. So that we may fully understand and evaluate the effects of continued project operation and maintenance on recreation use, please provide a discussion of the condition and adequacy of existing recreational facilities to meet current and future recreational demand at the project. Include all formal and informal recreation facilities in the assessment. Additionally, please describe the presence or absence, locations, and photographs of signage related to project recreation or safety at recreation sites at each recreation facility.

Cultural Resources

Cultural Resources Inventory Plan

In section 6.2.8, *Cultural and Tribal Resources*, of the PAD, I&M Power proposes to assess the potential for the project to affect identified historic and archaeological resources through a Phase I investigation, site file search, and/or an evaluation of project facilities. The PAD provides limited information on known archaeological and historic resources within the project vicinity. The PAD does discuss past surveys; however, it is not clear the extent, boundaries, methods, or adequacy of the surveys conducted.

In addition, while there is a general description of the Area of Potential Effects (APE), there is no map depicting the APE. This map information is necessary for us to determine the effects of project operation on historic properties. Therefore, a Phase I archaeological survey of the APE should be conducted. Also, as part of I&M Power's proposed study, and prior to any surveys being conducted, you should consult with the Michigan State Historic Preservation Officer (Michigan SHPO) and federally-recognized Tribes who have an active interest in the project, and any interested parties.

Please include the following in the study proposal for cultural resources:

1. a defined APE for the project that would include all lands and waters enclosed by the project boundary and any other lands or properties outside the project boundary where project operation may affect historic properties. Also include: (a) a detailed map showing all aspects of the APE in relation to the project boundary;¹ (b) a background section on previous work in and around the APE; and (c) a cultural history of the research area;
2. survey methodology, including: (a) areas to survey for archaeological and/or historic resources relative to the defined APE;² and (b) an evaluation of cultural resources, including known archaeological sites within the APE and the project itself, for National Register-eligibility; and (c) site- or resource-specific descriptions of existing and potential project-related effects on historic properties;
3. survey results and concurrence from the Michigan SHPO, any interested federally-recognized Tribes, and any interested parties on the results of the survey; and

¹ The APE should be developed after consultation with the Michigan SHPO, federally-recognized Tribes who have an active interest in the project, and any interested parties. Once you have defined your APE, please send your APE definition and APE map to the Michigan SHPO and seek their concurrence.

² Lands that are highly disturbed are less likely to contain cultural resources, and may not need to be surveyed.

4. a record of consultation with the Michigan SHPO, interested federally-recognized Tribes, and other interested parties regarding the proposed study, results and APE, and related concurrence letters.

In the event that any historic properties would be adversely affected by project operation or maintenance, I&M Power would need to develop a draft Historic Properties Management Plan (HPMP) to avoid, lessen, or mitigate for any project-related adverse effect on National Register-eligible properties. A draft HPMP should be developed after consultation with the Michigan SHPO, the federally-recognized Tribes who have an active interest in the project, and interested parties, and filed with your Preliminary Licensing Proposal (or draft license application).

The draft HPMP should, at a minimum, address the following elements:

1. identification of the APE for the project and inclusion of a map or maps that clearly show the APE in relation to the existing and proposed project boundary;
2. completion, if necessary, of identification of historic properties within the project's APE; continued use and maintenance of historic properties;
3. treatment of historic properties threatened by project-induced shoreline erosion, other project-related ground-disturbing activities, and vandalism;
4. consideration and implementation of appropriate treatment that would minimize or mitigate unavoidable adverse effects on historic properties;
5. treatment and disposition of human remains that may be discovered, taking into account any applicable State laws and the Advisory Council's "Policy Statement Regarding Treatment of Burial Sites, Human Remains, and Funerary Objects," February 23, 2007;
6. discovery of previously unidentified properties during project operation;
7. public interpretation of the historic and archaeological properties at the project;
8. a list of activities (i.e., routine repair, maintenance, and replacement in kind at the project) not requiring consultation with the Michigan SHPO because these activities would have little or no potential effect on historic properties;
9. a procedure to address effects on historic properties in the event of a project emergency; and
10. a review of the HPMP by the applicant, the Michigan SHPO and consulting parties to ensure that the information continues to assist the applicant in managing historic properties and updating the HPMP based on agency and tribal consultations.

Schedule C
P-10661-050

Schedule C

Additional Information

Geological and Soil Resources

1. In section 5.2.7, *Reservoir Shoreline and Stream Banks*, of the Pre-Application Document (PAD), Indiana and Michigan Power Company (I&M Power) states that the west downstream riverbank was repaired due to erosion and is being monitored. Please provide the location of this repaired riverbank and the extent of the erosion, the probable cause of the erosion, a description of the repair, and how the site is being monitored.

Aquatic Resources

2. In section 5.4.2, *Existing Fish and Aquatic Resources*, of the PAD, I&M Power describes the results of various fish surveys conducted by the Michigan Department of Natural Resources on the St. Joseph River in 2007. Please identify what sampling gear was used to collect the fish samples in the 2007 study.

3. Several places in the PAD describe the project bypassed reach as being 1,600 feet long (i.e., page 5-63) or 1,300 feet long (i.e., pages 4-7 and 5-14). Please confirm the exact length of the bypassed reach.

4. In section 5.3.7.1, *Impairment Listing*, I&M Power discusses the 2016 303(d) Water Quality Assessment Integrated Report. However, we are unable to discern from the information provided whether there are any waters within the project boundary, or the project bypassed reach, that are not meeting the 303(d) criteria. Please identify if project waters and the project bypassed reach are not listed as impaired or not attaining Michigan Water Quality Standards under section 303(d) of the Clean Water Act.

Terrestrial Resources

5. In section 5.5.2.2, *Wildlife and Botanical Resources*, of the PAD, I&M Power states that one of the nesting structures was found to be occupied during the 2017 monitoring period. Please provide information regarding: (1) which species used this nesting structure; and (2) historical observations of mallard or wood duck usage of all eight nesting structures erected at the project since inception. Please also provide background information on the factors leading to requirement of the installation of the duck nesting structures in the current license.

6. In section 5.6.1, *Wetland and Riparian Vegetation*, of the PAD, I&M Power states that the license for the project requires surveys be conducted for purple loosestrife and Eurasian watermilfoil within the project reservoir. Please provide survey results for purple loosestrife and Eurasian watermilfoil for the project for the 2018 survey. In addition, please provide additional information regarding the effectiveness of the use of *galerucella* beetles as a control measure for treating purple loosestrife, including the results from the annual surveys of beetle effectiveness on the purple loosestrife that

occurred in 2017. Please provide an explanation of the terms (e.g. “light, medium and heavy”) used on pages 5-30 – 5-36 to describe the quantity of aquatic invasive plants (i.e., purple loosestrife and Eurasian watermilfoil) observed during annual surveys for these two plant species. Also, please define these terms in terms of abundance or assign percentages to the terms.

Recreation and Land Use

7. Figure 5.8-1 in section 5.8, *Recreation and Land Use*, of the PAD provides a map of all existing recreation sites and facilities within the project boundary. However, it does not include the location of the portage trail or the paved walking trails referenced in section 5.2.7. Please identify these trails on figure 5.8-1 and provide a description of the paths, including the length, footing materials, condition, and all relevant signage. Also include a description of the condition of the put-in and take-out areas.

8. Figure 5.8-1 also shows the project boundary crossing a corner of the Constantine Project tailwater fishing access parking area, excluding most of the parking area from the project boundary. Exhibit G does not contain enough detail to determine if the parking area is excluded from the project boundary or if figure 5.8-1 is inaccurate. Please clarify if the tailwater fishing access parking area is within or outside of the project boundary and modify figure 5.8-1 accordingly.

9. In the methodology document that appends the Licensed Hydropower Development Recreation Report (Form 80), the American Legion Boat Launch is described as providing access within the project boundary, however, figure 5.8-1 does not include the location of the American Legion Boat Launch and the text does not describe the location of the boat launch in terms of the project boundary. Please clarify if the American Legion Boat Launch is within, on, or adjacent to the project boundary. If any additional facilities not owned, managed, or operated by I&M Power are within the project boundary, please include them in figure 5.8-1 and include them in your discussion.

10. To determine the adequacy of the recreational facilities, please describe the location and number of toilets referenced in section 5.8, *Recreation and Land Use*.

11. In section 5.8.2, *Current Project Recreation Use Levels and Restrictions* of the PAD, I&M Power states that the annual daytime visits to the project recreation areas were estimated to be 11,851 as of 2015. Because this figure is higher than might be expected for these project facilities, if the information is available, please provide an explanation (antidotal or numerical) of the effect the father’s day weekend boat race, or other large events, had on this visitor estimation figure, if any.

12. During the environmental site review, Commission staff noted two individuals fishing at the toe of the dam and on the dam apron. Staff observed fencing extending partly into the reservoir on the upstream side of the dam; however, the fencing on the downstream of the dam appeared to be circumvented by using the large existing rocks

adjacent to the fence. Please describe if this area is being used as an informal access-point and if any measures have been implemented to ensure public safety at the toe of the dam.

13. Exhibit G, sheet 1 of 2 shows an area of about 9 acres in the project boundary. This area lies east of the bypassed reach, between the left embankment and the Fawn River. Please describe the project use of the 9-acre area and if it is needed for project operation or maintenance.

Cultural Resources

14. In section 5.10, *Cultural Resources*, of the PAD, I&M Power states that archaeological investigations were completed in 1989 and 1990. However, the PAD does not contain these reports and studies. Please file these documents with the Commission as privileged.

15. Additionally, the section describes the Constantine Historic Commercial District, listed in 1985, as being located approximately 400 feet downstream from the project. Please provide information on whether the project has structures or sites that are contributing properties to the eligibility of the Constantine Historic Commercial District.

Developmental Resources

16. In section 4.3.2 of the PAD, table 4.3-1, I&M Power states that the reservoir has a storage capacity of 5,750 acre-feet and a surface area of 525 acres, which yields an average depth of about 11.0 feet. However, table 4.3-1 provides a maximum depth of 12 feet, which is inconsistent with an average depth of about 11.0 feet. Also, Exhibit F, sheet 2 of 3, of the typical spillway section shows an 8-foot depth adjacent to the spillway. Please confirm the reservoir storage capacity, surface area, and maximum depth to ensure consistency and revise the project description accordingly.

17. In section 4.3.7, table 4.3-2 of the PAD, I&M Power states that each turbine has a rated horsepower of 426 and a rated capacity of 300 kilowatt (kW). However, a turbine with a rated horsepower of 426 corresponds to a rated capacity of 320 kW. In the Preliminary Licensing Proposal (or draft license application), please provide a rated turbine horsepower and a rated generator capacity consistent with 18 CFR 11.1(i) of the Commission's regulations.

18. In section 4.3.7, table 4.3-2 of the PAD, I&M Power states that the voltage of each generator is 2,300 volts. In the single-line diagram, each generator is labeled as 2.4 kV. Please clarify the voltage of each generator.

19. In section 4.3.8 of the PAD I&M Power states that the 2.4 kV primary transmission line is about 50 feet long. However, the single-line diagram shows that the voltage from the powerhouse stepped up from 2.4 kV to 15 kV for delivery at Florence Road. In the Preliminary Licensing Proposal (or draft license application), please provide

the origin, the point of interconnection and length of the primary transmission line, whether the primary transmission line is above ground or underground, the location where the voltage is stepped up, and the owner of the point of interconnection and their relationship to I&M Power. If the Florence Road tie-in location is not the interconnection with the grid, please describe the significance of the Florence Road tie-in location shown on the single-line diagram.

20. In section 4.4 of the PAD, I&M Power states that the project is operated as a run-of-river facility, but does not include a normal range of water levels in the reservoir. During the environmental site review, staff noticed flashboards on the dam, which can affect water levels in the reservoir. Please describe the range of water elevations in the reservoir under run-of-river operation.
21. Please describe how the project is operated under high flow, low flow, and cold weather conditions.
22. Exhibit F, sheet 1 of 3, general plan shows the storage building west of the powerhouse that had been removed. In the Preliminary Licensing Proposal (or draft license application), please update Exhibit F so as not to include the storage building.
23. Exhibit F, sheet 1 of 3, general plan shows two sections of the dam and spillway, sections C-C and D-D, but there are no sections labeled C-C and D-D on any of the three sheets in Exhibit F. In the Preliminary Licensing Proposal (or draft license application), please revise Exhibit F to include sections C-C and D-D.
24. Exhibit F, sheet 1 of 3, general plan and sheet 2 of 3, plan view of dam & spillway, and longitudinal section of spillway each show the fish chute. Section 4.3 of the PAD states that the fish chute had been abandoned and replaced with a sluice gate. In the Preliminary Licensing Proposal (or draft license application), please revise Exhibit F to show the sluice gate that replaces the abandoned fish chute.
25. Exhibit F, sheet 1 of 3, sections A-A and F-F do not include the following relevant information for the left canal embankment: (1) the top elevation, the cross slope of the embankment crest; (2) top width; or (3) the slope of the right side of the embankment. In the Preliminary Licensing Proposal (or draft license application), please revise Exhibit F to include the relevant information for the left canal embankment.
26. Exhibit F, sheet 2 of 3, section E-E does not include the following relevant information for the powerhouse: (1) length and height of the powerhouse; (2) generator floor elevation; (3) length and floor elevation of the forebay intake section; (4) angle of the trash racks; (5) turbine pit floor elevation; (6) and draft tube invert. In the Preliminary Licensing Proposal (or draft license application), please revise Exhibit F, section E-E to include the relevant information.
27. Exhibit F, sheet 3 of 3 does not show the recent upgrades to the detached dike. In the Preliminary Licensing Proposal (or draft license application), please revise Exhibit F to include the as-built information for the detached dike.



Friends of the St. Joe River Association, Inc.

P.O. Box 1794
South Bend, Indiana 46634
www.fotsjr.org

Established 1994
501(c)(3) Not-for-Profit

September 27, 2018

Secretary
Federal Energy Regulatory Commission
888 First Street N.E.
Washington, D.C. 20426

Re: Constantine Project (P-10661-050); Scoping Meeting Comments

Dear Secretary:

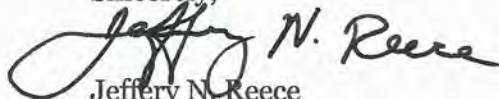
The Friends of the St. Joe River Association, Inc. (FotSJR) is a non-profit citizen-based organization working to protect the health of the St. Joseph River Watershed of Lake Michigan through education, advocacy, and scientific study. Its purpose is to support issues that pertain to the welfare of the St. Joseph River in general, including acting as the primary planning partner and advocacy group for implementation of the [St. Joseph River Watershed Management Plan](http://www.fotsjr.org/resources/documents/stjoeriverwmp.pdf) (link to this plan is: www.fotsjr.org/resources/documents/stjoeriverwmp.pdf).

The FotSJR (see www.fotsjr.org) raised an issue at the FERC scoping meeting on August 28, 2018 pertaining to the invasive species initiative currently being addressed by Cooperative Invasive Species Management Area (CISMA) coalition members. It was indicated at the scoping meeting that the Constantine Project Licensee (Indiana Michigan Power Company – American Electric Power) will be conducting invasive species monitoring efforts for purple loosestrife and Eurasian milfoil as part of the new FERC license now under consideration for this Project.

Therefore, the FotSJR is requesting that consideration should be made to utilize the Midwest Invasive Species Information Network (MISIN) as developed by Michigan State University (see www.misin.msu.edu) for use in the Midwest. The MISIN provides an avenue in which new invasive species can be reported and allows Michigan regulatory agencies that monitor this network to review and investigate any identified species as registered into the network. By downloading the app that is already available for mobile devices (search for “MISIN” in an appropriate App Store site), an electronic report can be developed for any sightings during the normal purple loosestrife and Eurasian milfoil monitoring events by the licensee (or its environmental contractor).

The mission of the FotSJR is to unite a diverse group of stakeholders in a collaborative effort to protect, restore and foster stewardship of the watershed. The environmental and economic impact of new and existing invasive species are detrimental to the entire watershed. The recommended use of the MISIN reporting app in particular is critical to prevent the further influx of invasive species into the St. Joseph River Watershed.

Sincerely,


Jeffery N. Reece
President

“A Bi-State Organization for Watershed-Wide Improvement & Protection”



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

SEP 28 2018

REPLY TO THE ATTENTION OF:

Lee Emery
Federal Energy Regulatory Commission
888 First Street, NE
Washington, District of Columbia 20426

Via electronic filing and hard copy delivery

RE: Comments on Scoping Document 1 – Federal Energy Regulatory Commission Notice of Intent to prepare an Environmental Assessment for the Constantine Hydroelectric Project – Application for New License; Constantine, St. Joseph County, Michigan (Project P-10661-050)

Dear Mr. Emery:

The U.S. Environmental Protection Agency has reviewed the Federal Energy Regulatory Commission's (FERC) August 1, 2018, Federal Register (FR) Notice of Intent (NOI) advising that an Environmental Assessment (EA) will be prepared for the Constantine Hydroelectric Project (Project) in Constantine, St. Joseph County, Michigan. The Indiana Michigan Power Company (I&M) is FERC's non-federal representative. FERC is in receipt of I&M's Notice of Intent to file an application for Subsequent License (relicensing) and I&M's Pre-Application Document (PAD) for the Project, which is located on the St. Joseph River in St. Joseph County, Michigan. The filing of the PAD and the associated Notice of Intent by I&M marks the formal start of the relicensing process for the Project. Via the FR NOI, FERC is soliciting comments on the PAD and on Scoping Document 1 (SD1), which was prepared by FERC staff. This letter provides EPA's scoping comments on the PAD and SD1, pursuant to NEPA, the Council on Environmental Quality's NEPA Implementing Regulations (40 CFR 1500-1508), and Section 309 of the Clean Air Act.

I&M, a unit of American Electric Power (AEP), is the Licensee, owner, and operator of the run-of-river, 1,200-kilowatt (kW) Project, located at approximately river mile 101.4 on the St. Joseph River in the Village of Constantine in St. Joseph County, Michigan. The Constantine Project consists primarily of an uncontrolled concrete gravity overflow spillway dam, a concrete headgate structure, an earthen embankment between the headgate structure and overflow spillway, an earth-fill reservoir impoundment dike, a power canal, and a powerhouse. The Project was constructed in 1873 by the Constantine Hydraulic Company. The Constantine Hydraulic Company operated the hydroelectric plant through 1917. The Project was purchased by Michigan Gas and Electric Company, the predecessor to I&M, in 1917 and subsequently placed under their operation. The original timber crib dam and powerhouse were replaced with the existing dam and powerhouse in 1923. Today the Project is operated by I&M in a run-of-river manner, generating approximately 5,000 megawatt hours (MWh) annually of renewable

energy. The upstream reservoir formed by the Project is approximately six miles long, with impoundment of approximately 525 acres at normal maximum surface area.

The Project's current license was issued by FERC on October 20, 1993 (with an effective date of October 1, 1993) for a term of 30 years. The license was amended by subsequent orders (1995, 1996, 1997, and additional orders modifying plans developed pursuant to license articles). As presently licensed, the primary compliance requirements associated with the operation of the Project is to operate the Project as run-of-river and to provide flows over the spillway to maintain a minimum water surface elevation of 770.0 feet NGVD downstream of the Project (tailwater elevation). Through the current relicensing process, I&M is not proposing any new Project facilities or upgrades,

Because specific project details are not known at this time, EPA's comments are generic in nature. Based on the information provided in the FR NOI, the PAD, SD1, and from our involvement in onsite early coordination meetings held on August 28, 2018, EPA offers the following comments, enclosed, for consideration when preparing the EA for the proposed project.

We look forward to working with you and reviewing future NEPA documents prepared for this project as it is developed. We are available to discuss the contents of this letter at your convenience, should you desire. If you have any questions about this letter, please contact the lead NEPA reviewer, Liz Pelloso, at 312-886-7425 or via email at pelloso.elizabeth@epa.gov.

Sincerely,



Kenneth A. Westlake, Chief
NEPA Implementation Section
Office of Enforcement and Compliance Assurance

cc (via email):

Hector Santiago, NPS-Midwest Regional Office
Scott Blackburn, NPS-Midwest Regional Office
Lisa Fischer, USFWS-East Lansing
Daria Hyde, MNFI
Kesiree Thiamkeelakul, MDNR
Kyle Kruger, MDNR
Jon Magalski, AEP
Liz Parcell, AEP

EPA's Detailed Comments: Constantine Hydropower Project
Scoping/Early Coordination (pre-EA)
Constantine, St. Joseph County, Michigan

September 28, 2018

RECREATION AND LAND USE

- The Constantine Project provides several recreational facilities as required under the current license. These facilities are located both upstream and downstream of the Constantine dam and are maintained and operated by I&M and open to the public, including a boat launch, a portage take-out and put-in, reservoir fishing access, tailwater fishing access, Americans with Disabilities Act (ADA) accessible portable toilets, and a picnic area. These facilities were toured during the August 28, 2018, site visit. Several of the facilities are in disrepair and would benefit from upgrades.

The portage take-out location could be more clearly marked and better maintained. The existing "trail" to the portage put-in location is also not clearly marked and is overgrown. That trail, located along the south bank of the St. Joseph River downstream of the dam, has been severely eroded, causing it to be narrower than required and full of erosional pitting. Between its current condition and trees that have fallen over the trail, it does not appear to be easily, or safely, used by individuals portaging with a kayak or canoe. Additionally, the portage put-in location needs to be clearly marked, cleared of vegetation, and restabilized with rock. The portage-put in location has also been recently utilized by potential vagrants, as evidenced by recent campfires and food trash noted during the agency site visit.

Recommendation: As part of relicensing, I&M should be required to renovate degraded recreational facilities, install increased signage, and provide a maintenance schedule for all facilities. Current conditions of all recreational facilities, and proposed requirements/upgrades/modification under the new license should be discussed in the forthcoming EA.

NATIONAL RIVERS INVENTORY

- The Project is located within a stretch of approximately 210 miles of the St. Joseph River that has been listed by the National Park Service (NPS) under the Nationwide Rivers Inventory¹ (NRI). The NRI is a listing of more than 3,200 free-flowing river segments in the United States that are believed to possess one or more "outstandingly remarkable" natural or cultural values judged to be at least regionally significant. The Outstandingly Remarkable Value identified by the NPS for this section of the river is recreation.

NRI river segments are potential candidates for inclusion in the National Wild and Scenic River System. In partial fulfillment of Section 5(d) of the Federal Wild and Scenic Rivers Act (WSRA), NPS maintains the NRI as a national listing of potentially eligible river segments. Consultation with NPS for NRI River segments is required, and NPS provides

¹ <https://www.nps.gov/subjects/rivers/nationwide-rivers-inventory.htm>

consulting instructions² for federal projects potentially affecting NRI segments. Under Section 5(d)(1) of the WSRA and related guidance³, all federal agencies must seek to avoid or mitigate actions that would adversely affect NRI river segments.

The Wild and Scenic Rivers Act: Section 7 manual⁴ states on page 8 (Agency-Identified, 5(d)(1), Study Rivers), “*If a river is listed in the Nationwide Rivers Inventory (NRI), the federal agency involved with the action must consult with the land managing agency, or the NPS, if the river is on private lands, in an attempt to avoid or mitigate adverse effects. This consultation is required pursuant to a directive from the Council on Environmental Quality.*” The Council on Environmental Quality (CEQ), under 5(d)(1) Wild and Scenic River Act authority, has provided guidance⁵ to federal agencies with permitting and/or granting authority for projects on or near rivers listed on the NRI.

Recommendation: The forthcoming EA should clearly discuss the protections afforded to NRI rivers and potentially-eligible river segments under the Wild and Scenic Rivers Act. The Draft EA should explain the required consultation process with NPS and provide information on the status of coordination with NPS. FERC should determine how to best implement the Project, including relicensing and any upgrades to required recreational facilities that may need to be implemented, in a manner that does not adversely affect the NRI river segment. A discussion on how adverse impacts will be avoided should be included in the EA.

FISH ENTRAINMENT

- The Pre-Application Document (PAD) states that I&M last presented fish entrainment and mortality estimates in 1991, approximately 2 years before the current FERC license was issued. The 1988 study associated with this information concluded that the amount of entrainment and mortality at the Project was insignificant and would have an insignificant effect on the fish community. There has been no change to Project operations or modification of significant Project features, and because of this, I&M believes that existing water velocities at the face of and through the Project’s trash racks are consistent with previously-measured values from 25 years ago. At this time, it does not appear that I&M plans to conduct a new entrainment/mortality study at the Project.

Recommendation: FERC and I&M should work closely with the U.S. Fish and Wildlife Service (USFWS) and the Michigan Department of Natural Resources (MDNR) to determine any fisheries-related studies that may be required before relicensing occurs. The forthcoming EA should include correspondence with MDNR and USFWS, as appropriate, regarding effects of turbine entrainment on fish populations in the project reservoir and downstream of the project. If MDNR and/or USFWS recommend modifications based on entrainment issues, the Draft EA should discuss and study

² <https://www.nps.gov/subjects/rivers/consultation-instructions.htm>

³ <https://www.nps.gov/subjects/rivers/upload/Presidential-Memorandum-for-Heads-of-Departments-and-Agencies.pdf>

⁴ <https://www.rivers.gov/documents/section-7.pdf>

⁵ <https://www.nps.gov/subjects/rivers/upload/Council-on-Environmental-Quality.pdf>

modifications to be included as a condition of the relicense. We recommend the EA describe the context and intensity of impacts to fish species from impingement, entrainment, and turbine-induced fish mortality, and consider whether measures are available and warranted to minimize impacts. Consider the potential for implementation of best practices, such as optimizing spacing between bars in trash racks, if they are not already present at the Project.

NON-NATIVE AND INVASIVE SPECIES

- The PAD states on page 5-30, “*Article 409 of the [current FERC] license requires I&M to conduct surveys for purple loosestrife and Eurasian watermilfoil within the Project’s reservoir. The surveys are to be conducted annually between late July and early August, the time during which Eurasian watermilfoil is at or near peak growth and purple loosestrife is in bloom.*”

Recommendation: The PAD should be updated to provide an update on the status of the 2018 invasive species survey.

- The PAD describes a biological control pilot project for purple loosestrife at the Constantine Project that utilized the *Galerucella sp.* beetle, and states, “*I&M will continue to consider and analyze various potential control measures at the Project including biocontrol using beetles, herbicides, physical removal, or a combination of multiple control measures.*” During the August 28, 2018, site visit, American Electric Power representatives noted that due to overwintering issues, it is likely that future control measures will not utilize beetles.

Recommendation: Provide an update on the status of use of beetles in upcoming years, including lessons learned/challenges/successes from the current three-year study between 2015 and 2017.

- The PAD states on page 6-6 that I&M proposes to continue monitoring specific invasive species in the project area and evaluating options to control their spread throughout the Project.

Recommendation: Include a commitment to implement specific measures, and under what conditions they’ll be implemented, to control the specified invasive species. This should be included in any requirements FERC implements during relicensing.

- SD1 states on page 9 that I&M plans to continue to evaluate options to control invasive plant species in the project. The PAD describes more specifically that invasive species within in the Project boundary are purple loosestrife and Eurasian watermilfoil. The current license requires annual surveys for invasive species within the reservoir. During the August 28, 2018, public meeting, there was a brief discussion that there is public concern on two additional species, frogbit and Japanese knotweed.

Recommendation: The forthcoming EA should discuss the concerns associated with frogbit and Japanese knotweed, including whether or not they are present within the

Project area, and if they are being monitored/controlled. If they are present but not being currently monitoring/controlled, a discussion on whether or not they will be under conditions of the new license should be included in the EA.

AQUATIC RESOURCES

- Continuing to operate the Project in a run-of-river mode helps to maintain stable flows and water surface levels both downstream of the project and in the upstream reservoir. Maintaining relatively stable conditions protects fish and other aquatic organisms that rely on nearshore habitat for feeding, spawning, and cover.

Recommendations: The forthcoming EA should discuss whether the Constantine project has experienced difficulty maintaining the run-of-river mode of operation due to hydraulic capacity differences between turbines, resulting in downstream water surface level fluctuations. If this is the case, EPA recommends a Run-of-River Plan be drafted to ensure the project operates as run-of-river. Additionally, if downstream water surface level fluctuations are experienced, the forthcoming EA should discuss whether refurbishment of any of the turbines would allow lower flows to pass, thus maintaining water levels downstream.

- The PAD on page 6-4 states, *“In addition to baseline fisheries surveys, I&M proposes to conduct a mussel assessment to identify any mussel populations that may be present within the Project area. I&M anticipates that a summer mussel assessment will be conducted at two locations downstream from the Constantine dam and at three locations in the Project’s reservoir, with specific locations to be identified in consultation with resource agencies and stakeholders.”* EPA anticipates that such mussel assessment surveys will be conducted using USFWS protocols⁶.

Recommendations: If mussels are located within the project area⁷, an effects analysis and consideration of whether measures are available to minimize impacts should be included in the forthcoming EA. Coordination measures with USFWS and MDNR should also be discussed in the forthcoming EA.

- Section 9.0 of SD1 specifies a preliminary list of noted federal and state comprehensive plans for improving, developing, or conserving a waterway or waterways affected by the project

Recommendation: Utilize the most recent version of comprehensive plans available, rather than only those currently on file with FERC, will be used to evaluate whether the proposed project/relicense is consistent with Federal and/or state comprehensive plans.

⁶ Michigan Freshwater Mussel Survey Protocols and Relocation Procedures, 2018 is available at <https://www.fws.gov/midwest/eastlansing/te/pdf/MIFreshwaterMusselSurveyProtocolsRelocationProceduresFeb2018.pdf>

⁷ EPA recommends the project area be revised to include the area downriver of the dam in order to fully consider potential impacts to water quality, aquatic species, and other downstream resources.

CLIMATE ADAPTATION

- SD1 explains that FERC may issue licenses for terms ranging from 30 to 50 years for non-federal hydroelectric projects. The National Climate Assessment⁸ finds that in the Midwest, extreme heat, heavy downpours, and flooding will affect infrastructure.

Recommendation: FERC should consider the current condition and expected integrity of the project's physical infrastructure over the life of the new license. The forthcoming EA should include a discussion of reasonably foreseeable effects that changes in the climate may have on the proposed project and the project area, including its long-term infrastructure. This could help inform the development of measures to improve the resilience of the proposed project. If projected changes could notably exacerbate the environmental impacts of the project, EPA recommends these impacts also be considered as part of the NEPA analysis.

DOCUMENT CLARIFICATIONS

- During the August 28, 2018, project site visit and public meeting, FERC representatives stated that FERC is proposing removal of acreage from within the project area. However, a proposal to remove any lands, or reference to any specific boundaries of lands to be removed from the project area, was not identified or discussed in Scoping Document 1.

Recommendation: The removal of areas from the project boundary should be clarified and discussed in publication of a Scoping Document 2 (SD2). SD2 could then account for the other comments noted above by EPA.

- Section 3.2.2 of SD1 states, "*The potential need for additional protection, mitigation, and enhancement (PM&E) measures will be evaluated during the relicensing process.*"

Recommendation: A list of the specific state and/or Federal agencies with which FERC or the applicant will discuss the need for new measures should be included in SD2 and the forthcoming EA. SD2 and the EA should also provide discussion of any measures suggested by agencies that FERC chooses to not incorporate in the draft license, including the reasons why such measures are not included as PM&E measures.

⁸ The U.S. Global Change Research Program's National Climate Assessment is available at: <https://www.globalchange.gov/browse/reports>



RICK SNYDER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
LANSING



KEITH CREAGH
DIRECTOR

October 2, 2018

Ms. Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

**RE: COMMENTS ON SCOPING DOCUMENT 1 FOR THE CONSTANTINE HYDROELECTRIC PROJECT
(FERC NO. 10661) ON THE SAINT JOSEPH RIVER, MICHIGAN**

Dear Ms. Bose,

The Michigan Department of Natural Resources (Department) has reviewed the Scoping Document 1 for the Constantine Project on the Saint Joseph River, Michigan. Staff also participated in the Scoping Meetings held in Constantine Michigan. After reviewing the Scoping Document, we have the following comments:

Geology and Soils

The Department concurs with the applicant's intention to conduct an erosion\shoreline instability survey of the shoreline within the project boundaries. We also concur that an appropriate scoring mechanism should be developed to prioritize any remediation that may be required.

Aquatic Resources

The Department concurs with the applicant's intentions to conduct environmental studies. We have the following specific comments:

Temperature and Dissolved Oxygen Monitoring (DO) – We concur that studies involving temperature and DO should be conducted at the project. The Michigan Department of Environmental Quality (MDEQ) should be consulted regarding the appropriate methodology. At a minimum, the Department prefers to see hourly temperature data for a full year. DO should be monitored hourly between June 1 and September 30. This should provide a good picture of the temperature regime throughout the year and the DO levels at the most critical time of the year.

Sediment Contaminant Sampling – The Department concurs that sediment contaminant sampling should be conducted. The MDEQ should be consulted for the proper protocols and the number of samples necessary to properly assess the sediments in the impoundment.

Kimberly D. Bose, Secretary
Comments on Constantine Scoping Document

October 2, 2018
Page 2

Fisheries Survey – The Department concurs with fisheries surveys of the impoundment and bypass reach. We also believe that surveys should be conducted in the power canal as well. Fish located in the power canal are the most vulnerable to entrainment and impingement. Therefore an assessment of those fish is important to understanding potential impacts of the project on fish in the Saint Joseph River. A variety of techniques should be used, including trap or fyke netting, gill netting and electrofishing. A sufficient number of net nights should be included such that a good assessment could be made of the current community structure. This data can be compared to historical data on fishery resources to determine if any significant changes have occurred within the fisheries communities and if so, are those changes due to the project. We highly recommend that the applicant contact the Southern Lake Michigan Management Unit for further information on the appropriate level of effort for the fisheries survey (Appendix 1).

Fish Tissue Collection - The Department concurs with collecting fish tissue samples for contaminant analysis. The species mix and protocols should be determined in consultation with the MDEQ.

Mussel Survey – The Department concurs with the applicant conducting a mussel survey in the vicinity of the project. Department staff will assist the applicant in determining the appropriate locations for the sampling and provide assistance with the sampling protocols (Appendix 1). The assessment should include special emphasis on federally and state listed species that may be in the project vicinity. We recommend the applicant review the Department's new publication *Michigan Freshwater Mussel Survey Protocols and Relocation Procedures* released in February 2018.

Entrainment Study – The applicant did not propose an entrainment and impingement study. Work on fish entrainment was conducted during the previous licensing process. At this time, the Department can agree to wait on an entrainment evaluation pending whether or not any significant changes to the local fish community has occurred over the period of the current license. We do recommend that the approach velocities at the trash racks be revisited to determine that there have been no changes in the risk to fish entrainment or impingement since the last study.

Exotic and Invasive Species Inventory – The applicant should conduct inventories of exotic and invasive species within the project boundaries. The applicant has conducted many good surveys of purple loosestrife and Eurasian water milfoil. However, the number of notable invasive species has increased since the last licensing period. The survey should include, but not be limited to, purple loosestrife, Eurasian Watermilfoil, Starry Stonewort, Curly-Leaf Pond Weed, European Frogbit, and Phragmites. We are willing to work with the applicant to develop the list that will best characterize the extent of any populations of these species.

Fish Passage – While fish passage is currently not being called for, any license issued for this project should contain a reopener clause for fish passage. If the need to include fish passage at the project is necessary in the future, that option should be available.

Kimberly D. Bose, Secretary
Comments on Constantine Scoping Document

October 2, 2018
Page 3

Terrestrial Resources

The Department concurs with the applicants plan to conduct a desktop analysis of the wetland resources within the project boundaries with field verification to ground truth the results of the study.

Recreation and Land Use

The Department concurs with the proposed assessment of the recreational facilities associated with the project to identify use and any improvements to the current facilities. We also request that the applicant evaluate the potential to take over some facilities currently available to the public but not currently operated by the applicant. As an example, the tail water boat launch operated by the City of Constantine provides access to river below the project for boaters. If that should be closed for some unforeseen reason, the applicant should have a contingency plan to provide a similar type facility. In addition, the need for access to the upper impoundment needs to be reviewed. A preliminary review suggests that access to the upper areas of the impoundment may be minimal. The Department also recommends improved signage at the kayak/canoe portage. From the site visit in August 2018, it was evident that the public are entering the river upstream of the boat barrier below the spillway.

Cultural Resources

The Department concurs with the proposed plan for evaluation of cultural resources at the project. Final approval of any such plan must be received from the State Historic Preservation Officer.

The Department appreciates the opportunity to comment on the Scoping Document for the Constantine Project. If you have any questions or need clarification, please feel free to contact Kesiree Thiamkeelakul (517-284-6245) or me at:

MICHIGAN DEPARTMENT OF NATURAL RESOURCES
MIO FIELD OFFICE
191 S MT TOM RD
MIO MI 48647

Sincerely,



Kyle Kruger
Senior Fisheries Biologist
Habitat Management Unit
FISHERIES DIVISION
(989) 826-3211 x 7073

Kimberly D. Bose, Secretary
Comments on Constantine Scoping Document

October 2, 2018
Page 4

cc Jonathan Magalski, AEP, Columbus, OH
Lee Emery, FERC, DC
Scott Hicks, USFWS, E. Lansing
Amira Oun, DEQ, Lansing
Brian Gunderman, Fisheries, Plainwell
Scott Hanshue, Fisheries, Plainwell
Kesiree Thiamkeelakul, Fisheries, Lansing

APPENDIX 1

For Fisheries Survey Specifications:

Brian Gunderman, Supervisor
Southern Lake Michigan Management Unit
Plainwell SCS
621 N. 10th
Plainwell, MI 49080
269-204-7009
GundermanB@michigan.gov

For Mussel Survey Specifications:

Scott Hanshue
Fisheries Management Biologist
Southern Lake Michigan Management Unit
Plainwell SCS
621 N. 10th
Plainwell, MI 49080
269-204-7043
HanshueS1@michigan.gov

Federal Energy
Regulatory Commission

P-10661-050

From: Kyle Boone
To: Michael Davis
Cc: Jennifer Kanine; Grant Poole
Subject: Comment Letter on Constantine Dam Relicensing
Date: Tuesday, October 02, 2018 4:50:54 PM
Attachments: image001.png
Constantine Dam Project Comment Letter 10.2.18.pdf

2018 OCT -3 PM 3:40

Mr. Davis,

OFFICE OF THE SECRETARY

My name is Kyle Boone and I am the Environmental Specialist for the Pokagon Band of Potawatomi, Department of Natural Resources. Attached is our comment letter in regards to the Constantine dam relicensing. Please let me know if you have any questions, concerns, or if the letter needs to also be submitted elsewhere.

Migwetth (Thank you),
Kyle

Kyle Boone
Environmental Specialist, Department of Natural Resources

Pokégnek Bodéwadmik
Pokagon Band of Potawatomi

PO Box 180 • 32142 Edwards Street
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October 2, 2018

Michael Davis
Federal Energy Regulatory Commission
888 First St NE,
Washington, District of Columbia 20426

Re: Study Requests for Constantine Dam Project

Dear Mr. Davis,

I am writing on behalf of the Pokagon Band of Potawatomi Indians ("Pokagon Band") Department of Natural Resources (PBDNR) in response to the August 1, 2018 Federal Register (FR), Notice of Intent (NOI) advising that an Environmental Assessment (EA) will be prepared for the Constantine Hydroelectric Project ("Project"). The Project will be completed in St. Joseph County, Michigan. The existing dam is on the St. Joseph River at the Village of Constantine at approximately river mile 101.4. Currently, the Project is operated by Indiana Michigan Power Company (I&M) in a run-of-river manner. The upstream reservoir created by the dam is approximately six miles long and 525 acres at normal maximum surface area.

The Pokagon Band is a federally recognized tribe located in southwestern Michigan and northwestern Indiana with approximately 5,600 enrolled citizens. The Pokagon Band has a federally mandated 10 county service area which is comprised of 4 counties in Michigan and 6 counties in Indiana. St. Joseph County, Michigan is adjacent to the Pokagon Band's service area. Historically, the Pokagon Band resided in the St. Joseph River Valley and was part of the larger Potawatomi Nation which occurred throughout southern Michigan, northern Indiana, northern Illinois, and eastern Wisconsin. The restoration and protection of the St. Joseph River Valley and its connecting tributaries for the next seven generations are a high priority for PBDNR. PBDNR also supports the efforts of the Nottawaseppi Huron Band of the Potawatomi ("Nottawaseppi Band") in their efforts to do the same.

PBDNR offers the following comments for your consideration as the Project, and specifically, the EA move forward.

Cultural Resource Preservation

PBDNR recommends that FERC and I&M consult with both the Pokagon Band and Nottawaseppi Band Tribal Historic Preservation Offices (THPO). The historic

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and current presence of tribes within the area present the possibility that cultural resources could be affected by current and future operations of the Project. The THPO is the most knowledgeable source on the locations of historic villages and cultural resources, as well as many other topics relating to historic and current tribal culture within their respective Bands. As such, both THPO offices should be consulted as early as possible in the EA process to identify any cultural resources that currently are or could be impacted from the operation of the existing dam at Constantine.

Furthermore, PBDNR recommends that the area within the scope of the EA be investigated for historic and current wild rice beds. Wild rice (*Zizania palustris* var *palustris*, *Zizania palustris* var *interior*, and *Zizania aquatica*) is a central part to Potawatomi culture. In fact, the migration story of the Potawatomi references that the Potawatomi were to move to "the place where food grows on water," which is a reference to wild rice. PBDNR recommends that FERC and I&M consult with both the Pokagon Band and Nottawaseppi Band THPO as well as the Michigan Wild Rice Initiative to identify if any historic and/or current wild rice beds are within the area where the EA is being completed. If it is determined that wild rice beds are or were in the area, PBDNR recommends that sediment cores be taken and examined for the presence of seeds in the seed bank and potentially the presence of wild rice phytoliths if seeds are too degraded to recognize.

Examination of Current Pollutant Loading

Land use within the St. Joseph Watershed is predominantly agricultural. As such, non-point source (NPS) pollution is a concern within the St. Joseph River. Currently, it is not fully understood how much pollution from NPS is entering the Project or how NPS pollution is affecting the Project, the longevity of the dam itself, or water quality in the reservoir. PBDNR recommends that FERC and I&M conduct a study that estimates the amount of NPS pollution (e.g. sediment, nutrients) the Project is receiving from upstream sources. PBDNR also recommends that FERC and I&M study how those pollutants are affecting project operations and longevity.

Fish Entrainment and Migration

The Pre-Application Document (PAD) states that I&M conducted a study on fish entrainment and mortality in 1988. This study found that fish entrainment and mortality at the Project was insignificant. Given that there have been no significant changes to operations at the Project, I&M does not appear to be planning a follow up study for the relicensing of the Project. PBDNR recommends that FERC and I&M consult with United States Fish and Wildlife (USFWS) and Michigan Department of

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Natural Resources (MDNR) on possible fish entrainment and mortality caused by the operations of the Project. Furthermore, PBDNR also recommends that the above parties conduct a study on fish migration in the St Joseph River. PBDNR also recommends that an additional study be done on potential structural modifications, possibly including the installation of a fish ladder to aid in fish migration, and/or operations of the Project to reduce its impact on fishes.

Thank you for the opportunity to comment. If you have any questions or concerns please contact Jennifer Kanine, Pokagon Band Department of Natural Resources Director, at 269-782-9602 or jennifer.kanine@pokagonband-nsn.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "Jennifer Kanine".

Jennifer Kanine, PhD. AWB®
Director, Department of Natural Resources
Pokagon Band of Potawatomi Indians
Jennifer.Kanine@PokagonBand-nsn.gov
Office: 269-782-9602
Desk: 269-462-4214
Cell: 269-783-9749

A handwritten signature in black ink, appearing to read "Kyle Boone".

Kyle Boone, MS
Environmental Quality Specialist
Pokagon Band of Potawatomi Indians
Kyle.Boone@PokagonBand-nsn.gov
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1 UNITED STATES OF AMERICA
2 FEDERAL ENERGY REGULATORY COMMISSION

3

4 CONSTANTINE PROJECT
5 DOCKET No: P-10661-050

6

7 SCOPING MEETING

8

9 Village Hall
10 115 White Pigeon Street
11 Constantine, Michigan 49042

12

13 Tuesday, August 28th 2018

14 6:30 p.m.

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25

1 SPEAKER LIST

2 Lee Emery, FERC

3 Laura Washington, FERC

4 Michael Davis, FERC

5 Jon Magalski

6 Liz Pelloso

7 Rich Walag

8 Rob Riggle

9 Danielle Hanson

10 Jeffery Reece

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1 P R O C E E D I N G S

2 MR. EMERY: Good evening everyone. Welcome to
3 this scoping meeting for the Constantine Project. It's
4 great to be back in my home state of Michigan as you can
5 imagine. A long, hot humid summer in D.C., not unusual but
6 boy it's been miserable although some might say there's
7 always a lot of hot air in Washington.

8 My name is Lee Emery, I'm with -- I'm the
9 coordinator for this project and I look forward to having a
10 productive scoping meeting with you this evening and
11 practicing -- if we don't do a good job tonight you can come
12 back tomorrow and I'm going to repeat the same show.

13 I'm on staff with FERC, I'm the project
14 coordinator for this project and FERC is located about four
15 blocks down the road from the Capitol Building, so right in
16 the heart of things. I've been a staff member with FERC for
17 a number of years. My brown hair and inherent clothes has
18 changed since the time I began.

19 I've been -- I've seen many projects, a couple
20 I've licensed on the St. Joe's River in the early '90's. I
21 have two co-workers with me this evening, Laura Washington
22 in the back there and Michael Davis is with us, after
23 today's incident but Laura will be -- is a terrestrial
24 biologist that is working for us, she works with terrestrial
25 and T and E species, and Mike will do the cultural

1 resources who you might want to talk with.

2 Several representatives here from Indiana Power.
3 Jon Magalski is the project manager for this project. He'll
4 be giving a presentation and he has some staff members with
5 him. I'll let you introduce those later on when you get
6 ready for your presentation as we move on.

7 So let's deal with a few housekeeping rules.
8 There's not a big crowd, it's pretty intimate here. There's
9 a sign-up sheet in the back of the room, I think most of you
10 have signed it already. I don't think there will be any
11 problems with speakers, we have a time mechanism here.

12 The court reporter has already introduced
13 himself, Jim, and talked about what he does and I don't know
14 if you mentioned what the transcripts -- the transcripts
15 will be available from FERC in a couple of weeks but you can
16 get it from him earlier if you want, if you see him
17 afterwards for information.

18 For those that speak, please stand up. We're
19 going to have a microphone here, although the acoustics are
20 pretty good in here, I don't know we'll see how Jim -- what
21 Jim says about that but -- I know you're laughing but it's
22 pretty straight forward. And if you're with a special
23 organization that has a different acronym, please spell out
24 that too, so we'll know who you are.

25 Everyone will have a chance to speak -- speak

1 clearly and the bathrooms are as you walk in the door on the
2 right-hand side as you came in. There's our project --
3 Constantine. Tonight we're going to identify issues,
4 concerns and opportunities for enhancing and mitigating
5 actions associated with the proposed relicensing of the
6 Constantine project.

7 We've review the pre-application document,
8 hopefully you have as well, the PAD I'll call it,
9 pre-application document that was filed with the Commission
10 in early June and from that document we've identified
11 several resource issues that we believe to that the
12 cumulative effect -- that could be effected by the proposed
13 operation of the project going forward.

14 As a Michigander -- that's preferred over
15 Michiganian, as Michigander, coming back home to Michigan
16 I'm reminded of a call made by President Reed when he said,
17 "I'm from the government, I can help you." The most
18 terrifying 9 words in the English language he said.

19 More importantly, Ross Perot, I don't know if you
20 remember him from many years ago in his Presidential debate
21 said, "I'm all ears." Well that's me tonight, out with the
22 ears, but I'm here to listen. I don't have all the answers,
23 you guys are going to tell us what you think about this
24 project and the resources we should be looking at.

25 Ultimately we'll have to conduct an environmental

1 review and prepare an environmental document for this
2 product for the decision-makers. There are five
3 Commissioners who make the decisions on relicensing at our
4 agency, whether it be a constitute a major federal action
5 affecting the environment, I'll call it the human
6 environment, or not.

7 With the exception of our brief look at FERC, I
8 don't know if I should even do that, most of you people know
9 about FERC. This is a nice picture of them maybe it's
10 worthwhile, we'll try. And what it does and what FERC does
11 and then the scoping document for this project provides more
12 detail on the relicensing process we'll discuss tonight so
13 you may have some questions that may be answered by reports
14 or paragraphs in it or something like that, the time
15 schedule is in that document. I have several here if you
16 didn't get one in the mail.

17 My presentation will be brief, a brief prelude to
18 some of the early steps used in this multi-layered
19 integrated licensee process which I'll heretofore call the
20 ILP, which is the process that will be used in preparing the
21 application by the applicant for relicensing this project.

22 There's home -- unfortunately, I like most of the
23 888 Spanish cultural jokes too, that's our building number,
24 that's our headquarters right down the street from the
25 Capitol Building. FERC is a small agency, about 1600 warm

1 bodies. We have field offices located in Chicago, New York,
2 Portland, San Francisco and New York.

3 We had five until August 3rd, five -- and these
4 are our Commissioners, three are Republican, one is a
5 Democrat. One fellow left August 30th, who had been there
6 maybe two months and began a president of a local firm.
7 These Commissioners are nominated by the President,
8 confirmed by the U.S. Senate for a five-year term and
9 they're staggered, they don't all expire at the same time.

10 There cannot be more than three Commissioners
11 from the same political party at one time and usually they
12 reflect whatever is the presidential at that time so now
13 it's three Republicans.

14 Under the Federal Power Act, the Commission acts
15 as a lead agency for the purposes of complying with NEPA,
16 National Environmental Policy Act. FERC's mission statement
17 down below, it's nice to get an overview of this, assists
18 consumers in obtaining reliable, efficient and sustainable
19 energy services at a reasonable cost through appropriate and
20 regulatory market needs.

21 Here's the FERC emblem. We're not really
22 associated with the Department of Energy, we were many years
23 ago, we're a separate Commission. We really stand on our
24 own feet but we didn't change the emblem.

25 What does FERC do? Well, you guessed from the

1 name of the agency, Federal Energy Regulatory Agency, energy
2 -- we regulate energy, all different kinds. The symbol
3 shows the five energy from left to right down below the
4 first one a pipeline, second one is a hydropower, third is
5 gas, fourth is oil and fifth is electric electricity.

6 So the first slide, the first thing was a
7 pipeline for gas. This illustrates a pipeline for gas.
8 That happens to be the thumb region here in Michigan, recent
9 project. FERC approves the construction of interstate and
10 natural gas pipelines and storage facilities of liquefied
11 natural gas. So you have a transporting the gas, taking it
12 to a depository there -- a terminal, terminal to transport
13 and a depository to keep the gas, that's from Louisiana.

14 FERC licenses hydropower projects, non-federal.
15 I'll explain in a minute. Constantine of course is a
16 project of ours. I was involved in relicensing, this was
17 the CHEOA Project on the Tennessee border. It's interesting
18 in that it took a while to license it but that's where they
19 filmed the movie the "Fugitive", in 1993 when he jumps off
20 the dam, Harrison Ford -- he didn't do it, the stuntman did,
21 it's 225 feet to the water, it's a little dive, I don't know
22 if you saw the movie, but very interesting.

23 This one I just licensed very recently. It looks
24 like a cathedral, it's the Loop Project out in Nebraska,
25 built in 1939 it's pristine. It shines for miles around,

1 it's actually relatively flat, the only hill around was this
2 little thing, pretty interesting. A lot of controversy with
3 that, they weren't very happy they got a license.

4 So the other three symbols were the commodities.
5 The two were licensing the pipelines and the hydropower,
6 these are the commodity elements so for the gas, the oil and
7 the electric energy rate.

8 I was looking at this slide I think this is over
9 here, Niagara Falls, those two high structures at Niagara
10 Falls. He didn't identify the slide but -- so as I said we
11 do the non-federal, the mom and pops, the local hydropower
12 and then we took the federal projects -- Bureau of
13 Reclamation, Tennessee Valley Authority and the U.S. Army
14 Corp of Engineers, and you see the numbers of these
15 projects there.

16 So this one everybody recognizes, Hoover Dam, 100
17 people lost their live making that project, quite massive.
18 I saw a proposal recently where they want to take and make
19 it a pump storage with solar, they're going to take the
20 water from down here and pump it back up using solar power
21 back and forth.

22 Here's what you missed today Michael, our tour of
23 the powerhouse, there's a bunch of those at Hoover of
24 course, that's not Constantine. It's not, this is the water
25 view, impressive, that's a big project, so let's go to TVA,

1 a TVA project, Tennessee
2 Valley Authority -- they have a number.

3 And then there's the Corp of Engineers, they have
4 the most power of all in the Pacific Northwest primarily,
5 big rivers out there. This is Chief Joseph Project, this
6 produces enough power to annually light every house and
7 everything in the metropolitan city of Seattle, that's
8 impressive. I haven't been to Seattle before, it's -- but
9 this gives all the power for it.

10 And you recognize this, here Mishawaka looking at
11 it, St. Joseph is still the third largest river in the
12 state, I didn't realize that it's a big river. I don't
13 think it really impressed me. Michigan has 54 FERC licensed
14 projects, that's a lot. You saw the numbers for the federal
15 projects was bigger by 29 or 34, this state has 54.
16 Michigan, Wisconsin, Minnesota, it's really together, that's
17 a lot of projects -- 54 in Michigan.

18 There are 10 on the St. Joseph River. I think
19 you said 6 or 5 are yours, 6 of them are from I and M Power,
20 including an unlicensed one at the very mouth of various
21 springs. And then another thought here is that Michiganans
22 were always concerned about federal spending, we don't want
23 the federal government wasting our taxpayer money because
24 one additional fact that you should know about FERC, it is
25 the agency, one of the few that recovers all of its costs of

1 operating through annual charges and filing fees of the
2 industries it regulates.

3 The money is collected and deposited in the U.S.
4 Treasury as a direct offset of its appropriations. In other
5 words, there talking all costs incurred by the Commission
6 and paid by the licensees and leftover funds that you
7 deposit in the Treasury -- not many federal agencies make
8 that claim. I only know of one other and that's the Pageant
9 Office, that's an operational office.

10 Okay, thank you. So some more factual things
11 about FERC, I work at the Office of Energy Projects. We
12 have about 310 warm bodies there and that includes the three
13 divisions, the division of the hydropower license -- where
14 we're at, division of hydropower administration compliance
15 of -- or as the name applies -- we make the licenses they
16 have to enforce them and make sure that they comply with the
17 license conditions.

18 And then the division of dam safety, we have to
19 keep the dams safe and we inspect them frequently. Licenses
20 are issued from 30 to 50 years. Just recently, just
21 recently October of last year we now have a normal license
22 of 40 years -- that's the default. Walk in -- we had three
23 in the process of being relicensed and they were for 30
24 years or something like that and we passed by the stroke of
25 a wand, they got a 40 year license, they were happy campers.

1 So unless you ask for something less or more,
2 you're going to get a 40 year license. And the terms of a
3 license depends a lot on how much mitigation you're going to
4 do, costs, that sort of -- so there's three criteria if you
5 want to extend a license to greater than 40 years, to a 50
6 year for example.

7 UNIDENTIFIED SPEAKER: Will this be for a 40
8 year?

9 MR. EMERY: I can't say yet. And some
10 continuation of yeah -- the Commission regulates over 1,666
11 -- which is how many people we had 1,600 so we get a bunch
12 each -- we're talking about hydropower only. So 1,660 that
13 includes exemptions on a project. Together the public and
14 private hydropower capacity totals about 80% of all the U.S.
15 -- all the private energy produced in the United States --
16 that's pretty impressive, 80% of the United States power
17 from the private and public.

18 Since fiscal 2010 the Commission's issued 180
19 licenses, that's a pretty good amount for the years. There
20 are many existing FERC licensed hydropower projects that are
21 expiring within the next 10 years, there's going to be an
22 avalanche of projects. I was there in 1993 when we got 156
23 in one day.

24 For a Midwest branch where I work, we're going to
25 have like 18 relicensing projects coming here in the next

1 couple of years -- that's a lot, particularly if they're
2 ILP.

3 And a diagram that somebody -- most all of you
4 already know what these sent out, how they work to generate,
5 so they're pretty interesting diagrams showing what they
6 are. So the other thing exciting to FERC where I'm at
7 involves new technology generating energy from moving water.

8 This is moving from a high to a low or high to
9 lower to generate, but what about a wave in an ocean or a
10 stream running by or something else -- that's pretty
11 exciting stuff. So I'll show you a couple examples of that.

12

13 And in some of these short-term licenses since
14 they're brand new we don't know what they would do to the
15 environment, we would issue a pilot license for 8 to 10
16 years, have them study, see what happens, see what the
17 effects are -- are they killing whale, are they killing
18 fish, what's happening and what the effects this new
19 technology would have on the environment.

20 So here's three -- three examples, this is New
21 York City, it's an island, this is where that Island Tidal
22 Project sits in the bottom of the stream and this particular
23 part of New York City there's a lot of tide effects here, it
24 goes in and goes out so this blade works both ways, coming
25 in and going out.

1 They begin operating -- it's a 10-year license so
2 it was the first tidal energy project to be licensed. Once
3 it was operating up, it operated for about three months and
4 all the blades broke off, remember it's experimental so it's
5 -- they put it back in again, it seemed to be working
6 alright. They've taken it out now and it operated for about
7 three months and they're considering putting in an array of
8 30 of those things in this channel on the side of the coast
9 of the island.

10 Same -- a little different concept but the same
11 ideas that tide, a big tidal bay in Maine so it spins both
12 ways when the tide comes in, it spins the other way when the
13 tide goes out. That was licensed in 2012. Count Cook's Bay
14 near East Port, Maine it's got an 8 year pilot license.
15 Here's what the actual structure looks like, that is a
16 schematic before the actual structure -- pretty big
17 structure, sitting on the bottom of the bay.

18 Again it's tidal movements in and out. This one
19 I licensed in downtown Minneapolis, I thought this was
20 really neat. That's Minneapolis skyline, St. Paul is back
21 here, this was an English dam, this is a lock right here and
22 then this -- they had an abandoned stowaway here so we
23 filled it up with a hydropower project -- hydrokinetic
24 moving water moving through that. There's no powerhouse,
25 very few people it generates enough power for about 7,000

1 homes and operating for about 6 years now.

2 Here's what the intake -- if you can see inside
3 of the fan, these things weigh about 32 tons each, they're
4 two stacked, two deep, eight across in that spillway, very
5 successful. Still trying to get at some of the ideas of
6 what it does to the fish but we're still working on that.

7 And it's time for a change here -- let's change
8 it up. Jon? One last thought, this technology is not just
9 for us, it's been Australia, Sudan and White Nile, Austria,
10 Italy and Nova Scotia, they just dropped a 400 ton project
11 like the one in the bay in New York City, 400 ton, I think
12 it was there a couple of days and it blew up all of the
13 blades, so it's experimental but I think the idea is right.
14 Jon Magalski if you would?

15 MR. MAGALSKI: Sure, thanks Lee. Thanks
16 everybody for coming tonight and attending the site visit.
17 I think everybody was there except maybe Michael and Jeff,
18 but I know Jeff is very cognizant and aware of the project
19 and I'd just like maybe Liz, if you wouldn't mind
20 introducing yourself?

21 MS. PELLOSO: I'm Liz Pelloso, and I'm with
22 American Electric Power dealing with licensing, and
23 co-Project Manager.

24 MR. MAGALSKI: And I know that Lee introduced me
25 as the Project Manager but she is my co-Project Manager and

1 Richard if you don't mind introducing yourself.

2 MR. WALAG: My name is Rich Walag, Indiana
3 Michigan Power, our main office is in Fort Wayne, Indiana.

4 MR. MAGALSKI: You bring it to the table, thank
5 you Rich.

6 MR. WALAG: Thank you, now I'm afraid to say
7 anything because I'm on record.

8 MR. MAGALSKI: And also we have representatives
9 from HDR, Rob Riggle and Danielle Hanson who are our
10 consultants, they prepared the PAD and are supporting us
11 through this next phase of the relicensing.

12 I just wanted to kind of briefly go over --
13 briefly go along just to give a brief overview of the
14 project itself. I'm going to describe the project
15 facilities and the project operations. Basically the
16 recreational facilities that are existing and also provide
17 some contact information and we talked about a website that
18 we created to house our relicensing documents.

19 A little bit about the project -- it's owned and
20 operated by Indiana Michigan Power which is a subsidiary
21 company of American Electric Power, so the parent company.
22 The existing license expires in September -- September 30th
23 of 2023 and we filed the notice of intent and PAD in June of
24 this year, June 4th and that really kicks off the whole
25 relicensing process and as Lee mentioned we chose to use the

1 integrated license process which is very structured.

2 It sets a lot of schedules and it's just a very
3 structured process to go through and I know that you will
4 all explain more in a moment. The project became
5 operational in 1902 and it's one of the six hydroelectric
6 facilities on the St. Joseph River that Indiana Michigan
7 Power owns and operates.

8 The reservoir that the dams create is about 6
9 miles long and to put it in the perspective of where its
10 situation on the St. Joseph River it's about 101 miles
11 upstream of the concourse of Lake Michigan. Upstream of the
12 Constantine Project is the Three Rivers Project, it's about
13 9 miles upstream and it's not an INM project and then
14 downstream of the project, about 7 miles is the Montville
15 Project which the EP and INM owns and operates.

16 The project is operated as run of river, there's
17 no peaking basically it's whatever comes into the project
18 comes out of the project either through generation or on the
19 spillway. It's a 1.2 megawatt project, so it's quite small
20 in the grand scheme of things. There's four units there,
21 each are about 300 kilowatts and the dam structure itself,
22 the spillway is approximately 241 feet long, 12 feet high
23 with about 11 inch flashboards across the top of the
24 spillway.

25 And then it also contains a power canal that's

1 about 1,270 feet long and at the head of that power bowl is
2 the head gates which transports water down to the powerhouse
3 where the electricity is generated and that dam structure
4 impounds about 525 acres.

5 Here's kind of a map or an aerial of the project
6 facilities. You have the powerhouse, the power canal, the
7 head gates and then the spillway. And in the route is the
8 project boundary.

9 A little bit about the recreational facilities,
10 there's a boat launch that's just upstream of the powerhouse
11 and the power canal. There's a canoe portage on the
12 opposite side of the dam. There's recreational fishing at
13 both the boat ramp as well as the canoe portage and then
14 there's also tailrace recreational fishing. These three
15 facilities are all going to be equipped with Americans with
16 Disabilities Act compliant, port-o-pots for use and there's
17 also a small little picnic area at the canoe portage.

18 Just a little bit about the project operations as
19 I mentioned before it's a run of river. We are required by
20 the license to operate it that way and we're also required
21 to maintain a minimum tailrace water elevation of 770 feet.
22 The facility itself is staffed 5 days a week. There may not
23 always be somebody there, they may be at Montville, they're
24 kind of shared employees between the two.

25 All the units are operated manually so to kick

1 one on you actually have to be at the facility to start one.
2 But the facility is monitored 24/7 365 days a year by our
3 Columbus operation center in Columbus, Ohio which that's
4 where American Electric Power's headquartered.

5 So if something happens at the facility, there's
6 a call list where the operations center will call somebody
7 local to come out to the facility and check it out it's a
8 relatively quick short timeframe for somebody to be there.

9 Here's my contact information, my phone number
10 and email address. Feel free to contact me at any time and
11 then also at the bottom we created a website, APhydro.com.
12 We're in the process of relicensing a total of 4 facilities
13 right now but there is a page on there for Constantine.

14 And on that you'll find more information about
15 the project and as time goes on we'll be housing all of the
16 documents on there. Right now the PAD and the NOI and the
17 scoping documents are on there and as we develop study plans
18 and we get study reports, the environmental assessment and
19 the license application, we'll have it housed on there so
20 it's kind of a one-stop shop for people to go to.

21 There's also a link to FERC's web page, FERC's
22 regulations, how to submit comments right to the FERC
23 docket. I guess is there any questions at this point for
24 me?

25 MR. EMERY: Jim has the same question.

1 MR. MAGALSKI: That's in the slide as well,
2 thanks.

3 MR. EMERY: Thanks John. Now we get to the fun
4 stuff, happy process. The process began in 2005, the
5 defaults no matter what you do you have to use this thing
6 unless you request, you know, alternative licensing process
7 or traditional licensing process. And three basic concepts
8 of this thing -- early identification of resolution studies,
9 you don't want to wait until the very end to get surprises
10 in the TLP, now everybody is up front with all the cards
11 issued, everybody knows what's going on, what to expect.

12 It integrates many of the early steps in the
13 licensing process like with the tribes and other entities,
14 there are many needs, the NEPA, National Environmental
15 Policy Act, the applicant's permitting, pre-filing
16 consultation process, they have to get up and talk
17 beforehand at the 41 water service, the state agencies, the
18 FEMA Water Act, Endangered Species Act, all of those things
19 are right up front so you know what's going on so you can't
20 wait until everything is done at the last moment and by the
21 way your water quality certifications say you have to do
22 this.

23 And it establishes timeframes for completing all
24 steps in the ILP. It is driven, it is driven, all of us
25 have to meet those deadlines. There it is the ILP process.

1 The details came out involved in the ILP, we're going to go
2 over each and every item of this thing -- just kidding,
3 we're not going to go over any of it.

4 We're going to talk about the first six steps or
5 so. A number of the steps are pretty overwhelming, thank
6 God it's a 5.5 year process, the piece meal of these things
7 go along with holding your hand and meeting and saying,
8 "hi", frequently.

9 You have several -- you have the first six steps
10 here, there are about 28 steps here, the first six you just
11 read scoping, you'll have several opportunities to
12 participate in the licensing process, obviously this 5 year
13 period you come along. In the document -- you see the
14 scoping document, there's a schedule there, a schedule plan
15 it says every deadline that we have to meet and when and how
16 it'll affect the last page of the document.

17 And unless you're able to defeat it and then
18 appendix B of the document -- the license for this thing is
19 going to be filed with us September 30, 2021. I also note
20 here that it is a process plan, this schedule that we all
21 have to follow -- it's kind of like a traffic copy. If
22 you're not playing, meeting the deadlines, too bad, you're
23 going to be out. You can't make a late filing. It has all
24 of the staff at FERC, we can't screw any of the side deal
25 ones either so it's important that you know and see that

1 schedule, it will be followed.

2 You'll see me back here with Chris Chamberlain in
3 December and say "hi" again. This thing is sensitive. Is
4 it yours? There you go, (side talk regarding microphone).

5 The ILP process is broken into two segments the
6 pre-filing which we are involved in right now, it's a three
7 to four year time span and then the post-filing, once they
8 file the application with us September 30, 2021 we really go
9 to work trying to get that thing licensed or rejected, one
10 way or the other.

11 Here are some of the basic things that the
12 pre-filing -- pre-filing stage in the ILP is a three to four
13 filing period, it starts the process with a PAD which we
14 received first as a first step in that providence,
15 schematic, the PAD, pre-application document. It identifies
16 -- the applicant identifies himself and interested parties
17 and these are the studies that are part of the pre-filing
18 process.

19 Tonight's scoping meeting is part of the
20 pre-licensing process. We get oral comments from you
21 tonight and you have a chance to write them down, other
22 people will have a chance to write them down as well as with
23 us. We talk about the conducting the study plan, the
24 applicant's indicated some of the resources he wants to
25 study.

1 Our comments are due by October 2nd, by the way
2 of this year, on tonight's meeting, the scoping document and
3 whatever. And then the preliminary license proposal would
4 be submitted preliminary application -- once we put it all
5 together will be due us by May 3rd, 2021, it's kind of a
6 draft license application that we get the chance to look at
7 it before they file a final one to us.

8 Post-filing begins later on after the September
9 30, 2021, that's where we begin processing the application.
10 We prepare the environmental document, we do the analysis,
11 we seek public comments from everybody, you'll have another
12 chance to comment on the environmental documents, once we
13 evaluate and analyze all that information from the
14 application and comments and everything along the way.

15 So here are the first six steps of that 28 step
16 process called the ILP that we're going to look at tonight.
17 That might look overwhelming but a couple of those things
18 are already done. So the applicant files a pre-application
19 document PAD and notice of intent -- that's already been
20 done. That's been provided to us.

21 The second step is sufficient notice of the ILP,
22 PAD scoping document and defines the licensee process that
23 will be used. That's been done. The third step, we're
24 there tonight, probably scoping meeting and this site visit
25 occurs and we'll identify potential resource issues at the

1 scoping meeting tonight.

2 The fourth step in the process is comments on the
3 pad and scoping documents, study requests are filed with the
4 Commission. The fifth step, the study plan is filed with
5 the applicant, and potentially a scoping document 2 is
6 issued. We usually don't change the scoping document you've
7 gotten already unless there have been some significant
8 issues come up which we would direct -- if significant
9 issues we'll issue scoping document 2.

10 If not, and we get some comments we will
11 incorporate them into our analysis and then scoping -- step
12 6, a study plan meeting as I said Chris Chamberlain in
13 December, a study plan meeting is held on December 16th this
14 year to discuss any informal resolution of the study issues
15 that have been identified by the public, various
16 participants and stakeholders.

17 I know it sounds a little confusing but I'm going
18 to walk you through these first few steps and give a little
19 more detail of what they're going to be doing. The most
20 important think we could do this evening is we've got some
21 ideas of what we think are resources that need to be
22 addressed. We want your comments on each of those and again
23 I'm here to listen.

24 You probably have some comments, thoughts and
25 ideas. We need to put those down, that's the most important

1 thing we can do this evening. So the first step is the PAD
2 which we received, we've seen that. It develops the issues
3 in the PAD, what we think are issues that need to be
4 addressed that we are kind of realizing in this process in
5 order to prepare the license application.

6 That was filed on June 4th of this year. This is
7 the first step, it gets the ball rolling, the ILP is rolling
8 along now. Okay, the purpose of the PAD -- developer and
9 the applicant obtains the existing information relevant to
10 the project. The PAD brings together all existing and
11 relevant and reasonably available information although you
12 guys are going to get some new stuff tonight perhaps.

13 For example, description of the project
14 facilities, operation, existing environmental conditions of
15 the project, description of potential project effects, it's
16 all in that PAD. The distribution of the PAD to you, the
17 stakeholders, the public and other interested entities will
18 provide the basis for identifying data gaps and study needs
19 to help the applicant prepare an application that will be
20 filed with the Commission later on.

21 The PAD forms the foundation for future documents
22 and sets the schedule, that time-schedule we all have to
23 follow for events that will occur between now and the filing
24 of the application on September 30, 2021.

25 Step 2 has already been done, the public notice,

1 the NOI, the pad, scoping document, next slide please. That
2 was issued on July 25th of this year so that's step 2 -- two
3 steps are done, four to go out of six.

4 Step 3 we're there tonight, that's the scoping
5 meeting, site visit, public comments, site visit was this
6 morning, another scoping meeting tomorrow morning. The
7 purpose of scoping, to solicit public input and comments on
8 the scoping document we presented, to identify issues that
9 may be associated with relicensing this project, to discuss
10 existing conditions and potential information that we don't
11 know anything about and you do.

12 Exhibit 4 -- I'm here to listen, so you'll have
13 your chance to come up here pretty shortly. What other
14 resource issues, we'll show you what we have identified at
15 this point in time, one at a time and see if we have account
16 on each of these resource issues we've identified. Do we
17 need to delete some, do we need to add some, is there any
18 information we can provide on potentially affected resources
19 that we have not identified -- for example, do you know any
20 gray literature, Friends of the River, universities, a lot
21 of things are out there that may not make it to the public
22 in national publications.

23 I saw a pretty good research assessment in April
24 of last year for the Fawn River, the watershed. Some of
25 that will help us with the overall picture of the cumulative

1 impacts, what's happening in this whole river system, put
2 our project for both of those, respective of that.

3 As I said some -- maybe we don't need some of
4 these things we've identified. Maybe we need to add some.
5 The licensee doesn't have to describe human impacts, it's up
6 to us but perhaps you folks can have some ideas on some of
7 the cumulatively affected by this project.

8 These are the 6 or 7 resource issues that we've
9 identified for scoping. That's under the scoping document
10 list -- it's not that we have developed it's not intended to
11 be the exhaustive or final, it contains those issues that we
12 think could have substantial effects on resources.

13 After the scoping document is complete, we'll
14 review the list and modify if needed and a second scoping
15 document could be proposed, as I said if something
16 significant comes up.

17 So geology and soil resources, aquatic resources,
18 terrestrial resources, T&E, threatened and endangered
19 species, recreation land use, cultural resources and the
20 developmental resources. So now we're going to go through
21 each one and after each one I'm going to ask you what do you
22 think? Do you have some ideas? Are we missing? This is
23 the fun part, this will be the whole meeting right here.

24 First one, geologic and soil resources has
25 identified the effects of continued operation and

1 point fix, mitigate, stabilize those areas it would be great
2 if it was clarified with this document.

3 MR. EMERY: It's a pretty long process, they're
4 going to do this stuff, they're going to get some results
5 from that and they're going to make a proposal as to how
6 they will address that issue. They're going to collect that
7 data -- it sounds like to me, and see where and what kind of
8 issues are going on and then make a proposal of what they're
9 going to do.

10 MS. PELLOSO: But it doesn't say that.

11 MR. EMERY: No, I know, the PAD is just the big
12 picture trying to get at issues of --

13 MS. PELLOSO: And if it's long-term to do that as
14 time or money or resources allow clarity.

15 MR. EMERY: It's usually before the five years is
16 up for sure.

17 MS. PELLOSO: Sure.

18 MR. EMERY: Okay and you can also submit written
19 comments like that on this document.

20 MS. PELLOSO: We will, we will be doing that yes.

21

22 MR. EMERY: Any other comments from this
23 particular resource? Thank you for your comments Liz.
24 Okay, the next is the aquatic resource, the walleye. We've
25 identified a couple of issues and such with aquatic resource

1 and relicensing this project. The effects of continued
2 operation on water quality, including dissolved dioxin
3 concentrations and water temperature in the project
4 reservoir and at the bypass reach.

5 And secondly, the effects of turbine entrainment
6 of fish populations in the project reservoir and the St.
7 Joseph River downstream from the project -- the applicant is
8 proposing a couple of things so we're going to have a little
9 talk about that later but the unit entrainment study of this
10 project in 1993, they're here to try and look and see how
11 the populations of fish and species, if something may have
12 changed to determine whether they might need any further
13 discussion and treatment impingement.

14 Any other issues for aquatic resources that may
15 be of concern with the relicensing of this project --
16 nothing, when I see nothing I move forward then. Obviously
17 if you can't think of something tonight you still have until
18 October 2nd to write something down and submit it to us for
19 our consideration on issues.

20 Terrestrial resources -- my buddy the muskrat
21 there, interesting -- the effects of continued operation and
22 maintenance on riparian, littoral and wetland habitats and
23 associated wildlife. And secondly, hopefully Evelyn Nichols
24 would never see a situation like that on purple loosestrife,
25 that really pretty flower that everybody put in their

1 backyards, now it's taking over the environment,
2 outcompeting everything else -- purpose loosestrife and
3 water milfoil, a real problem with recreation, actually die
4 -- habitat -- a lot of problems with water milfoil.

5 So it's actually a continued operation -- project
6 operation on invasive plants, species including purpose
7 loosestrife and the regional water milfoil. I saw some out
8 there but I seen a very small footprint of that 6 mile long
9 reservoir, but the outfitting has been doing work on it
10 continually now for several years, but -- any comments on
11 those two items, wetland habitat effects and the invasive
12 species effects, issues?

13 MS. PELLOSO: Yeah, EPA has a couple of questions.
14 Page 5-30 notes that there was a plan to do annual surveys
15 for loosestrife and water milfoil, usually those are done
16 between July and August so if they have been completed, it
17 would be nice to know what the status of that survey was.

18 MR. EMERY: I suspect it hasn't -- Jo n is that
19 thing going on annually now already or is that still
20 proposed going forth?

21 MR. MAGALSKI: No it's been, Jon Magalski at AEP,
22 it's been going on since I believe late '90's like '98
23 We've done annual surveys, July, August when purple
24 loosestrife are cut at its full bloom, both mapping and
25 looking at densities of milfoil and purpose loosestrife.

1 We've done that at the Monville Project as well as Buchanan
2 Projects and Constantine Projects since the late '90's.

3 MR. EMERY: Any findings are changing in that
4 5-year period, decrease, increase, spread?

5 MR. MAGALSKI: Long-term I would say that it's
6 relatively stable with the investigations. There has been
7 some changes in survey people because it is a subjective
8 review.

9 MR. EMERY: Right.

10 MR. MAGALSKI: And visual so there has been
11 changes but I think overall for the loosestrife investigations
12 are, they're there and they're not spreading.

13 MR. EMERY: We spoke today too, you use some of
14 these beetles as a mechanism and they work with the -- over
15 winter or something?

16 MR. MAGALSKI: Yeah both, I don't know 5 or 6
17 years ago we met with representatives from DNR and Fish and
18 Wildlife Service to talk about implementing control at all
19 of our projects on the St. Joseph River and what we did here
20 at Constantine because of all the projects, Constantine
21 probably has the highest infestation.

22 We did a 3-year pilot studies and biologic
23 control using beetles and basically the findings of that
24 study is probably not a conducive method to control purpose
25 loosestrife because there are no over-wintering habitat at

1 the Constantine Project so nothing is going to survive
2 through the winter.

3 MR. EMERY: I've seen a couple projects where it
4 has been successful, the use of beetles, especially in
5 smaller populations of infestations but it's going to vary
6 from place to place but I wanted to put that in the
7 polycracker that I'm not sure if it was in the PAD or
8 not when you tried that.

9 MR. MAGALSKI: There was in the PAD, I would also
10 say that we just entered into -- this is our first year of a
11 three year contract to do some mechanical and some chemical
12 treatment to control purple loosestrife. They're taking a
13 very scientific approach to it to really look at stem counts
14 to see how effective it is.

15 MR. EMERY: So Liz, does that get at some of your
16 concerns and you can sit right down here as well, this is
17 early in the stage, they've recognized there may be an issue
18 with this and they're going to be attacking it.

19 MS. PELLOSO: Yeah, yeah.

20 MR. EMERY: Okay.

21 MS. PELLOSO: And we'll put -- we'll just
22 reiterate feeder comments.

23 MR. EMERY: Do you have any other concerns about
24 aquatics at this moment?

25 MS. PELLOSO: Yeah. Are we only talking about

1 invasive species at this point or are we talking about
2 wetlands too?

3 MR. EMERY: Wetlands would come into the
4 aquatics, yeah, wetlands.

5 MS. PELLOSO: Okay, page 6-6 there's a proposed
6 study right now. INM is going to do a desktop review of the
7 U.S. Fish and Wildlife Service, national wetland inventory
8 maps, review aerial photography and basically non-field work
9 type of information. But the plan in Section 6.2.5.2 is to
10 field verify and map the wetlands within the project
11 boundary and that is a pretty labor intensive and time
12 intensive endeavor and I'm just not clear from the PAD what
13 benefit that provides to the applicant so it's a question.

14 MR. EMERY: Would you like to comment on that
15 Jon?

16 MR. MAGALSKI: I mean as far as benefits, it's
17 more of establishing a baseline of wetlands are out there
18 just to set a baseline and this is a pretty standard
19 practice that other licensed projects where they catalogue
20 various habitats out there and you start from an aerial
21 assessment, NWI's soil survey data of existing information.
22 You compile that, then you go out and you field verify what
23 you're seeing on the aerials, what you're seeing on the
24 mapping is real, that it's -- in all honesty it's not
25 walking every square inch but you validate what you're

1 assessing from a desktop perspective and it's pretty
2 successful and it's not at the level of a full delineation
3 where you're looking at a regulatory program but it gives
4 you some idea of what's out there.

5 MS. POLLOSO: Do you have that information now or
6 from any point on the project?

7 MR. MAGALSKI: No, we've never --

8 MS. POLLOSO: Okay.

9 MR. MAGALSKI: Up to this point we haven't done
10 any wetland that I'm aware of assessments or cataloging.

11 MS. POLLOSO: Okay, well I mean that could be
12 beneficial for future if you're saying baseline should the
13 reservoir drop or the project be decommissioned at some
14 point or removed, so okay. It wasn't clear that that had
15 been done yet.

16 MR. MAGALSKI: No it hasn't and --

17 MS. POLLOSO: Some of these dates have been done
18 annually.

19 MR. MAGALSKI: Yeah, not a wetland assessment and
20 that will lead into the DEA, the environmental assessment
21 and looking at any potential project effects on wetlands.

22 MR. EMERY: Do you want to put that in writing,
23 that request as well.

24 MS. POLLOSO: Yeah, definitely.

25 MR. EMERY: Anything else on aquatics?

1 MS. POLLOSO: Yes.

2 MR. EMERY: Okay, and I'm sorry this is
3 terrestrial, its aquatics, right.

4 MS. POLLOSO: Well it's a river really in
5 question. Page 5-59, this -- there's a long stretch of the
6 St. Joe River that's been listed by the National Park
7 Service under the National -- Nationwide Rivers Inventory
8 and so there's a requirement for consultation with the Park
9 Service to insure that the project doesn't degrade.

10 MR. EMERY: Is this project within that boundary?

11 MS. POLLOSO: Yes, yes and so as I said
12 consultation with National Park Service is required. They
13 have a point of contact for each of these listed and rivers
14 that are under consideration I believe this is a
15 consideration river but it's afforded the same protection so
16 this is probably a requirement that FERC will need to do as
17 an agency to agency consultation for the EA.

18 So we would recommend that you work on that
19 pre-EA, make sure that it's not left until the last minute
20 to do that consultation.

21 MR. EMERY: Okay, provide that in writing as
22 well.

23 MS. POLLOSO: Absolutely.

24 MR. EMERY: Jon, any comment on this?

25 MR. MAGALSKI: No.

1 MR. EMERY: Any other comments on the terrestrial
2 resources?

3 MR. : Yes.

4 MR. EMERY: Identify yourself and reference any
5 agency -- name and agency.

6 MR. REECE: My name is Jeffrey Reece, R-e-e-c-e.
7 First name, J-e-f-f-e-r-y, I'm with the Friends of the St.
8 Joe River Association, Incorporated. We are an NGO. The
9 question I have is some of our members -- we are aware that
10 in the state of Michigan there's a Midwest invasive species
11 information network and we're wondering if Indiana Michigan
12 Power, part of this project if they would be aware of any --
13 some of the invasive species that have been identified by
14 some of our conservation district members has been European
15 Frog Bit and Japanese Knotweed -- Knotweed.

16 And the concern that we have is that if that
17 comes in, it seems like Eurasian milfoil and purple
18 loosestrife is already out here now, we're aware of it and
19 we want to prevent this from coming in, and --

20 MR. EMERY: Didn't we see some knotweed this
21 morning, today in the other dam or on one of the sites, a
22 small patch -- a very small patch of that, when we were on
23 the tour today, did verify -- wasn't that true, we saw some
24 Knotweed?

25 MS. HANSEN: The dam -- it looked like there

1 might have been some near the dike.

2 MR. EMERY: That's what I thought, the first dike
3 or the second dike?

4 MS. HANSON: The second one.

5 COURT REPORTER: What is your name please?

6 MS. HANSON: Danielle Hanson with HDR,
7 H-a-n-s-o-n.

8 COURT REPORTER: Thank you very much.

9 MR. EMERY: Anything else Jeoffery?

10 MR. REECE: The only thing that right now would
11 -- my Board of Directors has asked me is that the Midwest
12 invasive species information network, we would like that to
13 be one thing that might be considered because if during
14 these inspections that may occur for purpose loosestrife and
15 Eurasian milfoil from time to time on the project, if the
16 European Frog Bit, Japanese Knotweed may be noticed, it may
17 be important to enter that into this network so that that
18 way state of Michigan can address that through DEQ or DNR.

19 MR. EMERY: It might be easy to do when you're
20 out doing something else to see if you see some of that.

21 MR. REECE: That's essentially what we're
22 concerned about is if you see it, it's important to get it
23 in the network, identify it, you know, and that way then the
24 appropriate people from the state agencies can get out to
25 look at it.

1 MR. EMERY: Okay, thank you.

2 MR. MAGALSKI: Joe Magalski of the APO, just say
3 put that in writing what species and also the link and
4 information to that organization.

5 MR. EMERY: Anyone else on terrestrial resources?
6 Okay, T&A species, threatened and endangered species. There
7 are five up there but some examples at least. You see a lot
8 of northern bat issues on a lot of our projects these days
9 too.

10 Okay, we will determine as an issue to look at
11 effects of continued project operation and maintenance on
12 the federally listed threatened and endangered species
13 including the copper-belly water snake, eastern Massasauga
14 Rattlesnake, Mitchell's Satyr Butterfly, Eastern Prairie
15 French Orchid and the two bats, the northern long-eared and
16 the Indiana bat.

17 Any other T&E species or concerns that we should
18 be thinking about for this particular approach project going
19 forward? Okay, hearing none I'm going to move on then.

20 Next issue is recreation and land use. We were
21 talking about these races in the pond here we go -- we've
22 identified as the adequacy of existing public access and
23 recreational facilities that the project to meet the current
24 and future recreational needs and perhaps if some of these
25 are in disrepair and need some upgrading, there may be some

1 concerns and issues on that as well.

2 But any other thoughts on recreation for the
3 project -- proposed operation of the project? Okay, hearing
4 none I'm going to move forward. Cultural resources -- this
5 is really neat. I didn't know this, I'm from Michigan, and
6 the petroglyph, I didn't realize I was here in Michigan,
7 pretty neat, Indian issues, a lot of Indian tribes in these
8 northern states here, Michigan, Wisconsin, Minnesota and
9 then the deco architectural dig there with some of the
10 pieces of things that they find. Those are just examples of
11 what kinds of cultural resources -- not that any of that is
12 at this site but.

13 So for cultural resources we have effects of
14 continued project operation and the maintenance on
15 properties that are included in or potentially eligible for
16 inclusion in the National Register of Historic Places. The
17 powerhouse is 1902, yeah -- any comments on cultural
18 resources -- something we don't know about, something
19 that's a concern, something that you're worried about that
20 may have something that is sensitive, where's my at here?

21 MR. REECE: Again, this is Jeff Reece with
22 Friends of the St. Joe River. I wanted to make sure that
23 Indiana Michigan Power and FERC is aware -- we have two
24 members of our Board, I'm not sure that they -- that one of
25 the -- we have the Nottawaseppi Huron Band of the Potawatomi

1 and we also have the Pokagon Band of the Potawatomi, and --

2 MR. EMERY: Indian tribes?

3 MR. REECE: Yeah, Indian tribes up here. I don't
4 think that they were officially recognized by the federal
5 government in the previous license but they are now. And
6 they have environmental departments, the water quality
7 specialists, all the staff of both of those bands are part
8 of our organization. And I -- they will be in contact
9 because they were not able to make the meeting tonight nor
10 tomorrow but they are aware and I'll give them the
11 information to make sure that --

12 MR. EMERY: You can take a couple of the
13 documents here.

14 MR. REECE: They can get their information that I
15 think I've left you so --

16 MR. EMERY: You could also drop us a line, put it
17 in writing, so tonight's meeting have some addresses and
18 names and that sort of thing.

19 MR. REECE: Right, and I've already provided that
20 for both of those bands and so I just wanted to make sure
21 that you are aware that they are part of the St. Joe River
22 watershed so some of the Michigan projects they will be
23 involved with that going forward.

24 So when you want to notify native tribes of this,
25 it'd be important to remember those two and when it gets to

1 Indiana, there's also now -- I can't think of the name of
2 the band but there is another Potawatomi tribe that's
3 involved in Indiana so when it comes time --

4 MR. EMERY: Mike will be on top of all this
5 right, okay, alright -- our cultural resources person
6 Michael, alright thank you.

7 And the last issue that we've identified is
8 potential impact and things and developed -- these are just
9 schematic that in particular are the types of things we see
10 in other projects in protection, mitigation and enhancement
11 measures developed for that.

12 We don't know what PMEM, protection mitigation
13 enhancement measures are yet because we haven't identified
14 exactly what all the issues are yet and what their proposals
15 are. These are some examples of enhancing or improving some
16 existing sites or something for example or handling invasive
17 species such as the purpose loosestrife or something like
18 that.

19 So the effects of any proposed or recommended
20 environmental protection mitigation enhancement measures on
21 the economics of the project -- developmental, development
22 whatever they're proposing to do or operational changes or
23 construction or whatever, what might they do to offset those
24 impacts. We don't know exactly yet.

25 Any comments on developmental resources? Okay,

1 hearing none move -- go forward. Okay, we said six steps,
2 we're coming to number four. Comments on the PAD, NOI and
3 making study request kinds of things on step 4. These are
4 due October 2nd of this year. Comments on the PAD, comments
5 on the notice of intent, they propose to do an ILP not an
6 ALP or traditional licensing process, and study requests.

7 If you think of some kind of study that you think
8 this -- we're going to be needing beyond what's proposed by
9 the applicant, then we need to have those by October 2nd.
10 So let's look at what study requests consists of -- what's
11 the concern, what is it, what are they?

12 Request for information and for studies -- okay,
13 it helps us to define the geographic and temporal scope of
14 how many years into the future, what is the size of the
15 basin, where is our effectual area that we're concerned
16 about here. What is the effect of the project to extend
17 beyond Montville downstream or upstream or whatever,
18 geographically and the proposed operation of the project --
19 that continuation of a regular project, no changes in
20 operation.

21 Having data would help us to describe the
22 existing environment and the effects of the projects and
23 other developmental activities on the environment and
24 socio-economic resources. You guys live here, you know
25 what's around, what's happening. We're in a Neverland of

1 Washington, D.C. You're here, you can tell us what you
2 think about things.

3 Is there any -- as I said before great
4 literature, a lot of places we go to there's universities,
5 kids are out collecting data, we have river foundations, we
6 have homeowner's associations, all kinds of people that may
7 have some data.

8 I had a project in Wisconsin recently where the
9 homeowner's association was collecting water quality data
10 and giving it to the applicant which was helpful. Are you
11 aware of any ongoing studies that are currently being
12 conducted -- sometimes these universities, we don't know
13 about it but you're here you may know about them. I just
14 stumbled on that 2017 Fawn River watershed study by accident
15 looking at trying to get some -- all kinds of things have
16 been done for the St. Joe River over the years so.

17 Identification of any federal, state or local
18 resource plans and any future project proposals in the
19 effected resource area -- I had a project one time where it
20 was a nuclear power plant there and the applicant never said
21 anything about it. We were going to lower the water level
22 and we would have burn up his power plant.

23 So we need to be aware of what's around in the
24 area, what -- how a project may affect it. This is going to
25 continue the run of river so it would be lesser than if you

1 were changing operational or changing elevations of the pond
2 or something like that, or the reservoir.

3 Do you have any documentation showing why any
4 resources or issues identified thus far should be excluded?
5 Those six that we went through, six or seven of those --
6 should any of those be excluded, affected are okay, do we
7 have any additions?

8 Do you have any study requests that would provide
9 a framework for collecting information -- pertinent
10 information on the resources potentially affected by the
11 project that would be submitted to us, you'd have an idea if
12 something is needed to help get information to address what
13 is a doable project to the resources?

14 And, as part of your study request criteria, you
15 can't just willy nilly put something out there, it has to
16 address these -- there's seven criteria here. That's in our
17 scoping document that we gave you, it's in our reg's, so if
18 you want to have a chance at having that request go forward,
19 you're going to have to address each of these items say
20 "yeah" or "nay" on them for your study request to be
21 accepted.

22 Here let's go through these seven criteria --
23 they're pretty understanding I think if you look at them.
24 Describe the goals and objectives of your study. You know,
25 how will your study that you're proposing to us help to

1 address the project's effect on the environment?

2 Its right in the relevant resource management
3 goals -- how does your study fit into the goals -- resource
4 management goals? You're from the state of Michigan, you
5 have a goal, how is this going to affect or not affect your
6 study?

7 Explain the relevant public interest
8 considerations -- why is your study important to the public?
9 We can't just do this because you think it is right. We
10 have to balance the power and environmental issues of all of
11 these things. It's a tough job so you can't just dream up
12 something that, "Ah, we want to do this." What's it going
13 to cost? What's it going to do?

14 Describe the existing information and why there
15 is a need for this additional study? Is there some reason
16 why we need to add this other study on? If you could
17 justify why you think it's important, why do we need it?
18 And most importantly, explain the nexus between the proposed
19 project operations and the effects of highway study results
20 would inform the development of a license requirement for
21 the project.

22 It has to -- I can't be putting a parking lot in
23 Constantine, what's the association with the hydropower
24 project? There has to be some connection to that, a nexus,
25 an immediate connection between your proposed study and the

1 proposed project operation.

2 And describe the methodology -- just something
3 that's never been done before, it is wild. A fish way out
4 in the west coast one time, it's just unbelievable never
5 been tried before, it was going to go up a hill and down a
6 hill and water levels and T&E species were supposed to be
7 passage for the thing -- it's never going to see the light
8 of day because the resource agency said, "What are you
9 talking about? You want a 41 water quality for that or a
10 Section 18 for that?"

11 So it has to make sense. Is the method on how
12 you're going to collect it is an accepted practice? Is it
13 something we've done before and is it a study type that's
14 never been tried before? We're probably going to see a lot
15 of new stuff coming out with these drones that's looking at
16 data and collecting things.

17 It's going to be a great scientific leap forward.
18 Fighting off mosquitoes for 12 hours standing in a marsh to
19 get muskrats feeding or something like that you're going to
20 have drones helping you out so some new technology is there,
21 it may be very important to help us.

22 Describe your consideration of the level of
23 effort and the cost of this study and why this alternative
24 is needed. If it costs a million bucks and you can do it
25 for \$500.00 that doesn't seem quite logical.

1 Anyway, you get what I'm talking about, the seven
2 criteria. You come up with a study request, it has to meet
3 these criteria or address why it's not. Here are the five
4 studies that the applicant has proposed to do at this point
5 in time. They're going to do a study on geology and soils,
6 they're going to do an aquatic resources study, they're
7 going to do terrestrial resources -- these things are in the
8 PAD by the way, I'm just hitting the highlights of what they
9 are and they're specific items behind each of these.

10 Terrestrial resources, recreational land use and
11 cultural resources -- there is a proposed study in there for
12 each of those. You have something to add I want to know by
13 October 2nd. Okay, I just said it's due by the 2nd -- file
14 that electronically with email, snail mail by the U.S. mail,
15 postal service, identify the project name and project
16 number, 10661 - Constantine Project, important we have
17 thousands of projects coming in, we need -- don't slip up on
18 that project number it'll never see the light of day.

19 And this information is in our scoping documents,
20 received, the address, where to send it, how to do it. So
21 we've gone through four steps, there's six, two more to go.
22 The last part is the applicant is going to be conducting the
23 study that we approve that study plan a couple of years down
24 the road from the 2021, to finish off this license
25 application.

1 Here's the last two steps of our six steps that
2 we went through instead of 28, here's the six, here's the
3 last two. The applicant files a proposed study plan on
4 November 16th of this year and a scoping document 2 would be
5 issued if in fact based on our comments that we get if we
6 see something we need to modify our scoping document.

7 If it's not significant we will address those
8 issues but won't necessarily put them in a scoping document.
9 We don't typically request -- we don't requests comments on
10 a scoping document 2. If there has to be a scoping document
11 2, we don't want any more comments. With that said, we
12 won't accept any more comments.

13 And then step six -- that's the Kris Cringle
14 meeting December 16th, we'll sit around singing little
15 Christmas carols. December 16th here someplace for looking
16 at our study plan proposal and so you'll see my smiling face
17 a couple more times down the road here once we go along in
18 this process, this five year process.

19 Important dates to remember -- these are all on
20 the PAD, the deadlines for each of us to meet, study plan,
21 study plan meeting in September, we go into 2019, the study
22 plan comments are due, revised study plan 3/16/2019, study
23 plan determination that's for our record making we do all
24 that, look at comments and revisions and all that sort of
25 thing and make some decisions.

1 How to stay informed -- you guys most of you in
2 the room have been with this business for a while and know
3 if you get put on the mailing list you'll get all kinds of
4 things or you can go to e-library and look-up anything you
5 want that's filed on this stuff, on these projects.

6 E-library is a very good site. Being put on a
7 mailing, this is important -- you're going to do that
8 yourself by the way, just because you've got this scoping
9 document sent to you this time around you have to officially
10 say I want to be put on a mailing list for this project,
11 instructions are in the scoping document.

12 And you could sign-up for e-subscription and get
13 everything that ever happens in this project will
14 automatically come to you electronically if you want to do
15 that. There's a wet one -- does anybody know where that's
16 at? United States, big falls -- Niagara, Niagara Falls, do
17 you know they turn that thing off at night to generate
18 power?

19 They turn off the lights, they have rainbow
20 lights and if you've been there, colored lights, it
21 generates a lot of power, a lot of power but a lot of people
22 don't know that, Niagara Falls dries up at night as they're
23 generating water through the turbines as opposed to going
24 over the falls, not all of it but a significant amount --
25 that's the American side. The horseshoe shape is on the

1 Canadian side. That's all I have for tonight. It's nice
2 having interaction with you folks and I'll see you again in
3 December. I look forward to your comments if you have any
4 and I'm glad you took time to come up and meet and greet
5 with us this evening. Any other questions -- you can ask
6 me, or see me afterwards, whichever you like. If not, I'm
7 going to conclude the meeting.

8 I don't see anybody jumping up and down, we're good. Thanks
9 again for coming.

10 (Whereupon, at 9:45 p.m., the meeting was
11 concluded.)

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1 CERTIFICATE OF OFFICIAL REPORTER

2

3 This is to certify that the attached proceeding
4 before the FEDERAL ENERGY REGULATORY COMMISSION in the
5 Matter of:

6 Name of Proceeding: Constantine Project

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16 Docket No.: P-10661-050

17 Place: Constantine, Michigan

18 Date: Tuesday, August 28, 2018

19 were held as herein appears, and that this is the original
20 transcript thereof for the file of the Federal Energy
21 Regulatory Commission, and is a full correct transcription
22 of the proceedings.

23

24 Jim Seeley

25 Official Reporter

1 UNITED STATES OF AMERICA
2 FEDERAL ENERGY REGULATORY COMMISSION

3

4 CONSTANTINE PROJECT

5 DOCKET No: P-10661-050

6

7 SCOPING MEETING

8

9 Village Hall

10 115 White Pigeon Street

11 Constantine, Michigan 49042

12

13 Wednesday, August 29th, 2018

14 9:00 a.m.

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1 SPEAKER LIST

2 Lee Emery, FERC

3 Laura Washington, FERC

4 Michael Davis, FERC

5 Kyle Kruger

6 Jon Magalski

7 Kesiree Thiamkeelakul

8 Rich Walag

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1 P R O C E E D I N G S

2 MR. EMERY: Good morning, welcome to the Scoping
3 Meeting for the Constantine Project. I'm not going to
4 repeat much of what I said yesterday because you've heard it
5 already once. It's great to be back in my home state of
6 Michigan, super long hot summer in D.C. and some people
7 might say there's always lots of hot air in D.C. -- that's
8 true.

9 So I look forward to have a productive Scoping
10 Meeting, to this morning with you. We had a good one
11 yesterday, some good feedback, which is great.

12 I'm not going to talk much about FERC. We're a
13 small federal agency located in D.C. a couple of blocks down
14 from the Capitol Building, about 1600 employees. I have two
15 co-workers with me this morning. I'm going to introduce
16 Laura Washington, she'll be doing terrestrial resources
17 studies and Michael Davis will be doing coastal resources.

18 I don't think we need to go through the
19 housekeeping rules. If you want to speak, stand up, state
20 your name if it's hard to spell -- spell it out. If you're
21 representing an organization, spell the organization acronym
22 if you have it.

23 You've signed in already. We have a court
24 reporter here doing stuff already, Jim Stone.

25 COURT REPORTER: And Mr. Emery.

1 MR. EMERY: Yes?

2 COURT REPORTER: If anyone wants to talk, we'd
3 like to have the microphone --

4 MR. EMERY: Laura, will you take care of that?

5 MS. WASHINGTON: Yes.

6 COURT REPORTER: Thank you.

7 MR. EMERY: Thank you Laura. Okay, I think since
8 you heard some of the other stuff they handle, FERC and some
9 of its projects and the new hydrokinetic kinds of things,
10 I'm going to jump right to the issues I think today -- not
11 the PAD and the submission, not the other things, we'll just
12 get right to the real meat of what a scoping meeting is all
13 about and that is the issues -- what you think about the
14 project's effect on these resources.

15 We'll go through them one at a time and you can
16 provide your comments on those. Does that sound okay,
17 doable? Alright, let's do that. You'll get to see some of
18 the house -- we flow through these things because there's no
19 way to jump ahead but nice pictures.

20 By the way that is our building, 888 Ocho, Ocho,
21 Ocho, in Spanish, my favorite word and number, in downtown
22 D.C. Our Commissioners -- we have five typically. We have
23 four now, one left after being here only a couple of months,
24 left to be a President of a local company.

25 The emblem, I will point out we do have the

1 Federal Energy Regulatory Company so we do a lot of things
2 with energy regulation actually. The symbol here on the
3 left is gas pipelines, secondly it's hydropower gas, the
4 actual gas, oil and electricity, the transport of
5 electricity, the transport of gas and hydropower you're well
6 aware of.

7 That's a pipeline being installed in the southern
8 portion of Michigan, E Gas Pipeline. And LNG transports the
9 gas, off-lining it to a repository in Louisiana. I will say
10 something about this. Our license is Tapoco in North
11 Carolina several years ago -- they filed the movie "The
12 Fugitive" there, so Harrison Ford was running away and they
13 were trying to catch him all the time so he jumps off the
14 dam -- well he doesn't of course, it's his stunt man.

15 That dam is 225 tall, that's a pretty good
16 splash. They did have to put a touch-up in the movie, a
17 little extension. The platform, you have to find out where
18 in the dam to jump in and that could hurt -- isn't it
19 beautiful? 1939 project out in Nebraska, the Loop River,
20 just last Saturday about 6-7 months ago, you can see that
21 thing for miles and miles. Nebraska is relatively flat and
22 you see that white castle, pretty interesting.

23 Again, the pipeline -- oil, gas and electric rate
24 transformation, and we're non-federal projects. FERC, so
25 there are the federal projects, the Bureau of Reclamation,

1 TBA and the Corp of Engineers, they have a lot of projects
2 across America.

3 It's interesting that the Bureau of Reclamation
4 has 53 projects, 29 TBA, I think 75 for Corp. Michigan has
5 54 licensed hydropower projects -- that's a lot. Between
6 Michigan, Minnesota, Wisconsin, that's a lot of hydropower
7 plants.

8 Hoover Dam -- 100 people lost their life building
9 that thing, it's really amazing. TBA projects, St. Joseph
10 project, Corp of Engineers. Corp of Engineers has lots of
11 dams in the Pacific Northwest, they're big dams. This one
12 produces enough power to light annually all the electricity
13 needed for the Metropolitan area of Seattle -- that's
14 impressive, 2,626 megawatts -- that's a lot of power.

15 This is a view of the river here, the St. Joseph
16 River. We're fast, three licenses -- three divisions. I'm
17 in hydropower licensing. We have a compliance that makes,
18 enforces all of our licenses and the Division of Dam Safety
19 Inspections.

20 Now I'll zip through this. We're involved in
21 hydrokinetic projects -- moving water, generating
22 electricity which is pretty fascinating. We issued some
23 pilot licenses 8 to 10 years as we study. We don't know
24 what the effects of these things are so they start operating
25 and monitor them around the clock or whatever.

1 That's New York City and the coast of Rhode
2 Island. This company must have put about 30 of these things
3 in this back island here. Its title effect there, the water
4 goes in and out every day, twice a day and that will move
5 the blades either way to generate power.

6 Same kind of thing here -- spinning around, water
7 moves the turbines from the title action. Downtown
8 Minneapolis they have a project over here in the four dam
9 right here, removable turbine stacks, 16 of them, take them
10 on the water. No powerhouse, GP volt. There's enough power
11 for about 7,000 homes in Minneapolis.

12 You can see the size, they weigh about 30 tons
13 each. It was 16 of those turbines that's moving water,
14 moves a blade. Doesn't fall down through like a typical
15 hydropower project but just moving water whether it's waves
16 from the ocean or tidal boards or whatever, generates power.

17 And I'll skip through this. It was really much
18 stronger than that yesterday after that rainstorm, going
19 over the dam was really amazing. Home sweet home,
20 Constantine -- the ILP which is what the process is going to
21 be used by the applicants to prepare its license application
22 for this project.

23 It's a mind-boggling route to follow and it's a
24 five year process. We'll only talk about the -- I won't
25 talk much about them but the first six steps here is through

1 the scoping meeting in preparation of the application.

2 Again, pre-filing which we're now -- once they
3 get an application filed with us in September 30 of 2021,
4 then we take ahold and start making environmental documents
5 and getting inputs and preparing a license application.

6 First steps, these are the six steps I talked
7 about yesterday, it's worthwhile just to see what these
8 things are. The PAD NOI have been filed, they've indicated
9 they want to do an ILP to prepare their license application.
10 We've noticed already the PAD and scoping document you've
11 seen that in the paper.

12 We're having our public scoping meeting tonight,
13 yesterday and scoping site visit in the morning and scoping
14 meeting at night and then we're having our scoping meeting
15 today.

16 Again, the process, that's one and step two have been
17 completed. The purpose of the PAD, it's all the background
18 information we could get on the area to try to give people
19 an idea of what could be affected in the project.

20 And scoping meeting, purposes of scoping -- I'm
21 going to just jump to what we've identified as the issues
22 for this project, go through them one by one and see what
23 comments you may have.

24 These are the issues that have been identified as
25 part of scoping -- geology and soils, aquatic resources,

1 terrestrial resources, T&E threatened and endangered
2 species, recreational and land use, cultural resources and
3 developmental resources.

4 So here's the first one -- geological soil
5 resources. The issue we've -- these are some examples, this
6 isn't site specific it's just some examples. Okay, so the
7 issue we've identified for this project for geologic and
8 soil resources is the effects of the continued project
9 operation and maintenance on shoreline erosion within the
10 project boundary, the bypass reach and the areas immediately
11 downstream from the powerhouse.

12 So, that's what we have tentatively and we want
13 to hear what you may have to say in addition to this or
14 others as we come along. Identify yourself.

15 COURT REPORTER: If you could spell your name,
16 that's wonderful, thank you.

17 MR. EMERY: Don't go too fast, you're okay?

18 MR. KRUGER: My name is Kyle Kruger, I'm with
19 the Michigan Department of Natural Resources Fisheries
20 Division. And I'm here, we noted in the PAD that they've
21 noted that they're planning on doing an inventory, ranking
22 evaluation of it but as it was noted last night in the
23 meeting by the EPA and your clarifications, we would like to
24 see that potentially some mitigation plan -- at least
25 addressed, the worst case scenario.

1 MR. EMERY: Later, once we've collected
2 statements, the comments --

3 MR. KRUGER: Right, the first part is to
4 collectively --

5 MR. EMERY: The point's well taken.

6 MR. KRUGER: So we appreciate that.

7 MR. EMERY: They will look at that, so please.

8 MR. KRUGER: Correct and we feel it's important
9 and there's not a representative from the Michigan
10 Department of Environmental Quality here today, but
11 typically that would also be something I believe that
12 they'll need to do for their 401 cert application as well.

13 MR. EMERY: Okay.

14 MR. KRUGER: So we just would like to state we
15 support that position that you described and also what EPA
16 recommended.

17 MR. EMERY: Okay, any other comments?

18 MR. KRUGER: Oh, and in addition we're also
19 supportive of the fact that they want to remain a run of
20 river operation as that's the first step toward taking care
21 of this problem altogether.

22 MR. EMERY: Right, okay, makes sense, makes
23 sense. Thank you for your comments. Anything -- any other
24 comments on this particular resource issue?

25 UNIDENTIFIED FEMALE: No.

1 MR. EMERY: Okay, we'll go to the next one.
2 Aquatic resources -- so we've identified a couple of issues
3 here. Effects on continued operation on water quality
4 including DO, which is dioxin concentrations and water
5 temperature in the project reservoir and the bypass reach.

6 And then effects of the turbine entrainment on
7 fish populations in the project reservoir and in St. Joseph
8 River downstream from the project was the two tentative
9 things we've identified as a result of looking at the PAD
10 and the other information that we found associated with that
11 PAD, any comments from anybody on aquatic resources?

12 MR. KRUGER: This is Kyle Kruger again. In PAD
13 the company has indicated they are planning on doing an
14 evaluation of the fish community to see if there's any
15 change. They've gathered the current data that's out there
16 and they're going to look at some comparisons and we agree
17 with that.

18 They also indicated that they were not planning
19 on doing a desktop entrainment analysis unless they see a
20 difference in the community. We agree with that. They did
21 note that they did not want to repeat the approach
22 velocities on the tracks racks. We're leaning towards
23 suggesting that they do revisit that just to double check
24 that that hasn't changed.

25 The justification was since operations the same

1 conditions seem to be the same, that there is no change but
2 that would help address that question of if there has been
3 any change and that's a relatively small study compared to
4 trying to do a full blown desktop and I think that would be
5 a good kind of confirmation or at least a spot check on some
6 of the areas on the tracks racks just to kind of go back and
7 revisit whether there's been a change.

8 MR. EMERY: No change in tracks race has
9 occurred, is that correct?

10 MR. KRUGER: Correct and that would be the next
11 step that if down the road it says it looks like typically
12 now where you're giving a four year license that if tracks
13 racks needed to be changed and that can be a maintenance
14 item over that course of time that there would be something
15 in there that we'd have an option to have some consultation
16 with them about the sizing of the tracks racks route,
17 looking at a change now.

18 MR. EMERY: Realize that we open and reading
19 licenses we issue certainly --

20 MR. KRUGER: Right.

21 MR. EMERY: I was seeing if there was something
22 else.

23 MR. KRUGER: Well other than that you know, it
24 may take a little --

25 MR. EMERY: A spot check, that wouldn't be very

1 costly would it to look at a couple of areas to do something
2 to verify intakes?

3 MR. KRUGER: Just to kind of do some
4 confirmation.

5 MR. EMERY: Jon or anybody, just curious,
6 identify yourself for the record.

7 MR. MAGALSKI: Jon Magalski with the EPA.
8 I guess the answer to the first question, I don't believe
9 tracks racks and the spacing, none of that's ever been
10 changed.

11 MR. KRUGER: And it may not change, it's you
12 know, was one of those things that we're just looking at
13 even if there was a change made due to make us -- four years
14 is a long time so we're trying to project out over the
15 course of four years that there would be something that we
16 would have a chance to talk about the sizing of this, we're
17 not asking that you change it at this point of time, what's
18 that?

19 MR. EMERY: Annual divers instead.

20 MR. KRUGER: Right, and most likely they will
21 last right. You're asking for our comments.

22 MR. EMERY: Yeah, no that's fine.

23 MR. MAGALSKI: No, I think --

24 MR. EMERY: It's well noted.

25 MR. MAGALSKI: I guess the cost of looking at the

1 velocity, I wouldn't think it would be that much -- I know
2 there can be challenges in measuring the velocities when you
3 approach the intake screens but that's something that we can
4 certainly look at and consider.

5 I know on the past projects a lot of times it's a
6 calculation. You make a measurement and then you do some
7 calculation because you can't physically measure but I think
8 just the approach velocities are easy enough to measure then
9 you can make some assumptions and calculations.

10 MR. EMERY: Okay, and a comment on your comment
11 Kyle would be all licenses are 40 years, that's the default
12 so if you have something less or more they'd have to request
13 that.

14 MR. KRUGER: Right, so that just comes to mind.
15 One other thing I noted they said they were indicating the
16 impoundment in the river in the vicinity of it but you
17 didn't mention looking at the fish in the power canal.
18 Those are the fish that would be most vulnerable for
19 entrainment so I'd like to consider that they look at what
20 fish are occupying the power canal.

21 MS. THIAMKEELAKUL: This is Kesiree Thiamkeelakul,
22 do you want me to --

23 MS. EMERY: Yes please spell it out.

24 MS. THIAMKEELAKUL: First name Kesiree,
25 K-e-s-i-r-e-e, last name T (as in Tom) -

1 h-i-a-m-k-e-e-l-a-k-u-l. I can repeat that if you need it.
2 Sure, T-h-i-a-m-k-e-e-l-a-k-u-l, with Michigan D&R
3 Fisheries. I just have a question about your sediment
4 samples.

5 What kind of analytes are going to be -- what
6 kind of analytes are you guys looking for in those sediment
7 samples?

8 MR. MAGALSKI: Yeah this is Jon Magalski of the
9 EPA. I don't have the specific list in mind and that's
10 something that I would -- we would be looking for the
11 agencies to provide but I know mercury and PCB's are
12 probably the top two of concern with DEQ and probably DNR,
13 so probably those two and then any reasonably recommended
14 analytes.

15 MR. KRUGER: DEQ has a normal suite that most of
16 the projects when they do their sediment and fish
17 contaminated analysis that they do, they can provide that
18 and like I said when you talk to them about the 401 cert,
19 I'm sure they can give you their list of what they would
20 prefer to see.

21 MR. MAGALSKI: This is Jon Magalski and I would
22 just add that we've done it at Montville recently, the full
23 suite or whatever DEQ recommended as part of our license in
24 and it came back non-detect so.

25 MR. EMERY: Montville is from downstream and --

1 MR. MAGALSKI: Montville is the project
2 immediately downstream so --

3 MR. EMERY: That reservoir would be completely
4 discharged from Constantine.

5 MR. MAGALSKI: Yes, correct and I wouldn't -- I
6 wouldn't think that there would be contaminant in
7 Constantine since there's none in Montville, but that's
8 something that we'll verify.

9 MR. EMERY: I have a question. Is any portion of
10 the project boundary within 303D or the Michigan -- impaired
11 waters?

12 MR. KRUGER: Not that I'm aware of. This is Kyle
13 Kruger.

14 MR. EMERY: Okay.

15 MR. KRUGER: And also one last thing in terms of
16 there's been no discussion at this point in time about fish
17 passage but again we always like to see a reopener
18 potentially for that. Hopefully the Fish and Wildlife
19 Service will reserve that. But --

20 MR. EMERY: You should talk with the fish
21 monitoring service. Who is the representative now, assigned
22 to for that?

23 MR. KRUGER: I think Scott Hicks right now.

24 MR. EMERY: Okay.

25 MR. KRUGER: Is entering the hydro items. Mr.

1 Fisher who had been --

2 MR. EMERY: Right.

3 MR. KRUGER: Dealing with it retired so.

4 MR. EMERY: Okay.

5 MR. MAGALSKI: I can add a little bit. Jon
6 Magalski with EPA. There used to be a fish passage at
7 Constantine years and years ago. I believe a flood took it
8 out and there's some record with the agencies that it wasn't
9 necessary to put back in place because there's no anadromous
10 fish that make it up this far and no habitat, so, but your
11 comment is definitely noted.

12 MR. KRUGER: Typically we're, this is Kyle from
13 the DNR, we're looking out, we're considering what are our
14 thoughts for the next 40 years and so that's just an option.
15 As you mentioned right now our managers are satisfied with
16 the populations and the fisheries that we have currently and
17 by maintaining the current operation we believe that will
18 all be maintained but -- 25 years from now, you know, if
19 something changes in the Michowaka, there could be a move to
20 bring fish up but that may never materialize.

21 MR. EMERY: Lee Emery, any management fisheries
22 specifically by the state for the project waters?

23 MR. KRUGER: Well right now we stock walleyes as
24 probably the primary management tool that we have. Other
25 than that --

1 MR. EMERY: Frequently or?

2 MR. KRUGER: I believe on an annual basis.

3 MR. EMERY: Is that noticed in the -- is that
4 mentioned in the PAD anywhere?

5 MR. KRUGER: Yes, they have a list of the walleye
6 stocking.

7 MR. EMERY: Okay.

8 MR. KRUGER: What's described and I believe they
9 mention that historically in the past there were some
10 channel catfish stocking there but that's not officially
11 stocking in recent times.

12 MR. EMERY: Okay.

13 MR. KRUGER: But there are fisheries for both
14 walleye which, and catfish which are popular.

15 MR. EMERY: Okay, thank you very much, any other
16 comments from anybody on aquatic research? Okay, thank you
17 we'll move on to our next issue which is terrestrial
18 resource -- my favorite.

19 So for terrestrial resource we looked at and
20 determined the effects of continued project operation and
21 maintenance on the riparian, littoral and wetland habitats
22 and associated wildlife.

23 And the second item under terrestrial would be
24 the effects of continued project operation on invasive
25 plants, species including purple Loosestrife Eurasian

1 water-milfoil and this would be a nightmare the likes you
2 would never like to see. To take a purpose Loostrite like
3 that and it can be -- water-milfoil can be a real bother for
4 fishery resources and for recreational activity, all kinds
5 of things with these invasive species.

6 The applicant is currently doing things to try to
7 protect -- they're trying to take care of and handle some of
8 those species as I understand it, but any other comments
9 from the members here today on this particular -- on
10 terrestrial resources -- something we've missed or
11 eliminated or?

12 MR. KRUGER: This is Kyle Kruger with DNR again.
13 We appreciate the company doing the monitoring for the
14 Milfoil and the purpose Loosestrite that we'll probably like
15 to see inclusion of additional species such as frog bit
16 starwort which are becoming more of a nuisance species
17 throughout.

18 And we also would like to discuss the possibility
19 of changing up how the monitoring is doing, some licensees
20 from other parts of the state have discussed doing
21 monitoring where they look for more species but they do a
22 little scoping around the area of public access so typically
23 that's the vector where things come in -- looking for more
24 species.

25 But then do the full-blown studies on more

1 less-frequent basis, but look for more species when they do
2 it so we kind of spread out the overall inventories on the
3 impoundments like every three to four years, but hit those
4 other spots more frequently but just do a short survey but
5 look for more species.

6 And if they're open to discussion on that I think
7 that's one of our comments we'd like to talk about.

8 MR. EMERY: Yeah, would you provide that comment
9 in writing when you become --

10 MR. KRUGER: Yes, we're going to provide more
11 detail, comments in writing.

12 MR. EMERY: The only comment that I have is that
13 yesterday friends of the St. Joe's River mentioned a couple
14 of species. What is the spelling for frog bit starwort?

15 MR. KRUGER: Starwort I believe is
16 s-t-a-r-w-o-r-t.

17 MR. EMERY: Okay.

18 MR. KRUGER: Frog bit is frog bit, f-r-o-g b-i-t,
19 I believe.

20 MR. EMERY: Okay, all of these are plant species?

21 MR. KRUGER: Both are plant, wide plant species,
22 yeah.

23 MR. EMERY: Are they --

24 MR. KRUGER: Frog bit is like merging kind of
25 like a lily pad.

1 MR. EMERY: Okay.

2 MR. KRUGER: And starwort is sort of like
3 milfoil.

4 MR. EMERY: Have you seen those in lots of other
5 places in Michigan?

6 MR. KRUGER: They were starting to see it more
7 and more and they're very invasive and they're --

8 MR. EMERY: More in the south than the northern
9 part of the state or?

10 MR. KRUGER: Starwort and frog bit are more to
11 the north but it is something that's moving around. I know
12 the southern bay project up in Alpina has had some issues
13 with frog bit and they worked with some local groups that
14 have worked on trying to remove it.

15 MR. EMERY: Is it like a purple Loosetrite?

16 MR. KRUGER: Yes, but it's not -- I don't know
17 that it floats downstream. I don't know the whole life
18 history of it but its' coming out. But we were looking at
19 this as sort of a way to get a better handle on what might
20 be coming into the system but yet not place additional
21 burdens.

22 MR. EMERY: Right.

23 MR. KRUGER: On the licensees, you know, if
24 they're doing purpose Loosetrite inventories every year or
25 two years, but a full-blown survey if they moved that off

1 and those costs could be off-set for doing the look at --

2 MR. EMERY: We might be able to do that in
3 conjunction with other sites that they are going to do --

4 MR. KRUGER: Maybe it's at the same time --

5 MR. EMERY: We're out catching fish, we're out
6 doing, looking at fish and we just see if there are any
7 here.

8 MR. KRUGER: Right, so we're looking at trying to
9 do that but get a better handle on the species that come in
10 that may be problematic down the road.

11 MR. EMERY: Okay, any treatment mechanisms that
12 you know of for the frog bit and starwort?

13 MR. KRUGER: For frog bit they do hand removal.
14 I don't know about starworts.

15 MR. EMERY: Okay, anyway your accounts are of
16 value and are very helpful as well in identifying some
17 species, and some of the concerns, any other comments on
18 terrestrial resources? Ok.

19 Threatened and endangered species -- we've
20 identified the effects of the continued project operation
21 and maintenance on the federally listed threatened and
22 endangered species, including the copper belly water snake.
23 Anybody here ever see one of those here in this area, no?
24 Okay.

25 MR. KRUGER: What about that rattle snake?

1 MR. EMERY: The eastern massasauga rattlesnake,
2 they're around. Mitchell's satyr butterfly -- have you seen
3 that? Kyle or anybody?

4 MR. KRUGER: I have not. Not that I know of.

5 MR. EMERY: Okay.

6 MR. MAGALSKI: They're very habitat specific.

7 MR. EMERY: Yeah, eastern prairie fringed orchid
8 and the bats, the northern long-eared bat, Indiana bat. The
9 first thing a lot of projects in recent years with the
10 concern for the northern long-eared bat, Indiana bat --
11 we're right here in Indiana so it's probably typical. Okay,
12 any comments on these, what we've identified temporarily?

13 MR. KRUGER: We have one additional one that you
14 didn't specifically mention but it is mentioned in the
15 documentation provided by the licensee for purple wartyback
16 which is a mussel but they have indicated that they're
17 planning on doing a mussel survey so we're hoping that will
18 be capturing that but that is a state-listed species that
19 our local fisheries managers are concerned about so
20 hopefully that will be picked up when they do their
21 analysis.

22 MR. EMERY: For the non-biologists in the room,
23 they act as a host species for various fish species. The
24 fish have these juveniles that attach to the gills of the
25 fish and can transport upstream or downstream from the

1 mussels. Any other questions on terrestrial or T&E species?

2 Okay, if not we'll move on. Recreation and land
3 use -- I'm familiar with the races here. We've identified
4 the adequacy of existing public access and recreational
5 facilities that the project meet the current and future
6 recreational needs. Did we identify in the PAD other
7 recreational access sites on the reservoir, Jon, HDR, we do,
8 okay.

9 We, the project only has one is that correct?

10 MR. MAGALSKI: The project has a boat ramp and a
11 canoe portage, those are the two.

12 MR. EMERY: Okay.

13 MR. MAGALSKI: And in-tail water fishing.

14 MR. EMERY: Tail water fishing.

15 MR. MAGALSKI: I believe the private accesses are
16 mentioned in the pad.

17 MR. EMERY: Okay.

18 MR. MAGALSKI: But obviously out of I&N's
19 control.

20 MR. EMERY: I understand and your usage of your
21 resources are about 50% or so, your boat ramps that you've
22 got for them roughly, not overused?

23 MR. MAGALSKI: No I don't think so.

24 MR. EMERY: Okay. Any other comments on the
25 recreational land use?

1 MR. KRUGER: This is Kyle Kruger with Michigan
2 DNR again. On the walk down in the site visit and looking
3 at the PAD I think there's adequate recreational access but
4 part of it relies on access that's not available -- not
5 connected with the project directly.

6 For instance there's a tail water boat launch
7 which is across the river from the project, it's a city
8 park. There's that access we saw at Wither's Road which is
9 operated by someone else. Our position is I think
10 everything is fine as that goes but if for some reason those
11 access sites which contribute to the overall because we
12 prefer to see a tail water impound with boat launch and
13 fishing opportunity and that exists.

14 If the part goes away that the company look at
15 replacing in some form.

16 MR. EMERY: The park like crossing it.

17 MR. KRUGER: Right, in some form of the tailrace
18 boat launch access. We don't anticipate any change. A
19 similar situation was at French Paper where the city has a
20 park along the opposite side of the river that provides much
21 of the recreation that's necessary and so it fulfills that
22 requirement for access to the project waters.

23 But, if for some reason it goes away, some sort
24 of access may need to be replaced but at this time we feel
25 there's adequate recreational facilities with the exception

1 of we don't have a handicap accessible on your tail water
2 parking lot, it looks like a standard for Jon, just as a
3 minor note.

4 The PAD says I believe that you put in your
5 accessible toilets and I don't think that one is. That
6 looks smaller.

7 MR. MAGALSKI: Are you talking up here?

8 MR. KRUGER: Yeah.

9 MR. MAGALSKI: The Village actually.

10 MR. KRUGER: Is that the one Village maintains
11 it, okay, I stand corrected.

12 MR. WALAG: Rich Walag, INM, you're doing a fine
13 job Jim.

14 COURT REPORTER: Spell it please.

15 MR. WALAG: W-a-l-a-g and that is the Village
16 restroom at the parking lot.

17 The only other comment we had was for our local
18 fisheries manager the preference would be that your
19 impoundment boat launch would be a little larger, they
20 received some complaints, but we do understand that is
21 essentially out of control in the public because you do not
22 own that property, you did a pretty decent job of placing
23 that in on what was available with company property so
24 that's just a comment that's going.

25 MR. EMERY: It's about 7 miles from the project

1 down to the mine fill on the river is that right? I think
2 somebody mentions that more or less. I don't know how much
3 use people would use with that 7 miles around the project.
4 Do we have any idea Jon about the usage by Montville?

5 MR. MAGALSKI: Hopefully the recreation study
6 proposal will help lighten the amount of use and help answer
7 those questions.

8 MR. EMERY: Okay, any other comments from anybody
9 on recreation? Okay, seeing none we'll move on. So
10 cultural resources, I didn't know that was here, that's one
11 of those prototypes. This is just a general idea of some of
12 the kind of agricultural resources not specific to the
13 project.

14 So for the cultural resources we look at the
15 effects of continued project operation and maintenance on
16 properties that are included in or potentially eligible for
17 inclusion in the National Registrar of Historic Places.

18 This building itself is 1902, any comments on
19 cultural resources? Seeing none we'll go on to the next and
20 last issue. These are just examples here, nothing specific,
21 to the project. Some places we do have other enhancements
22 for canoes, rowing trails, benches, kind of things, purpose
23 Loosestrite for eradication and control is typical in a lot
24 of places that we see so.

25 And it's too early yet for the applicant --

1 hasn't proposed any major PM and E need, protection
2 mitigation and enhancement measures as we crawl along and
3 developing what the issues are and they can develop what
4 they may do to confer over PM and E and also the results of
5 their studies will help to develop PM and E.

6 So effective codes to recommend environmental
7 protection mitigation enhancement PM and E measures on the
8 economics of the project. Any comments on this particular
9 resource issue?

10 MR. MAGALSKI: Until they have a little more
11 information on the recreation of -- the only thing we did
12 notice is going to come through within our -- on your canoe
13 portage it looks like you could use a little better
14 directional signage to get people from just jumping in at
15 the bottom of your fence at the dock to get down to the
16 actual put in location below your safety buoys. I think you
17 noticed that on the walk down.

18 MR. EMERY: Yeah I'm not a rec person either but
19 I'm wondering about having somebody so close to the dam and
20 its buoys as the takeout point for the --

21 MR. MAGALSKI: On the upstream side you mean?

22 MR. EMERY: Yes, yeah oh no.

23 MR. MAGALSKI: I was thinking more the downstream
24 where we walked down.

25 MR. EMERY: I agree people will think -- I was

1 just curious but signage I agree with and probably well
2 again, I'll defer to my recreation people and see whether
3 they want to be right in the toe of the dam or tune it,
4 probably a little trail down further to put in there and
5 grout stuff, I'm not sure. Most are going to go right down
6 that stairway and put it right there and turning left and
7 going to the other site.

8 MR. MAGALSKI: That's a relatively simple cue to
9 hopefully direct people or make it clear which way the
10 people are supposed to go but.

11 MR. EMERY: That could be worked out as we go
12 along.

13 MR. MAGALSKI: Right.

14 MR. EMERY: It's going to be in the process.

15 MR. MAGALSKI: That was just an observation like
16 you said at this point in time.

17 MR. EMERY: Yeah.

18 MR. MAGALSKI: We'll defer to waiting to see what
19 the recommendations are once they further develop their
20 application.

21 MR. EMERY: Any other comments on this particular
22 resource issue, okay. I'm going to go on a little bit here
23 as to what the next step would be. You've heard it
24 yesterday but just a general accounts on the PAD NOI and
25 study -- we make study request is the next step coming up

1 and that's -- those are due by October 2 of this year.

2 And back at the scoping document you have that
3 time schedule that says every date of when things have to be
4 done, so that's what I'll be looking for post studies if any
5 additional or any suggestions or additional information or
6 comments on the PAD, the scoping meeting today, more if you
7 think of something afterwards -- the NOI.

8 These kind of counts will help if you find a
9 geographical and temporal scope of the analysis and identify
10 substantial environmental issues that may occur from the
11 proposed operations of the project going forward. Do you
12 have any data that will help to describe the existing
13 environment and effects of the project and other
14 developmental activities on environmental and socio-economic
15 resources?

16 You live nearby and you know these resources
17 better than we do so we're looking for comments that you may
18 have to offer. Rich mentioned yesterday something about a
19 herring in the area, it would nice to know a little more
20 about that, or swans. If swans and herring recreate in the
21 PAD anywhere, HDR?

22 MR. WALAG: At the stream of our boundaries.

23 MR. EMERY: Okay, way upstream.

24 MR. WALAG: Three rivers.

25 MR. EMERY: Okay, thank you. Identification of

1 any federal, state or local resource plans and other future
2 project proposals in the affected area -- sometimes we at
3 NEPA and the applicant may miss something that may be
4 nearby. The applicant is not responsible for cumulative
5 impacts, we are at FERC.

6 So I always try to drive around and see what's
7 going on in the neighborhood and how this project may or may
8 not affect those kinds of things. But it's important if you
9 have any information that will help us on that would be
10 great. Do you have any documentation showing why any
11 resource issues identified thus far should be excluded from
12 further study or consideration?

13 We can always delete what we've decided to take a
14 look at if you don't think it's needed and do you have any
15 study requests that would help provide a framework for
16 collecting pertinent information on the resources
17 potentially affected by the project?

18 You may know about some studies or something that
19 would be helpful. This one's the most important in terms of
20 your study request, if you're going to make a specific study
21 request. There are 7 criteria and if you don't address each
22 of these criteria your study request doesn't have a big
23 chance of making it very far. So let's just remind you what
24 these 7 are.

25 They're in the PAD or the scoping document as

1 well. So the first one is, "Describe the goals and
2 objectives of the study proposal and how will your study
3 help to address the project effects on the environment?"

4 "Explain the relevant resource management goals."
5 In other words, how does your study fit into the current
6 resource management goals? "Explain the relevant public
7 interest considerations, why is your study important to the
8 public?" It can't just be your pet peeve, it has to be
9 important to the public as well by and large.

10 "And describe the existing information why
11 there's a need for this additional information that would be
12 provided by your study." And most importantly, forget all
13 the rest of them this is probably the most important one if
14 I can get it changed.

15 Geez, where am I at here -- and that would be,
16 there are four documents -- explain the nexus, what is the
17 connection between your proposal and the project and the
18 project's effects? That will help us inform the development
19 of license requirements. It has to be connected to it, it
20 can't be something 100 miles away that you'd like to have
21 done, what's the nexus of the project, how is the project
22 affecting that issue?

23 So there has to be some immediate connection
24 between your proposed study and the proposed project
25 operation. "Describe the methodology proposed study and how

1 its consistent with accepted practices," -- it's something
2 that's never been used before. I foresee in the future
3 we're going to use a lot more drones to go out and look at
4 things and collect information and you won't be standing in
5 the water eaten by mosquitos for 12 hours in a swamp.

6 Is your study -- a type of study that's never
7 been tried before? Doesn't mean that it can't but we'd like
8 to know something about that. And describe your
9 consideration of the level of effort and cost of the study
10 and why an alternative study is needed.

11 So those are 7 factors that you really need to
12 think about when you come up with an additional study
13 request for a modification of a proposed study request.

14 The applicants proposed five studies that they're
15 going to do. We in fact mentioned some of them briefly --
16 geology and soils, applied resources, terrestrial resources,
17 recreation and land use and cultural resources. They've
18 identified they're going to do some studies on those issues.
19

20 We've been collecting notes as we go along and
21 see what comments are coming out of the sites. Comments are
22 due October 2nd. They can be filed electronically, by mail
23 -- regular mail, identify the project name -- important.
24 And even more important the project number 10661 as you file
25 your comments in and that the address and everything is here

1 within your scoping document as well in the PAD.

2 And it's a long process as I've said. This is a
3 five year -- five and a half year process, this IOP process
4 and we are just in the very beginning of it so you have a
5 lot of time to interact with us and the licensee. Between
6 now and then we'll be seeing each other frequently as we go
7 forward.

8 They'll be having -- they'll have, they have an
9 opportunity to do two years of studies. They will do one
10 year and if they think they need something after that they
11 can do the second year. Usually those things cannot be
12 extended unless there's an act of God, some kind of flooding
13 or something happened that they couldn't do a study.

14 And typically we don't do a scoping 2 -- a second
15 scoping document. We would if there's a significant issue
16 that comes up we would modify the scoping document, put that
17 in there and send it out. You do not have to -- we don't
18 take comments on scoping document number 2 if there is not.

19 If there are minor comments here that we would
20 take into consideration but we wouldn't change or make
21 another scoping document 2. So the applicant -- yeah the
22 applicant is proposed to file its study plan on November
23 16th of this year and if there's a scoping document 2, we
24 would issue it the same time and then step 6 of the 6 step
25 process, we talked about with the study plan meeting takes

1 place on December 16th of this year here and we'll look at
2 that proposed study plan.

3 Some important dates there in that study plan
4 that we all have to abide by, we can't miss those dates --
5 us, you, everybody, all the players in this have to meet
6 those dates with no exception. And we recognize this -- I'm
7 going to put the scale in here, people -- people, a pretty
8 big project, pretty big -- the project is a project. I
9 don't know if many of you know they turn that falls off at
10 night to be able to generate power, there are pretty lights
11 and a rainbow at night and about 8:30 lights out, the falls
12 diminish, they start creating power. It's a big project for
13 a project, 1,000 megawatts or more.

14 And now that we have it -- this is the American
15 side of Niagara Falls, the Horseshoe shaped falls is on the
16 Canadian side. Both of us have these -- make some power
17 from that falls. And that's it, all I have. I'll be back
18 again in December obviously -- not December, October --
19 October study plan. Any comments, suggestions to us -- I
20 hope I haven't confused you and a couple of you have heard
21 this a couple of times already but I would like to get
22 feedback today on some study information, I'm very happy
23 about that and we look forward to getting some of your
24 comments as well in writing. Any other comments -- seeing
25 none I thank you very much for attending today and coming

1 last night many of you.

2 Jon any parting comments from you?

3 MR. MAGALSKI: No I just appreciate everybody's
4 attendance and participation. It's a long process and stick
5 with us.

6 MR. EMERY: Thank you very much guys, have a good
7 day.

8 (Whereupon, the meeting was concluded.)

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1 CERTIFICATE OF OFFICIAL REPORTER

2

3 This is to certify that the attached proceeding
4 before the FEDERAL ENERGY REGULATORY COMMISSION in the
5 Matter of:

6 Name of Proceeding: Constantine Project

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16 Docket No.: P-10661-050

17 Place: Constantine, Michigan

18 Date: Wednesday, August 29, 2018

19 were held as herein appears, and that this is the original
20 transcript thereof for the file of the Federal Energy
21 Regulatory Commission, and is a full correct transcription
22 of the proceedings.

23

24 Jim Seeley

25 Official Reporter

ERRATA SHEET

DEPOSITION OF: Constantine Project No. 10661-050 Scoping Meeting

DATE OF DEPOSITION: August 28, 2018

PAGE 1 of 8 pages

Page	Line	Correction
3	8	My name is Lee Emery, I'm with --- FERC staff. I'm the
3	11	practicing --- my presentation, if I don't do a good job tonight you can come
3	17	a number of years. My brown hair and inherent clothes has My hair has turned white and I no longer wear a
3	18	changed since the time I began younger man'clothes.
3	19	I've been --- a staff member in the Division of Hydropower Licensing for many years. I've seen many projects, a couple
3	23	Today's incident but Laura is a terrestrial
3	24	biologist that is working for us, and she will be addressing terrestrial
3	25	and T and E species, and Mike will address the cultural
4	1	resources and you might want to talk with them after the meeting.
4	2	Several representatives are here from Indiana Power Michigan Power.
4	14	if you mentioned what when the transcripts
7	3	We had five Commissioners until August 3rd, five -- and these
7	5	Democrat. One fellow left August 30th 3rd, who had been there
7	6	maybe two months and began a president working as a president of a local firm.
7	12	reflect whatever is the presidential whoever is the president at that time so now
7	17	down below, it's nice to get an overview of this, saying it assists
8	1	name of the agency, Federal Energy Regulatory Agency,
8	3	shows the five energy sectors from left to right down below the
8	5	gas, fourth is oil and fifth is electric electricity electric transmission.
8	11	natural gas. So you see here a transporting ship transporting the liquefied natural gas,
8	13	and a depository to keep the gas, that's from Louisiana located in Louisiana.
8	14	FERC licenses hydropower projects, non-federal projects.
8	16	project of ours. I was involved in relicensing this Tapoco
8	17	The CHEOA Project on the North Carolina /Tennessee border. It's interesting
8	21	it's 225 feet to the water, it's a little dive ,it's a long dive, I don't know
8	24	like a cathedral, it's the Loop Loup River Project out in Nebraska,
9	3	that license , they weren't very happy they got with the license.

Page	Line	Correction
9	4	So the other three symbols were for the commodities.
9	5	The first two were licensing the pipelines and the hydropower,
9	6	These are and the last three are the commodity elements so for the gas, the oil and
9	7	the electric energy rate transmission of electricity.
9	15	projects there for each entity.
9	18	I saw a proposal recently where they want to take and make also make
9	19	it a pump storage with solar it's a pumped storage project using solar power, they're going to take the
9	23	the powerhouse, there's here's a bunch of those turbines at Hoover of
9	25	view of Hoover dam , impressive, that's a big project, so let's go to TVA,
10	2	Valley Authority -- they have a number of projects.
10	8	impressive. I haven't been to Seattle before If you haven't been to Seattle before, it's big -- but
10	9	this gives all the power for it project produces all the power for it.
10	10	And you recognize this, here Mishawaka the St. Joseph river at Mishawaka
10	12	state, I didn't realize that it's a big river it was that big. I don't
10	13	think it really impressed me before now. Michigan has 54 FERC licensed
10	15	Projects was bigger hydropower projects were big with 29 or 34, this state has 54.
10	16	Michigan, Wisconsin, Minnesota, it's really together combined together, that's
10	20	including an unlicensed one at the very mouth of various near the mouth at Berrien
10	21	Springs. And then another thought here is that Michiganers Michiganders
11	7	Deposit in the Treasury and depositing them in the Treasury - - not many federal agencies make
11	8	that claim. I only know of one other and that's the Patent Patent
11	13	divisions, the division of the hydropower license licensing
11	21	Recently in October of last year we now have a normal license
11	23	term of 40 years -- that's the default. Recently we had three
12	23	projects in one day.
13	3	And a diagram that somebody of typical hydropower generators -- most all of you
13	4	already know what these sent out look like, how they work to generate,
13	8	This moving from is not about moving water from a high to a low or high to
13	9	lower to generate power, but what about waves in an ocean or a
13	10	stream running by or something else — that naturally moves water that's pretty

Page	Line	Correction
13	17	effects are -- are they killing whales, are they killing
13	21	York City, it's an island and a project near Roosevelt island, this is where that island Tidal
13	23	part of New York City there's a lot of tide effects here, water
14	1	They begin operating — the Roosevelt Island Tidal Energy Project it's a 10-year license so
14	10	Same — Another example with a little different concept but the same
14	13	tide goes out. That was licensed in 2012. Count Cook's Cobscook's Bay
14	14	Tidal Energy Project near East Port, Maine it's got an 8 year pilot license
14	21	here, this was an English Dam a Corps of Engineer dam, this is a lock right here and
14	22	Then this — they had an abandoned stowaway spillway here so we
14	23	filled it up with a hydropower project, — a hydrokinetic project
14	24	Moving water moving through that with water moving through the turbines. There's no powerhouse,
14	25	very few people needed to operate it and it generates enough power for about 7,000
15	1	homes and has been operating for about 6 years now.
15	2	Here's what the intake — looks like if you can see inside
15	3	Of the fan the grill you see a fan, these things weigh about 32 tons each, they're
15	9	for us, it's been used in Australia, Sudan and White Nile, Austria,
15	10	Italy and Nova Scotia, In Nova Scotia they just dropped a 400 ton project
15	21	MS. Pellose PARCELL: I'm Liz Pellose Parcell, and I'm with
16	9	HDR, Rob Riggle Quiggle and Danielle Hanson who are our
16	21	company of American Electric Power, so the which is the parent company.
17	11	upstream of the concourse confluence with Lake Michigan. Upstream of the
17	14	downstream of the project, about 7 miles is the Montville Mottville
17	15	Project which the EP AEP and INM I&M own and operates.
18	1	about 1,270 feet long and at the head of that power bowl pool is
18	14	there's also tailrace recreational fishing. These three
18	23	always be somebody there, they may be at Montville Mottville, they're
19	14	And on that page you'll find more information about
20	4	stuff, happy process the happy ILP process. The ILP process began in 2005, the

Page	Line	Correction
20	10	like in the TLP, now everybody is up front with all their cards
20	11	Issued , so to speak, everybody knows what's going on, what to expect.
20	16	Consultation process, with nThey have to get up and talk
20	17	Beforehand at the 41 water service the state agencies, for a
20	18	FEMA Water Act 401 water quality certification under the Clean Water Act, Endangered Species Act, all of those things
20	23	And it the ILP establishes timeframes for completing all
21	3	we're not going to go over each step .
21	5	so. The number of the steps in the process is pretty overwhelming, thank
21	6	God it's a 5.5 year process, the piece meal of these things Process Plan and Schedule is a key part of the ILP
21	9	You have several— steps in the ILP, you have the first six steps
21	16	it'll affect the last page of the document process. The schedule appears on the last pages of the scoping document.
21	17	And unless you're able to defeat it and then In
21	18	appendix B of the document — There is around a 3 to 4 year process time before the license application is
21	19	going to be filed with us on September 30, 2021. I also note
21	20	here that it is a process plan and schedule that we all
21	23	going to be out. You can't make a late filing. of The Process Plan and Schedule
21	24	Of the staff at FERC, we can't screw any of the side deal keeps everyone informed and on schedule including staff at FERC, the applicant, resource agencies, stakeholders. All of us have to meet those set deadlines---
21	25	Ones either so it's important that you know and see that they are not changeable and
22	1	the schedule, it will be followed.
22	2	You'll see me back here with Chris Chamberlain Kris Kringle in
22	6	pre-filing stage which we are involved in right now, it's a three
22	7	to four year time span and then the post-filing stage , once they
22	13	year filing period, it starts the process with a PAD which we
22	14	received first as a first step in that providence process ,
22	15	see the ILP schematic, the PAD, pre-application document. It identifies

Page	Line	Correction
22	22	people will have a chance to write them down as well and file them with FERC
23	21	The second step is sufficient notice of the ILP public noticing of the
23	22	PAD, NOI, and scoping document and defines the licensee licensing process that
23	24	there tonight, with this scoping meeting and this site visit
24	12	6, a study plan meeting would occur with me, Chris Chamberlain Kris Kringle and you
24	20	important think thing we could do this evening is we've got some
25	8	along now. Okay, the purpose of the PAD is — developer and to collect
25	9	by the applicant obtains existing information relevant to
26	1	the NOI, the pad, scoping document, next slide please. That The
26	2	NOI and PAD were issued on July 25th of this year so that's step 2 -- two
26	12	Exhibit 4 Item 4 The purpose of scoping. I'm here to listen, so you'll have
26	13	your chance to come up here pretty shortly. What other are the
26	15	this point in time, one at a time and see if you have any comments if we have account
26	20	gray literature, groups , Friends of the River, universities, a lot
26	21	of things are out there other studies are out there that may have information that does not make it to the public
27	5	The licensee doesn't have to describe human impacts cumulative impacts, it's up
27	7	the cumulatively affected resources by this project.
27	17	Here are the items we identified for scoping for the project. So geology and soil resources, aquatic resources,
27	19	species, recreation and land use, cultural resources and the
27	22	think? Do you have some ideas? Are we missing something? This is
27	23	the fun part, this will be the whole reason why we are meeting right here
28	3	probably all know certainly they said Extreme breach that the bypassed reach is, section of the
28	4	the St. Joe River between the dam and where the water
28	6	Bypass bypassed reach in the park - downstream of the project and any other effects on geology and soil resources

Page	Line	Correction
28	9	river downstream of the project, any other ideas on soil or
28	13	been, in a run of river netive mode of operation.
28	17	the PAD notes that INM -I&M proposes to inventory map and
28	25	So if there is a plan to at some do so at some
29	1	point to fix, mitigate, stabilize those areas it would be great
29	5	from that study and they're going to make a proposal as to how
29	22	MR. EMERY: Any other comments from for this
30	2	operation on water quality, including dissolved dioxin oxygen
30	9	talk about that later but the unit entrainment there was an entrainment study of this
30	10	project in 1993, they're here the applicant will to try and look and see how
30	13	discussion and treatment of entrainment and impingement.
30	23	associated wildlife. And secondly, hopefully Evelyn Nichols the applicant
31	2	outcompeting everything else -- purpose purple loosestrife and
31	3	water milfoil, are a real problem with recreation, actually die
31	4	— habitat — and loss of habitat a lot of problems with water milfoil.
31	6	operation on invasive plants, species including purpose purple
31	8	there but I seen saw— a very small footprint of that 6 mile long
31	9	reservoir, but the outfitting applicant has been doing work on it
31	25	looking at densities of milfoil and purpose purple loosestrife.
32	1	We've done that at the Menville Mottville Project as well as Buchanan
32	11	changes but I think overall for the loosestrife investations investigations
32	24	study is probably not a conductive conducive method to control purpose purple
33	7	polycracker public record that I'm not sure if it was in the PAD or
34	6	study right now. INM I&M is going to do a desktop review of the
37	8	Jo River Association, Incorporated Incorporated . We are an NGO. The

Page	Line	Correction
38	9	MR. EMERY: Anything else Jeoffery? Jeffery?
38	14	these inspections that may occur for purpose purple loosestrife and
39	2	MR. MAGALSKI: JON Joe Magalski of the AEP APD , just say
39	15	French Fringed Orchid and the two bats, the northern long-eared and
39	21	talking about these boat races in the pond here we go -- we've
40	6	the petroglyph, I didn't realize ± one was here in Michigan
40	11	what kinds of cultural resources was one might find at a dig -- not that any of that is
40	17	powerhouse is was built in 1902, yeah -- any comments on cultural
40	20	20 may have something that is sensitive, where's my cultural resource person at here?
42	8	potential impact and things on developmental resources and developed -- these are just
42	9	schematic representations that in particular are the types of things we see
42	10	in other projects in the development of protection, mitigation and enhancement
42	12	We don't know what PMEM , PM&E protection mitigation
42	16	existing sites or something for example ex handling invasive
42	17	species such as the purpose purple loosestrife or something like
43	9	the applicant, then we need to have those comments by October 2nd.
43	17	beyond Montville Mottville downstream or upstream or whatever,
44	3	Is there any -- as I said before any gray great
44	15	looking at trying to get some - background information on the St. Jo River Basin , all kinds of things have
44	22	and we would have to burn up his power plant caused problems with operating the nuclear power plant by reducing its water supply.
44	24	area, what -- what's in the immediate project vicinity and -- how a project may affect it. This is going to
45	5	Those six resource areas that we went through, six or seven of those --
46	2	Its It's right in the relevant resource management

Page	Line	Correction
46	19	project operations and the effects of highway how the study results
46	22	It has to — be relevant to the project operation — I can't be putting a parking lot in
47	2	And describe the methodology—, is it — just something
47	3	that's never been done before, it is wild. I reviewed a fishway way out
47	7	passage passed by for the thing— the structure , it's never going to see the light
47	9	talking about? You want a 41 401 water quality certificate for that or a
47	15	of new stuff coming out with the use of drones that's looking at
47	25	for \$500.00 \$500,000 that doesn't seem quite logical.
48	17	thousands of projects coming in, we need — this project information don't slip up on
48	24	the road from the 2021 filing deadline , to finish off this license
49	2	we went through instead of 28 for the ILP , here's the six, here's the
49	13	And then step six -- that's the Kris Kringle Cringle
49	15	Christmas carols. December 16th meeting will be held here or someplace else for looking
49	19	Important dates to remember -- these dates are all on in
50	11	instructions for doing this are in the scoping document.
50	15	that. There's a wet one — a big falls , does anybody know where that's
50	22	don't know that, Niagara Falls almost dries up at night as they're
50	11	concluded concluded.)

ERRATA SHEET

DEPOSITION OF: Constantine Project No. 10661-050 Scoping Meeting

DATE OF DEPOSITION: August 29, 2018

PAGE 1 of 9 pages

Page	Line	Correction
3	9	So I look forward to having a productive Scoping
3	16	Laura Washington, she'll be addressing terrestrial resources
3	17	and Michael Davis will be addressing cultural resources.
3	24	reporter here doing things already, Jim Seeley
4	8	you have already heard some of the other stuff they handle, about what FERC does last night and some
4	10	I'm going to jump right to the issues I think today - and not
4	11	discuss the the PAD and other parts of the ILP the submission, not the other things, and we'll just
4	25	This is the FERC emblem, and as the name implies, I will point out we do have the
5	1	the Federal Energy Regulatory Commission Company so we do does a lot of things
5	2	with energy regulation actually. The symbol has five figures in it. Here on
5	3	left is gas pipelines, second is the symbol for it's hydropower, and the last three symbols represent the
5	4	actual gas, oil and electricity, the transport of
5	7	That's a gas pipeline being installed in the southern
5	8	portion of Michigan, E-Gas Pipeline. And LNG the transport of LNG the
5	9	gas, off- lining loading it to a storage repository in Louisiana. I will say
5	10	something about this hydropower project I was involved in licensing several years ago. Our license it is the Tapoco Project in North
5	11	Carolina several years ago - where they filed filmed the movie "The
5	12	Fugitive" there, so Harrison Ford was the actor and was running away and they

Page	Line	Correction
5	13	from people were trying to catch him all the time so he jumps off the
5	17	little extension on the dam . The platform, helped to ensure you have to find out where
5	18	in the dam to jump from the dam would not cause someone to get hurt — isn't it
5	19	beautiful? This is a 1939 hydropower project out in Nebraska, on the Loup
5	20	that was licensed just last Saturday about 6-7 months ago, you can see that
5	23	Again, some photos representing of the pipeline -- oil, gas and electric rate
5	24	transformation transmission , and remember FERC is involved in licensing we're non-federal projects. FERC , so
5	25	there are three federal agencies that handle the development of federal hydropower projects, the Bureau of Reclamation,
6	1	TBA TVA (Tennessee Valley Authority) and the Corp of Engineers, combined they have a lot of projects
6	4	has 53 projects, 29 TBA for TVA, I think and 75 for the Corps . Michigan has
6	8	Here's the Bureau of Rec's Hoover Dam -- 100 people lost their life building that project
6	9	that thing , it's really amazing. TBA TVA projects, and the St. Joseph
6	10	project by the Corp of Engineers. The Corp of Engineers has lots of
6	16	River. Here are several slides on FERC organization . We're fast, three licenses There are three divisions in the Office of Energy Projects three divisions . I'm
6	17	in hydropower licensing. We have a compliance division that makes ,
6	19	Inspections inspects dams .
6	20	Now I'll zip through these few slides on hydrokinetic projects . We're involved in
6	23	pilot licenses for 8 to 10 years as the licensee's study their projects . We don't know
6	25	and monitoring them around the clock or whatever to see what the project effects are on the environment .

Page	Line	Correction
7	1	That's New York City and a project located in the river channel near the Roosevelt east of Rhode
7	2	Island. This company must have is proposing to put about 30 of these things
7	3	in this back island here projects in the river in the future. Its title tidal effect there, the water
7	5	the blades on this project in either way direction to generate power.
7	6	Same kind of thing here - spinning blades around , water
7	7	moves the turbines from the title tidal action. This project is in Downtown
7	9	It has removable turbines in stacks, 16 of them, you can take them out of
7	10	on the water when storms approach or when repairs are needed. No powerhouse, GP volt. Is involved and There's enough power
7	12	You can see the size of each generating unit , they weigh about 30 tons
7	13	tons each. It was has 16 of those turbines that's with moving water generating the power.
7	14	The water doesn't fall down through a generating unit like a typical
7	15	hydropower project but instead uses just moving water flowing through the turbines whether it's waves
7	15	from river flows , the ocean or tidal boards bores or whatever, to generate power.
7	17	And I'll skip through this section. Photos of Constantine Project. Flows over the dam it was were really much
7	18	stronger than that yesterday after that rainstorm, compared to flows shown in this photo. going
7	19	The flows going over the dam was were really amazing. Home sweet home,
7	24	a five-year process. We'll only talk about the I won't
7	25	talk much about them but the first six steps of the ILP -- through
8	1	the scoping meeting in preparation of the application.
8	2	Again, pre-filing which is the stage we are in we're now to when we once they

Page	Line	Correction
8	4	then we are in post-filing stage of the ILP where we, FERC, start preparing environmental documents
8	5	and getting inputs from the public and start preparing a license application.
8	8	things are. The PAD and NOI have been filed, they've indicated
8	11	seen that in the newspaper .
8	12	We're having our second public scoping meeting tonight,
8	13	today and we had one yesterday and scoping with a site visit in the morning and scoping
8	14	meeting at night and then we're having our scoping meeting
8	15	today.
8	17	The purpose of the PAD, it's all the is to provide all the background
9	5	resources. The issues we've identified — these are some examples, this
9	12	So, that's what we have tentatively identified and we want
9	14	other resource issues we will be discussing others as we come along later. Identify yourself.
19	25	Kesiree Thiamkeelakul: No.
11	4	including DO, which is dioxin dissolved oxygen concentrations and water
11	8	River downstream from the project were was the two tentative
12	4	trying to do a full blown desktop analysis and I think that would be
12	8	MR. EMERY: No change in traskracks race has
12	12	now where you're giving a forty four year license that if track trash
12	18	MR. EMERY: Realize that we have reopener and reading
12	19	licenses we issue certainly clauses in licenses that can address this issue.
13	7	MR. MAGALSKI: Jon Magalski representing the applicant. with the EPA .
13	13	even if there was a change made due to make us - four forty years

Page	Line	Correction
13	15	course of four forty years that there would be something that we
15	6	kind of analytes analytics are you guys looking for in those sediment
15	8	MR. MAGALSKI: Yeah this is Jon Magalski of the AEP (American Electric Power Company)
15	9	EPA . I don't have the specific list in mind and that's
15	14	analytes analyses .
15	22	just add that we've done it at Montville Mottville recently, the full
15	24	that project and it came back non-detectable se .
15	25	MR. EMERY: Montville Mottville is from downstream and --
16	1	MR. MAGALSKI: Montville Mottville is the project
16	4	receive discharges from Constantine.
16	7	Constantine since there's none in the Montville Mottville reservoir , but that's
16	10	the project boundary within 303D or if the Michigan classifies it as —impaired
16	21	monitoring service. Who is the representative from the FWS that is now, assigned
16	23	to for that? the project?
17	1	Fisher who had been previously assigned to the project
17	3	MR. KRUGER: Mr. Fishers from FWS dealing with it retired se .
17	6	Magalski with AEP . There used to be a fish passage at
17	19	something changes in the Michowaka Mishawaka, there could be a move to
18	25	plants, species including purple Loosestrife loosestrife Eurasian Eurasian
19	2	would never like to see. To take a —To remove purple loosestrife like
19	3	that shown here and it can be — Eurasian water-milfoil can be a real bother for

Page	Line	Correction
19	5	of things problems with these invasive species.
19	14	Milfoil and the purple loosestrife purpose loosestrife that we'll probably like
19	17	throughout Michigan
20	9	in writing when you become file your comments on the scoping document.
20	21	MR. KRUGER: Both are plant, wide wild plant species,
21	15	MR. EMERY: Is it like a purple Loosestrife loosestrife?
21	24	they're doing purpose purple Loosestrife inventories every year or
22	7	invasive plant species at the project here.
23	9	first thing a lot of projects in recent years are concerned with the
23	10	concern for the northern long-eared bat, Indiana bat --
24	3	3 use -- I'm familiar with the hydro boat races here on the project reservoir. We've identified for recreational resources
24	18	MR. MAGALSKI: But obviously out of I&N I&M's
25	14	If the part park goes away that will the company look at
25	16	MR. EMERY: Is this the park across the river from the project tailrace? The park like crossing it.
26	1	of we don't have a handicap accessible site on your tail water
26	12	MR. WALAG: Rich Walag, I&M INM , you're doing a fine
27	4	Do we have any idea Jon about the usage by Montville Mottville?
27	10	cultural resources, (I didn't know that petroglyph was here in MI here, that's one
27	11	of those prototypes. This is just a general idea of some of
27	12	the kind of agri- agricultural resources not specific to the
27	18	This building itself was built is in 1902, any comments on
27	22	for canoes, t rowing trails, benches, those kinds of things, purple
27	23	Loosestrife loosestrife for eradication and control is typical in a lot
27	24	of places that we see se-

Page	Line	Correction
28	1	hasn't proposed any major PM and E need , protection
28	2	mitigation and enhancement measures as we crawl along and
28	3	for the project and will be developing what the issues are and they can develop what
28	4	_____ 4 they may do to confer over PM and E measures as they develop their studies and see study results nd also the results of
28	5	their studies will help to develop PM and E.
28	6	So for developmental resources the applicant effective codes to recommend environmental will look at any proposed recommended environmental
28	11	information on the developmental resources it is difficult to identify PM&E measures. recreation issues of the only thing we did
28	12	notice and it is going to come through in our comments on the PAD is that the canoe
28	17	noticed that on the walk down the canoe portage route.
28	25	MR. EMERY: I agree people will think -- I was
29	1	just curious but about the signage I agree with and probably will
29	2	again, I'll defer to my recreation comments to the recreation people and see whether
29	3	they want the put-in to be right at the toe of the dam or turn turn it,
29	4	probably to a site a little farther down the trail down further to put in there and
29	5	5 with grouting stuff , I'm not sure. Most are going to go right down
29	6	that canoe portage stairway and put it in right there at the toe of the dam rather than following the portage along the river to put-in further downstream from the dam. and turning left and
29	7	going to the other site.
29	22	resource issue, okay. I'm going to go on a little bit further here
29	23	as to what the next step would be in the ILP process. You've heard it
29	24	yesterday but just a general comment and on the PAD NOI and
29	25	study requests -- we make comments on the study request is the next step coming

Page	Line	Correction
30	1	And in the back at of the scoping document you have the
30	7	think of something afterwards, and any comments on the NOI.
30	8	These kinds of comments will help if you find a
30	9	us define the geographical and temporal scope of the analysis and identify
30	19	herring heron rookery in the area, it would nice to know a little more
30	20	about that, or the presence of swans in the project area. Are swans and the heron rookery If swans and herring recreate in the
30	22	MR. WALAG: Yes, At the stream and of out of our project boundaries for the heron rookery
30	24	MR. WALAG: Near Three rivers.
31	3	NEPA FERC and the applicant may miss something that may be
31	4	nearby. The applicant is not responsible for identifying cumulative
31	9	have any information that will help us identify any potential cumulative effects caused by the project on that would be
31	21	21 request. There are 7 criteria that must be addressed in any study request and if you don't address each
31	25	They're in the PAD or and the scoping document as
32	25	operation. "Describe the methodology of your proposed study and how
33	1	it is consistent with accepted practices," IF it's something
33	7	been tried before? It doesn't mean that it can't but be done but we'd like
33	8	to know something about the study . And describe your
33	21	will be waiting to see what comments are coming from you and the public from reviewing the NOI and PAD, Scoping meetings, and any additional study requests. Comments are
33	23	regular mail. You must identify the project name -
33	25	your comments. The correct address for filing your comments is listed in the scoping document.
34	1	within your scoping document as well in the PAD.
34	3	five year -- five and a half year process, this is ILP process

FEDERAL ENERGY REGULATORY COMMISSION

WASHINGTON D.C. 20426

October 16, 2018

OFFICE OF ENERGY PROJECTS

Project No. 10661-050-MI
Constantine Hydroelectric Project
Indiana Michigan Power Company

**Reference: Consultation with Tribes for the Constantine Hydroelectric Project
No. 10661**

Jamie Stuck, Chairperson
Nottawaseppi Huron Band of Potawatomi
2221 1 1/2 Mile Road
Fulton, MI 49052

The Federal Energy Regulatory Commission (Commission) invites your participation in the relicensing process for the existing Constantine Hydroelectric Project No. 10661 (Constantine Project). The Commission's relicensing process is an opportunity for both the licensee and interested agencies, tribes, and other stakeholders to consider the project's existing operation and protection, mitigation, and enhancement measures, and evaluate the need for any changes or additional measures to be implemented over the term of any subsequent license issued for the project. The 1.2-megawatt Constantine Project is located on the St. Joseph River near the Town of Constantine in St. Joseph County, Michigan. Indiana Michigan Power Company operates the project under a license issued by the Commission and has requested to use the Commission's Integrated Licensing Process to relicense the project. A Notice of Intent and Pre-Application Document were filed with the Commission on June 4, 2018. Indiana Michigan Power Company's current license for the Constantine Project expires September 30, 2023 and an application for a new license must be filed by September 30, 2021.

It is very important that a tribe whose interests could be affected by the proposed Constantine Project participate early in the process so that tribal issues are addressed. For this reason, please inform us if you have an interest in participating in the relicensing process for the project.

In addition, please indicate if you would like to meet with Commission staff to discuss the Commission's licensing process, how your Tribe can participate to the fullest extent possible, your interests and concerns in the affected area, and how to establish procedures to ensure appropriate communication between Commission and tribal staffs.

The meeting can be limited to Commission and your Tribal staff, or can be open to other tribes,¹ or Indiana Michigan Power Company.

If at all possible, we would appreciate your response by November 16, 2018.

Our regulations require that we hold a meeting with your tribe no later than thirty days from the filing of Indiana Michigan Power Company's Notice of Intent if a meeting is desired;² however, we are waiving that timeframe to ensure that, if your tribe desires a meeting, we will be able to conduct it at a mutually agreeable time.

The Commission strongly encourages electronic filing. Please file your response using the Commission's eFiling system at <http://www.ferc.gov/docs-filing/efiling.asp>. Commenters can submit brief comments up to 6,000 characters, without prior registration, using the eComment system at <http://www.ferc.gov/docs-filing/ecomment.asp>. You must include your name and contact information at the end of your comments. For assistance, please contact FERC Online Support at FERCOnlineSupport@ferc.gov, (866) 208-3676 (toll free), or (202) 502-8659 (TTY). In lieu of electronic filing, please send a paper copy to: Secretary, Federal Energy Regulatory Commission, 888 First Street NE, Washington, D.C. 20426. The first page of any filing should include docket number P-10661-050.

¹ The Lac du Flambeau Band of Lake Superior Chippewa Indians, Menominee Indian Tribe of Wisconsin, Citizen Potawatomi Nation, Forest County Potawatomi Community, Hannahville Indian Community, Prairie Band of Potawatomi Nation, Miami Tribe of Oklahoma, Pokagon Band of Potawatomi Indians, Little Traverse Bay Bands of Odawa Indians, and the Sault Ste. Marie Tribe of Chippewa Indians were contacted on October 12, 2017.

² 18 C.F.R. § 5.7.

P-10661-050

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If you have any questions or comments, please contact Michael Davis at (202) 502-8339, or at michael.davis@ferc.gov. Mr. Davis will contact you shortly to follow-up on this letter.

Sincerely,

Janet Hutzal, Chief
Midwest Branch
Division of Hydropower Licensing

cc:

Fred Jacko Jr., THPO
Nottawaseppi Huron Band of Potawatomi
1485 Mno-Bmadzewen Way
Fulton, MI 49052

OCT 30 2018

Telephone Memo

To: Public Files
From: Lee Emery
Date: October 25, 2018
Dockets: P-10661-000
Project: Constantine Hydroelectric Project

Subject: Comments on Environmental Protection Agency's Comments on the Scoping Document for the Constantine Hydroelectric Project No. 10661

On October 24, 2018, Lee Emery, Project Coordinator for the Constantine Project, and staff member of the Division of Hydropower Licensing, Federal Energy Regulatory Commission (Commission), Washington, D.C. spoke by telephone with Elizabeth Pelloso, National Environmental Policy Act Reviewer for the Chicago Office of the Environmental Protection Agency (EPA), concerning comments made by EPA in a letter filed with the Commission on September 28, 2018 regarding the subject scoping document issued on July 25, 2018.

Mr. Emery discussed with Ms. Pelloso a clarification and a correction to comments made in EPA's September 28th letter. On page 4 of EPA's letter it states that "EPA anticipates that such mussel assessment surveys will be conducted using USFWS protocols." This statement had an attached footnote that refers to the Michigan Department of Natural Resources' (Michigan DNR) 2018 Freshwater Mussel Survey Protocols and Relocation Procedures. Mr. Emery thought the reference in the footnote would have referred to a US Fish and Wildlife Service (FWS) publication on mussel surveys rather than to a Michigan DNR publication on mussel surveys. Ms. Pelloso explained that the footnote reference to Michigan DNR's mussel survey guidelines was not in error, as she noted that the FWS also has guidelines for mussel surveys.

On page 5 of EPA's letter, it states that during the site visit and public scoping meeting "FERC representatives stated that FERC is proposing removal of acreage from within the project area." Mr. Emery states that no such claim was made by FERC staff during the site visit or scoping meeting. There is no such comment in the transcripts from the scoping meetings. Furthermore, a statement made by Mr. Emery to the applicant while conducting the site visit, casually brought to the applicant's attention, that the 9-acre plot of land located on the east side of the project bypassed reach will ultimately need to be identified as to how the land parcel is needed for project maintenance and operation. There was no comment by Mr. Emery that the discussion about the 9-acre plot of land would be any part of the scoping process for the project. Ms. Pelloso agreed with Mr. Emery's correction to the statement regarding supposed removal of acreage from within the project boundary.

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D.C. 20426
November 13, 2018

OFFICE OF ENERGY PROJECTS

Project No. 10661-050 – Michigan
Constantine Hydroelectric Project
Indiana Michigan Power Company

**Subject: Scoping Document 2 for the Constantine Hydroelectric Project
(FERC No. 10661-050)**

To the Parties Addressed:

The Federal Energy Regulatory Commission (Commission) is currently reviewing the Pre-Application Document filed June 4, 2018, by Indiana Michigan Power Company (I&M Power) for relicensing the Constantine Hydroelectric Project (Constantine Project) (FERC No. 10661). The Constantine Project is located on the St. Joseph River in the Village of Constantine in St. Joseph County, Michigan. The project does not occupy federal land.

Under the Integrated Licensing Process, I&M Power must file its preliminary licensing proposal or draft license application by May 3, 2021. The final license application must be filed with the Commission by September 30, 2021, two years before the license expires.

Pursuant to the National Environmental Policy Act of 1969, as amended, Commission staff intends to prepare an environmental assessment (EA), which will be used by the Commission to determine whether, and under what conditions, to issue a new license for the project. To support and assist our environmental review, we are beginning the public scoping process to ensure that all pertinent issues are identified and analyzed, and that the EA is thorough and balanced.

In our July 25, 2018, Scoping Document 1 (SD1), we disclosed our preliminary view of the scope of environmental issues associated with relicensing the Constantine Project. We requested comments on SD1 and held scoping meetings on August 28 and 29, 2018, to hear the views of all interested agencies and entities on the scope of issues that should be addressed in the EA. Based on verbal comments received at the meetings and the submission of written comments we received throughout the scoping process, we have prepared the enclosed Scoping Document 2 (SD2). The enclosed SD2 is intended to serve as a guide to the issues and alternatives to be addressed in the EA. ***Key changes from SD1 to SD2 are identified in bold italicized type in the enclosed SD2.***

Project No. 10661-050

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The enclosed SD2 supersedes the July 25, 2018, SD1. SD2 is issued for informational use by all interested parties; no response is required. If you have any question about SD2, the scoping process, or how Commission staff will develop the EA for this project, please contact Lee Emery at lee.emery@ferc.gov or (202) 502-8379. Additional information about the Commission's licensing process and the Constantine Project may be obtained from our website, <http://www.ferc.gov>.

Enclosure: Scoping Document 2

SCOPING DOCUMENT 2
CONSTANTINE HYDROELECTRIC PROJECT
(FERC NO. 10661-050)

MICHIGAN



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

November 2018

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November 13, 2018

SCOPING DOCUMENT 2

Constantine Hydroelectric Project No. 10661-050

1.0 INTRODUCTION

The Federal Energy Regulatory Commission (Commission or FERC), under the authority of the Federal Power Act (FPA),¹ may issue licenses for terms ranging from 30 to 50 years for the construction, operation, and maintenance of non-federal hydroelectric projects. On June 4, 2018, Indiana Michigan Power Company (I&M Power) filed a Pre-Application Document (PAD) and Notice of Intent to seek a subsequent license for the Constantine Hydroelectric Project (Constantine Project or project) (FERC Project No. 10661).²

The Constantine Project is located at river mile 101.4 on the St. Joseph River in the Village of Constantine, St. Joseph County, Michigan (see figure 1). The project does not occupy federal land.

I&M Power proposes to continue operating the project as a run-of-river facility. The powerhouse for the Constantine Project contains four generating units with a total installed capacity of 1.2 megawatts (MW). The average annual generation is 4,933 megawatt-hours. A more detailed description of the project is provided in section 3.0, *Proposed Action and Alternatives*.

¹ 16 U.S.C. §§ 791(a)-825(r).

² The current license for the Constantine Project was issued on October 20, 1993, with an effective date of October 1, 1993, for a term of 30 years, and expires on September 30, 2023.

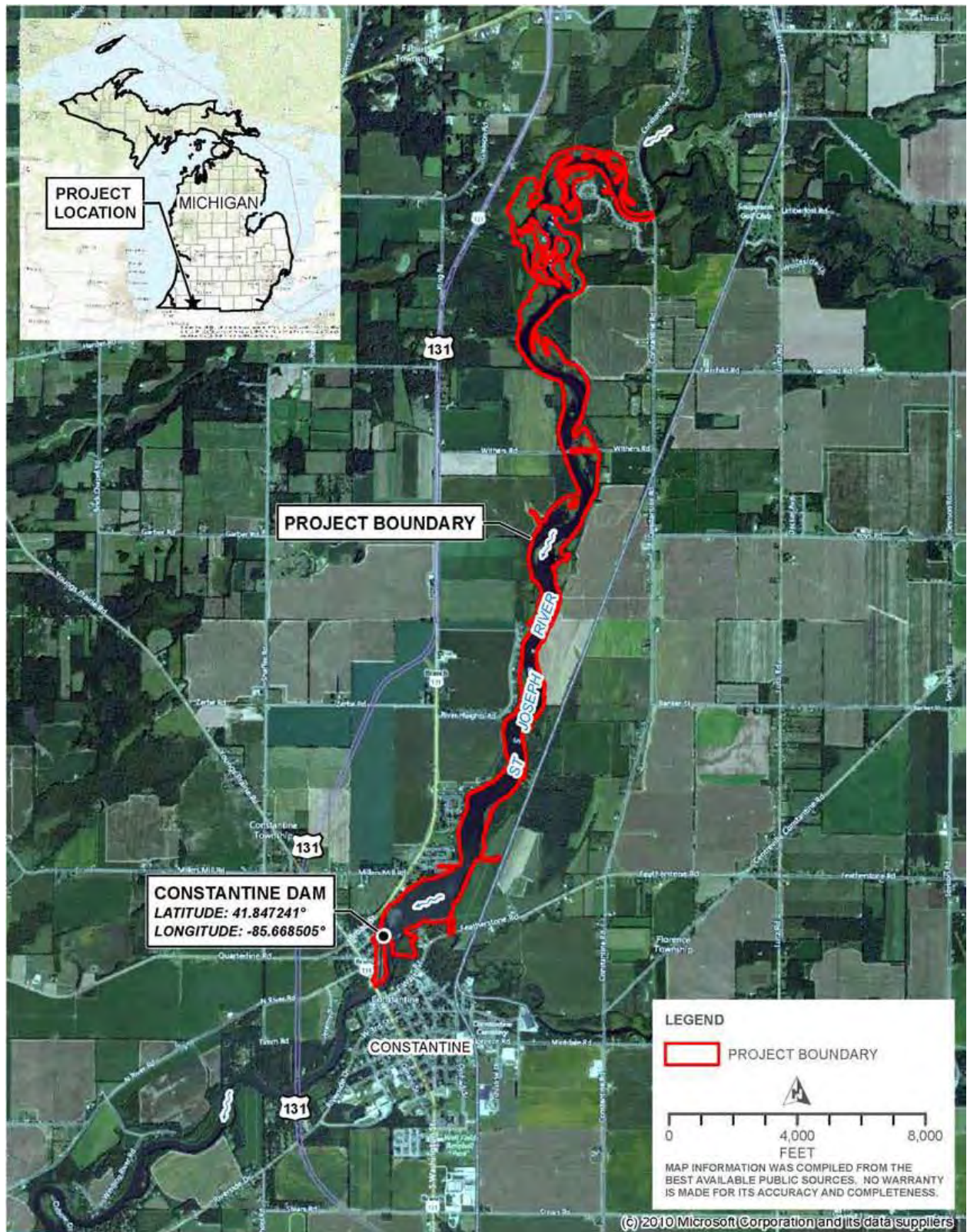


Figure 1. Constantine Project overall location map (Source: I&M Power, 2018).

The National Environmental Policy Act of 1969 (NEPA),³ the Commission's regulations, and other applicable laws require that we independently evaluate the environmental effects of relicensing the Constantine Project as proposed, and also consider reasonable alternatives to the licensee's proposed action. At this time, we intend to prepare an environmental assessment (EA) that describes and evaluates the probable effects, including an assessment of site-specific and cumulative effects, if any, of the proposed action and alternatives. The EA preparation will be supported by a scoping process to ensure that all pertinent issues are identified and analyzed.

Although our current intent is to prepare an EA, there is a possibility that an environmental impact statement (EIS) may be required. The scoping process will satisfy the NEPA scoping requirements, irrespective of whether the Commission issues an EA or an EIS.

³ National Environmental Policy Act of 1969, as amended (Pub. L. 91-190, 42 U.S.C. 4321-4347, January 1, 1970, as amended by Pub. L. 94-52, July 3, 1975, Pub. L. 94-83, August 9, 1975, and Pub. L. 97-258, §4(b), September 13, 1982).

2.0 SCOPING

This Scoping Document 1 (SD1) is intended to advise all participants as to the proposed scope of the EA and to seek additional information pertinent to this analysis. This document contains: (1) a description of the scoping process and schedule for the development of the EA; (2) a description of the applicant's proposed action and alternatives; (3) preliminary identification of environmental issues; (4) a request for comments and information; (5) a proposed EA outline; and (6) a preliminary list of comprehensive plans that are applicable to the project.

2.1 PURPOSE OF SCOPING

Scoping is the process used to identify issues, concerns, and opportunities for enhancement or mitigation associated with a proposed action. According to NEPA, the process should be conducted early in the planning stage of a project. The purposes of the scoping process are as follows:

- invite participation of federal, state, and local resource agencies; Tribes; non-governmental organizations (NGOs); and the public to identify significant environmental and socioeconomic issues related to the proposed project;
- determine the resource issues, depth of analysis, and significance of issues to be addressed in the EA;
- identify how the project would or would not contribute to cumulative effects in the project area;
- identify reasonable alternatives to the proposed action that should be evaluated in the EA;
- solicit from participants available information on the resources at issue, including existing information and study needs; and
- determine the resource areas and potential issues that do not require detailed analysis during review of the project.

2.2 COMMENTS, SCOPING MEETINGS, AND ENVIRONMENTAL SITE REVIEW

Commission staff issued Scoping Document 1 (SD1) on July 25, 2018, to enable resource agencies, Indian Tribes, and other interested parties to more effectively participate in and contribute to the scoping process. In SD1, we requested clarification of preliminary issues concerning the project and identification of any new issues that needed to be addressed in the EA.

We conducted two scoping meetings and an environmental site review to identify potential issues associated with the Constantine Project. Scoping meetings were held in Constantine, Michigan on August 28 and 29, 2018. An environmental site review was

conducted on August 28, 2018. The scoping meetings and environmental site review were noticed in local newspapers and the Federal Register. A court reporter recorded and transcribed oral comments made during both scoping meetings.

In addition to oral and written comments received from individuals at the scoping meetings, written comments were filed with the Commission by the following entities:

<u>COMMENTING ENTITY</u>	<u>FILING DATE</u>
U.S. Environmental Protection Agency (EPA)	September 28, 2018
Friends of the St. Joe River Association, Inc.	September 28, 2018
Michigan Department of Natural Resources (Michigan DNR)	October 2, 2018
Pokagon Band of Potawatomi	October 3, 2018

We revised SD1 following the scoping meetings and after receiving comments filed during the scoping comment period, which ended on October 2, 2018. This SD2 presents our current view of issues and alternatives to be considered in the EA. ***To facilitate review, key changes from SD1 to SD2 are identified in bold, italicized type.*** All comments received are part of the Commission’s official record for the project. Information in the official file is available for inspection and reproduction at the Commission’s Public Reference Room, located at 888 First Street, NE, Room 2A, Washington, DC 20426, or by calling (202) 502-8371. Information also may be accessed through the Commission’s eLibrary system using the “Documents & Filings” link on the Commission’s webpage at <http://www.ferc.gov>. Call (202) 502- 6652 for assistance.

2.3 ISSUES RAISED DURING SCOPING

The issues raised by participants in the scoping process are summarized below. The summaries do not include every oral and written comment made during the scoping process. We revised SD1 to address only those comments related directly to the scope of environmental issues. Several issues were raised that were not identified in SD1, and we have modified SD2 (in bolded italics) accordingly. Comments on the PAD and study requests are not discussed here, but will be considered during study plan development and the ensuing study plan meeting(s). Further, we do not address comments that are recommendations for license conditions, such as protection, mitigation, and enhancement measures, as these will be addressed in the EA or any license order that is issued for the project. We will request final terms, conditions, recommendations, and comments when we issue our Ready for Environmental Analysis notice.

Infrastructure

Comment: EPA recommends that the current condition and integrity of the project's physical infrastructure over the life of the new license be evaluated. EPA cites the National Climate Assessment's⁴ findings that in the Midwest, extreme heat, heavy downpours, and flooding will affect infrastructure, and states that measures should be considered to ensure that the project's infrastructure will maintain its structural integrity.

Response: The Constantine Project is subject to Part 12 of the Commission's regulations (Safety of Water Power Projects and Project Works) under the current license. Part 12 requires, among other things, periodic operational inspections by Commission staff focusing on the continued safety of the structures. Projects that are subject to Part 12 must also be inspected and evaluated every 5 years by an independent consultant and a consultant's safety report must be submitted for Commission review.

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 any 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.

⁴ Available: <https://www.globalchange.gov/browse/reports>.

Aquatic Resources

Comment: EPA recommends that the EA discuss whether the Constantine Project has experienced difficulty maintaining the run-of-river mode of operation due to hydraulic capacity differences between turbines, resulting in downstream water surface level fluctuations.

Response: We have revised section 4.2.2, Aquatic Resources to include an evaluation of the effects of run-of-river operation on water level fluctuations.

Comment. EPA recommends that the EA evaluate the effects of project operation on impingement, entrainment, and turbine-induced fish mortality.

Response: We have revised section 4.2.2, Aquatic Resources to include an evaluation of fish impingement, entrainment, and turbine-induced fish mortality.

Comment: EPA recommends that the EA analyze project effects on mussels if they are located in the project area, including whether measures are available to minimize project effects on mussels.

Response: I & M Power has proposed a mussel survey for the project reservoir. We have revised section 4.2.2, Aquatic Resources to include an evaluation of project effects on mussels.

Terrestrial Resources

Comment: EPA recommends that the EA discuss the effects of project operation and maintenance on the invasive frogbit and Japanese knotweed, including: (1) whether or not they are present within the project area; and (2) if they are monitored or controlled.

Response: We have revised section 4.2.3, Terrestrial Resources, to include European frogbit and Japanese knotweed to our list of invasive plants to be analyzed in the EA.

Recreation

Comment: EPA recommends that the EA discuss the effects of project operation and maintenance on the segment of the St. Joseph's River that is listed under the Nationwide Rivers Inventory and potentially eligible for inclusion in the National Wild and Scenic River System.

Response: We have revised section 4.2.5, Recreation Resources, to include an evaluation of the effects of continued project operation and maintenance on the segment of the St. Joseph's River that is listed under the Nationwide Rivers Inventory and potentially eligible for inclusion in the National Wild and Scenic Rivers System.

Comprehensive Plans

Comment: EPA recommends that the Commission use the most recent version of comprehensive plans available to evaluate whether the proposed project is consistent with Federal and/or state comprehensive plans.

Response: For a plan to be considered a comprehensive plan, Commission regulations require that the plan be submitted by the state or federal agency that developed it, and meet the criteria for a comprehensive plan. The website <https://www.ferc.gov/industries/hydropower/gen-info/licensing/complan.pdf> contains the criteria for approving comprehensive plans and filing instructions.

3.0 PROPOSED ACTION AND ALTERNATIVES

In accordance with NEPA, the environmental analysis will consider the following alternatives, at a minimum: (1) the no-action alternative, (2) the applicant's proposed action, and (3) alternatives to the proposed action.

3.1 NO-ACTION ALTERNATIVE

Under the no-action alternative, the Constantine Project would continue to operate as required by the current project license (*i.e.*, there would be no change to the existing environment). No new environmental protection, mitigation, or enhancement measures (PM&E) would be implemented. We use this alternative to establish baseline environmental conditions for comparison with other alternatives.

3.1.1 Existing Project Facilities

The Constantine Project consists of the following existing facilities:

- (1) an 525-acre reservoir with a storage capacity of 5,750 acre-feet at a water surface elevation of 782.94 feet National Geodetic Vertical Datum (NGVD);
- (2) a 561.25-foot-long dam consisting of, from east to west: (a) a 250-foot-long, 22.5-foot-high embankment with a top elevation of 790 feet NGVD; (b) a 241.25-foot-long, 12-foot-high uncontrolled concrete overflow spillway dam with a fixed crest elevation of 781.96 feet NGVD, topped by 0.94-foot-high flashboards with a crest elevation of 782.90 feet NGVD, which includes a 4-foot sluice gate at the left abutment; (c) a 70-foot-long earthen embankment;
- (3) a 650-foot-long, 20-foot-high earthen detached dike that begins 1,500 feet east of the left abutment of the spillway dam, with a top elevation of 790 feet NGVD;
- (4) a 68-foot-long, 20-foot-high concrete headgate structure consisting of seven wooden 15-foot-high vertical slide gates with a sill elevation of 770.00 feet NGVD with six 7.83-foot-long gates and one 6.75-foot-long gate located at the entrance to the power canal;
- (5) a 1,270-foot-long power canal with a bottom width of 60 feet;
- (6) a 140-foot-long, 30-foot-wide brick powerhouse, with a design head of 12.5 feet;
- (7) trash racks in front of the forebay at the entrance to the powerhouse;
- (8) four vertical shaft Francis turbines each coupled to a 300-kilowatt generator, for a total installed capacity of 1.2 MW;
- (11) a switchyard adjacent to the powerhouse with three step-up transformers;
- (12) a 50-foot-long, 2.4-kilovolt transmission line; and
- (13) appurtenant facilities.

The existing project facilities are shown in figure 2.

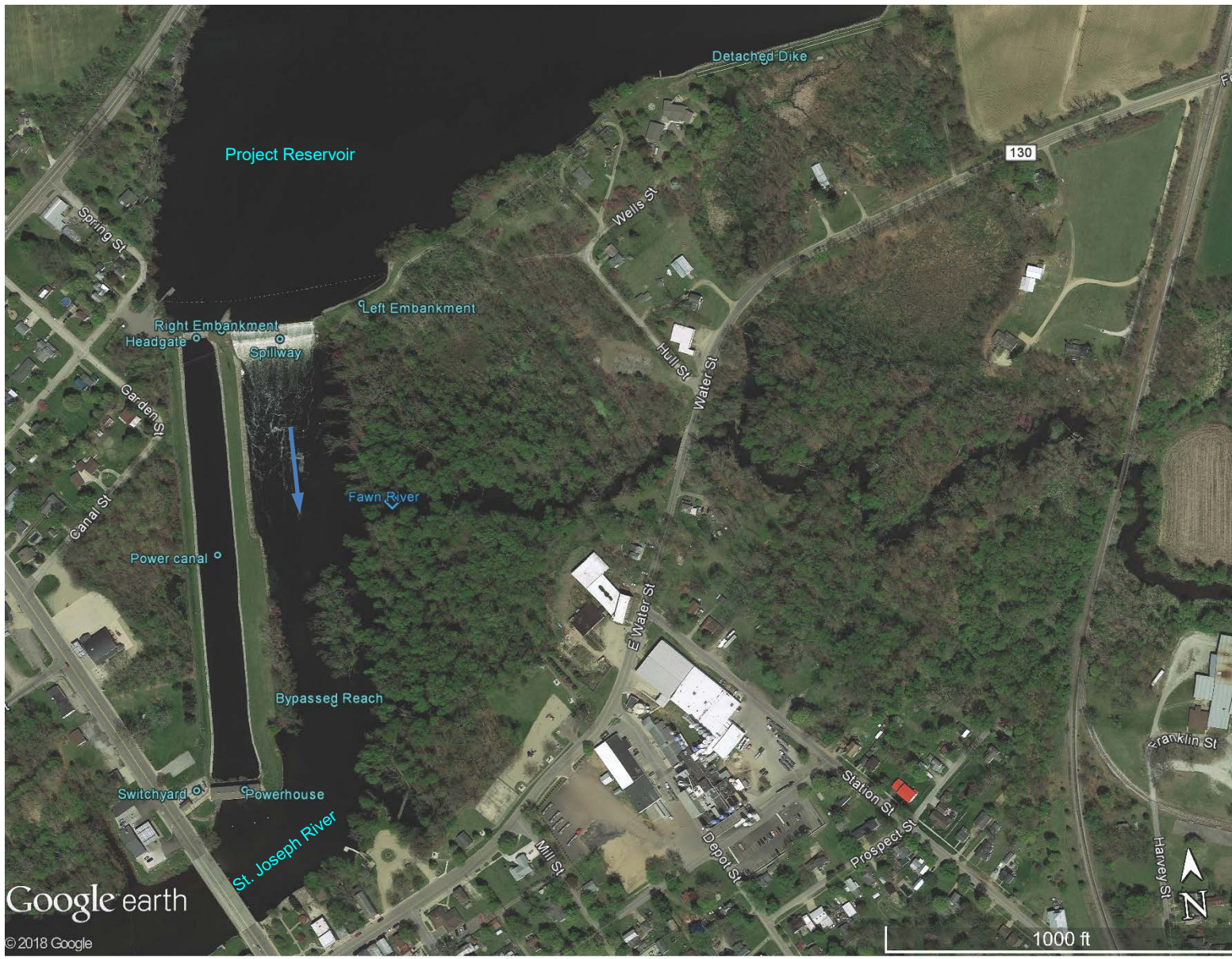


Figure 2. Constantine Project detail location map (Source: Staff)

3.1.2 Existing Project Operation

The Constantine Project is operated in a run-of-river mode, such that outflow from the project approximates inflow, as required by Article 403 of the current license.⁵ Project flows through the turbines are controlled by computer or manually operated. Flows in excess of the maximum hydraulic capacity of the four turbines, which is 1,528 cubic feet per second (cfs) at a head of 11.3 feet or 1,720 cfs at a head of 12.5 feet flow uncontrolled over the project's 241.25-foot-long spillway. Flashboards generally fail when the water level in the reservoir is about 785.0 feet NGVD.

3.2 APPLICANT'S PROPOSAL

3.2.1 Proposed Project Facilities and Operations

I&M Power proposes to continue to operate the Constantine Project in a run-of-river mode, such that outflow from the project approximates inflow. No new or upgraded facilities, structural changes, or operational changes are proposed for the project during the term of the new license.

3.2.2 Proposed Environmental Measures

I&M Power proposes to continue operating the Constantine Project with the protection, mitigation, and enhancement (PM&E) measures described below. The potential need for additional PM&E measures will be evaluated during the relicensing process.

Geologic and Soil Resources

- There are no proposed PM&E measures related to geology and soil resources for the project.

Aquatic Resources

- There are no proposed PM&E measures for aquatic resources.

Terrestrial Resources

- Continue to monitor purple loosestrife and Eurasian water milfoil in the project.
- Continue to evaluate options to control invasive plant species in the project.

⁵ 65 FERC ¶62,063 (1993).

Recreation Land Use, and Aesthetic Resources

- There are no proposed PM&E measures related to recreation, land use, and aesthetic resources for the project.

Cultural Resources

- There are no proposed PM&E measures related to cultural resources for the project at this time; however, if resources are identified within the area of potential effects (APE) that may potentially be affected by project operation, an Historic Properties Management Plan would be developed.

Socioeconomic Resources

- There are no proposed PM&E measures related to socioeconomic resources.

3.3 DAM SAFETY

It is important to note that dam safety constraints may exist and should be taken into consideration in the development of proposals and alternatives considered in the pending proceeding. For example, proposed modifications to the dam structure, such as the addition of flashboards or fish passage facilities, could affect the integrity of the dam structure. As the proposal and alternatives are developed, the applicant must evaluate the effects and ensure that the project would meet the Commission's dam safety criteria found in Part 12 of the Commission's regulations and the Engineering Guidelines (<http://www.ferc.gov/industries/hydropower/safety/guidelines/eng-guide.asp>).

3.4 ALTERNATIVES TO THE PROPOSED ACTION

Commission staff will consider and assess all alternative recommendations for operational or facility modifications, as well as environmental measures identified by staff, federal and state agencies, Tribes, NGOs, and the public.

3.5 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

At present, we propose to eliminate the following alternatives from detailed study in the EA.

3.5.1 Non-power License

A non-power license is a temporary license the Commission would terminate whenever it determines that another governmental agency is authorized and willing to assume regulatory authority and supervision over the lands and facilities covered by the non-power license. At this time, no governmental agency has suggested a willingness or ability to take over the project. No party has sought a non-power license, and we have no

basis for concluding that the Constantine Project should no longer be used to produce power. Thus, we do not consider a non-power license a reasonable alternative to relicensing the project.

3.5.2 Project Decommissioning

Decommissioning of the project could be accomplished with or without dam removal. Either alternative would require denying the relicense application and surrender or termination of the existing license with appropriate conditions. There would be significant costs involved with decommissioning the project and/or removing any project facilities. The project provides a viable, safe, and clean renewable source of power to the region. With decommissioning, the project would no longer be authorized to generate power.

No party has suggested project decommissioning would be appropriate in this case, and we have no basis for recommending it. Thus, we do not consider project decommissioning a reasonable alternative to relicensing the project with appropriate environmental measures.

4.0 SCOPE OF CUMULATIVE EFFECTS ANALYSIS AND RESOURCE ISSUES

4.1 CUMULATIVE EFFECTS

According to the Council on Environmental Quality's regulations for implementing NEPA (40 C.F.R., § 1508.7), a cumulative effect is the effect on the environment that results from the incremental effect 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 information in the PAD and preliminary staff analysis, we have not identified any resource that could be cumulatively affected by the continued operation and maintenance of the project.

4.2 RESOURCE ISSUES

In this section, we present a preliminary list of environmental issues to be addressed in the EA. We identified these issues, which are listed by resource area, by reviewing the PAD and the Commission's record for the Constantine Project. This list is not intended to be exhaustive or final, but contains those issues raised to date that could have substantial effects. After the scoping process is complete, we will review the list and determine the appropriate level of analysis needed to address each issue in the EA.

4.2.1 Geologic and Soils Resources

- Effects of continued project operation and maintenance on shoreline erosion within the project boundary, the bypassed reach, and immediately downstream of the powerhouse.

4.2.2 Aquatic Resources

- Effects of continued project operation on water quality, including dissolved oxygen concentrations and water temperature in the project reservoir and in the St. Joseph River immediately downstream from the project dam (i.e., in the project bypassed reach).
- Effects of *continued project operation on fish impingement, entrainment, and turbine-induced mortality* on fish populations in the project reservoir and in the St. Joseph River downstream from the project.
- *Effects of continued project operation on mussels in project-affected waters, including in the project bypassed reach.*

4.2.3 Terrestrial Resources

- Effects of continued project operation on riparian, littoral, and wetland habitat and associated wildlife.
- Effects of continued project operation on invasive plant species, including purple loosestrife, Eurasian watermilfoil, *European frogbit*, and *Japanese knotweed*.

4.2.4 Threatened and Endangered Species

- Effects of continued project operation and maintenance on the following federally-listed threatened and endangered species: copperbelly water snake, Eastern massasauga, Mitchell's Satyr Butterfly, eastern prairie fringed orchid, northern long-eared bat, and Indiana bat.

4.2.5 Recreation and Land Use

- Adequacy of existing public access and recreational facilities to meet current and future recreation needs.
- *Effects of continued project operation and maintenance on the segment of the St. Joseph's River that is listed under the Nationwide Rivers Inventory and potentially eligible for inclusion in the National Wild and Scenic Rivers System.*

4.2.6 Cultural Resources

- Effects of continued project operation and maintenance on properties that are included in or eligible for inclusion in the National Register of Historic Places.

4.2.7 Developmental Resources

- Effects of any proposed or recommended environmental PM&E measures on the project's economics.

5.0 PROPOSED STUDIES

I&M Power's initial study proposal is identified by resource area in table 1. Detailed information on I&M Power's initial study proposals can be found in the PAD. Additional studies may be added to this list based on comments provided by Commission staff, federal and state resource agencies, Tribes, and other interested participants during this scoping process.

I&M Power has not identified any issues relating to the following resources: aesthetic or socioeconomic resources. Therefore, no studies are proposed for these resource areas.

Table 1. I&M Power's initial study proposals for the Constantine Project. (Source: I&M Power, 2018).

Resource Area	Proposed Study/Information Need
1. Geology and Soils	Conduct a shoreline stability assessment at the project that would include: (1) a survey to locate any sites of erosion or shoreline instability; (2) an inventory, map, and photographs of any identified erosion areas; (3) a scoring system to identify areas that have a potential to erode at unnaturally high rates; and (4) a prioritization of any areas where remedial action may be needed.
2. Aquatic Resources	<p>Conduct a temperature and dissolved oxygen monitoring study within the project boundary. The locations of monitoring equipment would be determined after consultation with Michigan Department of Environmental Quality (Michigan DEQ) and other stakeholders.</p> <p>Conduct sediment contaminant sampling at locations in the reservoir identified after consultation with Michigan DEQ and other stakeholders. Up to six sediment samples would be analyzed at a qualified laboratory facility to determine the types and concentration of any contaminants in the samples.</p> <p>Conduct a fish survey in the project reservoir and bypassed reach to determine the current fish communities present in project waters. The specific survey sampling locations and sampling methods would be determined in consultation with resource agencies and other stakeholders. In addition, tissue samples would be removed from fish collected in the fall sampling period and analyzed for mercury and polychlorinated biphenyl concentrations.</p>

Resource Area	Proposed Study/Information Need
	<p>Conduct a mussel assessment survey in the summer to identify any mussel populations within the project area including at two locations downstream of the project dam and at three locations in the project reservoir. Specific survey locations would be identified after consultation with resource agencies and other stakeholders.</p> <p>Compare the results of the data collected from I&M Power's proposed fish survey with previous surveys to confirm if species compositions have not changed.</p>
3. Terrestrial Resources	<p>Conduct a desk-top study to review U.S. Fish and Wildlife's National Wetlands Inventory maps, aerial photographs, and information available from Michigan DEQ regarding mapped wetlands. Also field-verify mapped wetlands within the project boundary.</p>
4. Recreation and Land Use	<p>Conduct a recreation assessment of the project to assess recreational opportunities and potential improvements to recreational resources within the project boundary.</p>
5. Cultural Resources	<p>Assess project effects on identified historic and archeological resources and determine the need for: (1) additional archeological site file search; (2) an evaluation of project facilities; and/or (3) a Phase I investigation of the project's APE after consultation with the Michigan State Historic Preservation Office and federally recognized tribes.</p>

6.0 EA PREPARATION SCHEDULE

At this time, we anticipate preparing a single EA. The EA will be sent to all persons and entities on the Commission's service and mailing lists for the Constantine Project. The EA will include our recommendations for operating procedures, as well as PM&E measures that should be part of any license issued by the Commission. All recipients will then have 30 days to review the EA and file written comments with the Commission.

The major milestones, with pre-filing target dates are as follows:

<u>Major Milestone</u>	<u>Target Date</u>
Scoping Meetings	August 2018
License Application Filed	September 2021
Ready for Environmental Analysis Notice Issued	
Deadline for Filing Comments, Recommendations, and Agency Terms and Conditions/Prescriptions	
EA Issued	
Comments on EA Due	

Post-filing milestones will be established following I&M Power's filing of the final license application. A copy of the pre-filing portion of the process plan, which has a complete list of the milestones for developing the license application for the Constantine Project, is attached as Appendix A to this SD2.

7.0 PROPOSED EA OUTLINE

The preliminary outline for the Constantine Project EA is as follows:

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8.0 COMPREHENSIVE PLANS

Section 10(a)(2)(A) of the FPA⁶ 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. Commission staff has preliminarily identified and reviewed the plans listed below that may be applicable to the Constantine Project. Agencies are requested to review this list and inform staff of any changes. If there are other comprehensive plans that should be considered for this list that are not on file with the Commission, or if there are more recent versions of the plans already listed, they can be filed for consideration with the Commission according to 18 C.F.R. 2.19 of the Commission's regulations. Please follow the instructions for filing a plan at <http://www.ferc.gov/industries/hydropower/gen-info/licensing/complan.pdf>.

The following is a list of comprehensive plans currently on file with the Commission that may be relevant to the Constantine Project:

- Michigan Department of Environmental Quality. 1996. Non-indigenous aquatic nuisance species, State Management Plan: A strategy to confront their spread in Michigan. Lansing, Michigan.
- Michigan Department of Natural Resources. 1999. St. Joseph River Assessment and Appendix. St. Joseph River Management Plan. Lansing, Michigan. September 1999.
- Michigan Department of Natural Resources. Statewide Comprehensive Outdoor Recreation Plan (SCORP): 2008-2012. Lansing, Michigan.
- National Park Service. The Nationwide Rivers Inventory. Department of the Interior, Washington D.C. 1993.
- U.S. Fish and Wildlife Services. Canadian Wildlife Service. 1986. North American waterfowl management plan. Department of the Interior. Environment Canada. May 1986.
- 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.

⁶ 16 U.S.C. § 803(a)(2)(A) (2012).

9.0 MAILING LIST

The list below is the Commission's official mailing list for the Constantine Project. If you want to receive future mailings for this proceeding and are not included in the list below, please send your request by email to efiling@ferc.gov, or by mail to: Kimberly D. Bose, Secretary, Federal Energy Regulatory Commission, 888 First Street, N.E., Room 1A, Washington, D.C. 20426. All written and emailed requests to be added to the mailing list must clearly identify the following on the first page: Constantine Project (FERC No. 10661-050). You may use the same method if requesting removal from the mailing list.

Register online at <http://www.ferc.gov/docs-filing/esubscription.asp> to be notified via email of new filings and issuances related to this project or other pending projects. For assistance, please contact FERC Online Support at FERCOnlineSupport@ferc.gov, or toll free at 1-866-208-3676, or for TTY, (202) 502-8659.

Mailing List for Constantine Project, **FERC Project No. 10661-050**

Elizabeth Parcell Senior Process Supervisor American Electric Power Company, Inc. 40 Franklin Road Roanoke, VA 24022	David Mark Shirley Energy Production Supervisor American Electric Power Service Corporation 1 Riverside Plaza, 24 th Floor Columbus, OH 43215
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G. P. Maloney Vice President Indiana Michigan Power Company P.O. Box 60 Fort Wayne, IN 46801-0060	Frank Simms Hydro Support Manager Indiana Michigan Power Company 40 Franklin Road Roanoke, VA 24013
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<p>Douglas J. Rosenberger Plant Manager Hydro American Electric Power Service Corporation 40 Franklin Road, SW Roanoke, VA 24011</p>	<p>Pamela Stevenson Assistant Attorney General Department of Attorney General P.O. Box 30755 Lansing, MI 48909</p>
<p>Kurt Newman Michigan Department of Natural Resources P.O. Box 30446 Lansing, MI 48909-7946</p>	<p>Chris E. Freiburger, Biologist Michigan Department of Natural Resources Fisheries Division 530 West Allegan Street Lansing, MI 48933-1521</p>
<p>Michael C. Connor, Esquire Comm. U.S. Bureau of Reclamation U.S. Department of Interior 1849 C Street NW Washington, DC 20240-0001</p>	<p>Chief Michigan Air Quality Division P.O. Box 30260 Lansing, MI 48909-7760</p>
<p>Michigan Forest Management Division P.O. Box 30028 Lansing, MI 48909-7528</p>	<p>Michigan State Historic Preservation Officer Michigan Bureau of History 717 West Allegan Street Lansing, MI 48915-1703</p>
<p>Nick Chevance Regional Environmental Coordinator U.S National Park Service 601 Riverfront Drive Omaha, NE 68128</p>	<p>Michigan Wildlife Division P.O. Box 30028 Lansing, MI 48909-7528</p>
<p>Director Michigan Department of Natural Resources P.O. Box 30446 Lansing, MI 48909-7946</p>	<p>State Conservationist Natural Resources Conservation Service U.S. Department of Agriculture 3001 Coolidge Road, Ste 250 East Lansing, MI 48823-6362</p>
<p>U.S. Coast Guard MSO Sault St. Marie C/O CG Group Sault St. Marie, MI 49783-9501</p>	<p>U.S. Coast Guard FERC Contact MSO Chicago 555 Plainfield Road, Ste A Willowbrook, IL 60527</p>

U.S. Coast Guard MSO Detroit 110 Mount Elliott Street Detroit, MI 48207-4319	U.S. Environmental Protection Agency Region V 77 West Jackson Boulevard Chicago, IL 60604-3511
Michigan Department of Natural Resources P.O. Box 30257 Lansing, MI 48909-7757	Field Manager U.S. Bureau of Land Management 626 East Wisconsin Ave., Ste 200 Milwaukee, WI 53202-4618
Honorable Debbie Stabenow U.S. Senate 133 Hart Senate Office Building Washington, DC 20510	Honorable Frederick Stephen Upton U.S. House of Representatives Washington, D.C. 20515
District Engineer U.S. Army Corps of Engineers 477 Michigan Avenue Detroit, MI 48226-2523	U.S. Fish and Wildlife Service Regional Director 5600 American Blvd. West Ste. 990 Bloomington, MN 55437-1458
U.S. Bureau of Indian Affairs BIA—Midwest Regional Office Norman Pointe II Bldg. 5600 West American Blvd., Ste 500 Bloomington, MN 55437	

APPENDIX A
CONSTANTINE PROJECT PROCESS PLAN AND SCHEDULE

This process plan establishes the deadlines for the pre-filing process. If the due date falls on a weekend or holiday, the due date is the following business day. Early filings or issuances will not result in changes to these deadlines. Shaded milestones are unnecessary if there are no study disputes.

Responsible Party	Pre-Filing Milestone	Date	FERC Regulation
I&M Power	Issue Public Notice for NOI/PAD	6/4/2018	5.3(d)(2)
I&M Power	File NOI/PAD with FERC	6/4/2018	5.5, 5.6
FERC	Tribal Meetings	7/4/2018	5.7
FERC	Issue Notice of Commencement of Proceeding; Issue Scoping Document 1	8/3/2018	5.8
FERC	Constantine Project Environmental Site Review and Scoping Meetings	8/28/2018 and 8/29/2018	5.8(b)(viii)
All stakeholders	PAD/SD1 Comments and Study Requests Due	10/2/2018	5.9
FERC	Issue Scoping Document 2	11/16/2018	5.10
I&M Power	File Proposed Study Plan (PSP)	11/16/2018	5.11(a)
All stakeholders	Proposed Study Plan Meeting	12/16/2018	5.11(e)
All stakeholders	Proposed Study Plan Comments Due	2/14/2019	5.12
I&M Power	File Revised Study Plan	3/16/2019	5.13(a)
All stakeholders	Revised Study Plan Comments Due	3/31/2019	5.13(b)
FERC	Director's Study Plan Determination	4/15/2019	5.13(c)
Mandatory Conditioning Agencies	Any Study Disputes Due	5/5/2019	5.14(a)
Dispute Panel	Third Dispute Panel Member Selected	5/20/2019	5.14(d)
Dispute Panel	Dispute Resolution Panel Convenes	5/25/2019	5.14(d)(3)
I&M Power	Applicant Comments on Study Disputes Due	5/30/2019	5.14(j)
Dispute Panel	Dispute Resolution Panel Technical Conference	6/4 2019	5.14(j)
Dispute Panel	Dispute Resolution Panel Findings Issued	6/24/2019	5.14(k)

Responsible Party	Pre-Filing Milestone	Date	FERC Regulation
FERC	Director's Study Dispute Determination	7/14/2019	5.14(l)
I&M Power	First Study Season	2019	5.15(a)
I&M Power	Initial Study Report	4/14/2020	5.15(c)(1)
All stakeholders	Initial Study Report Meeting	4/29/2020	5.15(c)(2)
I&M Power	Initial Study Report Meeting Summary	5/14/2020	5.15(c)(3)
All stakeholders	Any Disputes/Requests to Amend Study Plan Due	6/13/2020	5.15(c)(4)
All stakeholders	Responses to Disputes/Amendment Requests Due	7/13/2020	5.15(c)(5)
FERC	Director's Determination on Disputes/Amendments	8/12/2020	5.15(c)(6)
I&M Power	Second Study Season	2020	5.15(a)
I&M Power	Updated Study Report due	4/14/2021	5.15(f)
All stakeholders	Updated Study Report Meeting	4/29/2021	5.15(f)
I&M Power	Updated Study Report Meeting Summary	5/14/2021	5.15(f)
All stakeholders	Any Disputes/Requests to Amend Study Plan Due	6/13/2021	5.15(f)
All stakeholders	Responses to Disputes/Amendment Requests Due	7/13/2021	5.15(f)
FERC	Director's Determination on Disputes/Amendments	8/12/2021	5.15(f)
I&M Power	File Preliminary Licensing Proposal	5/3/2021	5.16(a)
All stakeholders	Preliminary Licensing Proposal Comments Due	8/1/2021	5.16(e)
I&M Power	File Final License Application	9/30/2021	5.17
I&M Power	Issue Public Notice of License Application Filing	10/14/2021	5.17(d)(2)



American Electric Power
1 Riverside Plaza
Columbus, OH 43215
aep.com

Via Electronic Filing

November 16, 2018

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, D.C. 20426

**Subject: Constantine Hydroelectric Project (FERC No. 10661)
Filing of Proposed Study Plan for Relicensing Studies**

Dear Secretary Bose:

Indiana Michigan Power Company (I&M), a unit of American Electric Power (AEP), is the Licensee, owner, and operator of the run-of-river, 1,200-kilowatt (kW) Constantine Hydroelectric Project (Project) (FERC Project No. 10661), located on the St. Joseph River in the Village of Constantine in St. Joseph County, Michigan. The Federal Energy Regulatory Commission (FERC or Commission) issued an original license for the Project on October 20, 1993¹. The existing license expires on September 30, 2023. Accordingly, I&M is pursuing a new license for the Project pursuant to the Commission's Integrated Licensing Process (ILP), as described at 18 Code of Federal Regulations (CFR) Part 5. In accordance with 18 CFR §5.11 of the Commission's regulations, I&M is filing the Proposed Study Plan (PSP) with the Commission describing the studies that the Licensee is proposing to conduct in support of relicensing the Project.

I&M filed a Pre-Application Document and associated Notice of Intent with the Commission on June 4, 2018, to initiate the ILP. The Commission issued Scoping Document 1 (SD1) for the Project on July 25, 2018. SD1 was intended to advise resource agencies, Indian tribes, non-governmental organizations, and other stakeholders as to the proposed scope of FERC's Environmental Assessment (EA) for the Project and to seek additional information pertinent to the Commission's analysis.

On August 28 and 29, 2018, the Commission held public scoping meetings in Constantine, Michigan. During these meetings, FERC staff presented information regarding the ILP and details regarding the study scoping process and how to request a relicensing study, including the Commission's study criteria. In addition, FERC staff solicited comments regarding the scope of issues and analyses for the EA. Pursuant to 18 CFR §5.8(d), a public site visit of the Project was conducted on August 28, 2018.

Resource agencies, Indian tribes, and other interested parties were afforded a 60-day period to request studies and provide comments on the PAD and SD1. The comment period was initiated with the Commission's July 25, 2018 notice and concluded on October 2, 2018. During the

¹ Order Issuing License (Minor Project), 65 FERC ¶ 62,063 (1993)

Constantine Hydroelectric Project (FERC No. 10661)
Filing of Proposed Study Plan for Relicensing Studies
November 16, 2018
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comment period, a total of four stakeholders filed letters with the Commission providing general comments, comments regarding the PAD, comments regarding SD1, and/or study requests.

Proposed Study Plan

I&M has evaluated all the study requests and comments submitted by the stakeholders, with a focus on the requests that specifically addressed the seven criteria for study requests as set forth at 18 CFR §5.9(b) of the Commission's ILP regulations. For the study requests that did not address the seven study criteria, where appropriate, I&M considered the study in the context of providing the requested information in conjunction with one or more of I&M's proposed studies.

The purpose of the PSP is to present the studies that are being proposed by I&M and to address the comments and study requests submitted by resource agencies and other stakeholders. The PSP also provides FERC, regulatory agencies, Indian tribes, and other stakeholders with the methodology and details of I&M's proposed studies. At this time, I&M is proposing to conduct the following studies as described in detail in the PSP:

1. Botanical Resources Study;
2. Shoreline Stability Assessment;
3. Water Quality Study;
4. Fisheries Survey;
5. Mussel Survey;
6. Wetlands Study;
7. Recreation Study; and
8. Cultural Resources Study.

I&M is filing the PSP with the Commission electronically and is distributing this letter to the parties listed on the attached distribution list. For parties listed on the attached distribution list who have provided an email address, I&M is distributing this letter via email; otherwise, I&M is distributing this letter via U.S. mail. All parties interested in the relicensing process may obtain a copy of the PSP electronically through FERC's eLibrary system at <https://elibrary.ferc.gov/idmws/search/fercgensearch.asp> under docket number P-10661, or on I&M's website at www.aephydro.com/HydroPlant/Constantine. If any party would like to request a CD containing an electronic copy of the PSP, please contact Jonathan Magalski, Environmental Specialist Consultant, at the phone number or email address listed below.

Comments on the PSP, including any additional or revised study requests, must be filed within 90 days of the filing date of this PSP which is no later than February 14, 2019. Comments must include an explanation of any study plan concerns, and any accommodations reached with I&M regarding those concerns (18 CFR §5.12). Any proposed modifications to this PSP must address the Commission's criteria as presented in 18 CFR §5.9(b).

As necessary, after the comment period closes, I&M will prepare a Revised Study Plan (RSP) that will address interested parties' comments to the extent practicable. Pursuant to the ILP, I&M

Constantine Hydroelectric Project (FERC No. 10661)
Filing of Proposed Study Plan for Relicensing Studies
November 16, 2018
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will file the RSP with the Commission on or before March 16, 2019, and the Commission will issue a final Study Plan Determination by April 15, 2019.

Initial Proposed Study Plan Meeting

In accordance with 18 CFR §5.11(e) of the Commission's regulations, I&M intends to hold an initial Proposed Study Plan Meeting (PSP Meeting) to describe the background, concepts, and study methods described in the PSP. The PSP Meeting will begin at 9:00 AM on December 11, 2018 at the East Lansing Hannah Community Center located at 819 Abbot Road in East Lansing, Michigan.

To assist with meeting planning and logistics, I&M respectfully requests that individuals or organizations who plan to attend the meeting please RSVP by sending an email to me at jmmagalski@aep.com on or before November 30, 2018.

If there are any questions regarding the PSP or PSP Meeting, please do not hesitate to contact me at (614) 716-2240 or at the email address above.

Sincerely,



Jonathan M. Magalski
Environmental Specialist Consultant
American Electric Power Services Corporation, Environmental Services

Enclosures

**Constantine Hydroelectric Project
(FERC No. 10661)
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Federal Agencies

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Mr. Ken Westlake
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US Congressman, 59th District
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Hon. Gary Peters
US Senate
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Hon. Debbie Stabenow
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Ms. Kesiree Thiamkeelakul
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State Historic Preservation Officer,
Lansing Office
State Historic Preservation Office
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Cassopolis, MI 49031

Mr. Robert Hile
Mayor
City of Sturgis
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Sturgis, MI 49091

St. Joseph County
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Ms. Carolyn Grace
Administrator
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President
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Centreville, MI 49032

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Supervisor
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Sturgis, MI 49091

Mr. Donald E. Gloy, Jr.
Supervisor
Township of White Pigeon
16825 Tomahawk Trail
White Pigeon, MI 49099

Mr. Gary Mathers
President
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115 White Pigeon Street
Constantine, MI 49042

Mr. Tyler Royce
President
Village of White Pigeon
103 South Kalamazoo
PO Box 621
White Pigeon, MI 49099

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Tribal Historic Preservation Officer
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Crandon, WI 54520

Ms. Kelly Curran
Pokagon Band of Potawatomi Indians
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Dowagiac, MI 49047

Nottawaseppi Huron Band of the
Potawatomi
1485 Mno-Bmadzewen Way
Fulton, MI 49052

Non-governmental Organizations

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South Bend, IN 46634

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Washington, DC 20005

Mr. Kevin Richard Colburn
National Stewardship Director
American Whitewater
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Cullowhee, NC 28779

Michigan Audubon Society
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Okemos, MI 48864

Michigan Citizens for Water Conservation
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Mecosta, MI 49332

Michigan Environmental Council
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Fisheries Biologist
Michigan Hydropower Relicensing
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Director
St. Joseph River Basin Commission
227 West Jefferson Boulevard
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South Bend, IN 46601



Proposed Study Plan

Constantine Hydroelectric Project
(FERC No. 10661)

November 16, 2018

Prepared by:



Prepared for:

Indiana Michigan Power Company



An **AEP** Company

BOUNDLESS ENERGY™

Constantine Hydroelectric Project
Proposed Study Plan



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List of Acronyms

ACHP	Advisory Council on Historic Preservation
ADA	Americans with Disabilities Act
ADCP	Acoustic Doppler Current Profiler
AEP	American Electric Power
AIRs	Additional Information Requests
APE	Area of Potential Effect
BEHI	Bank Erosion Hazard Index
CFR	Code of Federal Regulations
CPUE	catch per-unit of effort
DLA	Draft License Application
DO	Dissolved Oxygen
EA	Environmental Assessment
FERC	Federal Energy Regulatory Commission (or Commission)
FLA	Final License Application
FR	Federal Register
GIS	Geographic Information System
GLEC	Great Lakes Environmental Center, Inc.
GPS	Global Positioning System
HPMP	Historic Properties Management Plan
I&M	Indiana Michigan Power Company (or Licensee)
ILP	Integrated Licensing Process
ISR	Initial Study Report
kV	kilovolt
kW	kilowatt
MDEQ	Michigan Department of Environmental Quality
MDNR	Michigan Department of Natural Resources
MISIN	Midwest Invasive Species Information Network
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act of 1969

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NHPA	National Historic Preservation Act of 1966
NGOs	non-governmental organizations
NGVD	National Geodetic Vertical Datum
NOI	Notice of Intent
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
PAD	Pre-Application Document
PCBs	polychlorinated biphenyls
PM&E	protection, mitigation and enhancement
Project	Constantine Hydroelectric Project
PSP	Proposed Study Plan
RSP	Revised Study Plan
RTE	rare, threatened, and endangered
SD1	Scoping Document 1
SD2	Scoping Document 2
SHPO	State Historic Preservation Office
U.S.C.	United States Code
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Forest Service
USGS	U.S. Geological Survey
USR	Updated Study Report

1 Introduction and Background

Indiana Michigan Power Company (I&M or Licensee), a unit of American Electric Power (AEP), is the Licensee, owner, and operator of the run-of-river, 1,200-kilowatt (kW) Constantine Hydroelectric Project (Project No. 10661) (Project or Constantine Project), located on the St. Joseph River in the Village of Constantine in St. Joseph County, Michigan.

The existing license for the Project was issued by the Federal Energy Regulatory Commission (FERC or Commission) with an effective date of October 1, 1993 for a term of 40 years. The existing license expires on September 30, 2023. Accordingly, I&M is pursuing a subsequent license for the Project pursuant to the Commission's Integrated Licensing Process (ILP), as described at 18 Code of Federal Regulations (CFR) Part 5. In accordance with 18 CFR §5.11 of the Commission's regulations, I&M is filing this Proposed Study Plan (PSP) describing the studies that the Licensee is proposing to conduct in support of relicensing the Project.

1.1 Study Plan Overview

I&M filed a Pre-Application Document (PAD) and associated Notice of Intent (NOI) with the Commission on June 4, 2018, to initiate the ILP. The PAD provides a description of the Project and summarizes the existing, relevant, and reasonably available information to assist the Commission, resource agencies, Indian Tribes, non-governmental organizations (NGOs), and other stakeholders in identifying issues, determining information needs, and preparing study requests.

The National Environmental Policy Act of 1969 (NEPA), the Commission's regulations, and other applicable statutes require the Commission to independently evaluate the environmental effects of issuing a subsequent license for the Project and to consider reasonable alternatives to relicensing. At this time, the Commission has expressed its intent to prepare an Environmental Assessment (EA) that describes and evaluates the site-specific and cumulative potential effects (if any) of issuing a subsequent license, as well as potential alternatives to relicensing. The EA is being supported by a scoping process to identify issues, concerns, and opportunities for resource enhancement associated with the proposed action. Accordingly, the Commission issued Scoping Document 1 (SD1) for the Project on July 25, 2018. SD1 was intended to advise resource agencies, Indian Tribes, NGOs, and other stakeholders as to the proposed scope of the EA and to seek additional information pertinent to the Commission's analysis. As provided in 18 CFR §5.8(a) and §5.18(b), the Commission issued a notice of commencement of the relicensing proceeding concomitant with SD1.

On August 28 and 29, 2018, the Commission held public scoping meetings in Constantine, Michigan. During these meetings, FERC staff presented information regarding the ILP and details regarding the study scoping process and how to request a relicensing study, including the Commission's study criteria. In addition, FERC staff

solicited comments regarding the scope of issues and analyses for the EA. Pursuant to 18 CFR §5.8(d), a public site visit of the Project was conducted on August 28, 2018.

Resource agencies, Indian Tribes, and other interested parties were afforded a 60-day period to request studies and provide comments on the PAD and SD1. The comment period was initiated with the Commission's July 25, 2018 notice and concluded on October 2, 2018.

FERC's ILP regulations require that stakeholders who provide study requests include specific information in the request in order to allow the Licensee, as well as Commission staff, to determine a requested study's appropriateness and relevancy to the Project and proposed action. As described in 18 CFR §5.9(b) of the Commission's ILP regulations, and as presented by FERC staff during the August 28 and 29, 2018 scoping meetings, the required information to be included in a study request is as follows:

(1) Describe the goals and objectives of each study and the information to be obtained (§5.9(b) (1));

This section describes why the study is being requested and what the study is intended to accomplish, including the goals, objectives, and specific information to be obtained. The goals of the study must clearly relate to the need to evaluate the effects of the Project on a particular resource. The objectives are the specific information that needs to be gathered to allow achievement of the study goals.

(2) If applicable, explain the relevant resource management goals of the agencies or Indian Tribes with jurisdiction over the resource to be studied (§5.9(b) (2));

This section must clearly establish the connection between the study request and management goals or resource of interest. A statement by an agency connecting its study request to a legal, regulatory, or policy mandate needs to be included that thoroughly explains how the mandate relates to the study request, as well as the Project's potential impacts.

(3) If the requester is not a resource agency, explain any relevant public interest considerations in regard to the proposed study (§5.9(b) (3));

This section is for non-agency or Indian Tribes to establish the relationship between the study request and the relevant public or tribal interest considerations.

(4) Describe existing information concerning the subject of the study proposal and the need for additional information (§5.9(b) (4));

This section must discuss any gaps in existing data by reviewing the available information presented in the PAD or information relative to the Project that is known from other sources. This section must explain the need for additional information and why the existing information is inadequate.

(5) Explain any nexus between project operation and effects (direct, indirect, and/or cumulative) on the resource to be studied and how the study results would inform the development of license requirements (§5.9(b) (5));

This section must clearly connect Project operations and Project effects on the applicable resource. This section can also explain how the study results would be used to develop protection, mitigation, and enhancement (PM&E) measures that could be implemented under a new FERC license. The PM&E measures can include those related to any mandatory conditioning authority under Section 401 of the Clean Water Act¹ or Sections 4(e) and 18 of the Federal Power Act, as applicable.

(6) Explain how any proposed study methodology is consistent with generally accepted practices in the scientific community or, as appropriate, considers relevant tribal values and knowledge. This includes any preferred data collection and analysis techniques, or objectively quantified information, and a schedule including appropriate field season(s) and the duration (§5.9(b) (6));

This section must provide a detailed explanation of the study methodology. The methodology may be described by outlining specific methods to be implemented or by referencing an approved and established study protocol and methodology.

(7) Describe considerations of level of effort and cost, as applicable, and why any proposed alternative studies would not be sufficient to meet the stated information needs (§5.9(b) (7));

This section must describe the expected level of cost and effort to conduct the study. If there are proposed alternative studies, this section can address why the alternatives would not meet the stated information needs.

During the comment period, a total of four stakeholders filed letters with the Commission providing general comments, comments regarding the PAD, comments regarding SD1, and/or study requests. FERC requested a Botanical Resources Study; however, no other formal study requests were received from stakeholders during the comment period. The U.S. Environmental Protection Agency (USEPA), Michigan Department of Natural Resources (MDNR), Friends of the St. Joe River, and the Pokagon Band of Potawatomi filed general information, statements, and/or informal study requests related to the Project. Copies of the letters filed with the Commission are provided in Appendix A of this document. The ILP requires I&M to file this PSP within 45 days from the close of the October 2, 2018 comment period (i.e., on or before November 16, 2018).

The purpose of this PSP is to present the studies that are being proposed by I&M and to address the comments and study requests submitted by resource agencies and other stakeholders. This PSP also provides FERC, regulatory agencies, Indian Tribes, and other stakeholders with the methodology and details of I&M's proposed studies. As

¹ 33 U.S.C. §1251 et seq.

necessary, after the comment period closes, I&M will prepare a Revised Study Plan (RSP) that will address interested parties' comments to the extent practicable. Pursuant to the ILP, I&M will file the RSP with the Commission on or before March 16, 2019, and the Commission will issue a final Study Plan Determination by April 15, 2019.

1.2 I&M's Proposed Study Plan

I&M has evaluated all the study requests submitted by the stakeholders, with a focus on the requests that specifically addressed the seven criteria set forth in §5.9(b) of the Commission's ILP regulations, as discussed above. For the study requests that did not address the seven study criteria, where appropriate, I&M considered the study in the context of providing the requested information in conjunction with one of I&M's proposed studies. For example, the Pokagon Band of Potawatomi Tribe requested that I&M examine current pollutant loading in the Project area. To address this issue, I&M is proposing to conduct a Water Quality Study and a Fisheries Study that will involve assessing water quality in the Project area, analyzing contaminant levels in sediments in the reservoir, and analyzing fish tissue samples to determine contaminant levels in fish.

Based on I&M's review of the requested studies, FERC criteria for study requests under the ILP, and available information (e.g., associated with the previous licensing effort or resulting from ongoing monitoring activities), I&M is proposing eight studies to be performed in support of issuing a new license for the Project. Information regarding each of these studies is provided in Sections 6 through 13 of this PSP. For each of I&M's proposed studies, this PSP describes:

1. The goals and objectives of the study;
2. The defined study area;
3. A summary of background and existing information pertaining to the study;
4. The nexus between Project operations and potential effects on the resources to be studied;
5. The proposed study methodology;
6. Level of effort, cost, and schedules for conducting the study.

1.2.1 Comments on the Proposed Study Plan

Comments on this PSP, including any additional or revised study requests, must be filed within 90 days of the filing date of this PSP (i.e., no later than February 14, 2019). Comments must include an explanation of any study plan concerns, and any accommodations reached with I&M regarding those concerns (18 CFR §5.12). Any proposed modifications to this PSP must address the Commission's criteria as presented in 18 CFR §5.9(b).

1.2.2 Proposed Study Plan Meeting

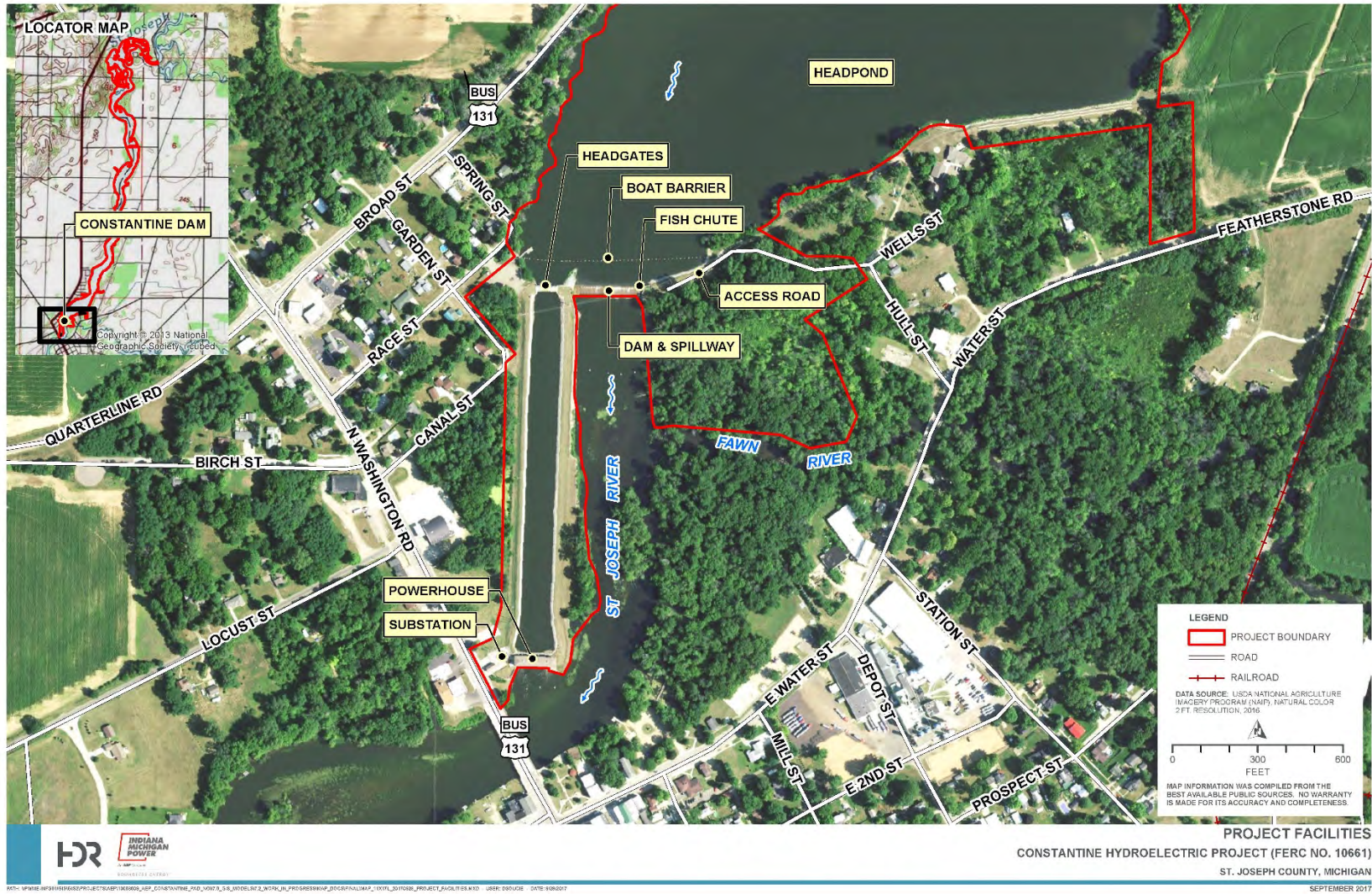
In accordance with 18 CFR §5.11(e), I&M plans to hold a PSP Meeting on December 11, 2018 in East Lansing, Michigan. The purpose of the PSP Meeting will be to clarify the intent and contents of this PSP, explain information gathering needs, and resolve outstanding issues associated with the proposed studies. Additional details regarding the meeting are presented in Section 5 of this document.

1.3 Project Description and Location

The licensed Project works consist of: (a) an uncontrolled concrete gravity overflow spillway dam with a height of about 12 feet, a total length of 241.25 feet, including an abandoned 4-foot-wide fish chute at the left abutment which is now a sluice gate, and topped with 11- $\frac{1}{4}$ -inch-high flashboards; (b) a reinforced-concrete headgate structure 68 feet long and 20 feet high containing seven wooden gates about 7.75 feet wide by 15 feet high; (c) a 70-foot-long earthen embankment between the headgate structure and overflow spillway; (d) an earthfill reservoir impoundment dike with a maximum height of about 20 feet and a length of 650 feet located about 1,500 feet east from the left abutment of the main dam; (e) a reservoir with a surface area of 525 acres at a normal water surface elevation of 782.94 feet, National Geodetic Vertical Datum (NGVD); (f) a 1,270-foot-long power canal with a bottom width of 60 feet; (g) a brick powerhouse with dimensions of 140 feet by 30 feet containing four vertical-shaft Francis turbines connected to four 300-kW generating units for a total installed capacity of 1,200 kW; (h) a switchyard adjacent to the powerhouse containing three step-up transformers; (i) a 2.4-kilovolt (kV) transmission line about 50 feet long; and (j) appurtenant facilities and equipment.

The Project is located on the St. Joseph River in the Village of Constantine in St. Joseph County, Michigan (Figure 1-1).

Figure 1-1. Constantine Hydroelectric Project Facilities



2 Execution of the Study Plan

As required by Section 5.15 of FERC's ILP regulations, I&M will prepare progress reports on a quarterly basis, file an Initial Study Report (ISR), hold an ISR Meeting with stakeholders and FERC staff to discuss the initial study results, and prepare and file an Updated Study Report (USR), and convene an associated USR Meeting as appropriate. I&M will submit all study documents that must be filed with the Commission via FERC's eFiling system.

2.1 Process Plan and Schedule

The Process Plan and Schedule is presented in Table 2-1. Gray shaded milestones are unnecessary if there are no study disputes. If the due date falls on a weekend or holiday, the due date is the following business day. Early filings or issuances will not result in changes to these deadlines.

Table 2-1. Process Plan and Schedule

Milestone	Responsible Party	Time Frame	Estimated Date
File NOI and PAD (18 CFR §5.5(d))	I&M	As early as 5.5 years but no later than 5 years prior to license expiration	June 4, 2018
Initial Tribal Consultation Meeting (18 CFR §5.7)	FERC	No later than 30 days of filing NOI and PAD	July 4, 2018
Issue Notice of PAD/NOI and SD1 (18 CFR §5.8(a))	FERC	Within 60 days of filing NOI and PAD	August 3, 2018
Conduct Scoping Meetings and Site Visit (18 CFR §5.8(b) (viii))	FERC	Within 30 days of NOI/PAD notice and SD1 issuance	August 28-29, 2018
Comments on PAD, SD1, and Study Requests (18 CFR §5.9(a))	Stakeholders	Within 60 days of NOI/PAD notice and issuance of SD1	October 2, 2018
Issuance of Scoping Document 2 (SD2) (18 CFR §5.10) (if necessary)	FERC	Within 45 days of deadline for filing comments on SD1	November 16, 2018
File PSP (18 CFR §5.11)	I&M	Within 45 days of deadline for filing comments on PAD	November 16, 2018
Study Plan Meeting(s) (18 CFR §5.11(e))	I&M	Meeting to be held within 30 days of filing PSP	December 11, 2018
Comments on PSP (18 CFR §5.12)	Stakeholders	Within 90 days of filing PSP	February 14, 2019
File RSP (18 CFR §5.13(a))	I&M	Within 30 days of deadline for comments on PSP	March 16, 2019

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Milestone	Responsible Party	Time Frame	Estimated Date
Comments on RSP (18 CFR §5.13(b))	Stakeholders	Within 15 days following RSP	March 31, 2019
Issuance of Study Plan Determination (18 CFR §5.13(c))	FERC Director	Within 30 days of RSP	April 15, 2019
Formal Study Dispute Resolution Process (18 CFR §5.14(a)) (if necessary)	Agencies and Tribes with mandatory conditioning authority	Within 20 days of study plan determination	May 5, 2019
Dispute Resolution Panel Convenes (18 CFR §5.14(d)) (if necessary)	Dispute Resolution Panel	Within 20 days of a notice of study dispute	May 25, 2019
Comments on Study Plan Disputes (18 CFR §5.14(i)) (if necessary)	I&M	Within 25 days of notice of study dispute	May 30, 2019
Third Panel Member Selection Due (18 CFR §5.14(d)(3)) (if necessary)	Dispute Resolution Panel	Within 15 days of when Dispute Resolution Panel convenes	June 9, 2019
Dispute Resolution Panel Technical Conference (18 CFR §5.14(j)) (if necessary)	Dispute Resolution Panel, I&M, Stakeholders	Prior to engaging in deliberative meetings	
Dispute Resolution Panel Findings and Recommendations (18 CFR §5.14(k)) (if necessary)	Dispute Resolution Panel	No later than 50 days after notice of dispute	June 24, 2019
Study Dispute Determination (18 CFR §5.14(1)) (if necessary)	FERC Director	No later than 70 days after notice of dispute	July 14, 2019
Conduct First Season of Studies (18 CFR §5.15)	I&M	-	Summer/Fall 2019
Study Progress Report (18 CFR §5.15(b))	I&M	I&M will provide summary updates every three months	Quarterly, beginning in Quarter 2 of 2019 through filing of the USR

Milestone	Responsible Party	Time Frame	Estimated Date
Initial Study Report (18 CFR §5.15(c))	I&M	Pursuant to the Commission-approved study plan or no later than 1 year after Commission approval of the study plan, whichever comes first	April 14, 2020
Initial Study Report Meeting (18 CFR §5.15(c)(2))	I&M and Stakeholders	Within 15 days of filing the initial study report	April 29, 2020
File Initial Study Report Meeting Summary (18 CFR §5.15(c)(3))	I&M	Within 15 days of initial study report meeting	May 14, 2020
File Meeting Summary Disagreements (18 CFR §5.15(c)(4)) (if necessary)	Stakeholders	Within 30 days of study results meeting summary	June 13, 2020
File Responses to Meeting Summary Disagreements (18 CFR §5.15(c)(5)) (if necessary)	I&M	Within 30 days of filing meeting summary disagreements	July 13, 2020
Resolution of Disagreements (18 CFR §5.15(c)(6)) (if necessary)	FERC Director	Within 30 days of filing responses to disagreements	August 12, 2020
Conduct Second Season of Studies (if necessary)	I&M	-	Summer/Fall 2020
File Updated Study Report (18 CFR §5.15(f)) (if necessary)	I&M	Pursuant to the Commission approved study plan and schedule provided in §5.13 or no later than two years after Commission approval	April 14, 2021
Updated Study Report Meeting (18 CFR §5.15(f)) (if necessary)	I&M and Stakeholders	Within 15 days of updated study report	April 29, 2021
File Preliminary Licensing Proposal or Draft License Application (18 CFR §5.16(a))	I&M	No later than 150 days prior to the deadline for filing the Final License Application	May 3, 2021
File Updated Study Report Meeting Summary (18 CFR §5.15(f)) (if necessary)	I&M	Within 15 days of study report meeting	May 14, 2021

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Milestone	Responsible Party	Time Frame	Estimated Date
File Meeting Summary Disagreements (18 CFR §5.15(f))	Stakeholders	Within 30 days of study results meeting summary	June 13, 2021
File Responses to Meeting Summary Disagreements (18 CFR §5.15(f)(5))	I&M	Within 30 days of filing meeting summary disagreements	July 13, 2021
Comments on Preliminary Licensing Proposal or Draft License Application Due (18 CFR §5.16(e))	Stakeholders	Within 90 days of filing Preliminary Licensing Proposal or Draft License Application	August 1, 2021
Resolution of Disagreements (18 CFR §5.15(f)) (if necessary)	FERC Director	Within 30 days of filing responses to disagreements	August 12, 2021
File License Application (18 CFR §5.17)	I&M	No later than 24 months before the existing license expires	September 30, 2021

3 Requested Studies Not Adopted

I&M is proposing to conduct the majority of the studies requested by stakeholders. At this time, I&M is not proposing to conduct fish entrainment or impingement studies, fish migration studies, or to study structural modifications or modifications to Project operations to facilitate fish passage at the Project. I&M believes that it is premature to study fish entrainment and impingement, as entrainment and impingement was previously evaluated at the Project, and determined to be insignificant. There is no evidence that the fish community in the Project's reservoir has changed significantly since the previous entrainment and impingement analysis, and I&M is not proposing to modify Project operations. I&M is not proposing to evaluate fish passage options or study fish migration in the St. Joseph River, as the potential upstream movement of resident fish species is currently limited by the dams at Mottville, Elkhart and Twin Branch, which do not have fish passage facilities, and there are no plans on record to install fish passage facilities at these three dams. These items are discussed further in Section 9.6 of this PSP.

In some instances, I&M has consolidated study requests or elements/objectives of study requests into one study to increase efficiencies in how data is collected and analyzed. For example, FERC requested a Botanical Resources Study. The USEPA, MDNR, and Friends of the St. Joe requested information documenting invasive species, and the Pokagon Band of Potawatomi Tribe requested that I&M document the presence of any wild rice beds in the Project area. I&M believes that all study objectives in these requests can be performed during a single study. Accordingly, I&M has consolidated these (and other) studies into a single Botanical Resources Study.

While I&M is proposing to conduct studies requested by stakeholders, in some instances, I&M has proposed minor modifications to the specific study methods. I&M discusses the reasons for proposing alternative methods in the individual study methodology section for each proposed study.

I&M expects to report on the progress and results of studies within the framework afforded by the ISR and associated ISR Meeting as well as the USR and associated USR Meeting. Based on the exact timing of completion of work for each study, I&M may issue draft products between the ISR and USR to the extent practicable. At this time, I&M is proposing to file technical study reports with the Commission and to provide stakeholders access to the study reports consistent with the schedule presented in Table 3-1. I&M notes that adverse weather conditions or other circumstances may necessitate modifications to this schedule. As necessary, I&M will update stakeholders of changes in the schedule in quarterly study progress reports.

Constantine Hydroelectric Project
Proposed Study Plan**Table 3-1. Preliminary Schedule for Study Reporting**

Study	Anticipated Date of Study Report
1. Botanical Resources Study	April 14, 2020 (Concurrent with ISR)
2. Shoreline Stability Assessment Study	April 14, 2020 (Concurrent with ISR)
3. Water Quality Study	April 14, 2020 (Concurrent with ISR)
4. Fisheries Survey	April 14, 2020 (Concurrent with ISR)
5. Mussel Survey	April 14, 2020 (Concurrent with ISR)
6. Wetlands Study	April 14, 2020 (Concurrent with ISR)
7. Recreation Study	April 14, 2020 (Concurrent with ISR)
8. Cultural Resources Study	April 14, 2020 (Concurrent with ISR)

4 Proposal for the PSP Meeting

Pursuant to 18 CFR §5.11(e) of the Commission's ILP regulations, I&M is providing information regarding the PSP Meeting that will be held for the purposes of clarifying the PSP, explaining information gathering needs, and resolving outstanding issues associated with the proposed studies. The Commission's regulations and the approved Process Plan and Schedule require I&M to conduct the PSP Meeting within 30 days of the filing of this PSP. Accordingly, I&M will hold the PSP Meeting on December 11, 2018 at the East Lansing Hannah Community Center located at 819 Abbot Road in East Lansing, Michigan.

Additional details regarding the meeting are presented below.

- Date: December 11, 2018
- Time: 9:00 a.m. (until 5:00 p.m., if necessary)
- Location: East Lansing Hannah Community Center
819 Abbott Road
East Lansing, Michigan 48823

- For additional information, please contact:
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5 FERC Additional Information Requests (AIRs)

In its comments dated September 27, 2018, FERC staff requested additional information about the Constantine Project based on their review of the PAD. The following sections identify the AIRs and I&M's response to each requested item.

5.1 Geological and Soil Resources

AIR 1: *In section 5.2.7, Reservoir Shoreline and Stream Banks, of the Pre-Application Document (PAD), Indiana and Michigan Power Company (I&M Power) states that the west downstream riverbank was repaired due to erosion and is being monitored. Please provide the location of this repaired riverbank and the extent of the erosion, the probable cause of the erosion, a description of the repair, and how the site is being monitored.*

I&M Response: The minor erosion at the Project occurred on the right-descending river bank immediately downstream of the sheet pile wall located approximately 100 feet downstream of the spillway. The repair consisted of placing riprap along approximately 40 feet of the river bank that had suffered minor erosion following a high water event. The area was repaired in August 2011 to prevent further erosion during high water conditions. I&M also made two repairs along the downstream shoreline in October 2018. The first of these repairs these repairs took place along an approximately 200-foot-long section of the right descending river bank, midway between the spillway and powerhouse. The second repair was conducted along a 100-foot-long section of the right descending river bank located immediately downstream of the powerhouse. The repairs conducted in 2018 consisted of placing riprap along sections of the shoreline that suffered minor erosion as a result of a high water event in the spring of 2018. The repairs were conducted to prevent further erosion during high water conditions.

As part of the Dam Safety Surveillance and Monitoring Plan, I&M performs weekly inspections of the Project and completes an inspection checklist monthly to document any signs of erosion or bank instability. Monitoring of the sheet pile wall and embankment is included in these inspections.

5.2 Aquatic Resources

AIR 2: *In section 5.4.2, Existing Fish and Aquatic Resources, of the PAD, I&M Power describes the results of various fish surveys conducted by the Michigan Department of Natural Resources on the St. Joseph River in 2007. Please identify what sampling gear was used to collect the fish samples in the 2007 study.*

I&M Response: The 2007 surveys conducted by MDNR were Roving and Access Site Angler Surveys. The surveys were conducted via boat and on shore and

involved collecting counts of anglers observed on the river and personal interviews with some of those engaged in fishing.

AIR 3: *Several places in the PAD describe the project bypassed reach as being 1,600 feet long (i.e., page 5-63) or 1,300 feet long (i.e., pages 4-7 and 5-14). Please confirm the exact length of the bypassed reach.*

I&M Response: The length of the bypassed reach is approximately 1,300 feet long, page 5-63 incorrectly references 1,600 feet. I&M will ensure that the correct length of the bypassed reach is referenced in future relicensing documents.

AIR 4: *In section 5.3.7.1, Impairment Listing, I&M Power discusses the 2016 303(d) Water Quality Assessment Integrated Report. However, we are unable to discern from the information provided whether there are any waters within the project boundary, or the project bypassed reach, that are not meeting the 303(d) criteria. Please identify if project waters and the project bypassed reach are not listed as impaired or not attaining Michigan Water Quality Standards under section 303(d) of the Clean Water Act.*

I&M Response: Based on the 2016 303(d) Water Quality Assessment Integrated Report it does not appear that any waters within the Project boundary are listed as impaired or not attaining Michigan Water Quality Standards. The upstream location referenced in Section 5.3.7.1 is in the Three Rivers Project's reservoir which is located approximately 9 miles upstream of the Constantine dam. The report indicates that fish consumption is not supported in the bypassed reach from Fawn River downstream to Pigeon River due to PCB's in fish tissue and in the water column.

5.3 Terrestrial Resources

AIR 5: *In section 5.5.2.2, Wildlife and Botanical Resources, of the PAD, I&M Power states that one of the nesting structures was found to be occupied during the 2017 monitoring period. Please provide information regarding: (1) which species used this nesting structure; and (2) historical observations of mallard or wood duck usage of all eight nesting structures erected at the project since inception. Please also provide background information on the factors leading to requirement of the installation of the duck nesting structures in the current license.*

I&M Response: License Article 409 was established to increase the value of Project lands by encouraging wildlife enhancement measures, as recommended by the Project's EA. During the 2017 monitoring period, conducted by I&M's consultant (Great Lakes Environmental Center, Inc. [GLEC]), nesting box WD-D (see Figure 5.5-1 in PAD for location) was documented to be occupied by wood ducks. I&M has been monitoring nesting structures at the Project since 1995 as required by Article 409 of the current license. Table 5.1 below summarizes the history of wood and mallard duck occupancy across all nesting boxes from 1995 through 2017.

Constantine Hydroelectric Project
Proposed Study Plan

Table 5-1. History of Wood and Mallard Duck Nesting Observations

Monitoring Year	Wood Duck Observations	Mallard Duck Observations
1995	No nesting activity observed.	No nesting activity observed.
1996	No nesting activity observed.	No nesting activity observed.
1997	No nesting activity observed; evidence of vandalism of nesting structures.	Evidence of habitation in two nesting structures.
1998	Signs of nesting activity observed in one structure.	No nesting activity observed.
1999	Signs of nesting activity observed in three structures.	Potential nesting observed – structures were inaccessible due to near drought conditions and viewed using binoculars.
2000	Evidence of habitation observed in three nesting structures.	No nesting activity observed.
2001	Three structures were vandalized and nesting activity was found in remaining structure.	Signs of nesting activity observed in three nesting structures.
2002	Two structures were vandalized and nesting activity was observed in the other two structures.	Signs of nesting activity observed in the same three nesting structures as 2001.
2003	Signs of nesting activity observed in all four structures.	Signs of nesting activity observed in all four structures.
2004	Signs of nesting activity observed in all four structures.	Signs of nesting activity observed in all four structures.
2005	No nesting activity observed.	No nesting activity observed.
2006	All four structures were destroyed due to vandalism and were all replaced.	Signs of nesting activity observed in one structure.
2007	Two of the structures were vandalized and no nesting activity was observed in the two intact structures.	No nesting activity observed.
2008	One structure was vandalized and the other three structures were missing.	No nesting activity observed.
2009	None of the structures were accessible during the entire monitoring period due to high water levels.	Signs of nesting activity observed at all four structures.
2010	All four of the nesting structures were missing or destroyed so they had to be replaced.	No nesting activity observed in three structures and the fourth missing structure was replaced.

Monitoring Year	Wood Duck Observations	Mallard Duck Observations
2011	Signs of nesting activity observed in one structure.	No nesting activity observed in three structures and the fourth missing structure was replaced.
2012	Two structures were vandalized and there were signs of nesting activity observed in one of the intact structures.	No nesting activity observed in two structures and low water prevented inspection of the other two structures.
2013	Signs of nesting activity observed in three structures.	No nesting activity observed in three structures and low water prevented inspection of the fourth structure.
2014	No nesting activity observed.	No nesting activity observed in one structure and low water prevented inspection of the other three structures.
2015	No nesting activity observed.	No nesting activity observed.
2016	No nesting activity observed.	No nesting activity observed.
2017	Signs of nesting activity observed in one of the structures.	No nesting activity observed.

AIR 6: *In section 5.6.1, Wetland and Riparian Vegetation, of the PAD, I&M Power states that the license for the project requires surveys be conducted for purple loosestrife and Eurasian watermilfoil within the project reservoir. Please provide survey results for purple loosestrife and Eurasian watermilfoil for the project for the 2018 survey. In addition, please provide additional information regarding the effectiveness of the use of galerucella beetles as a control measure for treating purple loosestrife, including the results from the annual surveys of beetle effectiveness on the purple loosestrife that occurred in 2017. Please provide an explanation of the terms (e.g. “light, medium and heavy”) used on pages 5-30 – 5-36 to describe the quantity of aquatic invasive plants (i.e., purple loosestrife and Eurasian watermilfoil) observed during annual surveys for these two plant species. Also, please define these terms in terms of abundance or assign percentages to the terms.*

I&M Response: AEP will summarize the results of the 2018 purple loosestrife and Eurasian watermilfoil monitoring surveys in the Draft License Application (DLA) and Final License Application (FLA). In summary of the feasibility study for purple loosestrife control using *galerucella* beetles, the study concluded that there was no significant increase in predation of loosestrife by the released beetles from 2015 to 2017 despite the increased release of beetles in 2016. In addition, the life stage monitoring showed very low beetle survivability indicating the difficulties of establishing a sustainable beetle population at the Constantine reservoir due to the lack of over-wintering habitat.

GLEC used the following guidelines for estimating infestations of purple loosestrife and Eurasian watermilfoil in the Project area: light – a single plant, or a few scattered

plants present; moderate – scattered plants present but not crowding out native vegetation; and heavy – plants dense and crowding out native vegetation, often as a pure stand. In their reports, GLEC documents the total number of light, moderate or heavy infestations that are observed during each survey year and does not assign percentages to those terms.

5.4 Recreation and Land Use

AIR 7: Figure 5.8-1 in section 5.8, Recreation and Land Use, of the PAD provides a map of all existing recreation sites and facilities within the project boundary. However, it does not include the location of the portage trail or the paved walking trails referenced in section 5.2.7. Please identify these trails on figure 5.8-1 and provide a description of the paths, including the length, footing materials, condition, and all relevant signage. Also include a description of the condition of the put-in and take-out areas.

I&M Response: I&M is proposing to conduct a Recreation Study as part of the relicensing process for the Project. A component of the Recreation Study is to conduct a Recreation Facility Inventory and Condition Assessment of the Project recreation facilities. The information requested above will be collected during this study and provided in the final study report as well as the DLA and FLA. Additional information regarding the study methodology is provided in Section 13.6.

AIR 8: Figure 5.8-1 also shows the project boundary crossing a corner of the Constantine Project tailwater fishing access parking area, excluding most of the parking area from the project boundary. Exhibit G does not contain enough detail to determine if the parking area is excluded from the project boundary or if figure 5.8-1 is inaccurate. Please clarify if the tailwater fishing access parking area is within or outside of the project boundary and modify figure 5.8-1 accordingly.

I&M Response: The Project boundary depicted in Figure 5.8-1 was created using the existing Exhibit G drawings and currently the parking area does appear to be mostly located outside of the Project boundary. During this relicensing process I&M will be updating the Exhibit G drawings to ensure that all Project facilities are located within the Project boundary and only lands necessary for Project operations and maintenance are also included within the Project boundary. Revised Exhibit G drawings will be filed according to FERC's regulations with the FLA.

AIR 9: In the methodology document that appends the Licensed Hydropower Development Recreation Report (Form 80), the American Legion Boat Launch is described as providing access within the project boundary, however, figure 5.8-1 does not include the location of the American Legion Boat Launch and the text does not describe the location of the boat launch in terms of the project boundary. Please clarify if the American Legion Boat Launch is within, on, or adjacent to the project boundary. If any additional facilities not owned, managed, or operated by I&M Power are within the project boundary, please include them in figure 5.8-1 and include them in your discussion.

I&M Response: The American Legion Boat Launch is located approximately 0.3 miles upstream of the Constantine dam on the west side of the river. The Project boundary on the west side of the river in the vicinity of the boat launch follows the shoreline very closely. While the American Legion Boat Launch is adjacent to the Project boundary, it is not considered to be within the Project or a Project recreation facility. Furthermore, there are no recreation facilities that are owned, managed, or operated by other entities considered to be within the Project boundary.

AIR 10: *To determine the adequacy of the recreational facilities, please describe the location and number of toilets referenced in section 5.8, Recreation and Land Use.*

I&M Response: There is one ADA-accessible toilet at the public boat launch one ADA-accessible toilet near the portage take-out and trail on the east side of the river that are the responsibility for I&M to maintain. The ADA-accessible toilet at near the tailrace fishing access parking lot is maintained by the Village of Constantine. This information will also be documented during the Recreation Study proposed by I&M as further described in Section 13 of this PSP.

AIR 11: *In section 5.8.2, Current Project Recreation Use Levels and Restrictions of the PAD, I&M Power states that the annual daytime visits to the project recreation areas were estimated to be 11,851 as of 2015. Because this figure is higher than might be expected for these project facilities, if the information is available, please provide an explanation (anecdotal or numerical) of the effect the father's day weekend boat race, or other large events, had on this visitor estimation figure, if any.*

I&M Response: The annual total daytime and nighttime recreation usage data for the 2015 Form 80 report was derived from the use of vehicle and trail counters installed at Project recreation facilities in 2014. During the data collection period in 2014, I&M reached out to the American Legion to obtain any recreation usage data for their boat launch and it was revealed that comprehensive data was not maintained for this site and was therefore not included in the 2015 report. Anecdotally, visitor usage increases during the Father's Day weekend boat races, which may account for the higher than expected use number; however, it is unclear from the FERC Form 80 when data was collected relative to the boat race. I&M is proposing a Recreation Study as part of the PSP and will collect visitor use data during the Father's Day weekend boat race, to the extent practicable.

AIR 12: *During the environmental site review, Commission staff noted two individuals fishing at the toe of the dam and on the dam apron. Staff observed fencing extending partly into the reservoir on the upstream side of the dam; however, the fencing on the downstream of the dam appeared to be circumvented by using the large existing rocks adjacent to the fence. Please describe if this area is being used as an informal access-point and if any measures have been implemented to ensure public safety at the toe of the dam.*

I&M Response: I&M is proposing a Recreation Study as part of the PSP and will document any observed informal recreation usage in the Project area. I&M will also

evaluate any potential measures needed to ensure public safety at all Project recreation facilities and informal access points.

AIR 13: *Exhibit G, sheet 1 of 2 shows an area of about 9 acres in the project boundary. This area lies east of the bypassed reach, between the left embankment and the Fawn River. Please describe the project use of the 9-acre area and if it is needed for project operation or maintenance.*

I&M Response: During this relicensing process, I&M will review the Exhibit G drawings and the lands included within the Project boundary to determine which lands are necessary for Project operation and maintenance and will revise the Exhibit G drawings accordingly. Revised Exhibit G drawings will be filed according to FERC's regulations with the FLA. In addition, I&M is proposing a Recreation Study as part of the PSP and will document usage of the 9-acre area during that study.

5.5 Cultural Resources

AIR 14: *In section 5.10, Cultural Resources, of the PAD, I&M Power states that archaeological investigations were completed in 1989 and 1990. However, the PAD does not contain these reports and studies. Please file these documents with the Commission as privileged.*

I&M Response: I&M has filed these reports as privileged in conjunction with the filing of this PSP (Appendix B).

AIR 15: *Additionally, the section describes the Constantine Historic Commercial District, listed in 1985, as being located approximately 400 feet downstream from the project. Please provide information on whether the project has structures or sites that are contributing properties to the eligibility of the Constantine Historic Commercial District.*

I&M Response: Project structures or sites are not considered contributing properties to the eligibility of the Constantine Historic Commercial District. I&M is proposing a Cultural Resources Study to determine if there are any historical or cultural properties in the Project area and if they are NRHP-eligible and will provide that information in the final study report as well as the DLA and FLA.

5.6 Developmental Resources

AIR 16: *In section 4.3.2 of the PAD, table 4.3-1, I&M Power states that the reservoir has a storage capacity of 5,750 acre-feet and a surface area of 525 acres, which yields an average depth of about 11.0 feet. However, table 4.3-1 provides a maximum depth of 12 feet, which is inconsistent with an average depth of about 11.0 feet. Also, Exhibit F, sheet 2 of 3, of the typical spillway section shows an 8-foot depth adjacent to the spillway. Please confirm the reservoir storage capacity, surface area, and maximum depth to ensure consistency and revise the project description accordingly.*

I&M Response: The storage capacity and surface area as stated above and in the PAD are accurate to the best of I&M's knowledge. The maximum depth of the Constantine reservoir was cited from a 2000 report from the Michigan Department of Environmental Quality (MDEQ) in which the MDEQ collected water quality profiles in the Constantine reservoir.

AIR 17: *In section 4.3.7, table 4.3-2 of the PAD, I&M Power states that each turbine has a rated horsepower of 426 and a rated capacity of 300 kilowatt (kW). However, a turbine with a rated horsepower of 426 corresponds to a rated capacity of 320 kW. In the Preliminary Licensing Proposal (or draft license application), please provide a rated turbine horsepower and a rated generator capacity consistent with 18 CFR 11.1(i) of the Commission's regulations.*

I&M Response: Based on the nameplate on each unit, the rated operating voltage at full load is 2,300 volts and the rated kilowatts at full load is 300 kW which equates to about 402 HP. I&M will confirm the rated horsepower and generator capacity and provide any necessary revisions in the Preliminary Licensing Proposal or DLA.

AIR 18: *In section 4.3.7, table 4.3-2 of the PAD, I&M Power states that the voltage of each generator is 2,300 volts. In the single-line diagram, each generator is labeled as 2.4 kV. Please clarify the voltage of each generator.*

I&M Response: I&M will confirm that the correct voltage for each generator should be 2,300 volts. As necessary, the single line diagram will be revised accordingly and provided with the DLA and FLA.

AIR 19: *In section 4.3.8 of the PAD I&M Power states that the 2.4 kV primary transmission line is about 50 feet long. However, the single-line diagram shows that the voltage from the powerhouse stepped up from 2.4 kV to 15 kV for delivery at Florence Road. In the Preliminary Licensing Proposal (or draft license application), please provide the origin, the point of interconnection and length of the primary transmission line, whether the primary transmission line is above ground or underground, the location where the voltage is stepped up, and the owner of the point of interconnection and their relationship to I&M Power. If the Florence Road tie-in location is not the interconnection with the grid, please describe the significance of the Florence Road tie-in location shown on the single-line diagram.*

I&M Response: I&M will provide the requested information in the DLA.

AIR 20: *In section 4.4 of the PAD, I&M Power states that the project is operated as a run-of-river facility, but does not include a normal range of water levels in the reservoir. During the environmental site review, staff noticed flashboards on the dam, which can affect water levels in the reservoir. Please describe the range of water elevations in the reservoir under run-of-river operation.*

I&M Response: The generating units are operated off pond level control to maintain the Constantine reservoir at approximately 782.94 feet (flashboards up) or elevation

782.0 feet (flashboards down). The normal operating range for the Project is 782.0 feet to 782.94 feet.

AIR 21: Please describe how the project is operated under high flow, low flow, and cold weather conditions.

I&M Response: During high flow conditions all units are normally operated in Float Mode to maintain headwater at the desired level. As the inflow to the Project increases above 1,600 cfs water begins to spill over the flashboards until the reservoir rises approximately one foot, upon which the flashboards begin to fail. When the flow increases above 4,000 cfs, plant personnel begin to close the headgates at the intake canal and adjust flow through the generating units to lower the water level in the canal. The plant is manned around the clock when flows reach 5,000 cfs or when the headgate sections are closed. At 10,000 cfs plant personnel de-energize the powerhouse and sandbag the openings in the upstream concrete walls on each side of the powerhouse.

During low flow conditions I&M maintains the tailwater at elevation 770.0 feet as required by the license. If I&M is unable to maintain the tailwater elevation at the required 770.0 feet, all inflow is directed over the spillway and I&M notifies the appropriate resource agencies. During cold weather conditions the generating units are operated off pond level control to maintain the Constantine reservoir at approximately 782.94 feet (flashboards up) or elevation 782.0 feet (flashboards down).

AIR 22: Exhibit F, sheet 1 of 3, general plan shows the storage building west of the powerhouse that had been removed. In the Preliminary Licensing Proposal (or draft license application), please update Exhibit F so as not to include the storage building.

I&M Response: During this relicensing process I&M will be updating the Exhibit F drawings to ensure that the existing Project facilities are accurately represented in the drawings. Revised Exhibit F drawings will be filed according to FERC's regulations with the FLA.

AIR 23: Exhibit F, sheet 1 of 3, general plan shows two sections of the dam and spillway, sections C-C and D-D, but there are no sections labeled C-C and D-D on any of the three sheets in Exhibit F. In the Preliminary Licensing Proposal (or draft license application), please revise Exhibit F to include sections C-C and D-D.

I&M Response: During this relicensing process I&M will be updating the Exhibit F drawings to ensure that the existing Project facilities are accurately represented in the drawings. Revised Exhibit F drawings will be filed according to FERC's regulations with the FLA.

AIR 24: Exhibit F, sheet 1 of 3, general plan and sheet 2 of 3, plan view of dam & spillway, and longitudinal section of spillway each show the fish chute. Section 4.3 of the PAD states that the fish chute had been abandoned and replaced with a sluice gate. In

the Preliminary Licensing Proposal (or draft license application), please revise Exhibit F to show the sluice gate that replaces the abandoned fish chute.

I&M Response: During this relicensing process I&M will be updating the Exhibit F drawings to ensure that the existing Project facilities are accurately represented in the drawings. Revised Exhibit F drawings will be filed according to FERC's regulations with the FLA.

AIR 25: *Exhibit F, sheet 1 of 3, sections A-A and F-F do not include the following relevant information for the left canal embankment: (1) the top elevation, the cross slope of the embankment crest; (2) top width; or (3) the slope of the right side of the embankment. In the Preliminary Licensing Proposal (or draft license application), please revise Exhibit F to include the relevant information for the left canal embankment.*

I&M Response: During this relicensing process I&M will be updating the Exhibit F drawings to ensure that the existing Project facilities are accurately represented in the drawings. Revised Exhibit F drawings will be filed according to FERC's regulations with the FLA.

AIR 26: *Exhibit F, sheet 2 of 3, section E-E does not include the following relevant information for the powerhouse: (1) length and height of the powerhouse; (2) generator floor elevation; (3) length and floor elevation of the forebay intake section; (4) angle of the trash racks; (5) turbine pit floor elevation; (6) and draft tube invert. In the Preliminary Licensing Proposal (or draft license application), please revise Exhibit F, section E-E to include the relevant information.*

I&M Response: During this relicensing process I&M will be updating the Exhibit F drawings to ensure that the existing Project facilities are accurately represented in the drawings. Revised Exhibit F drawings will be filed according to FERC's regulations with the FLA.

AIR 27: *Exhibit F, sheet 3 of 3 does not show the recent upgrades to the detached dike. In the Preliminary Licensing Proposal (or draft license application), please revise Exhibit F to include the as-built information for the detached dike.*

I&M Response: During this relicensing process I&M will be updating the Exhibit F drawings to ensure that the existing Project facilities are accurately represented in the drawings. Revised Exhibit F drawings will be filed according to FERC's regulations with the FLA.

6 Botanical Resources Study

6.1 Study Requests

The Commission's July 25, 2018 SD1 identified the following environmental resource issues to be analyzed in the EA for the Project relicensing.

- Effects of continued project operation on invasive plant species, including purple loosestrife and Eurasian watermilfoil.

FERC requested that I&M conduct a Botanical Resources Study to determine potential effects of Project operation and maintenance activities on botanical resources within the Project boundary. Comments were received from USEPA, MDNR, and Friends of the St. Joe River related to invasive plant species in the Project area. Additionally, the Pokagon Band of Potawatomi requested a study to document historic and/or current wild rice beds in the Project boundary.

6.2 Goals and Objectives

The goals and objectives of the Botanical Resources Study are to:

- Describe vegetation types within the Project boundary;
- Document historic and/or current presence of wild rice beds in the Project boundary;
- Identify and map any rare, threatened, or endangered (RTE) plant species, specifically the federally threatened Eastern prairie fringed orchid and state threatened water willow; and
- Document the presence, abundance, and location of invasive plant species.

6.3 Study Area

The study area for the Botanical Resources Study is the Project boundary.

6.4 Background and Existing Information

Existing relevant and reasonably available information regarding botanical resources in the Project vicinity was presented in Section 5.5 of the PAD (I&M 2018). Southwest Michigan lies in the Beech-Maple Association of the Eastern Deciduous Forest Province (Bailey 1978). In the Project vicinity, vegetation is a mixed hardwood community of predominantly oak, with some ash, beech, hickory, maple, cottonwood, and aspen (I&M 1988).

The area surrounding the Constantine reservoir is largely agricultural. Along its lower third, the reservoir is largely within pre-existing river banks and is bordered by a fringe of trees, while along the upper two-thirds of the reservoir the river often covers more

extensive (up to 1,200 feet) widths of lowland areas (I&M 1988). Limited information is available regarding botanical resources in the Project area.

6.5 Project Nexus

Project operation and maintenance activities have the potential to disturb botanical resources in the Project boundary. This study would assist in identifying plant species and their habitats within the Project and provide baseline information from which to evaluate the effects of continued operation and maintenance of the Constantine Project on botanical resources.

6.6 Methodology

I&M proposes to generally adopt FERC's recommended approach to this study with the following modification. FERC's study request included a task involving mapping the presence of trees with ≥ 5 inches diameter at breast height with exfoliating bark and snags in the Project area. This request would require an extensive amount of field effort and I&M does not have any plans involving tree removal in the Project area. As such, I&M is not proposing to include this component in the Botanical Resources Study. If, over the term of the license, I&M determines that tree removal is necessary, I&M will consult with resource agencies prior to conducting any such activities.

6.6.1 Task 1 – Desktop Mapping of Vegetation

I&M will obtain high-resolution aerial imagery to characterize the vegetation in the Project area, to the extent practical. The imagery will be used to create base maps that depict the major cover types that are present in the Project study area. I&M will use these base maps during the field portion of this study to verify the mapped vegetation cover types.

6.6.2 Task 2 – Develop Plant Species List

I&M will work with resource agencies and other stakeholders to finalize a list of the plant species that will be surveyed during this study prior to conducting any field work. Table 6-1 provides an initial list of plant species that have been identified by stakeholders as species of interest in the Project area.

Table 6-1. Initial Plant List for Botanical Survey

Common Name	Scientific Name
Eastern Prairie Fringed Orchid ¹	<i>Platanthera leucophaea</i>
Water Willow ²	<i>Justicia americana</i>
Purple Loosestrife	<i>Lythrum salicaria</i>
Eurasian Watermilfoil	<i>Myriophyllum spicatum</i>
Japanese Knotweed	<i>Fallopia japonica</i>
European Frogbit	<i>Hydrocharis morsus-ranae</i>
Starry Stonewort	<i>Nitellopsis obtusa</i>
Curly-Leaf Pondweed	<i>Potamogeton crispus</i>
Pond Water-Starwort	<i>Callitriche stagnalis</i>
Common Reed	<i>Phragmites australis</i>
Carolina Fanwort	<i>Cabomba caroliniana</i>

¹ Federally threatened species.² State threatened species.

6.6.3 Task 3 – Survey for RTE and Invasive Plant Species and Field Verification of Vegetation Cover Types

I&M will perform field surveys to document RTE and invasive plant species, based on the species list to be finalized in consultation with stakeholders in Task 2, present in the Project study area. Locations of RTE and invasive species will be mapped and photographed. The approximate density and area of coverage will be documented for observed invasive species. General observations will also be noted regarding habitat and site conditions, including type, density, and quality. Any invasive species observed in the study area will be reported using the Midwest Invasive Species Information Network (MISIN) and either submitted online via www.misin.msu.edu or through the MISIN app on a mobile device. Additionally, I&M will ground-truth the information presented in the cover type base maps developed in Task 1. Cover type maps will be updated as necessary based on field verification and the results of the RTE and invasive species field surveys.

Additionally, I&M will search for and document the presence of any wild rice beds. If any wild rice beds are documented in the survey area, location and photographic documentation will be collected, and I&M will consult with the Pokagon Band of Potawatomi Tribe and other stakeholders during the ISR Meeting to determine if and how core samples should be collected in the field during the second year of study.

6.7 Analysis and Reporting

Results of this study will be summarized in the final study report. I&M anticipates that the Botanical Resources study report will include the following elements:

- Project information and background
- Study area
- Methodology
- Mapping and study results
- Analysis and discussion
- Any stakeholder correspondence and/or consultation
- Literature cited

6.8 Schedule and Level of Effort

I&M anticipates that this study will be completed by October 2019. The study report will be prepared and provided to the applicable parties in conjunction with the ISR that will be distributed to stakeholders and filed with the Commission in accordance with the Commission's ILP Process Plan and Schedule. The estimated level of effort for this study is approximately 240 hours. The preliminary estimated cost for this study is \$25,000.

7 Shoreline Stability Assessment Study

7.1 Study Requests

The Commission's July 25, 2018 SD1 identified the following environmental resource issues to be analyzed in the EA for the Project relicensing.

- Effects of continued project operation and maintenance on shoreline erosion within the project boundary, the bypassed reach, and immediately downstream of the powerhouse.

In Section 6.2.1 of the PAD, I&M proposed to conduct a Shoreline Stability Assessment Study at the Project to identify sites of erosion or shoreline instability. No formal study requests were received regarding geology and soil resources. Comments were received from MDNR related to geology and soil resources, specifically related to potential erosion as a result of Project operations.

7.2 Goals and Objectives

The goals and objectives of the Shoreline Stability Assessment Study are to:

- Survey the Project's reservoir, bypassed reach and tailrace area to characterize the shoreline, with the focus on erosion or shoreline instability;
- Inventory, map, and document any areas of erosion or shoreline instability;
- Develop a scoring system to identify areas that have a potential to erode at unnaturally high rates; and
- Prioritize any areas where remedial action or further assessment may be needed.

7.3 Study Area

The study area for the Shoreline Stability Assessment Study is the Project's reservoir, bypassed reach and tailrace area downstream of the powerhouse to the Business Route 131 Bridge.

7.4 Background and Existing Information

Existing relevant and reasonably available information regarding geology and soils in the Project vicinity was presented in Section 5.2 of the PAD (I&M 2018). The upstream shoreline is surrounded by forested land, with nearby residential housing with minimal-to-moderate slope. Towards the Project dam, there is a boat launch, reservoir fishing access, and paved walking trails upstream of the dam. Canopy vegetation is present in the reservoir area, as well as groundcover layers of vegetation (shrubs, small trees, perennials) that thrive under tree canopies. Upstream of the dam, the river is flanked by farmland, residential neighborhoods, and forested land. The shoreline downstream of the

Project's dam is also surrounded by forested land and residential housing and has a similar composition as lands upstream of the Project dam. The shoreline downstream of the Project can also be classified as having minimal-to-moderate sloping.

In 2011, the right-descending bank immediately downstream of the spillway to the bypass channel was repaired due to erosion. In addition, in 2018, a portion of the right-descending bypass channel bank approximately halfway downstream of the spillway and a portion of the right-descending bank immediately downstream of the powerhouse was repaired due to erosion.

7.5 Project Nexus

Shoreline erosion is a common concern at hydroelectric projects. While the run-of-river mode of Project operation provides protection against erosion, I&M recognizes that aspects of the Project's geological setting may contribute to the potential for shoreline erosion.

7.6 Methodology

7.6.1 Task 1 – Literature Review

I&M will review any existing information on geology and soils in the study area including soil type maps and geologic maps. Existing information, as well as information collected through field observations and field measurements, will be used to assess bank composition and erosion potential in the study area.

7.6.2 Task 2 – Shoreline Survey

A field survey will be conducted to characterize the shoreline of the Project's reservoir, bypass reach and tailrace area down to the US 131 Business Route Bridge. I&M will use the Standard Operating Procedure for assessing bank erosion potential (Appendix C) using the modified Bank Erosion Hazard Index (BEHI) method proposed by David Rosgen to estimate erosion susceptibility (Rosgen, 2001) at the Project. For each area observed, vegetative cover, quantity of material, height, and slope of bank, existing erosion control mechanisms, soil or rock type, composition, and thickness of various bank materials or strata, and other relevant data will be obtained. Other factors contributing to bank erosion in the study area will also be identified and analyzed. A GPS will be used to identify areas of erosion and representative photographs will be taken. Geographic Information System (GIS) maps will be produced to characterize the banks of the study area.

7.6.3 Task 3 – Determine Areas Potentially Needing Remediation

An analysis of erosion potential for the areas identified within the study area will be conducted. Recommendations for minimizing the effects of bank erosion from Project operations and/or enhancing bank stability will be assessed. A report characterizing bank

erosion potential and stability in the study area will be provided to stakeholders. The final report will include an analysis of the degree of susceptibility to erosion for all shorelines in the study area.

7.7 Analysis and Reporting

Results of this study will be summarized in the final study report. I&M anticipates that the Shoreline Stability Assessment study report will include the following elements:

- Project information and background
- Study area
- Methodology
- Study results
- Analysis and discussion
- Any stakeholder correspondence and/or consultation
- Literature cited

7.8 Schedule and Level of Effort

I&M anticipates that this study will be completed by October 2019. The study report will be prepared and provided to the applicable parties in conjunction with the ISR that will be distributed to stakeholders and filed with the Commission in accordance with the Commission's ILP Process Plan and Schedule. The estimated level of effort for this study is approximately 200 hours. I&M estimates that this study will cost approximately \$25,000 to complete.

8 Water Quality Study

8.1 Study Requests

The Commission's July 25, 2018 SD1 identified the following environmental resource issues to be analyzed in the EA for the Project relicensing.

- Effects of continued project operation on water quality, including dissolved oxygen (DO) concentrations and water temperature in the project reservoir and in the St. Joseph River immediately downstream from the project dam (i.e., in the project bypassed reach).

In Section 6.2.2 of the PAD, I&M proposed to conduct a Water Quality Study within the Project area. More specifically, I&M proposed to monitor temperature and DO, and to analyze sediment samples in the Project reservoir for contaminants. No formal study requests were received regarding water quality. Comments were received from FERC, MDNR, and the Pokagon Band of Potawatomi Tribe related to water quality and sediment contamination.

8.2 Goals and Objectives

I&M's proposed study focuses on collecting and establishing baseline information on water quality in the vicinity of the Project. The proposed study employs standard methodologies as consistent with the scope and level of effort of water quality monitoring conducted at hydropower projects in the region. I&M believes that the information provided by this study will be sufficient to analyze the Project's potential effects on water quality and will provide baseline water quality data to determine compliance with applicable water quality standards and designated uses. The goals and objectives of this study are to:

- Gather existing and relevant baseline water quality data to determine compliance with state water quality standards.
- Analyze sediment in the Project reservoir to determine the concentration of select contaminants potentially present in sediment.

8.3 Study Area

The study area for the Water Quality Study includes the FERC Project boundary, the bypass reach, and the river each downstream to the US 131 Business Route Bridge.

8.4 Background and Existing Information

Existing relevant and reasonably available information regarding water quality in the Project vicinity was presented in Section 5.3 of the PAD (I&M 2018). The PAD included historical water quality data collected in support of the existing license. Historical data

show that the Project waters meet the state standards regarding water temperature and DO, and that Project operations appear to have little to no effect on water quality in the St. Joseph River.

The St. Joseph River has been identified by USEPA as the biggest contributor of atrazine to Lake Michigan and a significant contributor of sediments and toxic substances such as mercury and polychlorinated biphenyls (PCBs) (Friends of the St. Joseph River Association 2005). Sewage overflows and agricultural practices in the river basin contribute to contamination of sediments from pesticides, herbicides, and fertilizers. It is expected that continued operation of the Project will have no effect on sediment contamination in the St. Joseph River.

8.5 Project Nexus

The Project impounds water at the Constantine dam. Operation of the hydropower facilities may impact water quality parameters such as temperature and DO in the Project's impoundment, bypass reach and areas downstream of the Project.

8.6 Methodology

8.6.1 Task 1 – Continuous Water Temperature and DO Monitoring

I&M proposes to monitor water quality and temperature at the following locations:

- Reservoir
- Power canal
- Tailrace
- Bypass reach (2 locations: upstream and downstream of Fawn River)

DO and temperature continuous data loggers, set to record at one hour intervals will be deployed at the monitoring locations listed above. Water quality monitoring locations will be verified in consultation with MDEQ and other stakeholders.

All water quality monitoring locations will be georeferenced using GPS. These GPS locations will be included in a GIS database layer to support the documentation and reporting of collected data.

The water temperature data loggers will be deployed for an entire year from approximately May 1, 2019 through April 30, 2020. DO data loggers will be deployed from approximately May 1, 2019 through September 30, 2019. As necessary, the loggers will be weighted to the bottom and / or secured to more permanent structures. Data will be downloaded from the loggers on a monthly basis.

Two loggers will be placed at each sampling location in order to provide backup data. For each location, a primary logger and a secondary logger will be identified. Data will be

preferentially reported and analyzed from the primary logger at each location; in the event of data loss from the primary logger, data from the secondary logger will be used. Consistency between logger data will also be incorporated into the data quality assurance process. Water quality equipment will be cleaned and calibrated prior to deployment, checked each month during data retrieval, and protective and antifouling measures will be employed as appropriate.

8.6.2 Task 2 – Routine Water Quality Monitoring

In situ water quality measurements for temperature, DO, pH, and specific conductance will be collected on a monthly basis at each of the sample locations of the continuous loggers from May through September. In addition, similar data will be collected during the fisheries and mussel surveys.

8.6.3 Task 3 – Sediment Contaminant Sampling

I&M proposes to conduct sediment contaminant sampling in the Project reservoir. I&M anticipates that three sediment samples will be collected across three transects in the upper, middle and lower reservoir (nine samples total). Final sampling locations will be identified in consultation with stakeholders. Each transect will be composited and analyzed for the following parameters: (1) oil and grease, (2) total arsenic, (3) total cadmium, (4) total chromium, (5) total copper, (6) total lead, (7) total mercury, (8) total nickel, (9) total selenium, (10) total phosphorus, (11) total silver, (12) total zinc, and (13) total PCBs. Sediment samples will be collected and processed following the methodologies outlined in EPA-823-B-01-002 – *Methods for Collection, Storage, and Manipulation of Sediments for Chemical and Toxicological Analyses*

8.7 Analysis and Reporting

Results of this study, including continuous water temperature and DO data, monthly in-situ water quality data, and sediment contaminant sampling will be summarized in the final study report. Raw data will be provided in appendices to the study report. I&M anticipates that the Water Quality study report will include the following elements:

- Project information and background
- Study area
- Methodology
- Study results
- Analysis and discussion
- Any stakeholder consultation
- Literature cited

8.8 Schedule and Level of Effort

I&M anticipates that Tasks 1 through 3 of this study will be completed by September 2019, with the exception of the continuous water temperature monitoring that will be completed by the end of April 2020. The study report will be prepared and provided to the applicable parties in conjunction with the ISR (and updated accordingly with the USR) that will be distributed to stakeholders and filed with the Commission in accordance with the Commission's ILP Process Plan and Schedule. The estimated level of effort for this study is approximately 400 hours. I&M estimates that this study will cost approximately \$50,000 to complete.

9 Fisheries Survey

9.1 Study Requests

The Commission's July 25, 2018 SD1 identified the following environmental resource issues to be analyzed in the EA for the Project relicensing.

- Effects of turbine entrainment on fish populations in the project reservoir and in the St. Joseph River downstream from the project.

In Section 6.2.3 of the PAD, I&M proposed to conduct a Fisheries Survey to collect baseline fisheries data in the Project area. No formal study requests were received regarding fisheries resources. Comments were received from FERC, USEPA, MDNR, and the Pokagon Band of Potawatomi Tribe related to fisheries resources.

9.2 Goals and Objectives

The goals and objectives of the Fisheries Survey are to:

- Collect a comprehensive baseline for existing fishery resources in the vicinity of the Project.
- Compare current fisheries data to historical fisheries data to determine any significant changes to fish species composition.
- Analyze tissue samples for mercury and PCB concentrations.
- Confirm intake velocities for fish entrainment potential.

9.3 Study Area

The study area for the Fisheries Survey includes the FERC Project boundary as well as the bypassed reach of the Project.

9.4 Background and Existing Information

Existing relevant and reasonably available information regarding the fish community in the Project vicinity was summarized in Section 5.4 of the PAD (I&M 2018). The St. Joseph River is characterized as a warm water stream (I&M 1988), and the middle reach (from Mendon, Michigan, to Elkhart, Indiana) of the St. Joseph River is managed for channel catfish (*Ictalurus punctatus*), smallmouth bass (*Micropterus dolomieu*), and walleye (*Sander vitreus*) (Wesley and Duffy 1999). Historically, the MDNR has stocked walleye and channel catfish in this reach of the St. Joseph River (Wesley and Duffy 1999). Over the past eleven years (2006 to 2016) nearly 275,000 walleye (just over an inch long) have been stocked in the St. Joseph River in St. Joseph County. Stocking occurred in 2006, 2012, 2014, and 2016 (MDNR 2017). Channel Catfish have not been stocked in this area of the St. Joseph River since 1999 (MDNR 2017).

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In 1998, the MDNR conducted a general survey to evaluate the fish community and the walleye stocking program upstream of the Constantine Dam using electroshocking, trap nets, and gill nets in June and July (MDNR 1998). The fish community was diverse and nineteen species were collected during the survey (Table 9-1). Bluegill (*Lepomis macrochirus*), black crappie (*Pomoxis nigromaculatus*), channel catfish, walleye, and smallmouth bass were identified as the primary sport fish.

Table 9-1. MDNR Fish Community and Walleye Survey Upstream of the Constantine Dam in June and July 1998 (MDNR 1998)

Common Name	Scientific Name	Number	Percent
Black crappie	<i>Pomoxis nigromaculatus</i>	45	7.1
Bluegill	<i>Lepomis macrochirus</i>	296	46.7
Bowfin	<i>Amia calva</i>	1	0.2
Bullhead catfishes (family)	Ictaluridae	2	0.3
Common carp	<i>Cyprinus carpio</i>	18	2.8
Channel catfish	<i>Ictalurus punctatus</i>	29	4.6
White sucker	<i>Catostomus commersonii</i>	3	0.5
Hybrid sunfish	<i>Lepomis sp.</i>	4	0.6
Largemouth bass	<i>Micropterus salmoides</i>	13	2.1
Longnose gar	<i>Lepisosteus osseus</i>	16	2.5
Logperch	<i>Percina caprodes</i>	2	0.3
Northern pike	<i>Esox lucius</i>	1	0.2
Pumpkinseed	<i>Lepomis gibbosus</i>	9	1.4
Redhorse	<i>Moxostoma spp.</i>	95	15.0
Rock bass	<i>Ambloplites rupestris</i>	4	0.6
Smallmouth bass	<i>Micropterus dolomieu</i>	34	5.4
Spotted sucker	<i>Minytrema melanops</i>	44	6.9
Walleye	<i>Sander vitreus</i>	14	2.2
Yellow perch	<i>Perca flavescens</i>	4	0.6
TOTAL		634	100.0

Source: MDNR 1998.

9.5 Project Nexus

Potential Project effects on fishery resources may include fish impingement and entrainment, flows within downstream reaches, and reservoir fluctuations. Information on the existing fisheries community will help identify the fish species potentially affected by Project operations.

9.6 Methodology

In support of the original licensing, I&M conducted a fish entrainment study during 1990-1991 in which it was determined that the amount of entrainment and mortality at the Project was insignificant and would have an insignificant effect on the fish community (FERC 1993b). I&M is proposing to conduct a fisheries survey to confirm that there have been no significant changes in the species composition or intake velocities at the Project since the original fish entrainment study was conducted. If this study shows that there have been significant changes to either fish species composition or intake velocities at the Project since the previous fish entrainment study, I&M will consult with stakeholders during the ISR Meeting to determine the need to conduct further studies regarding fisheries resources.

There are no anadromous fish species in the Project area. Upstream movement of fish is currently limited by multiple dams downstream of the Project including the Mottville Project (immediately downstream of the Constantine Project), as well as the Elkhart and Twin Branch Projects (immediately downstream of the Mottville Project) and there are currently no plans on record to install fish passage at these facilities. Additionally, FERC determined that upstream fish passage for resident fish was not necessary at the Mottville Project because a healthy fishery with suitable habitats for key life stages of various resident species exists upstream and downstream of the Project (FERC 2002). In general, a lack of suitable substrate and the low velocities in the Constantine Project's reservoir would preclude anadromous fish spawning.

At this time I&M believes it is premature to conduct a fish migration/fish passage study as requested by the Pokagon Band of Potawatomi. Based on the results of this study, I&M will consult with stakeholders during the ISR Meeting to determine if further study is required related to fisheries resources. Additionally, I&M expects that a standard license article will be included in the new FERC license regarding fishway prescriptions under Section 18 of the Federal Power Act.

9.6.1 Task 1 - Collector's Permits

I&M's consultant will obtain any necessary collector / survey permits that may be required to conduct the fisheries sampling work and will not begin fieldwork prior to receiving the necessary permits.

9.6.2 Task 2 - Conduct Field Sampling to Document Fish Assemblages

I&M proposes to conduct two sampling events. Sampling will be conducted during daylight hours in the late spring/early summer (May – June) and the late summer/early fall (August – September) of 2019. Specific sampling dates within these timeframes will be determined based on factors including (but not limited to) weather conditions, water temperatures, and safety of field staff and the general public. A variety of sampling techniques will be used during this study such as boat electrofishing, seining, minnow traps, and/or gill, trap or fyke nets.

I&M will conduct sampling in the Project's reservoir, power canal, and bypass reach. To the extent practicable, multiple methods of fish capture will be used in each sampling area. Both near-shore (shallow) and mid-channel (deep) habitats will be sampled to characterize fish communities and life stages that use these different habitat types. I&M will consult with the MDNR, Southern Lake Michigan Management Unit regarding the level of effort for this fisheries survey. Methodologies and gear types used will vary by habitat type, but are expected to include a combination of the following:

- Boat electrofishing²
- Seining
- Gill, trap or fyke nets
- Minnow traps

Supporting data will be collected at each sampling site including:

- Location (GPS)
- Sampling gear type
- Mesohabitat type
- Representative photographs
- Time and date
- Weather
- General descriptions of depth, flows, and substrate
- Cover type and estimated percentage of cover

² Because of the depth of the Project's bypass reach, I&M anticipates conducting sampling in the bypass reach via boat electrofishing. If the bypass reach is inaccessible by boat or presents unsafe conditions for boat electrofishing, I&M will determine another appropriate sampling in the field and document the specific reason(s) for selecting an alternative method.

In addition to this supporting data, I&M will collect discrete water quality measurements of temperature, DO, pH, and specific conductance at each sampling location using an appropriate instrument calibrated per the manufacturer's instructions. A secchi disk reading will be taken at each site at the time of sampling.

Catch per-unit of effort (CPUE) will be recorded for all sites/gear types used. All fish collected will be identified to species, measured, weighed and examined for abnormalities. Photo vouchers will be taken of all species in the field, and those that cannot be identified to species will be preserved and identified in a laboratory setting based on any sampling permit specifications. In the event more than 30 individuals of the same species are collected at a given site, those excess fish will be only counted. Minnows and small juvenile fish that cannot be readily identified in the field will be preserved and identified in a laboratory. All other fish will be returned to the place of capture after processing.

9.6.3 Task 3 - Collection of Fish Tissue Samples

During the late summer/early fall sampling event, I&M will collect fish tissue samples that will be sent to a qualified laboratory to be analyzed for mercury and PCBs. Fish tissue samples will be obtained from ten (10) legal size resident predator fish of one species (walleye, basses or sunfishes) and ten (10) bottom feeder fish of one species (common carp or channel catfish) that are representative of the sizes normally consumed by anglers. If ten legal size resident predator fish of one species cannot be collected after a reasonable effort, then smaller fish may be substituted. Specimens for tissue samples will be collected and processed following the methodologies outlined in EPA 823-B-00-007 – *Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories Volume 1 Fish Sampling and Analysis Third Edition*. Collected tissue for analysis will be skinless filet (most conservative method). Methods used for analysis will conform to requirements stated in EPA 823-B-00-007. All quality assurance and control measures will be adhered to during the collection and analyses of fish tissue samples as specified in the referenced guidance document. I&M will consult with the MDEQ to finalize these proposed methodologies.

9.6.4 Task 4 - Verification of Intake Velocities

I&M will measure the average approach velocity 1-foot in front of the existing trashrack structure. Measurements will be collected at the Project's maximum and efficient generation rates. Measurements will be collected using an Acoustic Doppler Current Profiler (ADCP) or similar technology. Results of this task will be compared to approach velocities measured during the previous desktop fish entrainment study to verify that velocities have not significantly changed since the desktop study was performed in 1990.

9.6.5 Task 5 – Comparison of Study Results

I&M will compile the fisheries data collected in Task 1 and compare the data with historical fisheries surveys in the Project area to determine whether or not species

compositions have significantly changed over time. Results of Task 4 will be compared to approach velocities measured during the previous desktop fish entrainment study to verify that velocities have not significantly changed since the desktop study was performed in 1990. These data will be used to determine if any changes have occurred at the Project that would affect the conclusions of the previous fish entrainment assessment.

9.7 Analysis and Reporting

Results of this study will be summarized in the final study report. I&M anticipates that the Fisheries Survey study report will include the following elements:

- Project information and background
- Study area
- Methodology
- Study results
- Analysis and discussion
- Any agency correspondence and/or consultation
- Literature cited

9.8 Schedule and Level of Effort

I&M anticipates that this study will be completed by October 2019. The study report will be prepared and provided to the applicable parties in conjunction with the ISR that will be distributed to stakeholders and filed with the Commission in accordance with the Commission's ILP Process Plan and Schedule. The estimated level of effort for this study is approximately 350 hours. I&M estimates that this study will cost approximately \$45,000 to complete.

10 Mussel Survey

10.1 Study Requests

In Section 6.2.3 of the PAD, I&M proposed to conduct a Mussel Survey during the summer to identify any mussel populations within the Project area upstream and downstream of the Project. No formal study requests were received regarding aquatic resources specifically relating to mussels. Comments were received from FERC, USEPA and MDNR related to surveying for mussels in the Project area.

10.2 Goals and Objectives

The goals and objectives of this study are to conduct a field survey to evaluate the mussel community in the Project's impoundment and bypassed reach.

10.3 Study Area

The study area for the Mussel Survey includes the Project reservoir, bypassed reach and immediately downstream of the US 131 Business Route Bridge.

10.4 Background and Existing Information

Existing relevant and reasonably available information regarding mussels in the Project vicinity was presented in Section 5.4 of the PAD (I&M 2018). The distribution of mussels has been documented in several reports (Van der Schalie 1930, Horvath et al. 1994, Sherman 1997, and Fisher 1998) and is summarized in Wesley and Duffy (1999). Data collected in these studies that are in close proximity to the Project are provided in Table 10-1.

Table 10-1. Mussels Found at Two Study Reaches near the Constantine Project in the St. Joseph River

Common Name	Scientific Name	St. Joseph River by Three Rivers	St. Joseph River at Mottville
Creepers	<i>Strophitus undulatus</i> ¹	X	X
Cylindrical Papershell	<i>Anodontoidea ferussacianus</i>		X
Elktoe	<i>Alasmidonta marginata</i>	X	X
Ellipse	<i>Venustaconcha ellipsiformis</i>	X	X
Fluted-Shell	<i>Lasmigona costata</i>		X
Giant Floater	<i>Pyrquanonodon grandis</i> ²	X	
Mucket	<i>Actinonaias carinata</i>		X
Ohio Pigtoe	<i>Pleurobema cordatum</i>		X

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Common Name	Scientific Name	St. Joseph River by Three Rivers	St. Joseph River at Mottville
Pocketbook	<i>Lampsilis cardium</i>		X
Purple Wartyback ³	<i>Cyclonaias tuberculata</i>		X
Rainbow Shell	<i>Villosa iris</i>		X
Spike	<i>Elliptio dilatata</i>	X	X
Wabash Pigtoe	<i>Fusconaia flava</i>	X	X

¹ Identified in report as *Strophitus rugosus* - not recognized as a valid taxon.

² Identified in report as *Anodonta grandis* - not recognized as a valid taxon.

³ State threatened.

Source: Wesley and Duff 1999.

10.5 Project Nexus

Hydroelectric dams alter flow, which may impact and mussel propagation and survival.

10.6 Methodology

10.6.1 Task 1 – Collector’s Permit

I&M’s consultant will obtain and necessary collector / survey permits that may be required to conduct the mussel sampling work and will not begin fieldwork prior to receiving the necessary permits.

10.6.2 Task 2 – Mussel Survey

A qualitative mussel survey will be conducted at two locations in the reservoir, one location in the bypass reach, and one location downstream of the Project’s powerhouse. Specific survey sites will located in the most suitable habitat for mussels in the reservoir, bypass reach, and river reach downstream of the powerhouse. The qualitative mussel survey will be conducted according to the MDNR’s Michigan Freshwater Mussel Survey Protocols and Relocation Procedures³. I&M will consult with resource agencies and other stakeholders to determine survey scope and locations. Depending on water depths and flow conditions, the surveys are expected to consist of qualitative visual timed-searches using snorkel, view buckets, or wading of shallow water areas. Starting from the downstream end of a transect or survey site, the visual survey will consist of searching for freshwater mussels or shell material in a meandering or “zig-zag” pattern, with a focus to include representative habitats within the river reach. Shoreline areas within the

³ Michigan Freshwater Mussel Survey Protocols and Relocation Procedures, 2018 is available at <https://www.fws.gov/midwest/eastlansing/te/pdf/MIFreshwaterMusselSurveyProtocolsRelocationProceduresFeb2018.pdf>.

proposed survey areas will also be searched for evidence of shell material or middens. Any mussels observed will be identified by species, measured and carefully placed back into the same habitat. Basic habitat information such as substrate type (e.g. gravel, cobble, boulder), water depth, habitat type (e.g., riffle, run, pool), cover type (e.g. woody debris), stream width, and qualitative water velocity will be recorded. Data will be recorded on field data sheets and mussel locations marked on field maps. Representative photographs will be taken for each species as vouchers. Water quality data will be collected from representative locations in the proposed survey areas at the beginning and end of each field day during the mussel survey.

10.7 Analysis and Reporting

Results of this study will be summarized in the final study report. I&M anticipates that the Mussel Survey study report will include the following elements:

- Project information and background
- Study area
- Methodology
- Study results
- Analysis and discussion
- Any agency correspondence and/or consultation
- Literature cited

10.8 Schedule and Level of Effort

I&M anticipates that this study will be completed by September 2019. The study report will be prepared and provided to the applicable parties in conjunction with the ISR that will be distributed to stakeholders and filed with the Commission in accordance with the Commission's ILP Process Plan and Schedule. The estimated level of effort for this study is approximately 350 hours I&M estimates that this study will cost approximately \$50,000 to complete.

11 Wetlands Study

11.1 Study Requests

The Commission's July 25, 2018 SD1 identified the following environmental resource issues to be analyzed in the EA for the Project relicensing.

- Effects of continued project operation on riparian, littoral, and wetland habitat and associated wildlife.

In Section 6.2.5 of the PAD, I&M proposed to conduct a desktop Wetlands Study to document wetlands in the Project area. No formal study requests were received regarding wetland and riparian resources. Comments were received from FERC related to wetland resources.

11.2 Goals and Objectives

The proposed Wetlands Study will identify wetland and riparian habitat within the Project area. The goals and objectives of this study are to:

- Use National Wetlands Inventory (NWI) and MDEQ Wetland Maps (and other potential sources) to identify, display, and describe the current composition of wetland communities within and adjacent to the study area.
- Use the NWI and MDEQ Wetland Maps (and other potential sources) to develop a GIS database on the extent, classification, and plant community structure of wetland habitats within and adjacent to the study area.
- Confirm NWI wetland classifications of previously documented wetlands based on field observations and assess any necessary map change recommendations.
- Via the GIS data, estimate the total acres of wetlands and cover type habitats that currently exist within the study area.
- Provide the necessary baseline data to support determination of potential Project effects.

11.3 Study Area

The study area will include all wetlands located within and adjacent to the Project boundary that may potentially be impacted due to continued Project operations.

11.4 Background and Existing Information

Existing relevant and reasonably available information regarding wetlands in the Project vicinity was presented in Section 5.6 of the PAD (I&M 2018). The Project area is in the Beach-Maple Association of the Eastern Deciduous Forest Province (Bailey 1980).

Dominant vegetation in the Project area is a mixed hardwood community consisting of oak, some ash, beach, hickory, maple, cottonwood, and aspen. The Project boundary also includes six palustrine wetland habitat types as classified by Cowardin (1979). The Project boundary includes one palustrine emergent, three palustrine forested, and two palustrine scrub-shrub wetland habitats. Willow species dominate the plant community in the scrub-shrub areas and maple, sycamore, and cottonwood dominate the forested wetlands. Other species of the palustrine forested areas include ash, sumac, walnut, and oaks. Plant species of the aquatic bed community include water-lily, watermilfoil, and the crisp pondweed. Arrow arum is a dominant species in the emergent wetland class. Cattails are a minor component of the wetland plant community in the Constantine reservoir (FERC 1993a). Section 5.6 of the PAD provides additional information on wetland resources.

11.5 Project Nexus

Operation of the Project may affect water levels and velocities, as well as the timing and location of releases. These factors can impact aquatic vegetation and wetlands, which can be important habitats for fish and wildlife. The study will be used to assist in the evaluation of potential Project effects on wetlands.

11.6 Methodology

I&M is proposing this study as a desktop study with field verification of wetlands in the Project boundary. I&M will develop cover type base maps using existing available datasets and will verify those preliminary maps in the field. I&M is not proposing to conduct formal wetland delineations according to the 1987 U.S. Army Corps of Engineers Wetland Delineation Manual, which involves collecting soil core samples, identifying and formally mapping wetland vegetation, and documenting hydrologic characteristics. The Project is operated as run-of-river and has little effect on reservoir levels that may potentially impact wetlands associated with the Project. The study methods proposed by I&M below are used commonly during FERC relicensing studies and will provide adequate information to assess potential impacts to wetlands related to Project operations.

11.6.1 Task 1 - Desktop Mapping/Distribution of Wetland and Riparian Vegetation

I&M will develop a base map in GIS of wetland cover types in the Project study area using source data from the NWI and MDEQ wetland databases (and other potential resources). A preliminary cover type map will be produced from existing resources that will include riparian and wetland vegetation throughout the study area. Wetlands will generally be classified into four classification groups according to Cowardin et al. (1979): Palustrine Emergent, Palustrine Scrub-Shrub, Palustrine Forested, and Open Water. Subgroupings may be necessary depending on observed findings in the field. Other terrestrial cover types will be identified on the maps using appropriate nomenclature.

Information sources for the base map may include:

- Aerial photography
- Soil surveys
- Existing wetland maps (e.g., NWI and MDEQ Wetlands Map Viewer)

11.6.2 Task 2 - Field Verification of Wetland Maps

The preliminary cover type maps developed as part of Task 1 will be field verified (i.e., ground-truthed) during other field activities proposed during the 2019 field season (e.g., botanical resources study). Once the cover type map has been prepared in the office, I&M will field verify the wetland cover type maps and update the wetland cover type maps accordingly. Map change recommendations will only be required for any major deviations from the wetland cover type map prepared in the office. Any identified inconsistencies with the preliminary maps will be marked in the field and revised within the database accordingly. Each cover type will be described by species composition, successional stage, and extent of shoreline. Wetland classifications will distinguish the degree of inundation (e.g., seasonally flooded, permanently flooded) based upon information obtained from this study as well as other studies conducted within the study area. Qualified wetland scientists will conduct the field verification efforts.

11.7 Analysis and Reporting

I&M will prepare a report that includes Project wetland cover-type maps and notes any areas of inconsistency with the NWI and MDEQ wetland maps resulting from the field verification exercise. I&M anticipates that the Wetlands study report will include the following elements:

- Project information and background
- Study area
- Methodology
- Study results
- Analysis and discussion
- Any stakeholder correspondence and/or consultation
- Literature cited

11.8 Schedule and Level of Effort

I&M anticipates that this study will be completed by October 2019. The study report will be prepared and provided to the applicable parties in conjunction with the ISR that will be distributed to stakeholders and filed with the Commission in accordance with the Commission's ILP Process Plan and Schedule. The estimated level of effort for this study

is approximately 125 hours. I&M estimates that this study will cost approximately \$20,000 to complete.

12 Recreation Study

12.1 Study Requests

The Commission's July 25, 2018 SD1 identified the following environmental resource issues to be analyzed in the EA for the Project relicensing.

- Adequacy of existing public access and recreational facilities to meet current and future recreation needs.

In Section 6.2.6 of the PAD, I&M proposed to conduct a Recreation Study to assess recreational opportunities and potential improvements at the Project. No formal study requests were received regarding recreation resources. Comments were received from FERC, USEPA, and MDNR related to recreation resources.

12.2 Goals and Objectives

The Recreation Study will collect information regarding current recreation use levels and the condition of the existing formal and informal recreation facilities in the Project area. The goals and objectives of this study are presented below.

- Characterize current recreational use of the Project area;
- Estimate future demand for public recreation use at the Project;
- Gather information on the condition of I&M's FERC-approved recreation facilities and identify any need for improvement; and
- Evaluate potential impacts of the Project on existing formal and informal recreational facilities and opportunities.

12.3 Study Area

The study area includes the Project boundary and recreational facilities adjacent to the Project boundary. This is an appropriate study area as it includes lands and recreation facilities managed by I&M under the license and other recreational opportunities that may potentially be affected by Project operations.

12.4 Background and Existing Information

Section 5.8 of the PAD describes existing information about recreation facilities and opportunities in the Project area. The Constantine Project provides several formal (licensed) recreational facilities located upstream and downstream of the Constantine dam that are maintained and operated by I&M and open to the public. The Project amenities include a boat launch, a portage, reservoir fishing access, tailwater fishing access, Americans with Disabilities Act (ADA) accessible portable toilets, and a picnic area.

The tailwater fishing platform is located just downstream of the powerhouse with an associated parking lot with the capacity for approximately 14 vehicles. The Constantine boat launch is located adjacent to the west abutment of the spillway. There is a small fishing dock next to the one-lane boat launch with a parking area for approximately 10 vehicles, and additional space for trailers. Located on the east side of the Constantine dam, there is a portage trail that allows individuals to transport canoes and kayaks around the dam, as well as providing access to the reservoir for fishing, and a picnic area. There is no official parking area at the portage site. However, street-side parking is available for approximately 5 vehicles, close to the intersection of Hull Street and Wells Street.

In addition to the formal Project recreation facilities listed above, there are several community parks in the vicinity of the Project, including Shelby Park and Riverview Park. Shelby Park is a one-acre park located east of the St. Joseph River with an open space with benches and picnic tables (Michigan Department of Transportation 2008). Riverview Park is also located on the east side of the river within the Village of Constantine. Facilities at Riverview Park include a boat launch, fishing platform, boardwalk, playground, and benches. The American Legion also maintains a boat launch upstream of the Constantine Dam. This site is a popular place for members to launch boats on the Project reservoir, especially during the hydroplane and runabout boat races that are held by the U.S. Title Series Championship Racing Association annually at Constantine American Legion Post 223.

12.5 Project Nexus

The Project currently provides several public recreational opportunities. The results of this study, in conjunction with existing information, will be used to inform analysis in the license application regarding potential Project effects on public recreation.

12.6 Methodology

At this time, I&M is not proposing to take over the operation and maintenance of any existing recreation facilities within or adjacent to the Project boundary that are currently operated by other entities. I&M believes that it is premature to study such undertakings as there is no indication that the current public recreation facilities will be unavailable to the public in the future.

12.6.1 Recreation Facility Inventory and Condition Assessment

I&M will perform a field inventory to document existing formal and informal recreation facilities in the Project area (within and adjacent to the Project boundary). Information will be collected for each of the recreation areas listed in Section 13.6.2. I&M will record the following information for each recreational facility including:

- A description of the type and location of existing recreation facilities;
- The type of recreation provided (boat access, angler access, picnicking, etc.);

- Length and footing materials of any trails;
- Existing facilities, signage, and sanitation;
- The type of vehicular access and parking (if any);
- Suitability of facilities to provide recreational opportunities and access for persons with disabilities (i.e., compliance with current ADA standards for accessible design); and
- Photographic documentation of recreation facilities and GPS location.

Additionally, a qualitative assessment of the condition of the recreation facilities will be performed using a Facilities Inventory and Condition Form (provided in Appendix D). Using the Facilities Inventory and Condition Form, the recreation amenities available at each recreation facility will be rated using the following criteria: (N) Needs replacement (broken or missing components, or non-functional); (R) Needs repair (structural damage or otherwise in obvious disrepair); (M) Needs maintenance (ongoing maintenance issue, primarily cleaning); and (G) Good condition (functional and well-maintained). If a facility is given a rating of “N”, “R”, or “M”, an explanation for the rating will be provided.

12.6.2 Recreation Visitor Use Data

I&M will collect visitor use data at the FERC-approved recreation sites, formal non-Project recreation sites, and other informal recreation sites through a combination of in-person surveys, field reconnaissance, and photo documentation. I&M will conduct field reconnaissance and interviews with respondents at the following recreation facilities during the prime recreational season from May 2019 through September 2019:

FERC-Approved Recreation Sites

- Constantine Boat Launch;
- Constantine Tailwater Fishing Access; and
- Constantine Portage and Fishing Access Area.

Other Non-Project Recreation Sites

- Riverview Park;
- Riverview Park Boat Launch;
- Shelby Park;
- American Legion Boat Launch; and
- Other informal recreation sites in the Project area.

Surveys will begin at 8:00 AM and continue until 6:00 PM to capture a range of recreational activities throughout the day. I&M intends to conduct surveys pursuant to the schedule presented in Table 12-1.

Table 12-1. Visitor Use Survey Schedule

Month	Survey and Reconnaissance
May	<ul style="list-style-type: none"> ▪ One weekend day (Memorial Day Weekend) ▪ One randomly selected weekday
June	<ul style="list-style-type: none"> ▪ One weekend day that coincides with the Father's Day boat race¹ ▪ One randomly selected weekday
July	<ul style="list-style-type: none"> ▪ One weekend day ▪ One randomly selected weekday
August	<ul style="list-style-type: none"> ▪ One weekend day ▪ One randomly selected weekday
September	<ul style="list-style-type: none"> ▪ One weekend day (Labor Day Weekend) ▪ One randomly selected weekday

¹ The Michigan Hydroplane Racing Association typically holds an annual boat race on the St. Joseph River in Constantine on or about Father's Day weekend. To the extent practicable, I&M will attempt to collect visitor use data during one weekend race day. However, the boat race has been cancelled or postponed in previous years due to permitting issues, weather events, or other circumstances. If the boat race is postponed in 2019, I&M will attempt to reschedule a weekend survey day to accommodate the rescheduled boat race.

I&M expects that one team of two technicians will rotate between each of the recreation sites listed above (in random order) and will spend approximately half an hour at each site conducting interviews. I&M anticipates providing respondents with the option to complete the interview digitally (i.e., on an iPad/tablet) or to answer interview questions orally. Before rotating to the next site, technicians will record relevant conditions, including observed recreational activities, estimated number of vehicles, and number of recreational users. General information regarding date, time, and weather conditions will also be recorded by technicians.

I&M has developed an interview/survey instrument that draws from general concepts and guidance from the *National Visitor Use Monitoring Handbook* (US Forest Service [USFS] 2007) as well as from other relicensing studies approved by FERC for in-person interviews during the recreation visitor use surveys as detailed in Table 12-1. The questionnaire is provided in Appendix E of this study plan. The questionnaire is designed to collect information about:

- General user information;
- Resident/visitor;
- Purpose and duration of visit;
- Distance traveled;
- Day use/overnight lodging;
- History of visiting the site or area;

- Types of recreational activities respondents participated in or plan to participate in during their visit, including primary and secondary recreation activities;
- Other recreational sites that respondents visited or intend to visit during their trip;
- General satisfaction with recreational opportunities, facilities, and the respondents overall visit and/or areas that need improvement;
- Effects of Project operations on recreation use and access; and
- Accessibility of facilities.

12.6.3 Online Survey

In addition to the personal interviews, I&M will develop an online version of the interview questions that will allow respondents to provide survey responses electronically. The online survey will allow respondents who do not wish to complete an interview or survey in the field to complete an online version of the survey at a later time or upon returning home from their visit. The online survey will also provide a means to capture data from recreationalists who do not frequent the St. Joseph River.

I&M will post a brief description of the purpose and intent of the survey, as well as the website address, at all formal Project recreation locations. Additionally, notice of the survey will be posted on the Project's relicensing website, and I&M will provide handouts to recreationists with the relevant information on how to complete the online survey.

12.7 Analysis and Reporting

Results of this study will be summarized in the final study report. I&M anticipates that the Recreation study report will include the following elements:

- Project information and background
- Study area
- Methodology
- Study results
- Analysis and discussion
- Any stakeholder and/or consultation
- Literature cited

12.8 Schedule and Level of Effort

I&M intends to conduct the Recreation Study from May 2019 through September 2019. Upon completion of field work, the data will be analyzed and the study report will be prepared and provided to the applicable parties in conjunction with the ISR that will be distributed to stakeholders and filed with the Commission in accordance with the Commission's ILP Process Plan and Schedule. The estimated level of effort for this study

is approximately 280 hours. I&M estimates that this study will cost approximately \$35,000 to complete.

13 Cultural Resources Study

13.1 Study Requests

The Commission's July 25, 2018 SD1 identified the following environmental resource issues to be analyzed in the EA for the Project relicensing.

- Effects of continued project operation and maintenance on properties that are included or eligible for inclusion in the National Register of Historic Places (NRHP).

In Section 6.2.8 of the PAD, I&M proposed to conduct a Cultural Resources Study in support of the required Section 106 consultation associated with the National Historic Preservation Act of 1966 (NHPA) (Section 106). No formal study requests were received regarding historical and cultural resources. Comments were received from FERC and the Pokagon Band of Potawatomi Tribe related to cultural resources.

13.2 Goals and Objectives

The proposed Cultural Resources Study will identify reported historic properties within the Project's Area of Potential Effect (APE). This study will also assess the potential effects of continued Project operations and maintenance activities on historic and cultural resources, should any be present. The goals and objectives of this study are to:

- Consult with Michigan State Historic Preservation Office (SHPO), Indian Tribes⁴ to determine an appropriate APE for the Project;
- Conduct background research and an archival review;
- Conduct a Phase I Reconnaissance Survey (Reconnaissance Survey) of the Project's APE;
- Consult with the Pokagon Band of Potawatomi and the Nottawaseppi Huron Band of the Potawatomi Tribes regarding any historic and/or current wild rice beds located within the Project boundary.
- Consult with federally recognized Indian Tribes to develop and conduct an inventory of properties of traditional religious and cultural importance (often referred to as "traditional cultural properties") within the APE; and

⁴ By letter dated October 12, 2017, the Commission invited the Lac du Flambeau Band of Lake Superior Chippewa Indians, Menominee Indian Tribe of Wisconsin, Citizen Potawatomi Nation, Forest County Potawatomi Community, Hannahville Indian Community, Prairie Band Potawatomi Nation, Miami Tribe of Oklahoma, Pokagon Band of Potawatomi Indians, Little Traverse Bay Bands of Odawa Indians, and Sault Ste. Marie Tribe of Chippewa Indians to participate in the relicensing process for the Project. The Citizen Potawatomi Nation, the Miami Tribe of Oklahoma, and the Little Traverse Bay Band of Odawa Indians stated that they have no interest in the Project; therefore, I&M does not anticipate additional consultation with these Indian Tribes.

- If there is potential for effects to any historic or cultural resources, prepare an Historic Properties Management Plan (HPMP) in consultation with Michigan SHPO and federally recognized Indian Tribes that includes appropriate measures for the management of historic properties within the Project's APE, including specific PM&E measures.

13.3 Study Area

The study area for the Cultural Resources Study includes the APE (Figure 13-1). I&M intends to define an APE in consultation with the Michigan SHPO and Indian Tribes as a component of the Cultural Resources Study. I&M tentatively proposes the following APE which will be refined through consultation.

The APE for the Constantine Project includes lands within the FERC-approved Project boundary. The APE also includes lands outside of the Project boundary where Project operations, Project-related recreation activities, or other enhancements may cause changes in the character or use of historic properties, if any such properties exist.

13.4 Background and Existing Information

Existing relevant and reasonably available information regarding water quality in the Project vicinity was presented in Section 5.10 of the PAD (I&M 2018). In 1989, I&M conducted a Phase I Archaeological Investigation. Background research was queried at the State Historic Preservation Office and the Michigan State Library in Lansing, Michigan. Examination of cultural resource management reports indicated that limited archaeological investigations have been conducted in the area which may account for the absence of recorded sites in the Project area. A preliminary study of the Project area conducted in 1989 by Louis Berger and Associates Inc. suggested a moderate to high potential of prehistoric archaeological resources, since the Project parcels are near the St. Joseph River. In contrast, the potential for historic archaeological sites was evaluated as moderate to low, based on the distribution of known historic sites in this area (I&M 1990).

Archaeological fieldwork was conducted in the three parcels of the Constantine Project, which included visual inspection, pedestrian survey, and subsurface testing. Fieldwork was completed in May 1990. The archaeological investigation concluded that there were no historic or prehistoric archaeological sites recorded for the Project site.

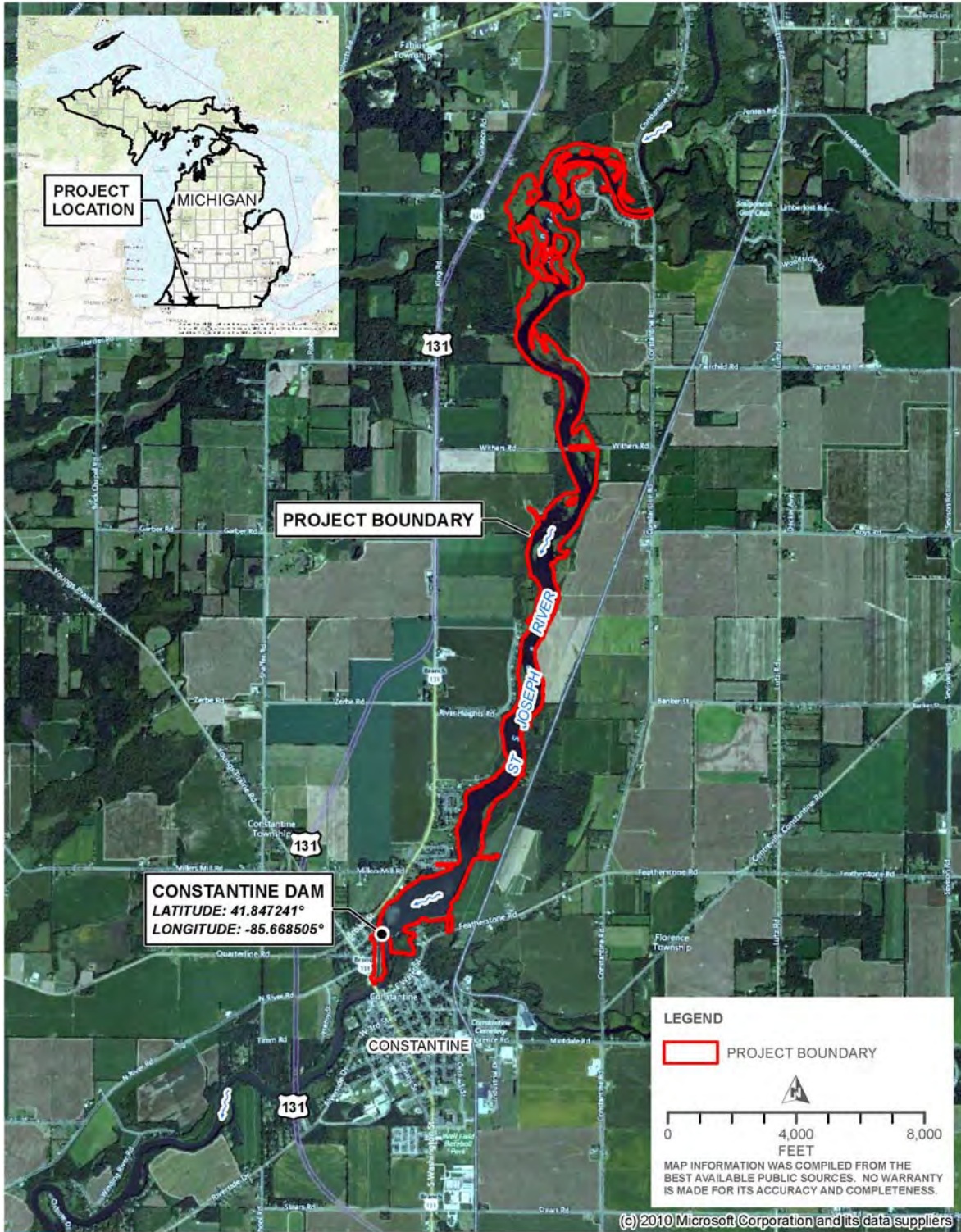
No properties listed on or eligible for listing on the NRHP have been identified in the Project boundary. The NRHP-listed Constantine Historic Commercial District is located approximately 400 feet downstream from the Project along river right (across from the powerhouse) and includes 28 contributing commercial and residential structures representing examples of mid-nineteenth to early-twentieth century Greek Revival and Italianate styles. The Constantine Historic Commercial District was listed in the NRHP in 1985. The Art Gallery Building located at 156 South Washington Street is a contributing

Constantine Hydroelectric Project
Proposed Study Plan

resource to the Constantine Historic Commercial District and was also individually listed on the NRHP in 1980.

In addition to the Constantine Historic Commercial District, the Gov. John S. Barry House located at 280 North Washington Street in Constantine was also individually listed in the NRHP in 1972. The house was built by John S. Barry, Michigan's fourth governor, in a vernacular style and is currently operated as a museum. The John S. Barry House is located approximately 800 feet southwest from the Constantine Dam.

Figure 13-1. FERC-approved Boundary for the Constantine Project



PROJECT LOCATION MAP
CONSTANTINE HYDROELECTRIC PROJECT (FERC NO. 10661)
ST. JOSEPH COUNTY, MICHIGAN

13.5 Project Nexus

At present, there is no evidence that archaeological or historic resources are currently being affected by the Project's operations. However, the Project has the potential to directly or indirectly affect historic properties listed in or eligible for inclusion in the NRHP.

13.6 Methodology

13.6.1 Task 1 – APE Determination

I&M has tentatively proposed an APE as presented in Section 13.3. Pursuant to the implementing regulations of Section 106 at 36 CFR § 800.4(a), I&M will consult with the Michigan SHPO and Indian Tribes, and other parties, as appropriate, to determine and document the APE for the Project as defined in 36 CFR § 800.16(d).

13.6.2 Task 2 – Background Research and Archival Review

I&M will conduct background research and an archival review to inform the specific research design and the historic and environmental contexts. I&M will review relevant sources of information that may include (but are not necessarily limited to):

- Information on archaeological sites, historic architectural resources, and previous cultural resources studies on file with Michigan SHPO;
- A review of Michigan's NRHP listings;
- Historic maps and aerial photographs of the APE;
- Relevant documents related to Project construction;
- Relevant information available from local repositories;
- Information on the current and historical environment, including mapped soils, bedrock geology, physiography, topography, and hydrology in the vicinity of the APE;
- Relevant historical accounts of the Project area;
- Relevant management plans for the Project, including approved management plans; and
- Any additional relevant information made available by the Michigan SHPO, Indian Tribes, or other stakeholders.

The results of the background research and archival review will be integrated into the Reconnaissance Survey Report, as appropriate.

Additionally, I&M will review any existing information and consult with the Pokagon Band of Potawatomi and the Nottawaseppi Huron Band of the Potawatomi Tribes' Tribal Historic Preservation Offices to determine if any historic and/or current wild rice beds are or were located within the Project area.

13.6.3 Task 3 - Reconnaissance Survey

I&M will conduct a Reconnaissance Survey of the Project's APE. The proposed methods for the Reconnaissance Survey take into account the nature and extent of potential effects on historic properties, and the likely nature and location of historic properties within the APE (36 CFR 800.4(b) (1)). The Reconnaissance Survey will be conducted by a qualified cultural resources professional⁵ retained by I&M and will be in accordance with the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 Federal Register [FR] 44716, Sept. 1983) and the Michigan SHPO's *Michigan Above-Ground Survey Manual* (Michigan SHPO 2018).

The Reconnaissance Survey will include a visual reconnaissance of the exposed portions of the reservoir shoreline areas to identify any previously recorded or unrecorded archaeological and/or historic architectural resources. If archaeological material is observed during the Reconnaissance Survey, I&M will conduct a preliminary assessment of the archaeological site that will consist of the delineation of site boundaries. The maximum length and width of each site will be measured and recorded and the site's location geo-located. Site dimensions and elevations will be recorded on standardized field forms along with sketch maps of site settings and notations regarding landform, site aspect, temporal affiliations (if possible) and density of observed materials, site condition, any evidence of Project-related effects, and the nature of site deposits. Site boundaries will be located on Project maps and U.S. Geological Survey (USGS) topographic maps. Based on the judgment of the archaeologist, visual reconnaissance may be augmented by limited subsurface testing (e.g., shovel test pits). I&M will geo-locate, record, and collect any observed artifacts, features, or other pre-contact or historic period cultural material (as appropriate), and any new archaeological sites discovered will be documented on Michigan Archaeological Site Form (Appendix F).

Treatment and disposition of any human remains that may be discovered will be managed in a manner consistent with the Native American Graves Protection and Repatriation Act (NAGPRA) (P.L. 101-601; 25 U.S.C. 3001 *et seq.*)⁶, and the Council's Policy Statement Regarding Treatment of Burial Sites, Human Remains, and Funerary Objects (Advisory Council on Historic Preservation [ACHP] 2007). Any human remains, burial sites, or funerary objects that are discovered will at all times be treated with dignity and respect. In the event that any Native American graves and/or associated cultural

⁵ For this study, a "qualified cultural resources professional" is defined as an individual who meets the Secretary of the Interior's Professional Qualification Standards (48 FR 44738-44739, Sept. 1983).

⁶ Pursuant to 43 C.F.R. Part 10, NAGPRA applies to human remains, sacred objects, and items of cultural patrimony (described as "cultural items" in the statute) located on federal or tribal lands or in the possession and control of federal agencies or certain museums. Regardless of where cultural items are discovered, the principles described in NAGPRA's implementing regulations will serve as guidance for I&M's actions should the remains or associated artifacts be identified as Native American and to the extent such principles and procedures are consistent with any other applicable requirements.

items are inadvertently discovered, I&M will immediately notify the Michigan SHPO and potentially affected Indian Tribes.

As a component of the Reconnaissance Survey, I&M will also identify properties of architectural significance within the APE and update existing information on architectural resources in the Michigan SHPO's files. The Reconnaissance Survey will document properties of architectural significance using photographs, brief descriptions, condition, and location information. I&M will conduct limited research on the history of the buildings, sites, and features, and I&M will complete a survey form for each property. The location will be documented on Project maps and USGS topographic maps.

13.6.4 Task 4 – Historic Properties Management Plan

I&M will consult with Michigan SHPO, Indian Tribes, and other parties to determine if an HPMP is necessary for the Project. If an HPMP is required, I&M will develop an HPMP in consultation with Michigan SHPO, Indian Tribes, and other parties as appropriate. The measures provided in the HPMP will assist I&M in managing historic properties within the Project's APE throughout the term of the new license.

The HPMP will be prepared in accordance with the Guidelines for the Development of Historic Properties Management Plans for FERC Hydroelectric Projects, promulgated by the Commission and the ACHP on May 20, 2002. The HPMP will address the following items (ACHP and FERC 2002):

- Potential effects on historic properties resulting from the continued operation and maintenance of the Project;
- Protection of historic properties threatened by future ground-disturbing activities;
- Protection of historic properties threatened by other direct or indirect Project-related activities, including routine Project maintenance and vandalism;
- The resolution of unavoidable adverse effects on historic properties;
- Treatment and disposition of any human remains that are discovered, taking into account any applicable state laws and the Council's Policy Statement Regarding Treatment of Burial Sites, Human Remains, and Funerary Objects (ACHP 2007);
- Compliance with the Native American Graves Protection and Repatriation Act (25 United States Code [U.S.C.] §3001), for tribal or federal lands within the Project's APE;
- Provisions for unanticipated discoveries of previously unidentified cultural resources within the APE;
- A dispute resolution process;
- Categorical exclusions from further review of effects;
- Public interpretation of the historic and archaeological values of the Project, if any; and

- Coordination with Michigan SHPO and other interested parties during implementation of the HPMP.

13.7 Analysis and Reporting

Based on the results of Task 3, I&M will prepare a report on the results of the Phase I Reconnaissance Survey. The report will include: 1) a summary of information obtained through the background research and archival review, 2) maps and descriptions of reported archaeological and historic resources within the Project's APE, 3) an assessment of the APE's archaeological sensitivity and potential, 4) an assessment of significant architectural resources within the APE, and 5) recommendations regarding additional cultural resource studies and/or management measures for identified resources. I&M will consult with Michigan SHPO, Indian Tribes, and other interested parties (as appropriate) regarding the Phase I report. I&M anticipates that the Cultural Resources study report will include the following elements:

- Project information and background
- Study area
- Methodology
- Study results
- Analysis and discussion
- Any agency correspondence and/or consultation
- Literature cited

13.8 Schedule and Level of Effort

I&M anticipates initiating Task 1 during the summer of 2019. Tasks 1 and 2 will be completed by fall of 2019. Task 3, the Phase IA report, will be prepared and provided to the applicable parties in conjunction with the ISR that will be distributed to stakeholders and filed with the Commission in accordance with the Commission's ILP Process Plan and Schedule. If an HPMP is required for this Project, I&M will prepare a draft HPMP for review by the applicable parties. Following review and comment by the applicable parties, I&M will prepare a final HPMP. I&M estimates that this study will cost approximately \$30,000 to complete.

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Appendix A. Comments and Study Requests

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D.C. 20426
September 27, 2018

OFFICE OF ENERGY PROJECTS

Project No. 10661-050 – Michigan
Constantine Hydroelectric Project
Indiana and Michigan Power Company

Jonathan Magalski
Environmental Consultant Specialist
Indiana Michigan Power Company
1 Riverside Plaza
Columbus, OH 43215

**Reference: Comments on Preliminary Study Plans, Request for Studies, and
Additional Information**

Dear Mr. Magalski:

After reviewing the Constantine Hydroelectric Project's Pre-Application Document, the transcripts of the scoping meetings held on August 28 and 29, 2018, and participating in a project environmental site review on August 28, 2018, we have determined that additional information is needed to adequately assess potential project effects on environmental resources. We have one study request (enclosed in Schedule A) for botanical resources, and recommend that you consider our comments on your preliminary study plans (enclosed in Schedule B). We also have additional information needs (enclosed in Schedule C). Unless otherwise noted, please provide the requested additional information when you file your proposed study plan, which must be filed by November 16, 2018.

Please include in your proposed study plan a master schedule that includes the estimated start and completion date of all field studies, when progress reports will be filed, who will receive the reports and in what format, and the filing date of the initial study report. All studies, including fieldwork, should be initiated and completed during the first study season, and the study reports should be filed as a complete package. If, based on the study results, you are likely to propose any plans for measures to address project effects, drafts of those plans should be filed with your Preliminary Licensing Proposal (or draft license application).

Please note that we may, upon receipt and review of scoping comments/study requests from other entities due October 2, 2018, as well as your proposed study plan, request additional studies or information at a later time.

Project No. 10661-050

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If you have any questions, please contact Lee Emery at (202) 502-8379, or via e-mail at lee.emery@ferc.gov.

Sincerely,

A handwritten signature in black ink that reads "Janet Hutzel". The signature is written in a cursive style.

Janet Hutzel, Chief
Midwest Branch
Division of Hydropower Licensing

Enclosures: Schedule A
Schedule B
Schedule C

Schedule A
P-10661-050

Schedule A

Study Requests

After reviewing the information in the Pre-Application Document (PAD), we have identified information that is needed to assess project effects. As required by section 5.9 of the Commission's regulations, we have addressed the seven study request criteria in the study requests that follow.

Botanical Resources Study

§5.9(b)(1) – *Describe the goals and objectives of each study proposal and the information to be obtained.*

The goal of the study is to develop additional information necessary to address the potential effects of project operation and maintenance activities on botanical resources within the project boundary. The results of this study would be used to determine how potential effects can be avoided, minimized, or otherwise mitigated.

The objectives of the botanical resources study are as follows:

- 1) map and/or confirm vegetation types within the project boundary, including age-class and composition of forested areas. Please include the presence of trees with ≥ 5 inches diameter at breast height with exfoliating bark and snags, which are characteristic of Indiana and/or northern long-eared bat habitat;
- 2) identify and map any rare, threatened, or endangered plant species or potential habitats, specifically the federally threatened Eastern prairie-fringed orchid and state threatened water willow; and
- 3) document the presence, abundance, and location of invasive plant species, specifically the presence of emerging invasive plants such as the European frog-bit and pond-water starwort.

§5.9(b)(2) – *If applicable, explain the relevant resource management goals of the agencies or Indian tribes with jurisdiction over the resource to be studied.*

Not applicable.

§5.9(b)(3) – *If the requester is not a resource agency, explain any relevant public interest considerations in regard to the proposed study.*

Sections 4(e) and 10(a) of the Federal Power Act require the Commission to give equal consideration to all uses of the waterway on which a project is located, and what conditions should be placed on any license that may be issued. In making its license decision, the Commission must equally consider the environmental, recreational, fish and

wildlife, and other non-developmental values of the project, as well as power and developmental values.

The Constantine Hydroelectric Project (Constantine Project) provides habitat for a variety of plants and animals. An understanding of the botanical resources within the project boundary would provide information on the type, abundance, and location of habitat potentially affected by continued operation and maintenance of the project. Understanding the project's effects on botanical resources is relevant to the Commission's public interest determination.

§5.9(b)(4) – Describe existing information concerning the subject of the study proposal, and the need for additional information.

In the PAD, Indiana and Michigan Power Company (I&M Power) provides a general discussion of vegetation types common to the ecoregion, but omits a substantive discussion of botanical resources at the project. In addition, I&M Power references information on botanical resources from reports from dating back to 1975; however, the PAD does not provide current information regarding the plants or animals that make use of this habitat. Therefore, we cannot determine the potential project effects on botanical resources in the project boundary.

§5.9(b)(5) – Explain any nexus between project operations and effects (direct, indirect, and/or cumulative) on the resource to be studied, and how the study results would inform the development of license requirements.

Project operation and maintenance activities have the potential to disturb botanical resources in the project boundary that could provide habitat for federally listed endangered or threatened species, including the Indiana and northern long-eared bats. This study would assist in identifying plant species and their habitats within the project and provide baseline information from which to evaluate the effects of continued operation and maintenance of the Constantine Project on those resources.

§5.9(b)(6) – Explain how any proposed study methodology (including any preferred data collection and analysis techniques, or objectively quantified information, and a schedule including appropriate field season(s) and the duration) is consistent with generally accepted practice in the scientific community or, as appropriate, considers relevant tribal values and knowledge.

Field Survey

There would be one field survey with multiple components. The spatial boundaries of the field study area would consist of the project facilities and the riparian corridor upstream and northwest of the project and within the project boundary. A general inventory of plants, including any state listed rare, or federally listed threatened or endangered botanical species, including identifying if the federally threatened Eastern

prairie-fringed orchid and state threatened water willow are present, should be conducted within the field study area. Age class, species composition, and relative density of any forested understory should be recorded, as well as the presence of snags or old-growth hardwoods with sloughing bark, which may provide habitat for Indiana and northern long-eared bats. The invasive species portion of the survey should focus on previously unidentified and/or emerging invasive plant species (e.g., European frog-bit, pond-water starwort), examining disturbed habitats (including areas adjacent to infrastructure and roadside ditches), and natural terrestrial habitats (Constantine Project shoreline) where these particular invasive species are observed or likely to occur in the project boundary. The survey should be conducted during the spring and summer months in which the plant characteristics and features are most identifiable. Occurrences of previously unidentified and/or emerging invasive plant species should be mapped with a handheld GPS unit and depicted on an aerial photograph. Data should be recorded for each invasive species occurrence, including species name, GPS location, approximate density, and area of coverage. Representative photos should be taken and general observations should be noted regarding habitat and site conditions, including type and quality.

The methods described above are consistent with accepted methods for conducting botanical resources surveys.

Report Preparation

I&M Power would prepare a report that summarizes the botanical resources encountered within the project boundary. The report should include emerging or previously unidentified invasive plant species occurrence data, age class and composition of any forested habitat, and mapping of newly identified invasive plant species. Captioned photographs of typical and/or significant habitat conditions should be included in the report. Documentation of threatened or endangered species occurrence should be filed with the Commission as privileged.

§5.9(b)(7) – Describe considerations of level of effort and cost, as applicable, and why any proposed alternative studies would not be sufficient to meet the stated information needs.

The estimated cost of a reconnaissance-level botanical resources survey and the preparation of a report containing the above criteria is approximately \$15,000.

Schedule B
P-10661-050

Schedule B

Comments on Preliminary Study Plans

Based on our review of your preliminary study plans outlined in your Pre-Application Document (PAD), we request the following modifications. Please address our requests in your proposed study plans.

Aquatic Resources

Water Resources

In section 6 of the PAD, *Preliminary Issues, Project Effects, and Potential Studies List*, for Water Resources (section 6.2.2), Indiana and Michigan Power Company (I&M Power) states that project operation has the potential to locally alter water quality in the project bypassed reach during periods of minimum flow and high air temperatures. On page 6-3, I&M Power proposes to conduct a temperature and dissolved oxygen (DO) study from May through October at the project. Furthermore, I&M Power proposes to limit the scope of the study to the project boundary. However, the project bypassed reach is not within the project boundary. The proposed temperature and DO study for the project should include collecting temperature and DO levels in the project bypassed reach because this area is very susceptible to rapid changes in flows that can affect temperature and DO levels that could have adverse effects on fish and aquatic resources residing there.

Fish and Mussels

In section 6.2.3, *Fish and Aquatic Resources*, I&M Power states that the fish baseline survey would occur in the project boundary and mussel baseline surveys would be conducted in two locations downstream from the Constantine dam and at three locations in the project's reservoir. The fish and mussel surveys should also include sampling in the project bypassed reach. The bypassed reach is subject to rapid changes in water volumes and also receives water from the Fawn River. The generally faster flowing waters in the bypassed reach are likely to create favorable habitat conditions for mussels, and therefore have different species than those identified at other sampling sites in project waters where waters are more lentic. In addition, there is a potential for different fish species to occur in the bypassed reach, compared to the project reservoir and tailwater area, because of species contributions from inflows provided by the Fawn River.

Also, describe if the proposed fish and mussel surveys would entail qualitative sampling to determine species presence and quantitative sampling to estimate densities or populations, or both. Using some degree of both methodologies would be useful as it would provide not only an indication of the presence or absence of species present in project waters (i.e., qualitative results) but would provide an estimate of densities or sheer numbers of fish or mussel species collected (i.e., quantitative results).

The proposed fish and mussel surveys should include the following.

Fish

1. Sample similar areas and habitats in project waters that may have been sampled by previous fish sampling efforts conducted in project waters. The results would help to make comparisons of how fish species may or may not have changed since the last sampling efforts.
2. Identify sampling gear that would be used for collecting fish. Describe the overall health of individual fish species collected (e.g., are various fish species showing normal growth patterns or are they stunted), as this information could help inform how project operation may be affect fish populations.
3. Determine if various year classes are present for selected fish species, particularly for game fish, as this information would help to indicate if the fish populations are self-supporting and if there has been a change in the general fish community compositions since the last survey efforts in project waters.
4. Identify various invasive fish species and their abundance in comparison with all fish species captured during the proposed survey, and compare the results with the types and numbers of invasive fish species reported for the previous fish survey conducted in project waters.

Mussels

1. Compare the mussels collected in project waters and the project bypassed reach with previous mussel surveys conducted in project waters and with any mussel data for the lowermost reach of the Fawn River. The results of the mussel survey would help to determine the effects of project operation on habitat for the mussels.
2. Develop a survey protocol that minimizes the disruption of mussels collected and one that returns mussels removed from the stream bottom to the same location after data is collected.
3. Conduct the survey with a qualified malacologist or use a qualified malacologist to be assisting in and/or identifying the mussels collected.

Terrestrial Resources

Wetland Survey

In section 6 of the PAD, *Preliminary Issues, Project Effects, and Potential Studies List*, I&M Power proposes to conduct a wetland study to characterize wetland and riparian habitat within the project boundary. I&M Power provides some details on the proposed desktop review of wetlands. However, specific methodology for the field-verification portion were not identified. The wetland survey for the purpose of field verification should include all wetlands within the project boundary.

In addition, the study report should include:

1. maps of the sites, including observed vegetation, soils, hydrologic characteristics, and topography;
2. wetland vegetation data mapped during the survey by community, age class, and distribution class in tabular format; and
3. a narrative description of results and conclusions, including characteristics and acreage of each area of wetland.

Recreation and Land Use

Recreational Assessment

In section 6 of the PAD, *Preliminary Issues, Project Effects, and Potential Studies List*, I&M Power proposes to conduct a recreational assessment of the project facilities. However, I&M Power does not provide information on how recreation facilities would be assessed. The PAD does not include a detailed description of the condition of each recreation site or facility, or of signage related to recreation and public safety near recreation sites. Understanding the condition of the existing project recreation sites and facilities and how these sites and facilities are managed is essential in determining the adequacy of project recreation facilities to meet current and future recreation needs, and is therefore relevant to the Commission's public interest determination.

In the absence of data on facility conditions and signage, we cannot determine if the existing information is adequate for us to assess the adequacy of existing recreation facilities to meet current and future demand. So that we may fully understand and evaluate the effects of continued project operation and maintenance on recreation use, please provide a discussion of the condition and adequacy of existing recreational facilities to meet current and future recreational demand at the project. Include all formal and informal recreation facilities in the assessment. Additionally, please describe the presence or absence, locations, and photographs of signage related to project recreation or safety at recreation sites at each recreation facility.

Cultural Resources

Cultural Resources Inventory Plan

In section 6.2.8, *Cultural and Tribal Resources*, of the PAD, I&M Power proposes to assess the potential for the project to affect identified historic and archaeological resources through a Phase I investigation, site file search, and/or an evaluation of project facilities. The PAD provides limited information on known archaeological and historic resources within the project vicinity. The PAD does discuss past surveys; however, it is not clear the extent, boundaries, methods, or adequacy of the surveys conducted.

In addition, while there is a general description of the Area of Potential Effects (APE), there is no map depicting the APE. This map information is necessary for us to determine the effects of project operation on historic properties. Therefore, a Phase I archaeological survey of the APE should be conducted. Also, as part of I&M Power's proposed study, and prior to any surveys being conducted, you should consult with the Michigan State Historic Preservation Officer (Michigan SHPO) and federally-recognized Tribes who have an active interest in the project, and any interested parties.

Please include the following in the study proposal for cultural resources:

1. a defined APE for the project that would include all lands and waters enclosed by the project boundary and any other lands or properties outside the project boundary where project operation may affect historic properties. Also include: (a) a detailed map showing all aspects of the APE in relation to the project boundary;¹ (b) a background section on previous work in and around the APE; and (c) a cultural history of the research area;
2. survey methodology, including: (a) areas to survey for archaeological and/or historic resources relative to the defined APE;² and (b) an evaluation of cultural resources, including known archaeological sites within the APE and the project itself, for National Register-eligibility; and (c) site- or resource-specific descriptions of existing and potential project-related effects on historic properties;
3. survey results and concurrence from the Michigan SHPO, any interested federally-recognized Tribes, and any interested parties on the results of the survey; and

¹ The APE should be developed after consultation with the Michigan SHPO, federally-recognized Tribes who have an active interest in the project, and any interested parties. Once you have defined your APE, please send your APE definition and APE map to the Michigan SHPO and seek their concurrence.

² Lands that are highly disturbed are less likely to contain cultural resources, and may not need to be surveyed.

4. a record of consultation with the Michigan SHPO, interested federally-recognized Tribes, and other interested parties regarding the proposed study, results and APE, and related concurrence letters.

In the event that any historic properties would be adversely affected by project operation or maintenance, I&M Power would need to develop a draft Historic Properties Management Plan (HPMP) to avoid, lessen, or mitigate for any project-related adverse effect on National Register-eligible properties. A draft HPMP should be developed after consultation with the Michigan SHPO, the federally-recognized Tribes who have an active interest in the project, and interested parties, and filed with your Preliminary Licensing Proposal (or draft license application).

The draft HPMP should, at a minimum, address the following elements:

1. identification of the APE for the project and inclusion of a map or maps that clearly show the APE in relation to the existing and proposed project boundary;
2. completion, if necessary, of identification of historic properties within the project's APE; continued use and maintenance of historic properties;
3. treatment of historic properties threatened by project-induced shoreline erosion, other project-related ground-disturbing activities, and vandalism;
4. consideration and implementation of appropriate treatment that would minimize or mitigate unavoidable adverse effects on historic properties;
5. treatment and disposition of human remains that may be discovered, taking into account any applicable State laws and the Advisory Council's "Policy Statement Regarding Treatment of Burial Sites, Human Remains, and Funerary Objects," February 23, 2007;
6. discovery of previously unidentified properties during project operation;
7. public interpretation of the historic and archaeological properties at the project;
8. a list of activities (i.e., routine repair, maintenance, and replacement in kind at the project) not requiring consultation with the Michigan SHPO because these activities would have little or no potential effect on historic properties;
9. a procedure to address effects on historic properties in the event of a project emergency; and
10. a review of the HPMP by the applicant, the Michigan SHPO and consulting parties to ensure that the information continues to assist the applicant in managing historic properties and updating the HPMP based on agency and tribal consultations.

Schedule C
P-10661-050

Schedule C

Additional Information

Geological and Soil Resources

1. In section 5.2.7, *Reservoir Shoreline and Stream Banks*, of the Pre-Application Document (PAD), Indiana and Michigan Power Company (I&M Power) states that the west downstream riverbank was repaired due to erosion and is being monitored. Please provide the location of this repaired riverbank and the extent of the erosion, the probable cause of the erosion, a description of the repair, and how the site is being monitored.

Aquatic Resources

2. In section 5.4.2, *Existing Fish and Aquatic Resources*, of the PAD, I&M Power describes the results of various fish surveys conducted by the Michigan Department of Natural Resources on the St. Joseph River in 2007. Please identify what sampling gear was used to collect the fish samples in the 2007 study.

3. Several places in the PAD describe the project bypassed reach as being 1,600 feet long (i.e., page 5-63) or 1,300 feet long (i.e., pages 4-7 and 5-14). Please confirm the exact length of the bypassed reach.

4. In section 5.3.7.1, *Impairment Listing*, I&M Power discusses the 2016 303(d) Water Quality Assessment Integrated Report. However, we are unable to discern from the information provided whether there are any waters within the project boundary, or the project bypassed reach, that are not meeting the 303(d) criteria. Please identify if project waters and the project bypassed reach are not listed as impaired or not attaining Michigan Water Quality Standards under section 303(d) of the Clean Water Act.

Terrestrial Resources

5. In section 5.5.2.2, *Wildlife and Botanical Resources*, of the PAD, I&M Power states that one of the nesting structures was found to be occupied during the 2017 monitoring period. Please provide information regarding: (1) which species used this nesting structure; and (2) historical observations of mallard or wood duck usage of all eight nesting structures erected at the project since inception. Please also provide background information on the factors leading to requirement of the installation of the duck nesting structures in the current license.

6. In section 5.6.1, *Wetland and Riparian Vegetation*, of the PAD, I&M Power states that the license for the project requires surveys be conducted for purple loosestrife and Eurasian watermilfoil within the project reservoir. Please provide survey results for purple loosestrife and Eurasian watermilfoil for the project for the 2018 survey. In addition, please provide additional information regarding the effectiveness of the use of *galerucella* beetles as a control measure for treating purple loosestrife, including the results from the annual surveys of beetle effectiveness on the purple loosestrife that

occurred in 2017. Please provide an explanation of the terms (e.g. “light, medium and heavy”) used on pages 5-30 – 5-36 to describe the quantity of aquatic invasive plants (i.e., purple loosestrife and Eurasian watermilfoil) observed during annual surveys for these two plant species. Also, please define these terms in terms of abundance or assign percentages to the terms.

Recreation and Land Use

7. Figure 5.8-1 in section 5.8, *Recreation and Land Use*, of the PAD provides a map of all existing recreation sites and facilities within the project boundary. However, it does not include the location of the portage trail or the paved walking trails referenced in section 5.2.7. Please identify these trails on figure 5.8-1 and provide a description of the paths, including the length, footing materials, condition, and all relevant signage. Also include a description of the condition of the put-in and take-out areas.

8. Figure 5.8-1 also shows the project boundary crossing a corner of the Constantine Project tailwater fishing access parking area, excluding most of the parking area from the project boundary. Exhibit G does not contain enough detail to determine if the parking area is excluded from the project boundary or if figure 5.8-1 is inaccurate. Please clarify if the tailwater fishing access parking area is within or outside of the project boundary and modify figure 5.8-1 accordingly.

9. In the methodology document that appends the Licensed Hydropower Development Recreation Report (Form 80), the American Legion Boat Launch is described as providing access within the project boundary, however, figure 5.8-1 does not include the location of the American Legion Boat Launch and the text does not describe the location of the boat launch in terms of the project boundary. Please clarify if the American Legion Boat Launch is within, on, or adjacent to the project boundary. If any additional facilities not owned, managed, or operated by I&M Power are within the project boundary, please include them in figure 5.8-1 and include them in your discussion.

10. To determine the adequacy of the recreational facilities, please describe the location and number of toilets referenced in section 5.8, *Recreation and Land Use*.

11. In section 5.8.2, *Current Project Recreation Use Levels and Restrictions* of the PAD, I&M Power states that the annual daytime visits to the project recreation areas were estimated to be 11,851 as of 2015. Because this figure is higher than might be expected for these project facilities, if the information is available, please provide an explanation (antidotal or numerical) of the effect the father’s day weekend boat race, or other large events, had on this visitor estimation figure, if any.

12. During the environmental site review, Commission staff noted two individuals fishing at the toe of the dam and on the dam apron. Staff observed fencing extending partly into the reservoir on the upstream side of the dam; however, the fencing on the downstream of the dam appeared to be circumvented by using the large existing rocks

adjacent to the fence. Please describe if this area is being used as an informal access-point and if any measures have been implemented to ensure public safety at the toe of the dam.

13. Exhibit G, sheet 1 of 2 shows an area of about 9 acres in the project boundary. This area lies east of the bypassed reach, between the left embankment and the Fawn River. Please describe the project use of the 9-acre area and if it is needed for project operation or maintenance.

Cultural Resources

14. In section 5.10, *Cultural Resources*, of the PAD, I&M Power states that archaeological investigations were completed in 1989 and 1990. However, the PAD does not contain these reports and studies. Please file these documents with the Commission as privileged.

15. Additionally, the section describes the Constantine Historic Commercial District, listed in 1985, as being located approximately 400 feet downstream from the project. Please provide information on whether the project has structures or sites that are contributing properties to the eligibility of the Constantine Historic Commercial District.

Developmental Resources

16. In section 4.3.2 of the PAD, table 4.3-1, I&M Power states that the reservoir has a storage capacity of 5,750 acre-feet and a surface area of 525 acres, which yields an average depth of about 11.0 feet. However, table 4.3-1 provides a maximum depth of 12 feet, which is inconsistent with an average depth of about 11.0 feet. Also, Exhibit F, sheet 2 of 3, of the typical spillway section shows an 8-foot depth adjacent to the spillway. Please confirm the reservoir storage capacity, surface area, and maximum depth to ensure consistency and revise the project description accordingly.

17. In section 4.3.7, table 4.3-2 of the PAD, I&M Power states that each turbine has a rated horsepower of 426 and a rated capacity of 300 kilowatt (kW). However, a turbine with a rated horsepower of 426 corresponds to a rated capacity of 320 kW. In the Preliminary Licensing Proposal (or draft license application), please provide a rated turbine horsepower and a rated generator capacity consistent with 18 CFR 11.1(i) of the Commission's regulations.

18. In section 4.3.7, table 4.3-2 of the PAD, I&M Power states that the voltage of each generator is 2,300 volts. In the single-line diagram, each generator is labeled as 2.4 kV. Please clarify the voltage of each generator.

19. In section 4.3.8 of the PAD I&M Power states that the 2.4 kV primary transmission line is about 50 feet long. However, the single-line diagram shows that the voltage from the powerhouse stepped up from 2.4 kV to 15 kV for delivery at Florence Road. In the Preliminary Licensing Proposal (or draft license application), please provide

the origin, the point of interconnection and length of the primary transmission line, whether the primary transmission line is above ground or underground, the location where the voltage is stepped up, and the owner of the point of interconnection and their relationship to I&M Power. If the Florence Road tie-in location is not the interconnection with the grid, please describe the significance of the Florence Road tie-in location shown on the single-line diagram.

20. In section 4.4 of the PAD, I&M Power states that the project is operated as a run-of-river facility, but does not include a normal range of water levels in the reservoir. During the environmental site review, staff noticed flashboards on the dam, which can affect water levels in the reservoir. Please describe the range of water elevations in the reservoir under run-of-river operation.

21. Please describe how the project is operated under high flow, low flow, and cold weather conditions.

22. Exhibit F, sheet 1 of 3, general plan shows the storage building west of the powerhouse that had been removed. In the Preliminary Licensing Proposal (or draft license application), please update Exhibit F so as not to include the storage building.

23. Exhibit F, sheet 1 of 3, general plan shows two sections of the dam and spillway, sections C-C and D-D, but there are no sections labeled C-C and D-D on any of the three sheets in Exhibit F. In the Preliminary Licensing Proposal (or draft license application), please revise Exhibit F to include sections C-C and D-D.

24. Exhibit F, sheet 1 of 3, general plan and sheet 2 of 3, plan view of dam & spillway, and longitudinal section of spillway each show the fish chute. Section 4.3 of the PAD states that the fish chute had been abandoned and replaced with a sluice gate. In the Preliminary Licensing Proposal (or draft license application), please revise Exhibit F to show the sluice gate that replaces the abandoned fish chute.

25. Exhibit F, sheet 1 of 3, sections A-A and F-F do not include the following relevant information for the left canal embankment: (1) the top elevation, the cross slope of the embankment crest; (2) top width; or (3) the slope of the right side of the embankment. In the Preliminary Licensing Proposal (or draft license application), please revise Exhibit F to include the relevant information for the left canal embankment.

26. Exhibit F, sheet 2 of 3, section E-E does not include the following relevant information for the powerhouse: (1) length and height of the powerhouse; (2) generator floor elevation; (3) length and floor elevation of the forebay intake section; (4) angle of the trash racks; (5) turbine pit floor elevation; (6) and draft tube invert. In the Preliminary Licensing Proposal (or draft license application), please revise Exhibit F, section E-E to include the relevant information.

27. Exhibit F, sheet 3 of 3 does not show the recent upgrades to the detached dike. In the Preliminary Licensing Proposal (or draft license application), please revise Exhibit F to include the as-built information for the detached dike.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

SEP 28 2018

REPLY TO THE ATTENTION OF:

Lee Emery
Federal Energy Regulatory Commission
888 First Street, NE
Washington, District of Columbia 20426

Via electronic filing and hard copy delivery

RE: Comments on Scoping Document 1 – Federal Energy Regulatory Commission Notice of Intent to prepare an Environmental Assessment for the Constantine Hydroelectric Project – Application for New License; Constantine, St. Joseph County, Michigan (Project P-10661-050)

Dear Mr. Emery:

The U.S. Environmental Protection Agency has reviewed the Federal Energy Regulatory Commission's (FERC) August 1, 2018, Federal Register (FR) Notice of Intent (NOI) advising that an Environmental Assessment (EA) will be prepared for the Constantine Hydroelectric Project (Project) in Constantine, St. Joseph County, Michigan. The Indiana Michigan Power Company (I&M) is FERC's non-federal representative. FERC is in receipt of I&M's Notice of Intent to file an application for Subsequent License (relicensing) and I&M's Pre-Application Document (PAD) for the Project, which is located on the St. Joseph River in St. Joseph County, Michigan. The filing of the PAD and the associated Notice of Intent by I&M marks the formal start of the relicensing process for the Project. Via the FR NOI, FERC is soliciting comments on the PAD and on Scoping Document 1 (SD1), which was prepared by FERC staff. This letter provides EPA's scoping comments on the PAD and SD1, pursuant to NEPA, the Council on Environmental Quality's NEPA Implementing Regulations (40 CFR 1500-1508), and Section 309 of the Clean Air Act.

I&M, a unit of American Electric Power (AEP), is the Licensee, owner, and operator of the run-of-river, 1,200-kilowatt (kW) Project, located at approximately river mile 101.4 on the St. Joseph River in the Village of Constantine in St. Joseph County, Michigan. The Constantine Project consists primarily of an uncontrolled concrete gravity overflow spillway dam, a concrete headgate structure, an earthen embankment between the headgate structure and overflow spillway, an earth-fill reservoir impoundment dike, a power canal, and a powerhouse. The Project was constructed in 1873 by the Constantine Hydraulic Company. The Constantine Hydraulic Company operated the hydroelectric plant through 1917. The Project was purchased by Michigan Gas and Electric Company, the predecessor to I&M, in 1917 and subsequently placed under their operation. The original timber crib dam and powerhouse were replaced with the existing dam and powerhouse in 1923. Today the Project is operated by I&M in a run-of-river manner, generating approximately 5,000 megawatt hours (MWh) annually of renewable

energy. The upstream reservoir formed by the Project is approximately six miles long, with impoundment of approximately 525 acres at normal maximum surface area.

The Project's current license was issued by FERC on October 20, 1993 (with an effective date of October 1, 1993) for a term of 30 years. The license was amended by subsequent orders (1995, 1996, 1997, and additional orders modifying plans developed pursuant to license articles). As presently licensed, the primary compliance requirements associated with the operation of the Project is to operate the Project as run-of-river and to provide flows over the spillway to maintain a minimum water surface elevation of 770.0 feet NGVD downstream of the Project (tailwater elevation). Through the current relicensing process, I&M is not proposing any new Project facilities or upgrades,

Because specific project details are not known at this time, EPA's comments are generic in nature. Based on the information provided in the FR NOI, the PAD, SD1, and from our involvement in onsite early coordination meetings held on August 28, 2018, EPA offers the following comments, enclosed, for consideration when preparing the EA for the proposed project.

We look forward to working with you and reviewing future NEPA documents prepared for this project as it is developed. We are available to discuss the contents of this letter at your convenience, should you desire. If you have any questions about this letter, please contact the lead NEPA reviewer, Liz Pelloso, at 312-886-7425 or via email at pelloso.elizabeth@epa.gov.

Sincerely,



Kenneth A. Westlake, Chief
NEPA Implementation Section
Office of Enforcement and Compliance Assurance

cc (via email):

Hector Santiago, NPS-Midwest Regional Office
Scott Blackburn, NPS-Midwest Regional Office
Lisa Fischer, USFWS-East Lansing
Daria Hyde, MNFI
Kesiree Thiamkeelakul, MDNR
Kyle Kruger, MDNR
Jon Magalski, AEP
Liz Parcell, AEP

EPA's Detailed Comments: Constantine Hydropower Project
Scoping/Early Coordination (pre-EA)
Constantine, St. Joseph County, Michigan

September 28, 2018

RECREATION AND LAND USE

- The Constantine Project provides several recreational facilities as required under the current license. These facilities are located both upstream and downstream of the Constantine dam and are maintained and operated by I&M and open to the public, including a boat launch, a portage take-out and put-in, reservoir fishing access, tailwater fishing access, Americans with Disabilities Act (ADA) accessible portable toilets, and a picnic area. These facilities were toured during the August 28, 2018, site visit. Several of the facilities are in disrepair and would benefit from upgrades.

The portage take-out location could be more clearly marked and better maintained. The existing "trail" to the portage put-in location is also not clearly marked and is overgrown. That trail, located along the south bank of the St. Joseph River downstream of the dam, has been severely eroded, causing it to be narrower than required and full of erosional pitting. Between its current condition and trees that have fallen over the trail, it does not appear to be easily, or safely, used by individuals portaging with a kayak or canoe. Additionally, the portage put-in location needs to be clearly marked, cleared of vegetation, and restabilized with rock. The portage-put in location has also been recently utilized by potential vagrants, as evidenced by recent campfires and food trash noted during the agency site visit.

Recommendation: As part of relicensing, I&M should be required to renovate degraded recreational facilities, install increased signage, and provide a maintenance schedule for all facilities. Current conditions of all recreational facilities, and proposed requirements/upgrades/modification under the new license should be discussed in the forthcoming EA.

NATIONAL RIVERS INVENTORY

- The Project is located within a stretch of approximately 210 miles of the St. Joseph River that has been listed by the National Park Service (NPS) under the Nationwide Rivers Inventory¹ (NRI). The NRI is a listing of more than 3,200 free-flowing river segments in the United States that are believed to possess one or more "outstandingly remarkable" natural or cultural values judged to be at least regionally significant. The Outstandingly Remarkable Value identified by the NPS for this section of the river is recreation.

NRI river segments are potential candidates for inclusion in the National Wild and Scenic River System. In partial fulfillment of Section 5(d) of the Federal Wild and Scenic Rivers Act (WSRA), NPS maintains the NRI as a national listing of potentially eligible river segments. Consultation with NPS for NRI River segments is required, and NPS provides

¹ <https://www.nps.gov/subjects/rivers/nationwide-rivers-inventory.htm>

consulting instructions² for federal projects potentially affecting NRI segments. Under Section 5(d)(1) of the WSRA and related guidance³, all federal agencies must seek to avoid or mitigate actions that would adversely affect NRI river segments.

The Wild and Scenic Rivers Act: Section 7 manual⁴ states on page 8 (Agency-Identified, 5(d)(1), Study Rivers), “*If a river is listed in the Nationwide Rivers Inventory (NRI), the federal agency involved with the action must consult with the land managing agency, or the NPS, if the river is on private lands, in an attempt to avoid or mitigate adverse effects. This consultation is required pursuant to a directive from the Council on Environmental Quality.*” The Council on Environmental Quality (CEQ), under 5(d)(1) Wild and Scenic River Act authority, has provided guidance⁵ to federal agencies with permitting and/or granting authority for projects on or near rivers listed on the NRI.

Recommendation: The forthcoming EA should clearly discuss the protections afforded to NRI rivers and potentially-eligible river segments under the Wild and Scenic Rivers Act. The Draft EA should explain the required consultation process with NPS and provide information on the status of coordination with NPS. FERC should determine how to best implement the Project, including relicensing and any upgrades to required recreational facilities that may need to be implemented, in a manner that does not adversely affect the NRI river segment. A discussion on how adverse impacts will be avoided should be included in the EA.

FISH ENTRAINMENT

- The Pre-Application Document (PAD) states that I&M last presented fish entrainment and mortality estimates in 1991, approximately 2 years before the current FERC license was issued. The 1988 study associated with this information concluded that the amount of entrainment and mortality at the Project was insignificant and would have an insignificant effect on the fish community. There has been no change to Project operations or modification of significant Project features, and because of this, I&M believes that existing water velocities at the face of and through the Project’s trash racks are consistent with previously-measured values from 25 years ago. At this time, it does not appear that I&M plans to conduct a new entrainment/mortality study at the Project.

Recommendation: FERC and I&M should work closely with the U.S. Fish and Wildlife Service (USFWS) and the Michigan Department of Natural Resources (MDNR) to determine any fisheries-related studies that may be required before relicensing occurs. The forthcoming EA should include correspondence with MDNR and USFWS, as appropriate, regarding effects of turbine entrainment on fish populations in the project reservoir and downstream of the project. If MDNR and/or USFWS recommend modifications based on entrainment issues, the Draft EA should discuss and study

² <https://www.nps.gov/subjects/rivers/consultation-instructions.htm>

³ <https://www.nps.gov/subjects/rivers/upload/Presidential-Memorandum-for-Heads-of-Departments-and-Agencies.pdf>

⁴ <https://www.rivers.gov/documents/section-7.pdf>

⁵ <https://www.nps.gov/subjects/rivers/upload/Council-on-Environmental-Quality.pdf>

modifications to be included as a condition of the relicense. We recommend the EA describe the context and intensity of impacts to fish species from impingement, entrainment, and turbine-induced fish mortality, and consider whether measures are available and warranted to minimize impacts. Consider the potential for implementation of best practices, such as optimizing spacing between bars in trash racks, if they are not already present at the Project.

NON-NATIVE AND INVASIVE SPECIES

- The PAD states on page 5-30, “*Article 409 of the [current FERC] license requires I&M to conduct surveys for purple loosestrife and Eurasian watermilfoil within the Project’s reservoir. The surveys are to be conducted annually between late July and early August, the time during which Eurasian watermilfoil is at or near peak growth and purple loosestrife is in bloom.*”

Recommendation: The PAD should be updated to provide an update on the status of the 2018 invasive species survey.

- The PAD describes a biological control pilot project for purple loosestrife at the Constantine Project that utilized the *Galerucella sp.* beetle, and states, “*I&M will continue to consider and analyze various potential control measures at the Project including biocontrol using beetles, herbicides, physical removal, or a combination of multiple control measures.*” During the August 28, 2018, site visit, American Electric Power representatives noted that due to overwintering issues, it is likely that future control measures will not utilize beetles.

Recommendation: Provide an update on the status of use of beetles in upcoming years, including lessons learned/challenges/successes from the current three-year study between 2015 and 2017.

- The PAD states on page 6-6 that I&M proposes to continue monitoring specific invasive species in the project area and evaluating options to control their spread throughout the Project.

Recommendation: Include a commitment to implement specific measures, and under what conditions they’ll be implemented, to control the specified invasive species. This should be included in any requirements FERC implements during relicensing.

- SD1 states on page 9 that I&M plans to continue to evaluate options to control invasive plant species in the project. The PAD describes more specifically that invasive species within in the Project boundary are purple loosestrife and Eurasian watermilfoil. The current license requires annual surveys for invasive species within the reservoir. During the August 28, 2018, public meeting, there was a brief discussion that there is public concern on two additional species, frogbit and Japanese knotweed.

Recommendation: The forthcoming EA should discuss the concerns associated with frogbit and Japanese knotweed, including whether or not they are present within the

Project area, and if they are being monitored/controlled. If they are present but not being currently monitoring/controlled, a discussion on whether or not they will be under conditions of the new license should be included in the EA.

AQUATIC RESOURCES

- Continuing to operate the Project in a run-of-river mode helps to maintain stable flows and water surface levels both downstream of the project and in the upstream reservoir. Maintaining relatively stable conditions protects fish and other aquatic organisms that rely on nearshore habitat for feeding, spawning, and cover.

Recommendations: The forthcoming EA should discuss whether the Constantine project has experienced difficulty maintaining the run-of-river mode of operation due to hydraulic capacity differences between turbines, resulting in downstream water surface level fluctuations. If this is the case, EPA recommends a Run-of-River Plan be drafted to ensure the project operates as run-of-river. Additionally, if downstream water surface level fluctuations are experienced, the forthcoming EA should discuss whether refurbishment of any of the turbines would allow lower flows to pass, thus maintaining water levels downstream.

- The PAD on page 6-4 states, “*In addition to baseline fisheries surveys, I&M proposes to conduct a mussel assessment to identify any mussel populations that may be present within the Project area. I&M anticipates that a summer mussel assessment will be conducted at two locations downstream from the Constantine dam and at three locations in the Project’s reservoir, with specific locations to be identified in consultation with resource agencies and stakeholders.*” EPA anticipates that such mussel assessment surveys will be conducted using USFWS protocols⁶.

Recommendations: If mussels are located within the project area⁷, an effects analysis and consideration of whether measures are available to minimize impacts should be included in the forthcoming EA. Coordination measures with USFWS and MDNR should also be discussed in the forthcoming EA.

- Section 9.0 of SD1 specifies a preliminary list of noted federal and state comprehensive plans for improving, developing, or conserving a waterway or waterways affected by the project

Recommendation: Utilize the most recent version of comprehensive plans available, rather than only those currently on file with FERC, will be used to evaluate whether the proposed project/relicense is consistent with Federal and/or state comprehensive plans.

⁶ Michigan Freshwater Mussel Survey Protocols and Relocation Procedures, 2018 is available at <https://www.fws.gov/midwest/eastlansing/te/pdf/MIFreshwaterMusselSurveyProtocolsRelocationProceduresFeb2018.pdf>

⁷ EPA recommends the project area be revised to include the area downriver of the dam in order to fully consider potential impacts to water quality, aquatic species, and other downstream resources.

CLIMATE ADAPTATION

- SD1 explains that FERC may issue licenses for terms ranging from 30 to 50 years for non-federal hydroelectric projects. The National Climate Assessment⁸ finds that in the Midwest, extreme heat, heavy downpours, and flooding will affect infrastructure.

Recommendation: FERC should consider the current condition and expected integrity of the project's physical infrastructure over the life of the new license. The forthcoming EA should include a discussion of reasonably foreseeable effects that changes in the climate may have on the proposed project and the project area, including its long-term infrastructure. This could help inform the development of measures to improve the resilience of the proposed project. If projected changes could notably exacerbate the environmental impacts of the project, EPA recommends these impacts also be considered as part of the NEPA analysis.

DOCUMENT CLARIFICATIONS

- During the August 28, 2018, project site visit and public meeting, FERC representatives stated that FERC is proposing removal of acreage from within the project area. However, a proposal to remove any lands, or reference to any specific boundaries of lands to be removed from the project area, was not identified or discussed in Scoping Document 1.

Recommendation: The removal of areas from the project boundary should be clarified and discussed in publication of a Scoping Document 2 (SD2). SD2 could then account for the other comments noted above by EPA.

- Section 3.2.2 of SD1 states, "*The potential need for additional protection, mitigation, and enhancement (PM&E) measures will be evaluated during the relicensing process.*"

Recommendation: A list of the specific state and/or Federal agencies with which FERC or the applicant will discuss the need for new measures should be included in SD2 and the forthcoming EA. SD2 and the EA should also provide discussion of any measures suggested by agencies that FERC chooses to not incorporate in the draft license, including the reasons why such measures are not included as PM&E measures.

⁸ The U.S. Global Change Research Program's National Climate Assessment is available at: <https://www.globalchange.gov/browse/reports>



Friends of the St. Joe River Association, Inc.

P.O. Box 1794
South Bend, Indiana 46634
www.fotsjr.org

Established 1994
501(c)(3) Not-for-Profit

September 27, 2018

Secretary
Federal Energy Regulatory Commission
888 First Street N.E.
Washington, D.C. 20426

Re: Constantine Project (P-10661-050); Scoping Meeting Comments

Dear Secretary:


The Friends of the St. Joe River Association, Inc. (FotSJR) is a non-profit citizen-based organization working to protect the health of the St. Joseph River Watershed of Lake Michigan through education, advocacy, and scientific study. Its purpose is to support issues that pertain to the welfare of the St. Joseph River in general, including acting as the primary planning partner and advocacy group for implementation of the [St. Joseph River Watershed Management Plan](#) (link to this plan is: www.fotsjr.org/resources/documents/stjoeriverwmp.pdf).

The FotSJR (see www.fotsjr.org) raised an issue at the FERC scoping meeting on August 28, 2018 pertaining to the invasive species initiative currently being addressed by Cooperative Invasive Species Management Area (CISMA) coalition members. It was indicated at the scoping meeting that the Constantine Project Licensee (Indiana Michigan Power Company – American Electric Power) will be conducting invasive species monitoring efforts for purple loosestrife and Eurasian milfoil as part of the new FERC license now under consideration for this Project.

Therefore, the FotSJR is requesting that consideration should be made to utilize the Midwest Invasive Species Information Network (MISIN) as developed by Michigan State University (see www.misin.msu.edu) for use in the Midwest. The MISIN provides an avenue in which new invasive species can be reported and allows Michigan regulatory agencies that monitor this network to review and investigate any identified species as registered into the network. By downloading the app that is already available for mobile devices (search for “MISIN” in an appropriate App Store site), an electronic report can be developed for any sightings during the normal purple loosestrife and Eurasian milfoil monitoring events by the licensee (or its environmental contractor).

The mission of the FotSJR is to unite a diverse group of stakeholders in a collaborative effort to protect, restore and foster stewardship of the watershed. The environmental and economic impact of new and existing invasive species are detrimental to the entire watershed. The recommended use of the MISIN reporting app in particular is critical to prevent the further influx of invasive species into the St. Joseph River Watershed.

Sincerely,


Jeffery N. Reece
President

“A Bi-State Organization for Watershed-Wide Improvement & Protection”



RICK SNYDER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
LANSING



KEITH CREAGH
DIRECTOR

October 2, 2018

Ms. Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

**RE: COMMENTS ON SCOPING DOCUMENT 1 FOR THE CONSTANTINE HYDROELECTRIC PROJECT
(FERC NO. 10661) ON THE SAINT JOSEPH RIVER, MICHIGAN**

Dear Ms. Bose,

The Michigan Department of Natural Resources (Department) has reviewed the Scoping Document 1 for the Constantine Project on the Saint Joseph River, Michigan. Staff also participated in the Scoping Meetings held in Constantine Michigan. After reviewing the Scoping Document, we have the following comments:

Geology and Soils

The Department concurs with the applicant's intention to conduct an erosion\shoreline instability survey of the shoreline within the project boundaries. We also concur that an appropriate scoring mechanism should be developed to prioritize any remediation that may be required.

Aquatic Resources

The Department concurs with the applicant's intentions to conduct environmental studies. We have the following specific comments:

Temperature and Dissolved Oxygen Monitoring (DO) – We concur that studies involving temperature and DO should be conducted at the project. The Michigan Department of Environmental Quality (MDEQ) should be consulted regarding the appropriate methodology. At a minimum, the Department prefers to see hourly temperature data for a full year. DO should be monitored hourly between June 1 and September 30. This should provide a good picture of the temperature regime throughout the year and the DO levels at the most critical time of the year.

Sediment Contaminant Sampling – The Department concurs that sediment contaminant sampling should be conducted. The MDEQ should be consulted for the proper protocols and the number of samples necessary to properly assess the sediments in the impoundment.

Kimberly D. Bose, Secretary
Comments on Constantine Scoping Document

October 2, 2018
Page 2

Fisheries Survey – The Department concurs with fisheries surveys of the impoundment and bypass reach. We also believe that surveys should be conducted in the power canal as well. Fish located in the power canal are the most vulnerable to entrainment and impingement. Therefore an assessment of those fish is important to understanding potential impacts of the project on fish in the Saint Joseph River. A variety of techniques should be used, including trap or fyke netting, gill netting and electrofishing. A sufficient number of net nights should be included such that a good assessment could be made of the current community structure. This data can be compared to historical data on fishery resources to determine if any significant changes have occurred within the fisheries communities and if so, are those changes due to the project. We highly recommend that the applicant contact the Southern Lake Michigan Management Unit for further information on the appropriate level of effort for the fisheries survey (Appendix 1).

Fish Tissue Collection - The Department concurs with collecting fish tissue samples for contaminant analysis. The species mix and protocols should be determined in consultation with the MDEQ.

Mussel Survey – The Department concurs with the applicant conducting a mussel survey in the vicinity of the project. Department staff will assist the applicant in determining the appropriate locations for the sampling and provide assistance with the sampling protocols (Appendix 1). The assessment should include special emphasis on federally and state listed species that may be in the project vicinity. We recommend the applicant review the Department's new publication *Michigan Freshwater Mussel Survey Protocols and Relocation Procedures* released in February 2018.

Entrainment Study – The applicant did not propose an entrainment and impingement study. Work on fish entrainment was conducted during the previous licensing process. At this time, the Department can agree to wait on an entrainment evaluation pending whether or not any significant changes to the local fish community has occurred over the period of the current license. We do recommend that the approach velocities at the trash racks be revisited to determine that there have been no changes in the risk to fish entrainment or impingement since the last study.

Exotic and Invasive Species Inventory – The applicant should conduct inventories of exotic and invasive species within the project boundaries. The applicant has conducted many good surveys of purple loosestrife and Eurasian water milfoil. However, the number of notable invasive species has increased since the last licensing period. The survey should include, but not be limited to, purple loosestrife, Eurasian Watermilfoil, Starry Stonewort, Curly-Leaf Pond Weed, European Frogbit, and Phragmites. We are willing to work with the applicant to develop the list that will best characterize the extent of any populations of these species.

Fish Passage – While fish passage is currently not being called for, any license issued for this project should contain a reopener clause for fish passage. If the need to include fish passage at the project is necessary in the future, that option should be available.

Kimberly D. Bose, Secretary
Comments on Constantine Scoping Document

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Terrestrial Resources

The Department concurs with the applicants plan to conduct a desktop analysis of the wetland resources within the project boundaries with field verification to ground truth the results of the study.

Recreation and Land Use

The Department concurs with the proposed assessment of the recreational facilities associated with the project to identify use and any improvements to the current facilities. We also request that the applicant evaluate the potential to take over some facilities currently available to the public but not currently operated by the applicant. As an example, the tail water boat launch operated by the City of Constantine provides access to river below the project for boaters. If that should be closed for some unforeseen reason, the applicant should have a contingency plan to provide a similar type facility. In addition, the need for access to the upper impoundment needs to be reviewed. A preliminary review suggests that access to the upper areas of the impoundment may be minimal. The Department also recommends improved signage at the kayak/canoe portage. From the site visit in August 2018, it was evident that the public are entering the river upstream of the boat barrier below the spillway.

Cultural Resources

The Department concurs with the proposed plan for evaluation of cultural resources at the project. Final approval of any such plan must be received from the State Historic Preservation Officer.

The Department appreciates the opportunity to comment on the Scoping Document for the Constantine Project. If you have any questions or need clarification, please feel free to contact Kesiree Thiamkeelakul (517-284-6245) or me at:

MICHIGAN DEPARTMENT OF NATURAL RESOURCES
MIO FIELD OFFICE
191 S MT TOM RD
MIO MI 48647

Sincerely,



Kyle Kruger
Senior Fisheries Biologist
Habitat Management Unit
FISHERIES DIVISION
(989) 826-3211 x 7073

Kimberly D. Bose, Secretary
Comments on Constantine Scoping Document

October 2, 2018
Page 4

cc Jonathan Magalski, AEP, Columbus, OH
Lee Emery, FERC, DC
Scott Hicks, USFWS, E. Lansing
Amira Oun, DEQ, Lansing
Brian Gunderman, Fisheries, Plainwell
Scott Hanshue, Fisheries, Plainwell
Kesiree Thiamkeelakul, Fisheries, Lansing

APPENDIX 1

For Fisheries Survey Specifications:

Brian Gunderman, Supervisor
Southern Lake Michigan Management Unit
Plainwell SCS
621 N. 10th
Plainwell, MI 49080
269-204-7009
GundermanB@michigan.gov

For Mussel Survey Specifications:

Scott Hanshue
Fisheries Management Biologist
Southern Lake Michigan Management Unit
Plainwell SCS
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Plainwell, MI 49080
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HanshueS1@michigan.gov

Federal Energy
Regulatory Commission

P-10661-050

From: Kyle Boone
To: Michael Davis
Cc: Jennifer Kanine; Grant Poole
Subject: Comment Letter on Constantine Dam Relicensing
Date: Tuesday, October 02, 2018 4:50:54 PM
Attachments: image001.png
Constantine Dam Project Comment Letter 10 2 18.pdf

2018 OCT -3 PM 3:40

Mr. Davis,

OFFICE OF THE SECRETARY

My name is Kyle Boone and I am the Environmental Specialist for the Pokagon Band of Potawatomi, Department of Natural Resources. Attached is our comment letter in regards to the Constantine dam relicensing. Please let me know if you have any questions, concerns, or if the letter needs to also be submitted elsewhere.

Migweth (Thank you),
Kyle

Kyle Boone
Environmental Specialist, Department of Natural Resources

Pokégnek Bodéwadmik
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October 2, 2018

Michael Davis
Federal Energy Regulatory Commission
888 First St NE,
Washington, District of Columbia 20426

Re: Study Requests for Constantine Dam Project

Dear Mr. Davis,

I am writing on behalf of the Pokagon Band of Potawatomi Indians ("Pokagon Band") Department of Natural Resources (PBDNR) in response to the August 1, 2018 Federal Register (FR), Notice of Intent (NOI) advising that an Environmental Assessment (EA) will be prepared for the Constantine Hydroelectric Project ("Project"). The Project will be completed in St. Joseph County, Michigan. The existing dam is on the St. Joseph River at the Village of Constantine at approximately river mile 101.4. Currently, the Project is operated by Indiana Michigan Power Company (I&M) in a run-of-river manner. The upstream reservoir created by the dam is approximately six miles long and 525 acres at normal maximum surface area.

The Pokagon Band is a federally recognized tribe located in southwestern Michigan and northwestern Indiana with approximately 5,600 enrolled citizens. The Pokagon Band has a federally mandated 10 county service area which is comprised of 4 counties in Michigan and 6 counties in Indiana. St. Joseph County, Michigan is adjacent to the Pokagon Band's service area. Historically, the Pokagon Band resided in the St. Joseph River Valley and was part of the larger Potawatomi Nation which occurred throughout southern Michigan, northern Indiana, northern Illinois, and eastern Wisconsin. The restoration and protection of the St. Joseph River Valley and its connecting tributaries for the next seven generations are a high priority for PBDNR. PBDNR also supports the efforts of the Nottawaseppi Huron Band of the Potawatomi ("Nottawaseppi Band") in their efforts to do the same.

PBDNR offers the following comments for your consideration as the Project, and specifically, the EA move forward.

Cultural Resource Preservation

PBDNR recommends that FERC and I&M consult with both the Pokagon Band and Nottawaseppi Band Tribal Historic Preservation Offices (THPO). The historic

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and current presence of tribes within the area present the possibility that cultural resources could be affected by current and future operations of the Project. The THPO is the most knowledgeable source on the locations of historic villages and cultural resources, as well as many other topics relating to historic and current tribal culture within their respective Bands. As such, both THPO offices should be consulted as early as possible in the EA process to identify any cultural resources that currently are or could be impacted from the operation of the existing dam at Constantine.

Furthermore, PBDNR recommends that the area within the scope of the EA be investigated for historic and current wild rice beds. Wild rice (*Zizania palustris var palustris*, *Zizania palustris var interior*, and *Zizania aquatica*) is a central part to Potawatomi culture. In fact, the migration story of the Potawatomi references that the Potawatomi were to move to "the place where food grows on water," which is a reference to wild rice. PBDNR recommends that FERC and I&M consult with both the Pokagon Band and Nottawaseppi Band THPO as well as the Michigan Wild Rice Initiative to identify if any historic and/or current wild rice beds are within the area where the EA is being completed. If it is determined that wild rice beds are or were in the area, PBDNR recommends that sediment cores be taken and examined for the presence of seeds in the seed bank and potentially the presence of wild rice phytoliths if seeds are too degraded to recognize.

Examination of Current Pollutant Loading

Land use within the St. Joseph Watershed is predominantly agricultural. As such, non-point source (NPS) pollution is a concern within the St. Joseph River. Currently, it is not fully understood how much pollution from NPS is entering the Project or how NPS pollution is affecting the Project, the longevity of the dam itself, or water quality in the reservoir. PBDNR recommends that FERC and I&M conduct a study that estimates the amount of NPS pollution (e.g. sediment, nutrients) the Project is receiving from upstream sources. PBDNR also recommends that FERC and I&M study how those pollutants are affecting project operations and longevity.

Fish Entrainment and Migration

The Pre-Application Document (PAD) states that I&M conducted a study on fish entrainment and mortality in 1988. This study found that fish entrainment and mortality at the Project was insignificant. Given that there have been no significant changes to operations at the Project, I&M does not appear to be planning a follow up study for the relicensing of the Project. PBDNR recommends that FERC and I&M consult with United States Fish and Wildlife (USFWS) and Michigan Department of

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Natural Resources (MDNR) on possible fish entrainment and mortality caused by the operations of the Project. Furthermore, PBDNR also recommends that the above parties conduct a study on fish migration in the St Joseph River. PBDNR also recommends that an additional study be done on potential structural modifications, possibly including the installation of a fish ladder to aid in fish migration, and/or operations of the Project to reduce its impact on fishes.

Thank you for the opportunity to comment. If you have any questions or concerns please contact Jennifer Kanine, Pokagon Band Department of Natural Resources Director, at 269-782-9602 or Jennifer.Kanine@PokagonBand-nsn.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "Jennifer Kanine".

Jennifer Kanine, PhD. AWB®
Director, Department of Natural Resources
Pokagon Band of Potawatomi Indians
Jennifer.Kanine@PokagonBand-nsn.gov
Office: 269-782-9602
Desk: 269-462-4214
Cell: 269-783-9749

A handwritten signature in black ink, appearing to read "Kyle Boone".

Kyle Boone, MS
Environmental Quality Specialist
Pokagon Band of Potawatomi Indians
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Desk: 269-782-4880

Appendix B. Previous Cultural Study Reports (Filed as Privileged)

Appendix B contains sensitive information related to archaeological and historic resources; therefore, pursuant to 18 C.F.R. §388.112(b), I&M accordingly requests designation and special treatment as Privileged material.

Appendix C. Standard Operating Procedure for Assessing Bank Erosion Potential

STANDARD OPERATING PROCEDURE

ASSESSING BANK EROSION POTENTIAL USING ROSGEN'S BANK EROSION HAZARD INDEX (BEHI)

1.0 Overview

While stream bank erosion is a natural process that occurs in every watershed, excessive erosion has serious adverse consequences for the physical and biological function of rivers. Eroding stream banks can be a major source of sediment to a stream (up to 80% of the annual load; Simon and Thorne, 1996), and human activities such as urbanization or dam construction can accelerate bank erosion rates by more than an order of magnitude. It is often difficult, however, to distinguish between stream banks that are eroding at a natural rate from those that are or have the potential to erode at unnaturally high rates due to altered watershed hydrology or sediment loads. The Bank Erosion Hazard Index (BEHI), created by Dave Rosgen of Wildland Hydrology, Inc. (Rosgen, 2001), is one of several procedures for assessing stream bank erosion condition and potential. It assigns point values to several aspects of bank condition and provides an overall score that can be used to inventory stream bank condition over large areas, prioritize eroding banks for remedial actions, etc. This standard operating procedure (SOP) describes two versions of the BEHI technique.

2.0 Procedure

Below are descriptions of two BEHI procedures. The first describes the complete BEHI procedure created by Rosgen, including identification of bankfull width. The second describes a modified BEHI procedure, which does not require identification of bankfull width. The modified BEHI procedure is intended for use by workers who lack experience in identifying bankfull indicators, including volunteer monitors. Correctly identifying appropriate bankfull indicators requires considerable experience, and is the most subjective step in the original BEHI procedure.

In truth, both procedures described below are 'modified', in that the step of calculating BEHI scores has been simplified such that there is only a single score for each metric, rather than the range of possible scores provided in Rosgen's original paper. This simplification is intended to remove some unnecessary subjectivity from the field observations, without overly reducing the utility of the procedure.

A. Complete BEHI Procedure

The complete BEHI procedure consists of five metrics; four observational and one requiring some measurements. They are:

1. Ratio of bank height to bankfull height
2. Ratio of root depth to bank height

3. Root density, in percent
4. Bank angle, in degrees
5. Surface protection, in percent

Brief descriptions of each metric are provided below.

Point values for these metrics (Table 1) should only be assigned after a sufficient length of the stream channel (the ‘stream reach’) has been examined (at least 100’; 2 to 3 meander lengths is preferable), so that representative conditions are identified. Conditions on both banks should be assessed, and scored separately if they are consistently different. See Section 4 for further advice on where to make – and not make – the observations.

Ratio of bank height to bankfull height. This is the most challenging of the BEHI metrics, as it requires accurate identification of bankfull indicators. A full discussion of different bankfull indicators is beyond the scope of this SOP, but it is thoroughly discussed in Williams (1978), and a useful free video is available from the U.S. Forest Service (2003). Common bankfull indicators in stable southern Michigan streams include top of bank, top of point bars, and other changes in channel slope. Vegetative indicators are seldom useful in southern Michigan streams. Bankfull indicators in unstable streams (i.e., incising or aggrading streams) can be more difficult to identify, but are usually less than top of bank.

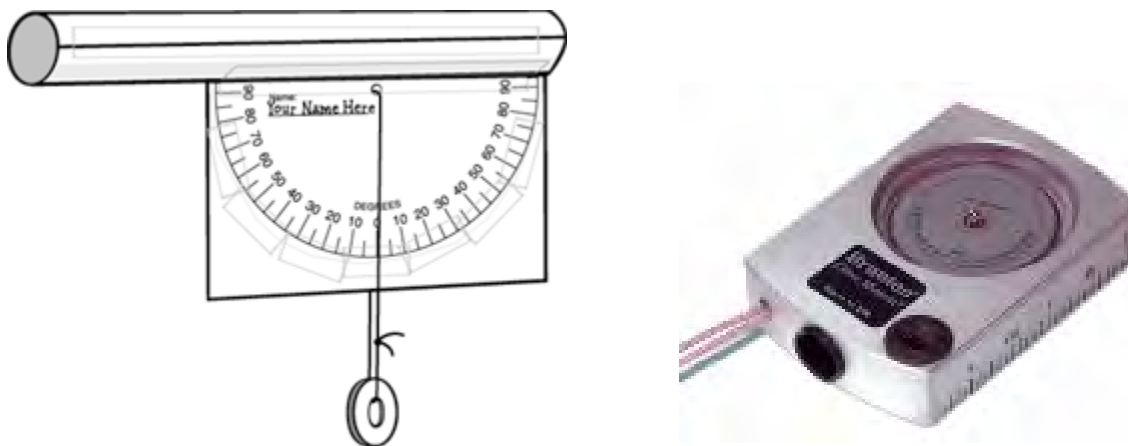
Ratio of root depth to bank height. Root depth is the ratio of the average plant root depth to the bank height, expressed as a percent (e.g., roots extending 2’ into a 4’ tall bank = 0.50.)

Root density. Root density, expressed as a percent, is the proportion of the stream bank surface covered (and protected) by plant roots (e.g., a bank whose slope is half covered with roots = 50%).

Surface protection. Surface protection is the percentage of the stream bank covered (and therefore protected) by plant roots, downed logs and branches, rocks, etc. In many streams in southern Michigan, surface protection and root density are synonymous.

Bank angle. Bank angle is the angle of the “lower bank” – the bank from the waterline at base flow to the top of the bank, as opposed to benches that are higher on the floodplain. Bank angles great than 90° occur on undercut banks. Bank angle can be measured with an inclinometer (Figure 1), though given the broad bank angle categories (Table 1), visual estimates are generally sufficient. Bank angle is perhaps the metric most often estimated incorrectly.

Figure 1. Simple and More Expensive (~ \$100) Inclinometers



B. Modified BEHI Procedure

If the field staff lack experience with identifying bank full indicators, it is recommended that the bank height/bankfull height ratio metric be dropped from the BEHI calculation, leaving four metrics:

1. Ratio of root depth to bank height
2. Root density, in percent
3. Surface protection, in percent
4. Bank angle, in degrees

Observations for these metrics are made as described in Section 2A, and the overall BEHI score is calculated using Table 2.

3.0 Data Calculation and Interpretation

A draft field sheet for recording observations for the modified BEHI procedure is in Appendix 1. Overall scores for the Complete BEHI are calculated by summing the scores for each individual metric using the values in Table 1, and scores for the Modified BEHI are similarly calculated using the values in Table 2. The overall BEHI score corresponds to an erosion hazard category. It should be noted that the overall BEHI scores and categories were created by Rosgen's work in the Rocky Mountain states, and in the future these may be modified for conditions in Michigan. Illustrated examples from southern Michigan streams are in Appendix 2.

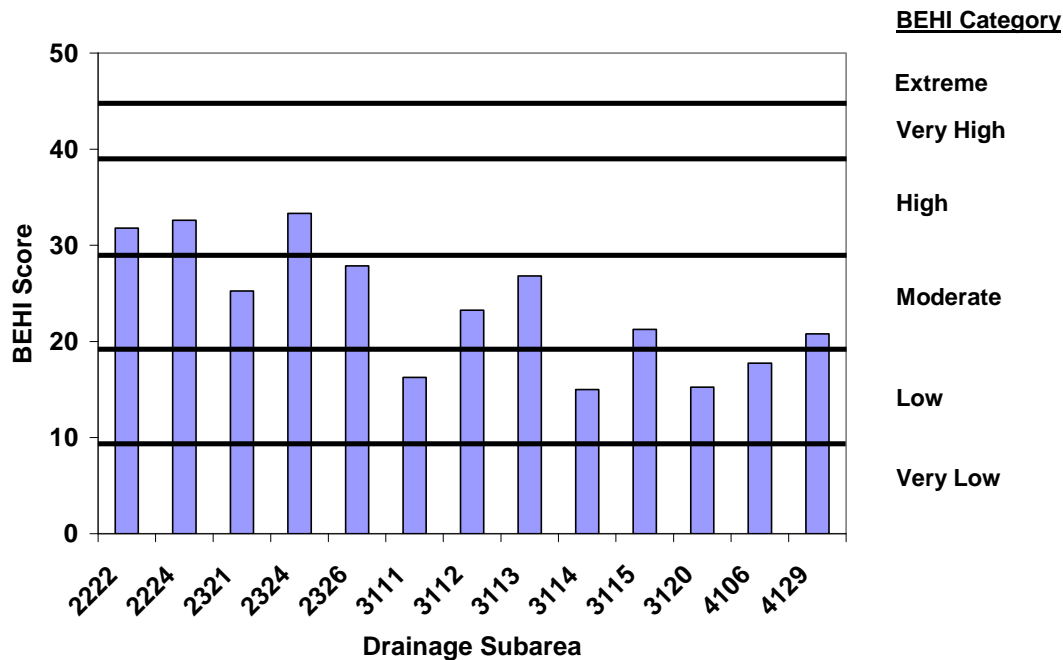
BEHI scores have several potential uses, including ranking multiple stations for further study or remedial actions (Figure 2).

Table 1. Scores for the Complete BEHI.

BEHI Category	Bank Height/ Bankfull Height	BH/BFH Score	Root Depth (% of BFH)	Root Depth Score	Root Density (%)	Root Density Score	Surface Protection (Avg. %)	Surface Protection Score	Bank Angle (degrees)	Bank Angle Score	Total Score, by Category
Very low	1.0-1.1	1.45	90-100	1.45	80-100	1.45	80-100	1.45	0-20	1.45	≤ 7.25
Low	1.11-1.19	2.95	50-89	2.95	55-79	2.95	55-79	2.95	21-60	2.95	7.26 – 14.75
Moderate	1.2-1.5	4.95	30-49	4.95	30-54	4.95	30-54	4.95	61-80	4.95	14.76 – 24.75
High	1.6-2.0	6.95	15-29	6.95	15-29	6.95	15-29	6.95	81-90	6.95	24.76 – 34.75
Very high	2.1-2.8	8.5	5-14	8.5	5-14	8.5	10-14	8.5	91-119	8.5	34.76 – 42.50
Extreme	>2.8	10	< 5	10	< 5	10	< 10	10	> 119	10	42.51 - 50

Table 2. Scores for the Modified BEHI.

BEHI Category	Root Depth Values	Root Depth Scores	Root Density (%)	Root Density Scores	Surface Protection (Avg. %)	Surface Protection Scores	Bank Angle (degrees)	Bank Angle Scores	Total Score, by Category
Very low	90-100	1.45	80-100	1.45	80-100	1.45	0-20	1.45	≤ 5.8
Low	50-89	2.95	55-79	2.95	55-79	2.95	21-60	2.95	5.8 – 11.8
Moderate	30-49	4.95	30-54	4.95	30-54	4.95	61-80	4.95	11.9 – 19.8
High	15-29	6.95	15-29	6.95	15-29	6.95	81-90	6.95	19.9 – 27.8
Very high	5-14	8.5	5-14	8.5	10-14	8.5	91-119	8.5	27.9 – 34.0
Extreme	< 5	10	< 5	10	< 10	10	> 119	10	34.1 - 40

Figure 2. BEHI Score Example**Selected BEHI Results - Rouge River****4.0 Quality Control Issues**

(1) Accuracy: Accuracy as traditionally defined is difficult to assess for this largely subjective, observational procedure. When performed by volunteers, however, the accuracy of their observations can be maximized by training from others more experienced in river morphology studies, and verified by spot-checks of their work by the trainers.

(2) Precision: Precision as traditionally defined is also difficult to assess for this largely subjective, observational procedure. Spot-checks within a few weeks of volunteer observations can be used to assess precision as well as accuracy.

(3) Reference reaches: In addition to the erosion hazard categories generated by this procedure, it can also be useful to make these observations at reference reaches – stream reaches in portions of the same watershed, or an adjacent watershed, that are believed to be (relatively) undisturbed by urban development, stream channelization, etc. A good document describing how to choose and document conditions at a reference site is the U.S. Forest Service report by Harrelson, et al. (1994). Alternatively, contact the author of this SOP for advice on selecting a representative reference reach. In general, reference reaches are best established in the same watershed as the stream reach of interest, in a stream of the same size (e.g., same stream order, or baseflow wetted width) and with similar soil type and channel slope.

(4) Stream reach selection (Representativeness): Selection of specific stream reaches for BEHI observations will depend on the objectives of the study, but a few general rules apply:

- Stream bank conditions are naturally variable even in stable streams, and to characterize a stream reach it is recommended that at least 200' of the stream reach be viewed before the BEHI observations are made.
- Stream banks adjacent to riffle areas tend to be the most stable section of a stream channel, while banks in meander bends tend to have the highest erosion rates – even in geomorphically stable streams.
- Stream banks in ‘high traffic’ areas (parks, livestock crossings, etc.) are not representative of average conditions and should be avoided – unless they are the specific focus of the study.

While volunteers can collect large amounts of useful BEHI data with adequate training and supervision, experience has shown that they are prone to overemphasizing small, atypical bank erosion “hot spots,” even when asked to score more representative banks.

5.0 References

Harrelson C. C., Rawlins, C. L. and Potyondy J. P. 1994. Stream Channel Reference Sites: An Illustrated Guide to Field Technique, General Technical Report RM-245, USDA - Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado, 61 pages. Available from:
<http://www.stream.fs.fed.us/publications/documentsStream.html>

Rosgen, D.L. 2001. A Practical Method of Computing Streambank Erosion Rate. Proceedings of the Seventh Federal Interagency Sedimentation Conference, Vol. 2, pp. II - 9-15, March 25-29, 2001, Reno, NV. Available on the Wildland Hydrology website:
http://www.wildlandhydrology.com/html/references_.html

Simon, A., and C. Thorne. 1996. Channel Adjustment of an Unstable Coarse-Grained Alluvial Stream: Opposing Trends of Boundary and Critical Shear Stress, and the Applicability of Extremal Hypothesis. *Earth Surface Processes and Landforms* 21:155-180.

U.S. Forest Service. 2003. Identifying Bankfull Stage in Forested Streams in the Eastern United States. Free from: <http://www.stream.fs.fed.us/publications/videos.html>

Williams, G.P. 1978. Bank-Full Discharge of Rivers. *Water Resources Research* 14(6):1141-1154.

SOP Prepared by:

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C:\Users\rscida\Documents\Office\TEMP\Quiggle, Rob\Constantine PSP\Appendix C - SOP for Assessing Bank Erosion Potential.doc
Version 3; 8/12/08

Modified Bank Erosion Hazard Index (BEHI) Field Form

Date: _____ Personnel: _____

Location: _____

(Circle one in each column)

Root Depth (% of BH)	Root Density (%)	Surface Protection (Avg. %)	Bank Angle (degrees)
90-100	80-100	80-100	0-20
50-89	55-79	55-79	21-60
30-49	30-54	30-54	61-80
15-29	15-29	15-29	81-90
5-14	5-14	10-14	91-119
< 5	< 5	< 10	> 119

Comments: _____

Date: _____ Personnel: _____

Location: _____

(Circle one in each column)

Root Depth (% of BH)	Root Density (%)	Surface Protection (Avg. %)	Bank Angle (degrees)
90-100	80-100	80-100	0-20
50-89	55-79	55-79	21-60
30-49	30-54	30-54	61-80
15-29	15-29	15-29	81-90
5-14	5-14	10-14	91-119
< 5	< 5	< 10	> 119

Comments: _____

Date: _____ Personnel: _____

Location: _____

(Circle one in each column)

Root Depth (% of BH)	Root Density (%)	Surface Protection (Avg. %)	Bank Angle (degrees)
90-100	80-100	80-100	0-20
50-89	55-79	55-79	21-60
30-49	30-54	30-54	61-80
15-29	15-29	15-29	81-90
5-14	5-14	10-14	91-119
< 5	< 5	< 10	> 119

Comments: _____

Appendix 2. Examples of Different Bank Conditions in Southern Michigan Streams

Figure A. Tributary, Kalamazoo River watershed



Bank Height/Bankfull Height \approx 1.0-1.1

Root Depth/Bank Height \approx 0.9-1.0

Root Density \approx 80-100%

Bank Angle \approx 0-20° ?

Surface Protection \approx 80-100%

BEHI Score = 7.25 (Very low)

Figure B. Kalamazoo River



Bank Height/Bankfull Height \approx 1.0-1.1

Root Depth/Bank Height \approx 0.9-1.0

Root Density \approx 30-54%, not counting sod slump

Bank Angle \approx 81-90°

Surface Protection \approx 30-54%

BEHI Score = 19.75 (Moderate)

Note sod slumping into channel – a sure indication of an unstable bank, presumably because streamside vegetation = mowed grass, not woody vegetation. Otherwise the channel is in pretty good shape.

Figure C. Rouge River



**Bank Height/Bankfull Height $\approx 1.0-1.1$
(assuming top of bank = bankfull)**

Root Depth/Bank Height $\approx 0.9-1.0$

Root Density $\approx 5-14\%$

Bank Angle $\approx 81-90^\circ$

Surface Protection $\approx 10-14\%$

BEHI Score = 26.85 (High)

Interesting site – roots extend to waterline, but are so few that they provide minimal bank protection. Also, this site is downstream from a dam, where erosion is usually atypically high due to “hungry water” created by the impoundment.

Figure D. Hagar Creek , Ottawa County



Bank Height/Bankfull Height $\approx > 2.8$

Root Depth/Bank Height $\approx 0.3-0.49$ at best

Root Density $\approx 5-14\%$

Bank Angle $\approx 81-90^\circ$

Surface Protection $\approx 10-14\%$

BEHI Score = 38.9 (Very high)

Appendix D. Recreation Facility Inventory and Condition Assessment Form

**RECREATION FACILITY INVENTORY AND CONDITION ASSESSMENT
Constantine Hydroelectric Project (FERC No. 10661)**

Location:	
Date:	Surveyor:
Photo Number(s):	

Type of Amenity	#	ADA	Condition	Notes
Boat Launch Ramp/Lane			N / R / M / G	
Fishing Platform			N / R / M / G	
Portage (put-in/take-out)			N / R / M / G	
Portage Trail/Walking Trail (include length and footing materials)			N / R / M / G	
Picnic Table			N / R / M / G	
Restroom			N / R / M / G	
Trash Receptacles			N / R / M / G	
Other			N / R / M / G	

PARKING	Total Spaces: _____	Standard: _____	ADA: _____	Double (trailer): _____	Other: _____	Condition
	Surface Type: _____	Asphalt	Concrete	Gravel	Other: _____	N / R / M / G

Signs	#	Size	Material	Condition	Comments
FERC Project			wood / metal / other	N / R / M / G	
Facility ID			wood / metal / other	N / R / M / G	
Regulations			wood / metal / other	N / R / M / G	
Directional			wood / metal / other	N / R / M / G	
Interpretive			wood / metal / other	N / R / M / G	

N - Needs replacement (broken or missing components, or non-functional)
 R - Needs repair (structural damage or otherwise in obvious disrepair)
 M - Needs maintenance (ongoing maintenance issue, primarily cleaning)
 G - Good condition (functional and well-maintained)
 If a facility is given a rating of "N", "R", or "M", provide specific details.

ADDITIONAL COMMENTS/NOTES:

Note the age of the facilities (if known) as well as any signs of overuse.

Appendix E. Recreation Visitor Use Survey Questionnaire

ON-SITE/IN-PERSON RECREATION INTERVIEW
Constantine Hydroelectric Project (FERC No. 10661)
Recreation Site Survey Questionnaire

Indiana Michigan Power Company (I&M) is the licensee, owner, and operator of the 1.2 megawatt (MW) Constantine Hydroelectric Project (Project or Constantine Project) which is licensed by the Federal Energy Regulatory Commission (FERC). The three FERC-approved recreation facilities associated with the Project are located immediately upstream and downstream of the Project. The current operating license for the Project was issued on October 20, 1993, and expires on September 30, 2023. I&M must file its application with FERC for a new license no later than September 30, 2021. As part of the relicensing process, I&M is conducting studies on environmental resources to enable FERC to prepare an environmental document. The purpose of this survey is to collect information about use of the Project's three FERC-approved recreation facilities.

Interview Location:	Constantine Boat Launch <input type="checkbox"/> Constantine Tailwater Fishing Access <input type="checkbox"/> Constantine Portage and Reservoir Fishing Access <input type="checkbox"/> Riverview Park <input type="checkbox"/> Riverview Park Boat Launch <input type="checkbox"/> Shelby Park <input type="checkbox"/> American Legion Boat Launch <input type="checkbox"/> Other <input type="checkbox"/>		
Home Zip Code: _____	Date: _____		
Age: _____	Time: _____		
Are you:	Male <input type="checkbox"/>	Female <input type="checkbox"/>	Prefer not to answer <input type="checkbox"/>
Interviewer: _____			

Q-1. Regarding the Constantine Project area, do you consider yourself: **(Please circle one)**

1. A regular visitor to this area (*3 or more times per year*)
2. An occasional visitor (*1-2 times per year*)
3. An infrequent visitor (*Less than 1 time per year*)
4. This is my first visit

Q-2. On this trip to the Constantine Project area, when did you arrive?

Arrival Date	Arrival Time
____/____/____	_____AM/PM

When do you expect to leave the Constantine Project area?

Departure Date	Departure Time
____/____/____	_____AM/PM

Q-3. During the last 12 months (including this trip), which month(s) did you visit the Constantine Project area?
(Please select all that apply)

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

- | | | |
|----------------------|-----------------|-----------------------------|
| 3. Pleasure boating | 7. Sight-seeing | 10. Other (please describe) |
| 4. Canoeing/kayaking | | |

Q-11. Of the activities you circled in Q-10 above, what is the primary activity that you participated in, or expect to participate in, on this visit? (Please write in the corresponding number **from above**)

A. Primary activity # _____

Q-12. If you specified that boating or fishing is the primary activity you participated in please rate the following:

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Safety	1	2	3	4	5
Enjoyment	1	2	3	4	5
Crowding	1	2	3	4	5
Overall Experience	1	2	3	4	5

Q-13. If you participated in recreational activities in the Constantine Project area today or in the past, please rate the following:

	Constantine Boat Launch	Constantine Tailrace Fishing Access	Constantine Portage and Reservoir Fishing Access	Riverview Park
Accessibility				
Parking				
Crowding				
Safety				
Condition of Recreation Facilities				
Available Facilities				
Overall Experience				

	Riverview Park Boat Launch	Shelby Park	American Legion Boat Launch	Other
Accessibility				
Parking				
Crowding				
Safety				
Condition of Recreation Facilities				
Available Facilities				
Overall Experience				

Q-14. Please tell us what type(s) of recreation enhancements you believe are needed and at what specific location(s) at the Constantine Project.

1. Type of recreation enhancement: _____

Location(s): _____

2. Type of recreation enhancement: _____

Location(s): _____

Q-15. Please share any other comments that you have regarding recreation near the Constantine Project: _____

Thank you for completing the Recreation Survey!

Appendix F. Michigan Archaeological Site Form



STATE SITE NO. _____

MICHIGAN ARCHAEOLOGICAL SITE FORM

SITE NAME:

OTHER NAMES OR NUMBERS:

SITE DESCRIPTION:

COUNTY:

TOWNSHIP NAME:

SITE ADDRESS (if applicable):

USGS 7.5 MIN. TOPOGRAPHIC QUADRANGLE
MAP NAME and DATE:

**Include map showing site location and boundaries when submitting site form*

TOWNSHIP/RANGE/SECTION (QUARTER-
SECTION)

UTM/LAT.-LONG. COORDINATES

UTM DATUM YEAR

UTM ZONE

DIRECTIONS FROM NEAREST STATE OR
COUNTY ROAD INTERSECTION:

NEAREST WATER SOURCE:

DISTANCE TO NEAREST WATER SOURCE (in
feet and meters):

SITE SIZE IN METERS AND FEET (length x
width x diameter):

FIELD EVIDENCE (surface scatter, stratification,
features, exposed by construction, etc.):

FIELDWORK (year, site visit/survey type/
excavation, institution, principal investigator):

SITE INTEGRITY OR CONDITION:

COLLECTIONS (private or institutional):

DIAGNOSTIC ARTIFACTS:

COMPONENTS (list period and site function for
each):

DATES (list radiocarbon dates with lab numbers and associations):

HUMAN REMAINS PRESENT?

IF YES, DETAILS:

OWNERSHIP (LIST NAME OF PERSON OR AGENCY):

NATIONAL REGISTER (NR) SIGNIFICANCE RECOMMENDATION:

Person making NR evaluation

Date of NR evaluation

EXPLANATION OF SIGNIFICANCE RECOMMENDATION:

APPEND A LIST OF REPORTS AND OTHER DOCUMENTATION ABOUT THE SITE, BOTH PUBLISHED AND UNPUBLISHED, INCLUDING PHOTOS, CORRESPONDENCE, NEWSPAPER ARTICLES, CRM REPORTS, JOURNAL ARTICLES, ETC.

COMMENTS:

RECORDED BY

NAME:

INSTITUTION/COMPANY:

DATE:

TO SUBMIT THIS FORM:

e-mail: Dr. Dean Anderson, State Archaeologist, andersond15@michigan.gov

Fax: (517) 335-0348

Mail: State Archaeologist, SHPO, Michigan State Housing Development Authority, P.O. Box 30740, Lansing, MI 48909 -8240.

FORM INSTRUCTIONS & INFORMATION

- 1) This form may be completed on your computer, tablet, or other device, or it may be printed as a blank form and completed by hand.
- 2) Date fields require a two-digit day and month and a four-digit year. For example, 01/01/2013.
- 3) Please attach additional sheets as necessary.

Hanson, Danielle

From: Quiggle, Robert
Sent: Friday, November 16, 2018 1:58 PM
To: Advisory Council on Historic Preservation; Cass County Conservation District; Forest County Potawatomi Community; Friends of the St. Joe River Association Inc.; John Bullard; Michigan Department of Environmental Quality; Michigan Department of Natural Resources; Michigan DNR; Michigan DNR; Michigan Hydropower Relicensing Coalition; Pokagon Band of Potawatomi Indians; St. Joseph River Basin Commission; US Department of the Interior; US Department of Agriculture; US Environmental Protection Agency; US Environmental Protection Agency; US Fish and Wildlife Service; USGS MI Water Science Center; USGS MI Water Science Center; Village of Constantine; Village of Constantine, Village Manager; Village of White Pigeon
Cc: Jonathan M Magalski; Elizabeth B Parcell; Hanson, Danielle
Subject: Constantine Hydroelectric Project (FERC No. 10661) -- Filing of Proposed Study Plan
Attachments: Constantine Project PSP Cover Letter 20181116.pdf

Constantine Hydroelectric Project Stakeholders:

Indiana Michigan Power Company (I&M), a unit of American Electric Power (AEP), is the licensee, owner and operator of the Constantine Hydroelectric Project (FERC No. 10661) (Project) located on the St. Joseph River in St. Joseph County, Michigan. The Project is operated under a license issued by the Federal Energy Regulatory Commission (FERC). The existing FERC license for the Project expires on September 30, 2023. I&M is pursuing a new license for the continued operation of the Project in accordance with FERC's Integrated Licensing Process (ILP). Pursuant to the ILP, I&M filed the Proposed Study Plan (PSP) for the Project on November 16, 2018. The PSP describes the studies that I&M is proposing to conduct in support of Project relicensing.

On behalf of I&M, we are notifying stakeholders of the availability of the PSP. For your convenience, a copy of the cover letter filed with the PSP is attached. Please note that, due to file size restrictions, the PSP has not been included in this email. I&M encourages stakeholders to view the filing online at FERC's eLibrary at http://elibrary.ferc.gov/idmws/file_list.asp?accession_num=20181116-5160. I&M will also be adding the PSP to the Project's public relicensing website (<http://www.aephydro.com/HydroPlant/Constantine>) in the coming days.

Should you have any questions regarding this filing, please contact Jon Magalski with AEP at (614) 716-2240 or jmmagalski@aep.com.

Thank you,

Robert Quiggle, RPA
Regulatory and Environmental Section Manager

HDR
1304 Buckley Road, Suite 202
Syracuse, New York 13212-4311
D 315.414.2216 M 724.989.1579
Robert.Quiggle@hdrinc.com

hdrinc.com/follow-us



Via Electronic Filing

November 16, 2018

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, D.C. 20426

**Subject: Constantine Hydroelectric Project (FERC No. 10661)
Filing of Proposed Study Plan for Relicensing Studies**

Dear Secretary Bose:

Indiana Michigan Power Company (I&M), a unit of American Electric Power (AEP), is the Licensee, owner, and operator of the run-of-river, 1,200-kilowatt (kW) Constantine Hydroelectric Project (Project) (FERC Project No. 10661), located on the St. Joseph River in the Village of Constantine in St. Joseph County, Michigan. The Federal Energy Regulatory Commission (FERC or Commission) issued an original license for the Project on October 20, 1993¹. The existing license expires on September 30, 2023. Accordingly, I&M is pursuing a new license for the Project pursuant to the Commission's Integrated Licensing Process (ILP), as described at 18 Code of Federal Regulations (CFR) Part 5. In accordance with 18 CFR §5.11 of the Commission's regulations, I&M is filing the Proposed Study Plan (PSP) with the Commission describing the studies that the Licensee is proposing to conduct in support of relicensing the Project.

I&M filed a Pre-Application Document and associated Notice of Intent with the Commission on June 4, 2018, to initiate the ILP. The Commission issued Scoping Document 1 (SD1) for the Project on July 25, 2018. SD1 was intended to advise resource agencies, Indian tribes, non-governmental organizations, and other stakeholders as to the proposed scope of FERC's Environmental Assessment (EA) for the Project and to seek additional information pertinent to the Commission's analysis.

On August 28 and 29, 2018, the Commission held public scoping meetings in Constantine, Michigan. During these meetings, FERC staff presented information regarding the ILP and details regarding the study scoping process and how to request a relicensing study, including the Commission's study criteria. In addition, FERC staff solicited comments regarding the scope of issues and analyses for the EA. Pursuant to 18 CFR §5.8(d), a public site visit of the Project was conducted on August 28, 2018.

Resource agencies, Indian tribes, and other interested parties were afforded a 60-day period to request studies and provide comments on the PAD and SD1. The comment period was initiated with the Commission's July 25, 2018 notice and concluded on October 2, 2018. During the

¹ Order Issuing License (Minor Project), 65 FERC ¶ 62,063 (1993)

comment period, a total of four stakeholders filed letters with the Commission providing general comments, comments regarding the PAD, comments regarding SD1, and/or study requests.

Proposed Study Plan

I&M has evaluated all the study requests and comments submitted by the stakeholders, with a focus on the requests that specifically addressed the seven criteria for study requests as set forth at 18 CFR §5.9(b) of the Commission's ILP regulations. For the study requests that did not address the seven study criteria, where appropriate, I&M considered the study in the context of providing the requested information in conjunction with one or more of I&M's proposed studies.

The purpose of the PSP is to present the studies that are being proposed by I&M and to address the comments and study requests submitted by resource agencies and other stakeholders. The PSP also provides FERC, regulatory agencies, Indian tribes, and other stakeholders with the methodology and details of I&M's proposed studies. At this time, I&M is proposing to conduct the following studies as described in detail in the PSP:

1. Botanical Resources Study;
2. Shoreline Stability Assessment;
3. Water Quality Study;
4. Fisheries Survey;
5. Mussel Survey;
6. Wetlands Study;
7. Recreation Study; and
8. Cultural Resources Study.

I&M is filing the PSP with the Commission electronically and is distributing this letter to the parties listed on the attached distribution list. For parties listed on the attached distribution list who have provided an email address, I&M is distributing this letter via email; otherwise, I&M is distributing this letter via U.S. mail. All parties interested in the relicensing process may obtain a copy of the PSP electronically through FERC's eLibrary system at <https://elibrary.ferc.gov/idmws/search/fercgensearch.asp> under docket number P-10661, or on I&M's website at www.aephydro.com/HydroPlant/Constantine. If any party would like to request a CD containing an electronic copy of the PSP, please contact Jonathan Magalski, Environmental Specialist Consultant, at the phone number or email address listed below.

Comments on the PSP, including any additional or revised study requests, must be filed within 90 days of the filing date of this PSP which is no later than February 14, 2019. Comments must include an explanation of any study plan concerns, and any accommodations reached with I&M regarding those concerns (18 CFR §5.12). Any proposed modifications to this PSP must address the Commission's criteria as presented in 18 CFR §5.9(b).

As necessary, after the comment period closes, I&M will prepare a Revised Study Plan (RSP) that will address interested parties' comments to the extent practicable. Pursuant to the ILP, I&M

will file the RSP with the Commission on or before March 16, 2019, and the Commission will issue a final Study Plan Determination by April 15, 2019.

Initial Proposed Study Plan Meeting

In accordance with 18 CFR §5.11(e) of the Commission's regulations, I&M intends to hold an initial Proposed Study Plan Meeting (PSP Meeting) to describe the background, concepts, and study methods described in the PSP. The PSP Meeting will begin at 9:00 AM on December 11, 2018 at the East Lansing Hannah Community Center located at 819 Abbot Road in East Lansing, Michigan.

To assist with meeting planning and logistics, I&M respectfully requests that individuals or organizations who plan to attend the meeting please RSVP by sending an email to me at jmmagalski@aep.com on or before November 30, 2018.

If there are any questions regarding the PSP or PSP Meeting, please do not hesitate to contact me at (614) 716-2240 or at the email address above.

Sincerely,



Jonathan M. Magalski
Environmental Specialist Consultant
American Electric Power Services Corporation, Environmental Services

Enclosures

**Constantine Hydroelectric Project
(FERC No. 10661)
Distribution List**

Federal Agencies

Mr. John Eddins
Office of Federal Agency Programs
Advisory Council on Historic Preservation
401 F Street NW, Suite 308
Washington, DC 20001-2637

Ms. Kimberly Bose
Secretary
Federal Energy Regulatory Commission
888 1st St NE
Washington, DC 20426

FEMA Region 5
536 South Clark Street, 6th Floor
Chicago, IL 60605

Mr. John Bullard
Regional Administrator
NOAA Fisheries Service
Greater Atlantic Regional Fisheries Office
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Mr. Martin J. Rosek
State Soil Scientist
US Department of Agriculture
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Ms. Mary Manydeeds
Bureau of Indian Affairs, Midwest Region
US Department of the Interior
Norman Pointe II Building
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Office of the Solicitor
US Department of the Interior
1849 C Street, NW
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Ms. Lindy Nelson
Regional Environmental Officer, Office of
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Ms. Liz Pelloso
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US Environmental Protection Agency
77 West Jackson Boulevard (E19-J)
Chicago, IL 60604

Mr. Ken Westlake
Chief, NEPA Implementation Section -
Region 5
US Environmental Protection Agency
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Mr. Jack Dingedine
Assistant Field Office Supervisor/Michigan
Ecological Services Field Office
US Fish and Wildlife Service
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Ms. Alisa Shull
Chief, Endangered Species - Midwest
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Mr. Derrick Hubbell
Michigan Water Science Center
US Geological Survey
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Lansing, MI 48911-5991

Mr. Tom Weaver
Michigan Water Science Center
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US Geological Survey
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US Congressman, 59th District
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Hon. Gary Peters
US Senate
Hart Senate Office Building
Washington, DC 20510

Hon. Debbie Stabenow
US Senate
713 Hart Senate Office Building
Washington, DC 20510-2204

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525 West Allegan Street
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Great Lakes Shorelands Unit - Water
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Kalamazoo District Office
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7953 Adobe Road
Kalamazoo, MI 49009-5025

Ms. Jessica Mistak
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PO Box 30028
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Mr. Kyle Kruger
Senior Fisheries Biologist
Michigan Department of Natural Resources
Mio Field Office
191 S. Mt. Tom Road
Mio, MI 48647

Ms. Kesiree Thiamkeelakul
Michigan Department of Natural Resources
Mio Field Office
191 S. Mt. Tom Road
Mio, MI 48647

Mr. Brian D. Conway
State Historic Preservation Officer,
Lansing Office
State Historic Preservation Office
735 East Michigan Avenue
PO Box 30044
Lansing, MI 48909

Local Governments

Ms. Korie Blyveis
District Manager
Cass County Conservation District
1127 East State St.
Cassopolis, MI 49031

Mr. Robert Hile
Mayor
City of Sturgis
130 North Nottawa
Sturgis, MI 49091

St. Joseph County
PO Box 189
Centreville, MI 49032

Ms. Carolyn Grace
Administrator
St. Joseph County Conservation District
693 E. Main Street
Centerville, MI 49032

Mr. Keith Shears
President
Town of Centreville
221 West Main
PO Box 399
Centreville, MI 49032

Mr. Mark R. Brown
Supervisor
Township of Constantine
425 Centreville Street
Constantine, MI 49042

Mr. George E. Morse
Supervisor
Township of Sturgis
70669 Stubey Road
Sturgis, MI 49091

Mr. Donald E. Gloy, Jr.
Supervisor
Township of White Pigeon
16825 Tomahawk Trail
White Pigeon, MI 49099

Mr. Gary Mathers
President
Village of Constantine
115 White Pigeon Street
Constantine, MI 49042

Mr. Tyler Royce
President
Village of White Pigeon
103 South Kalamazoo
PO Box 621
White Pigeon, MI 49099

Tribes

Mr. Michael LaRonge
Tribal Historic Preservation Officer
Forest County Potawatomi Community
5320 Wensaut Lane
PO Box 340
Crandon, WI 54520

Ms. Kelly Curran
Pokagon Band of Potawatomi Indians
58620 Sink Road
PO Box 180
Dowagiac, MI 49047

Nottawaseppi Huron Band of the
Potawatomi
1485 Mno-Bmadzewen Way
Fulton, MI 49052

Non-governmental Organizations

Friends of the St. Joe River Association, Inc.
PO Box 1794
South Bend, IN 46634

Mr. John Seebach
American Rivers
1104 14th St NW, Suite 1400
Washington, DC 20005

Mr. Kevin Richard Colburn
National Stewardship Director
American Whitewater
PO Box 1540
Cullowhee, NC 28779

Michigan Audubon Society
2311 Science Parkway, Suite 200
Okemos, MI 48864

Michigan Citizens for Water Conservation
PO Box 1
Mecosta, MI 49332

Michigan Environmental Council
602 West Ionia Street
Lansing, MI 48933

Mr. Bob Stuber
Fisheries Biologist
Michigan Hydropower Relicensing
Coalition
1620 High Street
Traverse City, MI 49684

Michigan Loon Preservation Association
10181 Sheridan Road
Millington, MI 48746

Michigan Nature Association
2310 Science Parkway, Suite 100
Okemos, MI 48864

Mr. Matt Meersman
Director
St. Joseph River Basin Commission
227 West Jefferson Boulevard
1120 County-City Boulevard
South Bend, IN 46601

Michael LaRonge, Crandon, WI.
December 11, 2018

Coleen Corballis
Midwest Branch
Division of Hydropower Licensing
Federal Energy Regulatory Commission
888 First Street N.E.
Washington D.C. 20426

Re: Project Number 10661-050-MI, Constantine Hydroelectric Project in
the Village of Constantine, St. Joseph County, Michigan.

Dear Ms. Corballis,

Pursuant to consultation under Section 106 of the National Historic Preservation Act (1966 as amended) the Forest County Potawatomi Community, a Federally Recognized Native American Tribe, reserves the right to comment on Federal undertakings, as defined under the act.

This response is regarding the project mention above. As noted in our previous submittal dated October 26, 2017 under docket #P-10661-000 "This hydroelectric project operates along the St. Joseph River a very significant location within the ancestral territory of the Potawatomi peoples. We therefore request the results of the Phase I archaeological survey and SHPO comments on the project." It appears the new scoping document from 2018 is looking to establish the project APE for all related field studies. In order to adequately determine the potential impact of hydro operations all archaeological sites abutting, or in the immediate proximity to, the project must have boundaries well defined by actual field survey, not relying solely on map locations based on finds reported to the State but never verified.

Your interest in protecting Michigan's cultural and historic properties is appreciated. If you have any questions or concerns, please contact me at the email or number listed below.

Respectfully,

Michael LaRonge
Tribal Historic Preservation Officer
Natural Resources Department
Forest County Potawatomi Community
5320 Wensaut Lane
P.O. Box 340
Crandon, Wisconsin 54520
Phone: 715-478-7354
Fax: 715-478-7225
Email: Michael.LaRonge@FCPotawatomi-nsn.gov



GRETCHEN WHITMER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
LANSING



DANIEL EICHINGER
DIRECTOR

January 9, 2019

Ms. Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

RE: Comments on Proposed Study Plan for Constantine Hydroelectric Project (FERC No. 10661) on the St. Joseph River, Michigan

Dear Ms. Bose,

The Michigan Department of Natural Resources (Department) has reviewed the Proposed Study Plan for the Constantine Project on the St. Joseph River, Michigan. Staff also participated in the Proposed Study Plan meeting held in East Lansing, Michigan on December 11, 2018. After reviewing the Proposed Study Plan, the Department has the following comments:

Botanical Resources Study

The Department agrees with applicant's intention to conduct a desktop review of vegetation within project boundaries (Task 1). We appreciate that the applicant has incorporated the species we requested into their initial plant list for the survey (Task 2), and we are willing to further assist with characterizing the extent of any populations of these species. We also agree with the applicant's intention to ground truth the desktop survey and document the presence of invasive species in the Midwest Invasive Species Information Network (MISIN) (Task 3).

Shoreline Stability Assessment Study

The Department agrees with the applicant's proposed shoreline stability assessment.

Water Quality Study

The Department agrees with the applicant's proposed water quality study.

Fisheries Survey

The Department concurs with the applicant's proposed fisheries survey. We recommend that the applicant contact Tom Goniea for a Scientific Collectors Permit to conduct the fisheries survey. If there is a need for a recreational nexus to justify fish tissue contaminant studies, we recommend the applicant reach out to Tracy Claramunt for catch-and-release versus harvest data in the project area. We also recommend the applicant review fish tissue data for the St. Joseph River posted by the Michigan Department of Health and Human Services' (DHHS) Eat Safe Fish Program. Questions about the Eat Safe Fish Program can be directed to Jennifer Gray. All contact information can be found in Appendix A.

Mussel Survey

The Department agrees with the applicant's proposed mussel survey. We recommend that the applicant contact Tom Goniea for a Scientific Collectors Permit to conduct the mussel survey. We also recommend the applicant refer to the Department's mussel survey protocol (Michigan Freshwater Mussel Survey Protocols and Relocation Procedures) and contact the Southern Lake Michigan Management Unit regarding survey design. Please be advised that in some areas of the reservoir, the use of scuba may be required.

Wetlands Survey

The Department concurs with the applicant's proposed wetland study.

Recreation Study

The Department concurs with the applicant's proposed recreation study.

Cultural Resources Study

The Department concurs with the applicant's proposed cultural resources study.

The Department appreciates the opportunity to comment on the Proposed Study Plan for the Constantine Project. If you have any questions, please contact Kyle Kruger (989-826-3211 x 7073) or me at:

Michigan Department of Natural Resources
Fisheries Division
Constitution Hall
PO Box 30446
Lansing, MI 48909

Best,



Kesiree Thiamkeelakul
Resource Analyst
Habitat Management Unit
Fisheries Division
517-284-6245
Thiamkeelakulk@michigan.gov

cc Jonathan Magalski, AEP, Columbus, OH
Lee Emery, FERC, Washington, DC
Scott Hicks, USFWS, East Lansing, MI
Amira Oun, DEQ, Lansing, MI

Brian Gunderman, DNR Fisheries, Plainwell, MI
Scott Hanshue, DNR Fisheries, Plainwell, MU
Kyle Kruger, DNR Fisheries, Mio, MI

Appendix 1

For Scientific Collector's Permit:

Tom Goniea
Fisheries Biologist
Constitution Hall
PO Box 30446
Lansing, MI 48909
517-284-5825
Gonieat@michigan.gov

For Creel Data:

Tracy Claramunt
Fisheries Biologist
Oden Hatchery Visitor Center
3377 US 31
Oden, MI 49764
517-282-2887
Claramuntt@michigan.gov

For Michigan Fish Consumption Advisory Program (Eat Safe Fish) Data:

Jennifer Gray
Toxicologist
517-281-3483
Grayj@michigan.gov

For Fisheries Survey Specifications:

Brian Gunderman
Fisheries Manager
Southern Lake Michigan Management Unit
Plainwell Customer Service Center
621 N. 10th
Plainwell, MI 49080
269-204-7009
GundermanB@michigan.gov

For Mussel Survey Specifications:

Scott Hanshue
Fisheries Biologist
Southern Lake Michigan Management Unit
Plainwell Customer Service Center
621 N. 10th
Plainwell, MI 49080
269-204-7043

HanshueS1@michigan.gov

From: [Oun, Amira \(DEQ\)](#)
To: [Jonathan M Magalski](#)
Subject: [EXTERNAL] MDEQ Comments on Proposed Study Plan for Constantine Hydroelectric Project
Date: Wednesday, January 16, 2019 3:03:58 PM

This is an **EXTERNAL** email. **STOP. THINK** before you **CLICK** links or **OPEN** attachments. If suspicious please click the '**Report to Incidents**' button in Outlook or forward to incidents@aep.com from a mobile device.

Hi Jon,

The Michigan Department of Environmental Quality (MDEQ) has reviewed the Proposed Study Plan for the Constantine Project on the St. Joseph River, Michigan. Amira Oun, Environmental Engineer from the Water Resources Division also participated in the Proposed Study Plan meeting held in East Lansing, Michigan on December 11, 2018.

The MDEQ concurs with the applicant's proposed water quality studies. The MDEQ should be consulted regarding the appropriate methodology and monitoring stations locations. We prefer to see hourly DO data between June 1 and October 31. Temperature should be monitor full year. We also concur with the applicant's intentions to conduct a shoreline erosion, sediment contaminant sampling, and collecting fish tissue samples for contaminant analysis.

Please let me know if you have any questions.

Amira Oun
Environmental Engineer
Department of Environmental Quality
Water Resources Division
Phone: 517-284-5541

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D.C. 20426
January 31, 2019

OFFICE OF ENERGY PROJECTS

Project No. 10661-050-Michigan
Constantine Hydroelectric Project
Indiana Michigan Power Company

Jonathan Magalski
Environmental Consultant Specialist
Indiana Michigan Power Company
1 Riverside Plaza
Columbus, OH 43215

Reference: Staff Comments on the Proposed Study Plan for the Constantine Project

Dear Mr. Magalski:

We have reviewed Indiana Michigan Power Company's (I&M Power) proposed study plan for the Constantine Hydroelectric Project filed on November 16, 2018. We provided verbal comments on the proposed study plan during the December 11, 2018 study plan meeting. We expect I&M Power to take those comments into consideration during the development of the revised study plan, which is due to be filed on March 16, 2019. In addition, we are providing written comments pursuant to section 5.12 of the Commission's regulations on the Shoreline Stability Assessment Study, Water Quality Study, and Fisheries Survey. Comments are provided in the attached Schedule A.

If you have any questions, please contact Lee Emery at lee.emery@ferc.gov or (202) 502-8379.

Sincerely,

Janet Hutzler, Chief
Midwest Branch
Division of Hydropower Licensing

Enclosure: Schedule A

Shoreline Stability Assessment Study

Section 7.6.2, *Task 2 – Shoreline Survey*, does not describe the flow conditions in the St. Joseph River at which the shoreline survey would be conducted. As we stated in the Study Plan Meeting, the shoreline survey should be performed when normal to low flows occur in the St. Joseph River so that potential evidence of shoreline erosion would not be obscured by high water levels. Therefore, please include the following requirements in the Revised Study Plan for the Shoreline Stability Assessment Study: (1) conduct the shoreline survey when flow in the St. Joseph River is at a normal rate or below; (2) obtain hourly flow data from the USGS gage on the St. Joseph River at Mottville, Michigan (gage no. 04099000) that occur during the shoreline survey and include these data in the Shoreline Stability Study Report; and (3) record the daily maximum and minimum water surface elevation in the Constantine reservoir, using project datum, that occur during the shoreline survey, and include the results in the Shoreline Stability Study Report.

Project Nexus

All requests for studies filed with the Commission must meet the criteria found in 18 CFR § 5.9(b) of the Commission's regulations, including criterion 5. *Explain any nexus between project operation and effects (direct, indirect, and/or cumulative) on the resource to be studied, and how the study results would inform the development of license requirements.* In the Revised Study Plan, please revise section 8.5, *Project Nexus*, of the Water Quality Study and section 9.5, *Project Nexus*, of the Fisheries Survey to clarify how there is a nexus between proposed project operation and the potential effects on the aquatic resources listed below.

Water Quality Study

The Water Quality Study proposes to continually monitor temperature in the reservoir, power canal, tailrace, and bypassed reach from approximately May 1, 2019 through April 30, 2020. Commission staff is uncertain why water temperature data would need to be collected year-round, based on the proposed project operation and cold water conditions that occur during winter weather in Michigan. Please provide the justification and nexus for year-round water temperature monitoring of project waters in the Revised Study Plan.

Also, the Water Quality Study proposes to conduct sediment contaminant sampling in the project reservoir. However, the Proposed Study Plan states that the expected continued operation of the project would have no effect on sediment contamination in the river. Please provide the justification and nexus for the proposed sediment contaminant sampling in the Revised Study Plan.

Fisheries Survey

As part of the Fisheries Survey, the collection of tissue samples from fish collected during the fish surveys, and analyzing the fish for the presence of mercury and PCBs, is proposed. The proposed Fisheries Survey does not identify the nexus between the proposed operation of the project and the need to identify the presence of contaminants in fish occurring in project waters. Please provide the justification for this effort in the Revised Study Plan.

From: Hanson, Danielle
Sent: Tuesday, February 5, 2019 4:06 PM
To: 'ouna@michigan.gov'; 'ThiamkeelakulK@michigan.gov';
'Jack_Dingledine@fws.gov'
Cc: 'Jonathan M Magalski (jmmagalski@aep.com)'; Elizabeth B Parcell; Quiggle,
Robert
Subject: Constantine Hydroelectric Project (FERC No. 10661) - Proposed Study Plan
Consultation Regarding the Water Quality Study
Attachments: Constantine WQ Study Consult Letter 20190205.pdf

Dear Ms. Oun, Ms. Thiamkeelakul, and Mr. Dingledine:

Indiana Michigan Power Company (I&M), a unit of American Electric Power (AEP), is the Licensee, owner, and operator of the 1.2 megawatt (MW) Constantine Hydroelectric Project (FERC No. 10661) (Project or Constantine Project), located on the St. Joseph River in the Village of Constantine in St. Joseph County, Michigan. The Project is operated under a license issued by the Federal Energy Regulatory Commission (FERC). The existing license expires on September 30, 2023. Accordingly, I&M is pursuing a subsequent license for the Project pursuant to the Commission's Integrated Licensing Process (ILP), as described at 18 Code of Federal Regulations (CFR) Part 5.

On November 16, 2018, I&M filed a Proposed Study Plan (PSP) with the Commission that included a Water Quality Study Plan. I&M held a PSP Meeting on December 11, 2018 to review the background, concepts, and study methods described in the PSP. During the PSP Meeting, resource agencies expressed interest in reviewing a map of proposed water quality sampling locations at the Project. Accordingly, I&M is consulting with the Michigan Department of Environmental Quality, Michigan Department of Natural Resources, and the U.S. Fish and Wildlife Service regarding the proposed locations for water quality sampling at the Project. I&M intends to include consultation correspondence and a map of proposed water quality sampling locations in the Revised Study Plan (RSP), which is due to be filed with the Commission on or before March 16, 2019.

Based on comments received during the PSP Meeting, and thereafter, I&M has developed a map (included in the attached letter) which shows approximate locations where water quality data would be collected during the 2019 study season. At this time, I&M is seeking your written concurrence regarding the proposed modifications and sampling locations for the Water Quality Study to be conducted in support of Project relicensing. I&M respectfully requests your written concurrence within 30 days (i.e., on or before March 7, 2019) so that any edits may be incorporated into the RSP.

Should you have any questions regarding the attached letter or other aspects of the Project relicensing, please contact Jon Magalski with AEP at (614) 716-2240 or jmmagalski@aep.com.

Thank you,

Danielle Hanson
Environmental Scientist

HDR
M 315.729.4745
Danielle.Hanson@hdrinc.com

hdrinc.com/follow-us



February 5, 2019

Ms. Amira Oun
Environmental Engineer
Michigan Department of Environmental Quality
525 West Allegan Street
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Ms. Kesiree Thiamkeelakul
Resource Analyst
Michigan Department of Natural Resources
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Lansing, MI 48909

Mr. Jack Dingleline
Assistant Field Office Supervisor/Michigan Ecological Services Field Office
U.S. Fish and Wildlife Service
2652 Coolidge Road, #101
East Lansing, MI 48823

**Subject: Constantine Hydroelectric Project (FERC No. 10661)
Proposed Study Plan Consultation – Water Quality Study**

Dear Ms. Oun, Ms. Thiamkeelakul, and Mr. Dingleline:

Indiana Michigan Power Company (I&M), a unit of American Electric Power (AEP), is the Licensee, owner, and operator of the 1.2 megawatt (MW) Constantine Hydroelectric Project (FERC No. 10661) (Project or Constantine Project), located on the St. Joseph River in the Village of Constantine in St. Joseph County, Michigan. The Project is operated in a run-of-river mode.

The existing license for the Project was issued by the Federal Energy Regulatory Commission (FERC) for a 30-year term on October 20, 1993. The existing license expires on September 30, 2023. Accordingly, I&M is pursuing a subsequent license for the Project pursuant to the Commission's Integrated Licensing Process (ILP), as described at 18 Code of Federal Regulations (CFR) Part 5.

On November 16, 2018, I&M filed a Proposed Study Plan (PSP) with the Commission that included a Water Quality Study Plan. In the Water Quality Study Plan, I&M proposed to collect water quality at the following locations: (1) reservoir, (2) power canal, (3) tailrace, and (4) bypass reach (two locations: upstream and downstream of the Fawn River). As further stated in the study plan, I&M proposed to: (1) record continuous water temperature for an entire year (from May 1,

2019 through April 30, 2020); (2) record continuous dissolved oxygen (DO) (from May 1, 2019 through September 30, 2019); and (3) collect *in situ* water quality measurements for water temperature, DO, pH, and specific conductance on a monthly basis at each of the locations listed above from May through September.

However, based on FERC's comments and further consideration of the challenges involved with accessing and maintaining the water quality monitors during a portion of the year, I&M is proposing a few modifications to the original study plan. The proposed modifications consist of eliminating the full year of temperature monitoring and extending the continuous temperature and DO monitoring period, as well as the *in situ* water quality measurements, through October 31, 2019. I&M believes the proposed modifications will adequately characterize temperature and DO during the periods of most interest (highest temperature and lowest DO potential), while eliminating the safety and logistical concerns with accessing the water quality monitors during frozen conditions (winter) and high flows (spring).

As such, the proposed / revised Water Quality Study Plan scope includes:

- Collecting water quality at the following locations: (1) reservoir, (2) power canal, (3) tailrace, and (4) bypass reach (two locations: upstream and downstream of the Fawn River);
- Continuously recording temperature and DO on an hourly basis from May 1, 2019 through October 31, 2019; and
- Collecting *in situ* water quality measurements for water temperature, DO, pH, and specific conductance on a monthly basis at each of the locations listed above from May through October, 2019.

On December 11, 2018, I&M held a PSP Meeting in Lansing, Michigan. The purpose of the PSP Meeting was to describe the background, concepts, and study methods described in the PSP. During the PSP Meeting, resource agencies expressed interest in reviewing a map of proposed water quality sampling locations at the Project. Accordingly, I&M is consulting with the Michigan Department of Environmental Quality, Michigan Department of Natural Resources, and the U.S. Fish and Wildlife Service regarding the proposed locations for water quality sampling in the Project's reservoir, power canal, tailrace, and bypass reach. I&M intends to include consultation correspondence and a map of proposed water quality sampling locations in the Revised Study Plan (RSP), which is due to be filed with the Commission on or before March 16, 2019.

Based on comments received during the PSP Meeting, and thereafter, I&M has developed the enclosed map (Figure 1) which shows approximate locations where water quality data would be collected during the proposed / revised May 2019 – October 2019 study season. I&M has selected locations that will be representative of the water quality conditions in the immediate Project area; however, specific locations are subject to change based on the field scientist's professional judgment, existing site conditions, and any safety concerns identified at the time the sampling equipment is being deployed.

At this time, I&M is seeking your written concurrence regarding the proposed modifications and sampling locations for the Water Quality Study to be conducted in support of Project relicensing.

Constantine Hydroelectric Project (FERC No. 10661)
Proposed Study Plan Consultation
February 5, 2019
Page 3 of 3

I&M respectfully requests your written concurrence within 30 days from the date of this letter (i.e., on or before March 7, 2019) so that any edits may be incorporated into the RSP.

If there are any questions regarding this submittal or other aspects of Project relicensing, please do not hesitate to contact me by phone at (614) 716-2240 or by email at jmmagalski@aep.com.

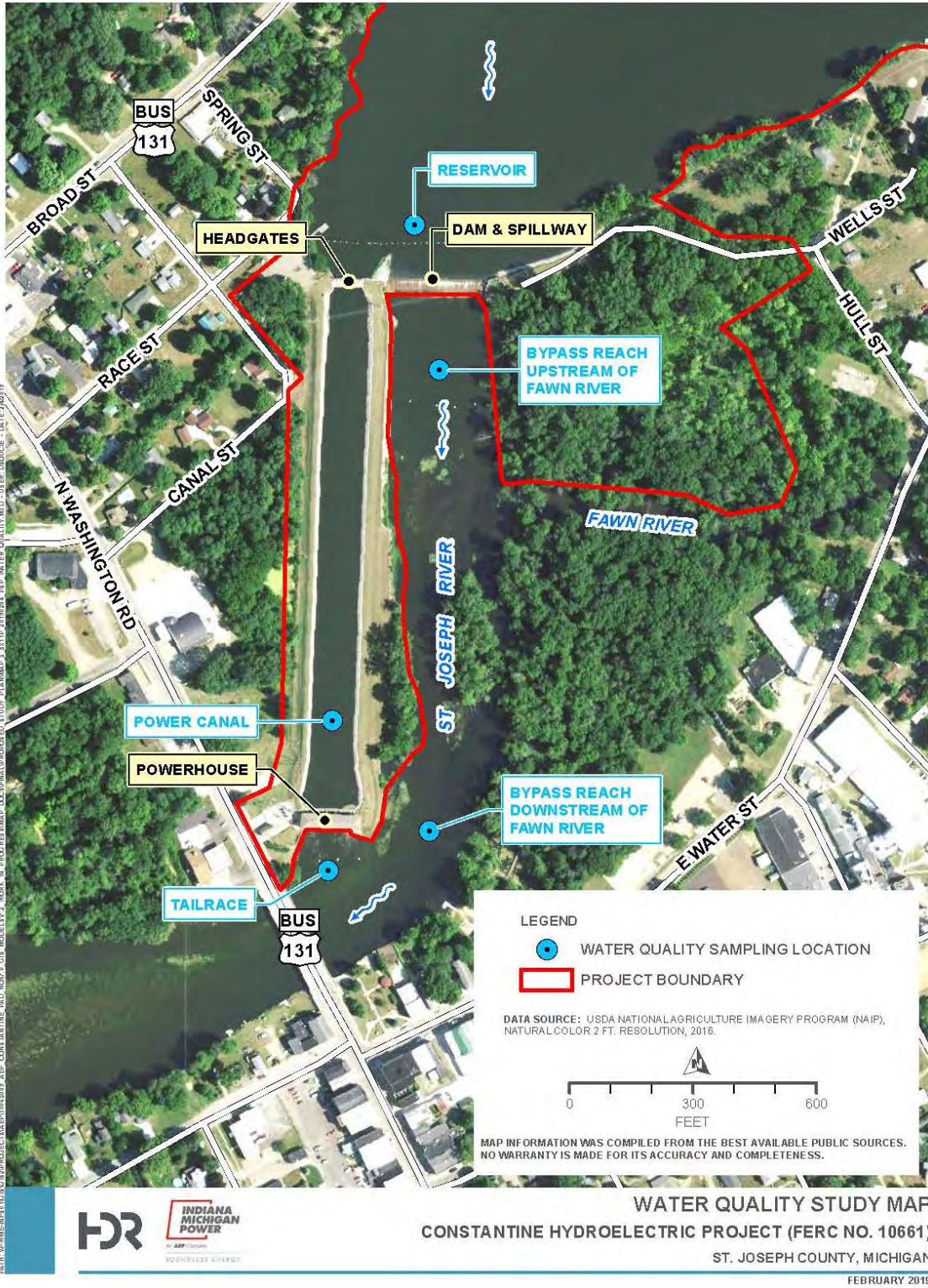
Sincerely,

A handwritten signature in black ink, appearing to read "Jonathan M. Magalski". The signature is written in a cursive style with a prominent initial "J".

Jonathan M. Magalski
Environmental Specialist Consultant
American Electric Power Services Corporation, Environmental Services

Enclosure

Figure 1. Constantine Project Proposed Water Quality Sampling Locations





February 5, 2019

To: Attached Section 106 Consultation Distribution List

**Subject: Constantine Hydroelectric Project (FERC No. 10661)
Consultation Regarding the Area of Potential Effects**

Dear Sir or Ma'am:

Indiana Michigan Power Company (I&M or Licensee), a unit of American Electric Power (AEP), is the Licensee, owner, and operator of the run-of-river, 1,200-kilowatt (kW) Constantine Hydroelectric Project (Project No. 10661) (Project or Constantine Project), located on the St. Joseph River in the Village of Constantine in St. Joseph County, Michigan. The existing license for the Project was issued by the Federal Energy Regulatory Commission (FERC or Commission) for a 30-year term, with an effective date of October 1, 1993. The existing license expires on September 30, 2023. Accordingly, I&M is pursuing a subsequent license for the Project pursuant to the Commission's Integrated Licensing Process (ILP), as described at 18 Code of Federal Regulations (CFR) Part 5. Section 106 of the National Historic Preservation Act (Section 106) requires the Commission to take into account the effects of issuing a new license for the continued operation of the Project on historic properties and to afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment¹. Pursuant to the regulations implementing Section 106, I&M is consulting with the Michigan State Historic Preservation Officer (SHPO), ACHP, and Indian Tribes, and other parties included on the attached Section 106 Consultation Distribution List to determine and document the Area of Potential Effects (APE) for Project relicensing.

Background

Pursuant to the regulations implementing Section 106², the Commission has determined that issuing a new license for the Constantine Project is considered an undertaking with the potential to effect historic properties listed in or eligible for inclusion in the National Register of Historic Places. Concurrent with the June 4, 2018 filing of the Pre-Application Document and Notice of Intent required by the ILP, I&M requested designation as the Commission's non-federal representative for carrying out informal consultation pursuant to Section 106. The Commission granted I&M's request by notice dated July 25, 2018. While I&M is authorized to consult in an informal capacity, the Commission remains legally responsible for all agency findings and determinations under Section 106.

On November 16, 2018 I&M filed a Proposed Study Plan (PSP) with the Commission describing the studies that the Licensee is proposing to conduct in support of relicensing the Project, including

¹ 54 United States Code § 306108

² 36 C.F.R. Part 800

a Cultural Resources Study. As described in the PSP, I&M tentatively proposed to define the APE for Project relicensing as:

The APE for the Constantine Project includes lands within the FERC-approved Project boundary. The APE also includes lands outside of the Project boundary where Project operations, Project-related recreation activities, or other enhancements may cause changes in the character or use of historic properties, if any such properties exist.

Subsequent to the filing of the PSP, I&M held a PSP Meeting in Lansing, Michigan on December 11, 2018. The purpose of the PSP Meeting was to describe the background, concepts, and study methods described in the PSP. Based on the discussions during the PSP Meeting, I&M is seeking concurrence from the consulting parties regarding the proposed APE for this undertaking.

Request for Concurrence

At this time, I&M is seeking concurrence from the Michigan SHPO, Indian Tribes, and ACHP regarding the APE as defined above and delineated on the attached map. I&M believes that this definition is appropriate, as the Project boundary currently encompasses all lands necessary for Project operations. In addition, I&M has not identified any potential Project-related effects outside the Project boundary, and I&M is not proposing to modify Project operations or to undertake Project-related activities or enhancements outside of the approved Project boundary. Accordingly, the geographic extent of the APE delineated on the attached map includes lands within the FERC-approved Project boundary. If the results of consultation or studies conducted in support of relicensing indicate that the Project is having a potential effect on lands outside the approved Project boundary, or if I&M proposes to undertake Project-related activities outside of the Project boundary, I&M will consult with the parties on the attached Section 106 Consultation Distribution List to refine the geographic extent of the APE and will provide FERC with consultation documentation.

I&M respectfully requests that the consulting parties provide written concurrence regarding the APE presented herein within 30 days of the date of this letter (e.g., on or before March 7, 2019).

If there are any questions regarding the proposed APE or the relicensing process, please do not hesitate to contact me at (614) 716-2240 or via email at jmmagalski@aep.com.

Sincerely,



Jonathan M. Magalski
Environmental Specialist Consultant
American Electric Power Services Corporation, Environmental Services

Enclosure

Constantine Hydroelectric Project (FERC No. 10661)
Section 106 Consultation Distribution List

Federal Agencies

Mr. John Eddins
Office of Federal Agency Programs
Advisory Council on Historic Preservation
401 F Street NW, Suite 308
Washington, DC 20001-2637

Ms. Kimberly Bose
Secretary
Federal Energy Regulatory Commission
888 1st St NE
Washington, DC 20426

State Agencies

Mr. Brian D. Conway
State Historic Preservation Officer,
Lansing Office
State Historic Preservation Office
735 East Michigan Avenue
PO Box 30044
Lansing, MI 48909

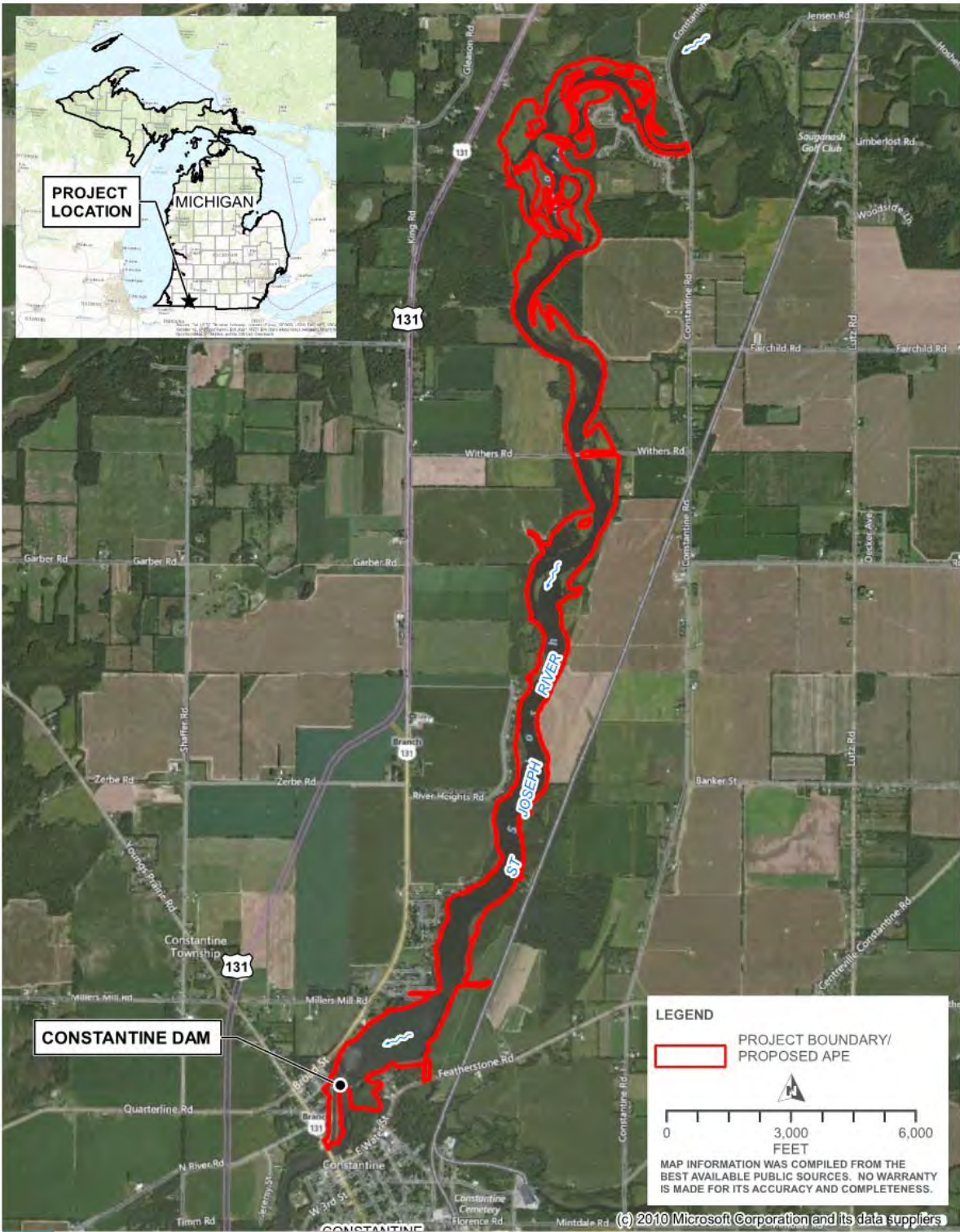
Indian Tribes

Mr. Michael LaRonge
Tribal Historic Preservation Officer
Forest County Potawatomi Community
5320 Wensaut Lane
PO Box 340
Crandon, WI 54520

Ms. Kelly Curran
Pokagon Band of Potawatomi Indians
58620 Sink Road
PO Box 180
Dowagiac, MI 49047

Nottawaseppi Huron Band of the Potawatomi
1485 Mno-Bmadzewen Way
Fulton, MI 49052

Figure 1. Proposed Constantine Project APE



PROJECT LOCATION MAP
CONSTANTINE HYDROELECTRIC PROJECT (FERC NO. 10661)
ST. JOSEPH COUNTY, MICHIGAN



GRETCHEN WHITMER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
LANSING



DANIEL EICHINGER
DIRECTOR

February 25, 2019

Ms. Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

RE: Comments on the Water Quality Consult Letter for Constantine Project (P-10661) on the St. Joseph River, Michigan

Dear Ms. Bose,

The Michigan Department of Natural Resources (Department) has reviewed the Water Quality Consult Letter submitted by Indiana Michigan Power Company (I&M) on February 5, 2019. The Department originally requested hourly temperature data for one full year and hourly dissolved oxygen data for four months (June – September) to adequately characterize any impacts of the Constantine Project on the St. Joseph River. I&M proposes an adjustment in study scope to six months (May 1, 2019 – October 31, 2019) for both hourly temperature and dissolved oxygen monitoring and suggests two locations upstream and downstream of the project for water quality measurements.

The Department concurs with the four proposed in-situ monitoring and sampling sites (reservoir, power canal, tailrace, bypass reach). The Department also agrees that collecting hourly dissolved oxygen data from May through October is sufficient to characterize levels at critical parts of the year. However, collecting hourly temperature data for a full year will help us discern any changes in the system while allowing for inferences on dissolved oxygen levels during months outside of the May through October monitoring period. This level of monitoring is consistent with our request for relicensing studies at other FERC projects and will allow for a more comprehensive understanding of the system.

The Department appreciates the opportunity comment on the Water Quality Consult Letter. If you have any questions, please contact Kyle Kruger (989-826-3211 x 7073) or me at:

Michigan Department of Natural Resources
Fisheries Division
Constitution Hall
PO Box 30446
Lansing, MI 48909

Best,



Kesiree Thiamkeelakul
Resource Analyst
Habitat Management Unit
Fisheries Division
517-284-6245
Thiamkeelakulk@michigan.gov

cc Jonathan Magalski, AEP, Columbus, OH
Lee Emery, FERC, Washington, DC
Scott Hicks, USFWS, East Lansing, MI
Amira Oun, DEQ, Lansing, MI
Brian Gunderman, DNR Fisheries, Plainwell, MI
Scott Hanshue, DNR Fisheries, Plainwell, MI
Kyle Kruger, DNR Fisheries, Mio, MI



United States Department of the Interior

FISH AND WILDLIFE SERVICE

2651 Coolidge Road, Suite 101
East Lansing, Michigan 48823-6360



IN REPLY REFER TO:

March 6, 2019

Mr. Jonathan M. Magalski
Environmental Specialist Consultant
American Electric Power Services Corporation, Environmental Services
1 Riverside Plaza
Columbus, OH 43215

RE: Comments on the Sampling Locations and Proposed Modifications to the Proposed Study Plan – Water Quality Study for the Constantine Project (P-10661)

Dear Mr. Magalski:

Thank you for your February 5, 2019, letter requesting our review and comments related to the Water Quality Study included in the Proposed Study Plan for the Constantine Hydroelectric Project. This facility is owned and operated by the Indiana Michigan Power Company (I&M), a unit of American Electric Power. I&M is proposing to eliminate the full year of temperature monitoring and extending the continuous temperature and Dissolved Oxygen monitoring period, as well as the in situ water quality measurements, through October 31, 2019. In addition, I&M has developed a map to show proposed water quality sampling at one location immediately above the dam and four locations below the dam. I&M is seeking our written concurrence regarding the proposed modifications and the proposed sampling locations.

As described in the U.S. Geological Survey's "Lakes and Reservoirs: Guidelines for Study Design and sampling" (Green *et. al.* 2015), typically, three zones occur in reservoirs along the downstream gradient affecting flow velocity, residence time, concentrations of bioavailable nutrients and suspended solids (turbidity), depth to which light can penetrate/light extinction (photic zone), and phytoplankton productivity and biomass. The three zones (i.e., riverine, transitional, and lacustrine) can exhibit a large degree of spatial heterogeneity in water quality.

We recommend that longitudinal transects be made with multiparameter instruments to determine the spatial variability associated with basic physical and chemical characteristics in the reservoir to identify discrete locations or sampling sites for further water-quality sampling and assessment.

For example, should spatial variability in the reservoir characteristics be identified, we recommend adding a sampling location in that zone (e.g., riverine zone). The characteristics we recommend measuring include physical (e.g., temperature, pH, specific conductance, turbidity), chemical (e.g., dissolved-oxygen, phosphorus, nitrogen species), and biological (e.g., chlorophyll). We also recommend that concurrent data be collected from the St. Joseph River immediately upstream of the uppermost influence of the impoundment in order to allow a more comprehensive evaluation of the water quality and biological impacts of the facility.

We also concur with the Michigan Department of Natural Resources' recommendation that rather than reducing both the hourly temperature and dissolved oxygen monitoring to a 6 month period, the hourly temperature data should at least be collected for the full year. If ice or other conditions affect the ability to collect the data, it may be feasible to deploy data loggers that can be retrieved when conditions allow.

We appreciate the opportunity to review the proposed sampling locations and the proposed Water Quality Study modifications. Please let me know if you have any questions or need additional information, my e-mail: Scott_Hicks@fws.gov and direct phone: (517) 351-6274.

Sincerely,

Acting For, Scott Hicks
Field Supervisor

cc: Kesiree Thiamkeelakul, MDNR
Kyle Kruger, MDNR
Amira Oun, MDEQ

References

Green, W.R., Robertson, D.M., and Wilde, F.D., 2015, Lakes and reservoirs—Guidelines for study design and sampling: U.S. Geological Survey Techniques of Water-Resources Investigations, book 9, chap. A10, 65 p., <http://dx.doi.org/10.3133/tm9a10>.



FOREST COUNTY POTAWATOMI
NATURAL RESOURCES

5320 WENSAUT LANE • PO BOX 340 • CRANDON, WI 54520 • (715) 478-7222 • Fax: (715) 478-7225

March 7, 2019

Jonathan M. Magalski
Environmental Specialist Consultant
American Electric Power Services
Corporation, Environmental Services
1 Riverside Plaza
Columbus, Ohio 43215

Re: Project Number 10661-050-MI, Constantine Hydroelectric Project in the Village of Constantine, St. Joseph County, Michigan.

Dear Mr. Magalski,

Pursuant to consultation under Section 106 of the National Historic Preservation Act (1966 as amended) the Forest County Potawatomi Community, a Federally Recognized Native American Tribe, reserves the right to comment on Federal undertakings, as defined under the act.

This response is regarding the project mention above. As noted in our previous submittal dated October 26, 2017 under docket #P-10661-000 "This hydroelectric project operates along the St. Joseph River a very significant location within the ancestral territory of the Potawatomi peoples. We concur with the general APE as illustrated by the map attached to your letter dated February 5, 2019. However, in order to adequately determine the potential impact of hydro operations all historic properties abutting, or in the immediate proximity to, the Hydro the associated site boundaries must have be well defined by actual field survey, not relying solely on reported map locations, such as the Hinsdale Maps, based on finds reported to the State but never verified. In these cases the relationship of the site boundary to the hydro must be determined by archaeological survey.

Your interest in protecting Michigan's cultural and historic properties is appreciated. If you have any questions or concerns, please contact me at the email or number listed below.

Respectfully,

Michael LaRonge
Tribal Historic Preservation Officer
Natural Resources Department
Forest County Potawatomi Community
5320 Wensaut Lane
P.O. Box 340
Crandon, Wisconsin 54520
Phone: 715-478-7354
Fax: 715-478-7225



GRETCHEN WHITMER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING



LIESL EICHLER CLARK
DIRECTOR

March 7, 2019

Mr. Jonathan Magalski, Environmental Specialist Consultant
American Electric Power
Environmental Services
1 Riverside Plaza
Columbus, Ohio 43215-2372

Dear Mr. Magalski:

SUBJECT: Constantine Hydroelectric Project (Project) – Revised Proposed Water Quality Study Plan (Plan)
Federal Energy Regulatory Commission (FERC) No. 10661
Comments by the Michigan Department of Environmental (MDEQ)

The MDEQ received and reviewed the revised Plan for the Project. The Indiana Michigan Power Company (I&M), a unit of American Electric Power, is the licensee, owner, and operator of the Project.

Background:

The Project is located on the St. Joseph River in the village of Constantine in St. Joseph County, and is operated in a run-of-river mode. The Project is operated under a license issued by the FERC. The existing license expires on September 30, 2023. I&M is pursuing a subsequent license for the Project under Title 18 of the Code of Federal Regulations, Part 5, Integrated License Application Process.

On November 16, 2018, I&M filed a Plan with the FERC that included a water quality study. On December 11, 2018, the I&M held a meeting to review the background, concepts, and study methods described in the Plan. MDEQ staff attended the meeting and expressed interest in reviewing a map of the Project's proposed water quality sampling locations. MDEQ staff recommended an extension of the dissolved oxygen (DO) monitoring from September 30 to October 31. Based on comments received during the Plan meeting and thereafter, I&M has developed a revised Plan. The proposed modifications consist of eliminating the full year of temperature monitoring and extending the continuous temperature and DO monitoring period, as well as the *in-situ* water quality measurements, through October 31, 2019. Also, I&M included a map, which shows approximate locations where water quality data would be collected during the 2019 study season.

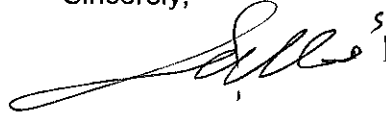
I&M has consulted with the MDEQ, Michigan Department of Natural Resources (MDNR), and the U.S. Fish and Wildlife Service regarding the proposed locations for water quality sampling at the Project.

MDEQ Comments:

The MDEQ concurs with the four proposed monitoring sites and believes that collecting hourly DO and temperature data from May through October is enough to characterize levels at critical parts of the year from a water quality perspective.

We appreciate the opportunity to comment on the revised Plan for the water quality study. If you have any questions, please feel free to contact me at 517-284-5541; ouna@michigan.gov; or MDEQ, P.O. Box 30458, Lansing, Michigan 48909-7958.

Sincerely,

A handwritten signature in black ink, appearing to read 'Amira Oun', with a long, sweeping underline that extends to the left.

Amira Oun, Environmental Engineer
Surface Water Assessment Section
Water Resources Division

cc: Ms. Kimberly D. Bose, FERC
Mr. Kyle Kruger, MDNR
Ms. Kesiree Thiamkeelakul, MDNR
Mr. Gary Kohlhepp/Section 401 File, MDEQ

Hanson, Danielle

From: Hanson, Danielle
Sent: Friday, March 15, 2019 11:33 AM
To: jeddins@achp.gov; antieauc@michigan.gov; MistakJ@michigan.gov; fotsjr.outreach@gmail.com; Jack_Dingledine@fws.gov; John.Bullard@noaa.gov; korie.blyveis@macd.org; KRUGERK@michigan.gov; ThiamkeelakulK@michigan.gov; martin.rosek@mi.usda.gov; Mary.Manydeeds@bia.gov; Michael.LaRonge@FCPotawatomi-nsn.gov; paddleheadz@gmail.com; peloso.elizabeth@epa.gov; stuberbob@gmail.com; westlake.kenneth@epa.gov; tlweaver@usgs.gov; dhubbell@usgs.gov; kelly.curran@pokagonband-nsn.gov; whitepigeonvillage@comcast.net; mhoneysett@comcast.net; skelton-m@comcast.net
Cc: 'Jonathan M Magalski (jmmagalski@aep.com)'; Elizabeth B Parcell; Quiggle, Robert
Subject: Constantine Hydroelectric Project (FERC No. 10661) -- Filing of Revised Study Plan
Attachments: Constantine Project RSP Cover Letter 20190315.pdf

Constantine Hydroelectric Project Stakeholders:

Indiana Michigan Power Company (I&M), a unit of American Electric Power (AEP), is the licensee, owner and operator of the Constantine Hydroelectric Project (FERC No. 10661) (Project) located on the St. Joseph River in St. Joseph County, Michigan. The Project is operated under a license issued by the Federal Energy Regulatory Commission (FERC). The existing FERC license for the Project expires on September 30, 2023. I&M is pursuing a new license for the continued operation of the Project in accordance with FERC's Integrated Licensing Process (ILP). Pursuant to the ILP, I&M filed the Revised Study Plan (RSP) for the Project on March 15, 2019. The RSP describes the studies that I&M is proposing to conduct in support of Project relicensing.

On behalf of I&M, we are notifying stakeholders of the availability of the RSP. For your convenience, a copy of the cover letter filed with the RSP is attached. Please note that, due to file size restrictions, the RSP has not been included in this email. I&M encourages stakeholders to view the filing online at FERC's eLibrary at <https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=15186826>. I&M will also be adding the RSP to the Project's public relicensing website (<http://www.aephydro.com/HydroPlant/Constantine>) in the coming days.

Should you have any questions regarding this filing, please contact Jon Magalski with AEP at (614) 716-2240 or jmmagalski@aep.com.

Thank you,

Danielle Hanson
Environmental Scientist

HDR
M 315.729.4745
Danielle.Hanson@hdrinc.com

hdrinc.com/follow-us



Via Electronic Filing

March 15, 2019

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, D.C. 20426

**Subject: Constantine Hydroelectric Project (FERC No. 10661)
Filing of Revised Study Plan for Relicensing Studies**

Dear Secretary Bose:

Indiana Michigan Power Company (I&M), a unit of American Electric Power (AEP), is the Licensee, owner, and operator of the run-of-river, 1,200-kilowatt (kW) Constantine Hydroelectric Project (Project) (FERC Project No. 10661), located on the St. Joseph River in the Village of Constantine in St. Joseph County, Michigan. The Federal Energy Regulatory Commission (FERC or Commission) issued an original license for the Project on October 20, 1993¹. The existing license expires on September 30, 2023. Accordingly, I&M is pursuing a new license for the Project pursuant to the Commission's Integrated Licensing Process (ILP), as described at 18 Code of Federal Regulations (CFR) Part 5. In accordance with 18 CFR §5.13 of the Commission's regulations, I&M is filing this Revised Study Plan (RSP) in support of relicensing the Project.

Background

I&M filed a Pre-Application Document and associated Notice of Intent with the Commission on June 4, 2018, to initiate the ILP. The Commission issued Scoping Document 1 (SD1) for the Project on July 25, 2018. SD1 was intended to advise resource agencies, Indian Tribes, non-governmental organizations, and other stakeholders as to the proposed scope of FERC's Environmental Assessment (EA) for the Project and to seek additional information pertinent to the Commission's analysis.

On August 28 and 29, 2018, the Commission held public scoping meetings in Constantine, Michigan. During these meetings, FERC staff presented information regarding the ILP and details regarding the study scoping process and how to request a relicensing study, including the Commission's study criteria. In addition, FERC staff solicited comments regarding the scope of issues and analyses for the EA. Pursuant to 18 CFR §5.8(d), a public site visit of the Project was conducted on August 28, 2018.

Resource agencies, Indian Tribes, and other interested parties were afforded a 60-day period to request studies and provide comments on the PAD and SD1. The comment period was initiated

¹ Order Issuing License (Minor Project), 65 FERC ¶ 62,063 (1993)

with the Commission's July 25, 2018 notice and concluded on October 2, 2018. During the comment period, a total of four stakeholders filed letters with the Commission providing general comments, comments regarding the PAD, comments regarding SD1, and/or study requests. FERC issued Scoping Document 2 (SD2) on November 13, 2018 to provide information on the proposed action and alternatives, the environmental analysis process FERC staff will follow to prepare the EA, and a revised list of issues to be addressed in the EA.

In accordance with 18 CFR §5.11, I&M developed a Proposed Study Plan (PSP) for the Project that was filed with the Commission and made available to stakeholders on November 16, 2018. The purpose of the PSP was to present the studies proposed by I&M and to address the comments and study requests submitted by resource agencies and other stakeholders. The PSP described I&M's proposed approaches for conducting studies and addressed agency and stakeholder study requests. Pursuant to 18 CFR §5.11(e), I&M held a PSP Meeting on December 11, 2018, for the purpose of clarifying the PSP, explaining any initial information gathering needs, and addressing any outstanding issues associated with the PSP.

During the PSP Meeting, resource agencies expressed interest in reviewing a map of proposed water quality sampling locations at the Project. Accordingly, I&M consulted with the U.S. Fish and Wildlife Service (USFWS), Michigan Department of Environmental Quality (MDEQ), and Michigan Department of Natural Resources (MDNR) regarding the proposed locations for water quality sampling in the Project's reservoir, power canal, tailrace, and bypass reach. On February 5, 2019, I&M sent a letter, including a map with the proposed water quality sampling locations, to the USFWS, MDEQ, and MDNR requesting their concurrence on the proposed sampling locations. The responses received from the resource agencies have been taken into consideration while developing the RSP and are detailed further in the attached RSP. Agency correspondence is also included in Appendix B of the RSP.

Based on comments from FERC during the PSP Meeting, I&M also consulted with the Advisory Council on Historic Preservation, FERC, Michigan State Historic Preservation Office, Forest County Potawatomi Tribe, Pokagon Band of Potawatomi Tribe, and Nottawaseppi Huron Band of the Potawatomi Tribe via letter dated February 5, 2019 regarding the proposed Area of Potential Effects (APE) for the Project. The Forest County Potawatomi Tribe provided a response on March 7, 2019, which has been discussed further in the RSP and included in Appendix B of the RSP. I&M has received no other responses regarding the proposed APE for the Project.

Resource agencies and stakeholders were afforded 90 days from the date of the PSP filing (i.e., until February 14, 2019) to provide comments on the PSP or to request additional studies. The Commission's regulations require that comments on the PSP include an explanation of any study plan concerns and any accommodations reached with I&M regarding those concerns (18 CFR §5.12). Any proposed modifications to the PSP are also required to address the Commission's criteria as presented in 18 CFR §5.9(b).

I&M received comments on the PSP from the Michigan Department of Natural Resources and FERC. In developing this RSP, I&M has carefully evaluated and considered agency and stakeholder comments and study requests filed in response to the PAD, SD1, SD2, PSP and discussed during the PSP Meeting.

Revised Study Plan

In developing the PSP, I&M evaluated all the study requests submitted by the stakeholders, with a focus on the requests that specifically addressed the seven study criteria set forth in §5.9(b) of the Commission's ILP regulations. For the study requests that did not attempt to address the seven study criteria, where appropriate, I&M considered the study in the context of providing the requested information in conjunction with one of I&M's proposed studies.

This RSP takes into account the Commission's November 13, 2018 SD2 as well as comments on the PSP filed by stakeholders. Based on I&M's review of the requested studies, the FERC criteria for study requests under the ILP, the discussion during the PSP Meeting, and formal comments on the PSP, I&M is proposing to conduct the following studies as described in detail in the RSP:

1. Botanical Resources Study;
2. Shoreline Stability Assessment;
3. Water Quality Study;
4. Fisheries Survey;
5. Mussel Survey;
6. Wetlands Study;
7. Recreation Study; and
8. Cultural Resources Study.

I&M is filing the RSP with the Commission electronically and is distributing this letter to the parties listed on the attached distribution list. For parties listed on the attached distribution list who have provided an email address, I&M is distributing this letter via email; otherwise, I&M is distributing this letter via U.S. mail. All parties interested in the relicensing process may obtain a copy of the RSP electronically through FERC's eLibrary system at <https://elibrary.ferc.gov/idmws/search/fercgensearch.asp> under docket number P-10661, or on I&M's website at www.aephydro.com/HydroPlant/Constantine. If any party would like to request a CD containing an electronic copy of the RSP, please contact Jonathan Magalski, Environmental Specialist Consultant, at the phone number or email address listed below.

Comments on the RSP must be filed within 15 days of the filing date of this RSP which is no later than March 31, 2019. The Commission will issue a final Study Plan Determination by April 15, 2019.

If there are any questions regarding the RSP or the overall relicensing process for the Project, please do not hesitate to contact me at (614) 716-2240 or via email at jmmagalski@aep.com.

Constantine Hydroelectric Project (FERC No. 10661)
Filing of Revised Study Plan for Relicensing Studies
March 15, 2019
Page 4 of 4

Sincerely,

A handwritten signature in black ink, appearing to read "Jonathan M. Magalski". The signature is written in a cursive style with a large, sweeping initial "J".

Jonathan M. Magalski
Environmental Specialist Consultant
American Electric Power Services Corporation, Environmental Services

Enclosure

Constantine Hydroelectric Project (FERC No. 10661) Distribution List

Federal Agencies

Mr. John Eddins
Office of Federal Agency Programs
Advisory Council on Historic Preservation
401 F Street NW, Suite 308
Washington, DC 20001-2637

Ms. Kimberly Bose
Secretary
Federal Energy Regulatory Commission
888 1st St NE
Washington, DC 20426

FEMA Region 5
536 South Clark Street, 6th Floor
Chicago, IL 60605

Mr. John Bullard
Regional Administrator
NOAA Fisheries Service
Greater Atlantic Regional Fisheries Office
55 Great Republic Drive
Gloucester, MA 01930-2276

Mr. Martin J. Rosek
State Soil Scientist
US Department of Agriculture
Natural Resources Conservation Service
3001 Coolidge Road, Suite 250
East Lansing, MI 48823

Ms. Mary Manydeeds
Bureau of Indian Affairs, Midwest Region
US Department of the Interior
Norman Pointe II Building
5600 W. American Boulevard, Suite 500
Bloomington, MN 55437

Office of the Solicitor
US Department of the Interior
1849 C Street, NW
Washington, DC 20240

Ms. Lindy Nelson
Regional Environmental Officer, Office of
Environmental Policy & Compliance
US Department of the Interior, Philadelphia
Region
Custom House, Room 244
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Philadelphia, PA 19106

Ms. Liz Pelloso
Wetland/Environmental Scientist, Region 5
US Environmental Protection Agency
77 West Jackson Boulevard (E19-J)
Chicago, IL 60604

Mr. Ken Westlake
Chief, NEPA Implementation Section - Region
5
US Environmental Protection Agency
77 West Jackson Boulevard (E19-J)
Chicago, IL 60604

Mr. Jack Dingledine
Assistant Field Office Supervisor/Michigan
Ecological Services Field Office
US Fish and Wildlife Service
2652 Coolidge Road, #101
East Lansing, MI 48823

Ms. Alisa Shull
Chief, Endangered Species - Midwest Region
(Region 3)
US Fish and Wildlife Service
5600 American Boulevard West, Suite 990
Bloomington, MN 55437-1458

Mr. Derrick Hubbell
Michigan Water Science Center
US Geological Survey
6520 Mercantile Way, Suite 5
Lansing, MI 48911-5991

Mr. Tom Weaver
Michigan Water Science Center
US Geological Survey
6520 Mercantile Way, Suite 5
Lansing, MI 48911-5991

US Geological Survey
1451 Green Road
Ann Arbor, MI 48105

Hon. Aaron Miller
US Congressman, 59th District
US House of Representatives
N-993 House Office Building
PO Box 30014
Lansing, MI 48909

Constantine Hydroelectric Project (FERC No. 10661) Distribution List

Mr. Michael Reynolds
Acting Director, Headquarters
US National Park Service
1849 C Street, NW
Washington, DC 20240

Hon. Gary Peters
US Senate
Hart Senate Office Building
Washington, DC 20510

Hon. Debbie Stabenow
US Senate
713 Hart Senate Office Building
Washington, DC 20510-2204

State Agencies

Michigan Department of Agriculture
525 West Allegan Street
Lansing, MI 48933

Mr. Chris Antieau
Great Lakes Shorelands Unit - Water
Resources Division
Michigan Department of Environmental
Quality
525 West Allegan Street
PO Box 30473
Lansing, MI 48909-7973

Kalamazoo District Office
Michigan Department of Environmental
Quality
7953 Adobe Road
Kalamazoo, MI 49009-5025

Ms. Jessica Mistak
Michigan Department of Natural Resources
PO Box 30028
Lansing, MI 48909

Mr. Kyle Kruger
Senior Fisheries Biologist
Michigan Department of Natural Resources
Mio Field Office
191 S. Mt. Tom Road
Mio, MI 48647

Ms. Kesiree Thiamkeelakul
Michigan Department of Natural Resources
Mio Field Office
191 S. Mt. Tom Road
Mio, MI 48647

Mr. Brian D. Conway
State Historic Preservation Officer, Lansing
Office
State Historic Preservation Office
735 East Michigan Avenue
PO Box 30044
Lansing, MI 48909

Local Governments

Ms. Korie Blyveis
District Manager
Cass County Conservation District
1127 East State St.
Cassopolis, MI 49031

Mr. Robert Hile
Mayor
City of Sturgis
130 North Nottawa
Sturgis, MI 49091

Friends of the St. Joe River Association, Inc.
PO Box 1794
South Bend, IN 46634

St. Joseph County
PO Box 189
Centreville, MI 49032

Ms. Carolyn Grace
Administrator
St. Joseph County Conservation District
693 E. Main Street
Centerville, MI 49032

Mr. Mark R. Brown
Supervisor
Township of Constantine
425 Centreville Street
Constantine, MI 49042

Constantine Hydroelectric Project (FERC No. 10661) Distribution List

Mr. George E. Morse
Supervisor
Township of Sturgis
70669 Stubey Road
Sturgis, MI 49091

Mr. Donald E. Gloy, Jr.
Supervisor
Township of White Pigeon
16825 Tomahawk Trail
White Pigeon, MI 49099

Mr. Mark Honeysett
Village Manager
Village of Constantine
115 White Pigeon Street
Constantine, MI 49042

Ms. Marcia Skelton
Village of Constantine
115 White Pigeon Street
Constantine, MI 49042

Mr. Tyler Royce
President
Village of White Pigeon
103 South Kalamazoo
PO Box 621
White Pigeon, MI 49099

Tribes

Mr. Michael LaRonge
Tribal Historic Preservation Officer
Forest County Potawatomi Community
5320 Wensaut Lane
PO Box 340
Crandon, WI 54520

Ms. Kelly Curran
Pokagon Band of Potawatomi Indians
58620 Sink Road
PO Box 180
Dowagiac, MI 49047

Nottawaseppi Huron Band of the Potawatomi
1485 Mno-Bmadzewen Way
Fulton, MI 49052

Non-governmental Organizations

Mr. John Seebach
American Rivers
1104 14th St NW, Suite 1400
Washington, DC 20005

Mr. Kevin Richard Colburn
National Stewardship Director
American Whitewater
PO Box 1540
Cullowhee, NC 28779

Michigan Audubon Society
2311 Science Parkway, Suite 200
Okemos, MI 48864

Michigan Citizens for Water Conservation
PO Box 1
Mecosta, MI 49332

Michigan Environmental Council
602 West Ionia Street
Lansing, MI 48933

Mr. Bob Stuber
Fisheries Biologist
Michigan Hydropower Relicensing Coalition
1620 High Street
Traverse City, MI 49684

Michigan Loon Preservation Association
10181 Sheridan Road
Millington, MI 48746

Michigan Nature Association
2310 Science Parkway, Suite 100
Okemos, MI 48864

Mr. Matt Meersman
Director
St. Joseph River Basin Commission
227 West Jefferson Boulevard
1120 County-City Boulevard
South Bend, IN 46601

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D. C. 20426
April 9, 2019

OFFICE OF ENERGY PROJECTS

Project No. 10661-050 – Michigan
Constantine Hydroelectric Project
Indiana Michigan Power Company

Mr. Jonathan Magalski
Environmental Consultant Specialist
Indiana Michigan Power Company
1 Riverside Plaza
Columbus, OH 43215

Reference: Study Plan Determination for the Constantine Hydroelectric Project

Dear Mr. Magalski:

Pursuant to 18 C.F.R. § 5.13(c) of the Commission's regulations, this letter contains the study plan determination for the Constantine Hydroelectric Project (Constantine Project) located on the St. Joseph River in the Village of Constantine, St. Joseph County, Michigan. The determination is based on the study criteria set forth in section 5.9(b) of the Commission's regulations, applicable law, Commission policy and practice, and the record of information for the project.

Background

On November 16, 2018, Indiana Michigan Power Company (I&M Power) filed its proposed plan for eight studies covering shoreline stability, water quality, fisheries resources, botanical resources, recreation, and cultural resources in support of its intent to relicense the project.

I&M Power held its initial Study Plan Meeting on December 11, 2018, to discuss the proposed study plan (PSP). Comments on the studies and request for modifications were filed by Commission staff, Michigan Department of Natural Resources, Michigan Department of Environmental Quality (Michigan DEQ), Pokagon Band of Potawatomi Tribe, and the Forest County Potawatomi Tribe.

On March 15, 2019, I&M Power filed a revised study plan (RSP) that included revisions to two of the studies proposed in the PSP (Botanical Resources Study and Water Quality Study). On March 19, 2019, Michigan DEQ filed comments on the RSP,

concurring with I&M Power's revisions to the Water Quality Study. No comments were filed on the Botanical Resources Study.

Study Plan Determination

I&M Power's RSP is approved, with the staff-recommended modifications discussed in Appendix B. As indicated in Appendix A, of the eight studies proposed by I&M Power, three are approved with staff-recommended modifications and five are approved as filed by I&M Power. No additional studies are required.

The specific modifications and basis for modifying I&M Power's RSP are discussed in Appendix B. Commission staff reviewed all comments and considered all study plan criteria in section 5.9 of the Commission's regulations. However, only the specific study criteria particularly relevant to the determination are referenced in Appendix B.

Studies for which no issues were raised in comments on the RSP are not discussed in this determination. Unless otherwise indicated, all components of the approved studies not modified by this determination must be completed as described in I&M Power's RSP. Pursuant to section 5.15(c)(1) of the Commission's regulations, the initial study report for all studies in the approved study plan must be filed by April 14, 2020.

Nothing in this study plan determination is intended, in any way, to limit any agency's proper exercise of its independent statutory authority to require additional studies. In addition, I&M Power may choose to conduct any study not specifically required herein that it feels would add pertinent information to the record.

If you have any questions, please contact Lee Emery at lee.emery@ferc.gov or (202) 502-8379.

Sincerely,

for
Terry L. Turpin
Director
Office of Energy Projects

Enclosure: Appendix A – Summary of determinations on proposed and requested studies and study modifications
Appendix B – Staff's recommendations on proposed studies

APPENDIX A**SUMMARY OF DETERMINATIONS ON PROPOSED AND REQUESTED STUDIES AND STUDY MODIFICATIONS**

Study	Recommending Entity	Approved	Approved with Modifications
Botanical Resources	I&M Power, FERC, Pokagon Band of Potawatomi Tribe	X	
Shoreline Stability Assessment	I&M Power	X	
Water Quality	I&M Power		X
Fisheries Survey	I&M Power		X
Mussel Survey	I&M Power		X
Wetlands	I&M Power	X	
Recreation	I&M Power	X	
Cultural Resources	I&M Power	X	

APPENDIX B

STAFF RECOMMENDATIONS ON PROPOSED STUDIES

The following discusses staff's recommendations on studies proposed by Indiana Michigan Power Company (I&M Power). We base our recommendations on the study criteria outlined in the Commission's regulations [18 C.F.R. section 5.9(b)(1)-(7)].

Study 3 – Water Quality Study

Applicant's Proposed Study

I&M Power proposes to sample temperature and dissolved oxygen, and to analyze sediment samples in the Constantine Hydroelectric Project (Constantine Project or project) reservoir for contaminants. The objectives of the study are to: (1) sample certain water quality parameters (water temperature, dissolved oxygen, pH, and specific conductance) to determine if these water quality parameters are consistent with state water quality standards; and (2) sample sediments in the project reservoir to determine the concentration of contaminants potentially present.

I&M Power proposes to conduct sediment sampling in the project reservoir at three transects located in the upper, middle, and lower portions of the reservoir. The sediments collected would be analyzed for the following contaminants: (1) oil and grease; (2) total arsenic; (3) total cadmium; (4) total chromium; (5) total copper; (6) total lead; (7) total mercury; (8) total nickel; (9) total selenium; (10) total phosphorus; (11) total silver; (12) total zinc; and (13) total polychlorinated biphenyls (PCB). The sediment samples would be processed following methodologies outlined in EPA-823-B-01-002---*Methods for Collection, Storage, and Manipulation of Sediments for Chemical and Toxicological Analyses*.

Comments

Michigan Department of Environmental Quality (Michigan DEQ) states that it concurs with I&M Power's component of the study to monitor water quality. Michigan DEQ did not provide comments on the sediment contaminant sampling component of the study.

Discussion and Staff Recommendation

In planning for sediment removal for a project prior to the construction of new facilities, sediment contaminant sampling can be used to characterize the sediment quality to determine if any special removal, transportation, or disposal requirement would be needed. Sediment contaminant sampling can also be used to inform whether or not

project operation or maintenance activities could cause the disruption and downstream release of any contaminated reservoir sediments on downstream environmental resources.

In this instance, I&M Power does not propose any construction, operation, or maintenance activities that could cause the mobilization of sediments, and it does not establish how the information developed by the sediment contaminant sampling component of the study would otherwise be used to develop potential license requirements (section 5.9(b)(5)). Therefore, we recommend that I&M Power's proposed Water Quality Study be modified to remove the sediment contaminant sampling component.

Study 4 – Fisheries Survey

Applicant's Proposed Study

I&M Power proposes to collect baseline fisheries data in the reservoir and bypassed reach. The objectives of the survey are to: (1) establish the baseline condition for fishery resources in the vicinity of the project; (2) compare current fisheries data to historical fisheries data to determine any significant changes to fish species composition; (3) analyze fish tissue samples for mercury and PCB concentrations; and (4) confirm intake velocities for fish impingement and entrainment potential.

I&M Power proposes to collect tissue samples from the fish collected during the survey and analyze them for mercury and PCBs. Fish tissue samples would be obtained from 10 legal-sized resident predator fish (e.g., walleye, bass, or sunfishes) and 10 bottom feeder fish of one species that are representative of sizes that are normally consumed by anglers (e.g., common carp or channel catfish). The tissue samples would be processed following the methodologies outlined in EPA 823-B-00-007—*Guidance for Assessing Chemical Contamination Data for Use in Fish Advisories Volume 1, Fish Sampling Analysis, Third Edition*.

Comments on the Study

No comments were filed on this study plan.

Discussion and Staff Recommendation

I&M Power states that it proposes the fish tissue sampling component of the survey because the Mottville Hydroelectric Project No. 401, which is located approximately seven miles downstream of the project, conducts periodic fish tissue monitoring per the conditions of its section 401 of the Clean Water Act water quality

certificate and Article 408 of its license.¹ However, I&M Power has not explained the nexus between the Constantine Project's proposed operation and how it would affect the presence of mercury and PCBs in fish in the bypassed reach or the reservoir of the Constantine Project (section 5.9(b)(5)). Although collecting fish tissue data as a general matter may be helpful for other non-project purposes, like supporting the state's fish eating safety advisories, I&M Power has not established how the information developed by the fish tissue sampling component of the study would be used to develop potential license requirements for the Constantine Project (section 5.9(b)(5)). Therefore, we recommend that I&M Power's proposed Fisheries Survey be modified to remove the fish tissue sampling component.

Study 5 – Mussel Survey

Applicant's Proposed Study

I&M Power proposes a mussel survey to determine whether there are mussel populations within the project area, and to identify project effects on mussels. For example, the flashboards that are used to maintain water levels in the reservoir are prone to seasonal failures. When the flashboards fail, the reservoir level can decrease by about a foot. The reservoir is shallow, and a one foot drawdown could dewater nearshore areas of the reservoir where mussels might be located. In addition, when the flashboards fail, reduced flows can occur in the bypassed reach upstream of the confluence of the Fawn River, which could potentially affect mussel habitat. The mussel survey would help to identify whether mussels are present at the project and help identify potential adverse effects that could occur, such as dewatering mussel habitat and exposing them to desiccation² prior to flashboard replacement. The proposed mussel survey would be conducted at two sites in the project reservoir, one site in the bypassed reach, and one site downstream of the powerhouse. The survey would be conducted according to the Michigan Department of Natural Resources' 2018 *Freshwater Mussel Survey Protocols and Relocation Procedures*.

Comments on the Study

No comments were filed on this study.

¹ 103 FERC 62,025 (2003).

² To become thoroughly dried or dried up.

Discussion and Staff Recommendation

Part of the bypassed reach receives continuous flow from the Fawn River such that flow and the resulting habitat conditions in the bypassed reach upstream of the confluence are likely very different than flow and habitat conditions downstream of the confluence. Therefore, one survey site upstream of the confluence and one downstream of the confluence would be necessary to accurately assess project operational flow effects on mussels and mussel habitat in the entire bypassed reach (section 5.9(b)(4)). For this reason, we recommend that the mussel survey be modified to include a requirement for two surveys sites in the bypassed reach, with one located upstream of the Fawn River confluence and the other site located in the bypassed reach downstream of the confluence.

Hanson, Danielle

From: Hanson, Danielle
Sent: Tuesday, July 9, 2019 11:36 AM
To: 'Advisory Council on Historic Preservation'; 'Cass County Conservation District'; 'Forest County Potawatomi Community'; 'Friends of the St. Joe River Association Inc.'; 'Michigan Department of Environmental Quality'; 'Michigan Department of Natural Resources'; 'Michigan DNR'; 'Michigan DNR'; 'Michigan Hydropower Relicensing Coalition'; 'NOAA'; 'Pokagon Band of Potawatomi Indians'; 'St. Joseph River Basin Commission'; 'US Department of the Interior'; 'US Department of Agriculture'; 'US Environmental Protection Agency'; 'US Environmental Protection Agency'; 'US Fish and Wildlife Service'; 'USGS MI Water Science Center'; 'USGS MI Water Science Center'; 'Village of Constantine'; 'Village of Constantine, Village Manager'; 'Village of White Pigeon'
Cc: 'Jonathan M Magalski (jmmagalski@aep.com)'; Elizabeth B Parcell; Quiggle, Robert
Subject: Constantine Hydroelectric Project (FERC No. 10661) -- Filing of First Quarterly Study Progress Report
Attachments: 20190709 Constantine 1st Quarterly Study Progress Report.pdf

Constantine Hydroelectric Project Stakeholders:

Indiana Michigan Power Company (I&M), a unit of American Electric Power (AEP), is the licensee, owner and operator of the Constantine Hydroelectric Project (FERC No. 10661) (Project) located on the St. Joseph River in St. Joseph County, Michigan. The Project is operated under a license issued by the Federal Energy Regulatory Commission (FERC). The existing FERC license for the Project expires on September 30, 2023. I&M is pursuing a new license for the continued operation of the Project in accordance with FERC's Integrated Licensing Process (ILP). As proposed in I&M's March 15, 2019 Revised Study Plan and approved in FERC's April 9, 2019 Study Plan Determination (SPD), I&M filed the First Quarterly Study Progress Report for the Project on July 9, 2019. The progress report describes the study efforts that have been completed since FERC's SPD and study activities that are generally expected to be performed during quarter 3 of 2019.

On behalf of I&M, we are notifying stakeholders of the availability of the progress report. For your convenience, a copy of the progress report is attached.

Should you have any questions regarding this filing, please contact Jon Magalski with AEP at (614) 716-2240 or jmmagalski@aep.com.

Thank you,

Danielle Hanson
Environmental Scientist

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Via Electronic Filing

July 9, 2019

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, D.C. 20426

**Subject: Constantine Hydroelectric Project (FERC No. 10661)
First Quarterly Study Progress Report**

Dear Secretary Bose:

Indiana Michigan Power Company (I&M), a unit of American Electric Power (AEP), hereby submits the First Quarterly Study Progress Report for the Constantine Hydroelectric Project (Project) (FERC Project No. 10661) relicensing.

I&M has elected to utilize the Integrated Licensing Process (ILP) for the relicensing of the Project as defined in 18 Code of Federal Regulations (C.F.R.) Part 5. As proposed in I&M's March 15, 2019 Revised Study Plan (RSP) and approved in the Commission's April 9, 2019 Study Plan Determination (SPD), I&M is hereby filing the First Quarterly Study Progress Report for the Project. This progress report describes the activities performed since the SPD, as well as ILP activities generally expected to be conducted in quarter 3 (Q3) of 2019. Unless otherwise described, all relicensing studies are being conducted in conformance with the approved RSP and the Commission's SPD.

1. Botanical Resources Study

- I&M's consultant has prepared initial maps for the Botanical Resources Study. I&M expects fieldwork to begin in Q3 during the peak flowering period.

2. Shoreline Stability Assessment

- I&M's consultant has conducted initial photographic documentation of shoreline areas. Additional fieldwork is expected to continue in Q3.

3. Water Quality Study

- Continuous water temperature and dissolved oxygen loggers were deployed at the five locations as described in the RSP (i.e., reservoir, power canal, bypassed reach (two locations - upstream and downstream of Fawn River), and in the tailrace area). The continuous data loggers began recording data on May 1, 2019.
- Monthly data download and discrete multi-parameter water quality sampling were conducted in May and June 2019 at each of the five data logger locations.

- I&M anticipates that continuous data collection, monthly data downloads, and discrete water quality sampling will continue in Q3.
- I&M expects that sediment contaminant sampling in the Project reservoir will be conducted in Q3.

4. Fisheries Survey

- I&M's consultant conducting this fieldwork has filed for and received a scientific collector's permit from the Michigan Department of Natural Resources (MDNR).
- The initial late spring/early summer sampling event has been completed and data is being compiled and analyzed for incorporation into the Initial Study Report.
- Due to the limited access to the power canal and the fisheries data currently available from the recent drawdown event, I&M is consulting with the MDNR to determine (a) if sampling in the power canal is appropriate, and (b) if so, what methods would be suitable for fisheries data collection.
- I&M anticipates that the late summer/early fall sampling event will be conducted in Q3.
- I&M expects that fish tissue samples will be collected during the late summer/early fall fish sampling event.

5. Mussel Survey

- I&M's consultant conducting this fieldwork has filed for and received a scientific collector's permit from the MDNR.
- Fieldwork has not yet begun for this study, but is expected to begin in Q3.

6. Wetland Study

- Fieldwork has not yet begun for this study, but is expected to begin in Q3 during the flowering season.

7. Recreation Survey

- In-person Visitor Use Surveys were conducted in May and June of 2019, per the schedule approved in the Commission's SPD. Visitor Use Surveys were conducted at formal and informal recreation areas in the Project vicinity on one weekday and one weekend day in May, and one weekday, and two weekend days corresponding with the Father's Day boat race in June. I&M expects that in-person Visitor Use Surveys will be conducted during additional hydroplane boat races that are scheduled for mid-July.
- As a component of the Recreation Study, I&M field technicians performed a Recreation Facility Inventory and Condition Assessment at all public recreation facilities in the Project vicinity. Data was collected regarding the types of existing recreation facilities available, type of vehicular access, condition of facilities, etc.

- An online Visitor Use Survey was launched in May 2019 and is available at the Project's public relicensing website (www.aephydro.com/HydroPlant/Constantine). Signs were placed at each of the Project's public recreation areas (i.e., upstream boat launch, canoe portage route, tailrace fishing platform, and parking area adjacent to the powerhouse) providing recreationists with the relevant information on how to access the online survey.
- Expected activities in Q3 include continued Visitor Use Survey data collection.

8. Cultural Resources Survey

- I&M has conducted a background literature review of the Project's area of potential effects (APE).
- Fieldwork has not yet begun for this study, but is expected to begin in Q3.
- Activities expected to occur in Q3 of 2019 include an archaeological field reconnaissance survey and an evaluation of historic architectural resources within the APE.

If there are any questions regarding this progress report, please do not hesitate to contact me at (614) 716-2240 or jmmagalski@aep.com.

Sincerely,



Jonathan M. Magalski
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Cc: Distribution List
Liz Parcell (AEP)
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Via Electronic Filing

July 9, 2019

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, D.C. 20426

**Subject: Constantine Hydroelectric Project (FERC No. 10661)
First Quarterly Study Progress Report**

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Constantine Hydroelectric Project (FERC No. 10661)
First Quarterly Study Progress Report
July 9, 2019
Page 2 of 3

- I&M anticipates that continuous data collection, monthly data downloads, and discrete water quality sampling will continue in Q3.
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Constantine Hydroelectric Project (FERC No. 10661)
First Quarterly Study Progress Report
July 9, 2019
Page 3 of 3

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- Activities expected to occur in Q3 of 2019 include an archaeological field reconnaissance survey and an evaluation of historic architectural resources within the APE.

If there are any questions regarding this progress report, please do not hesitate to contact me at (614) 716-2240 or jmmagalski@aep.com.

Sincerely,



Jonathan M. Magalski
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US Congressman, 59th District
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Via Electronic Filing

October 9, 2019

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, D.C. 20426

**Subject: Constantine Hydroelectric Project (FERC No. 10661)
Second Quarterly Study Progress Report**

Dear Secretary Bose:

Indiana Michigan Power Company (I&M), a unit of American Electric Power (AEP), hereby submits the Second Quarterly Study Progress Report for the Constantine Hydroelectric Project (Project) (FERC Project No. 10661) relicensing.

I&M has elected to utilize the Integrated Licensing Process (ILP) for the relicensing of the Project as defined in 18 Code of Federal Regulations (C.F.R.) Part 5. As proposed in I&M's March 15, 2019 Revised Study Plan (RSP) and approved in the Commission's April 9, 2019 Study Plan Determination (SPD), I&M is hereby filing the Second Quarterly Study Progress Report for the Project. This progress report describes the activities performed since the SPD, as well as ILP activities generally expected to be conducted in quarter 4 (Q4) of 2019. Unless otherwise described, all relicensing studies are being conducted in conformance with the approved RSP and the Commission's SPD.

1. Botanical Resources Study

- I&M's consultant has completed the desktop vegetation mapping and fieldwork associated with the Botanical Resources Study and is currently compiling and analyzing the data collected for incorporation into the Initial Study Report.

2. Shoreline Stability Assessment

- I&M's consultant has completed the fieldwork associated with the Shoreline Stability Assessment and is currently compiling and analyzing the data collected for incorporation into the Initial Study Report.

3. Water Quality Study

- Continuous water temperature and dissolved oxygen loggers were deployed at the five locations as described in the RSP (i.e., reservoir, power canal, bypassed reach (two locations - upstream and downstream of Fawn River), and in the tailrace area). The continuous data loggers began recording data on May 1, 2019 and will continue to collect data until October 31, 2019.

Constantine Hydroelectric Project (FERC No. 10661)
Second Quarterly Study Progress Report
October 9, 2019
Page 2 of 3

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- Continuous data collection, monthly data downloads, and discrete water quality sampling will continue until the end of October, at which time the data loggers will be removed from the river.
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4. Fisheries Survey

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- Fish tissue samples were collected in September and will be analyzed in a laboratory.
- I&M's consultant has completed the longitudinal verification of water velocity at two locations in the power canal.

5. Mussel Survey

- Fieldwork associated with the Mussel Survey was completed in August and the data collected is currently being compiled and analyzed for incorporation into the Initial Study Report.

6. Wetland Study

- Fieldwork associated with the Wetlands Study was completed in September and the data collected is currently being compiled and analyzed for incorporation into the Initial Study Report.

7. Recreation Survey

- In-person Visitor Use Surveys were conducted May through September of 2019, per the schedule approved in the Commission's SPD. Visitor Use Surveys were conducted at formal and informal recreation areas in the Project vicinity on one weekday and one weekend day each month. In-person Visitor Use Surveys are now complete for the 2019 recreation season.
- An online Visitor Use Survey was launched in May 2019 and is available at the Project's public relicensing website (www.aephydro.com/HydroPlant/Constantine). Signs were placed at each of the Project's public recreation areas (i.e., upstream boat launch, canoe portage, tailrace fishing platform, and parking area adjacent to the powerhouse) providing recreationists with the relevant information on how to access the online survey.
- To date, approximately seven online survey questionnaires have been completed since the online survey was launched in May 2019.
- Data collected from the recreation facilities inventory, in-person surveys, and online surveys is currently being compiled and analyzed for incorporation into the Initial Study Report.

Constantine Hydroelectric Project (FERC No. 10661)
Second Quarterly Study Progress Report
October 9, 2019
Page 3 of 3

8. Cultural Resources Survey

- Background literature review and fieldwork has been completed for this study and the data collected is currently being compiled and analyzed for incorporation into the Initial Study Report.

If there are any questions regarding this progress report, please do not hesitate to contact me at (614) 716-2240 or jmmagalski@aep.com.

Sincerely,

A handwritten signature in black ink, appearing to read "Jonathan M. Magalski". The signature is written in a cursive style with a large initial "J" and "M".

Jonathan M. Magalski
Environmental Specialist Consultant
American Electric Power Services Corporation, Environmental Services

Cc: Distribution List
Liz Parcell (AEP)
Rob Quiggle (HDR)

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Via Electronic Filing

October 9, 2019

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Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, D.C. 20426

**Subject: Constantine Hydroelectric Project (FERC No. 10661)
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Constantine Hydroelectric Project (FERC No. 10661)
Second Quarterly Study Progress Report
October 9, 2019
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Second Quarterly Study Progress Report
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Via Electronic Filing

January 9, 2020

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, D.C. 20426

**Subject: Constantine Hydroelectric Project (FERC No. 10661)
Third Quarterly Study Progress Report**

Dear Secretary Bose:

Indiana Michigan Power Company (I&M), a unit of American Electric Power (AEP), hereby submits the Third Quarterly Study Progress Report for the Constantine Hydroelectric Project (Project) (FERC Project No. 10661) relicensing.

I&M has elected to utilize the Integrated Licensing Process (ILP) for the relicensing of the Project as defined in 18 Code of Federal Regulations (C.F.R.) Part 5. As proposed in I&M's March 15, 2019 Revised Study Plan (RSP) and approved in the Commission's April 9, 2019 Study Plan Determination (SPD), I&M is hereby filing the Third Quarterly Study Progress Report for the Project. This progress report describes the activities performed since the SPD, as well as ILP activities generally expected to be conducted in quarter 1 (Q1) of 2020. Unless otherwise described, all relicensing studies are being conducted in conformance with the approved RSP and the Commission's SPD.

1. Botanical Resources Study

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2. Shoreline Stability Assessment

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3. Water Quality Study

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Constantine Hydroelectric Project (FERC No. 10661)
Third Quarterly Study Progress Report
January 9, 2020
Page 2 of 3

4. Fisheries Survey

- All fieldwork associated with the Fisheries Survey has been completed and I&M's subconsultant is currently compiling and analyzing the data collected for incorporation into the Initial Study Report.

5. Mussel Survey

- All fieldwork associated with the Mussel Survey has been completed and I&M's subconsultant is currently compiling and analyzing the data collected for incorporation into the Initial Study Report.

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- All fieldwork associated with the Wetlands Study has been completed and I&M's subconsultant is currently compiling and analyzing the data collected for incorporation into the Initial Study Report.

7. Recreation Survey

- All fieldwork associated with the Recreation Survey has been completed. The online recreation survey was also closed at the end of the 2019 recreation season. I&M's subconsultant has completed a draft study report that is currently undergoing internal review for incorporation into the Initial Study Report.

8. Cultural Resources Survey

- All tasks related to the Cultural Resources Survey have been completed. I&M's subconsultant has completed a draft study report that is currently undergoing internal review for incorporation into the Initial Study Report.

If there are any questions regarding this progress report, please do not hesitate to contact me at (614) 716-2240 or jmmagalski@aep.com.

Sincerely,



Jonathan M. Magalski
Environmental Specialist Consultant
American Electric Power Services Corporation, Environmental Services

Cc: Distribution List

Constantine Hydroelectric Project (FERC No. 10661)
Third Quarterly Study Progress Report
January 9, 2020
Page 3 of 3

Liz Parcell (AEP)
Rob Quiggle (HDR)

Constantine Hydroelectric Project (FERC No. 10661) Distribution List

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Hon. Debbie Stabenow
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Director
St. Joseph River Basin Commission
227 West Jefferson Boulevard
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South Bend, IN 46601



American Electric Power
1 Riverside Plaza
Columbus, OH 43215
aep.com

Via Electronic Filing

January 9, 2020

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, D.C. 20426

**Subject: Constantine Hydroelectric Project (FERC No. 10661)
Third Quarterly Study Progress Report**

Dear Secretary Bose:

Indiana Michigan Power Company (I&M), a unit of American Electric Power (AEP), hereby submits the Third Quarterly Study Progress Report for the Constantine Hydroelectric Project (Project) (FERC Project No. 10661) relicensing.

I&M has elected to utilize the Integrated Licensing Process (ILP) for the relicensing of the Project as defined in 18 Code of Federal Regulations (C.F.R.) Part 5. As proposed in I&M's March 15, 2019 Revised Study Plan (RSP) and approved in the Commission's April 9, 2019 Study Plan Determination (SPD), I&M is hereby filing the Third Quarterly Study Progress Report for the Project. This progress report describes the activities performed since the SPD, as well as ILP activities generally expected to be conducted in quarter 1 (Q1) of 2020. Unless otherwise described, all relicensing studies are being conducted in conformance with the approved RSP and the Commission's SPD.

1. Botanical Resources Study

- All desktop mapping and fieldwork associated with the Botanical Resources Study has been completed. I&M's subconsultant is currently compiling and analyzing the data collected for incorporation into the Initial Study Report.

2. Shoreline Stability Assessment

- All fieldwork associated with the Shoreline Stability Assessment has been completed and I&M's subconsultant is currently compiling and analyzing the data collected for incorporation into the Initial Study Report.

3. Water Quality Study

- All fieldwork associated with the Water Quality Study has been completed and I&M's subconsultant is currently compiling and analyzing the data collected for incorporation into the Initial Study Report.

Constantine Hydroelectric Project (FERC No. 10661)
Third Quarterly Study Progress Report
January 9, 2020
Page 2 of 3

4. Fisheries Survey

- All fieldwork associated with the Fisheries Survey has been completed and I&M's subconsultant is currently compiling and analyzing the data collected for incorporation into the Initial Study Report.

5. Mussel Survey

- All fieldwork associated with the Mussel Survey has been completed and I&M's subconsultant is currently compiling and analyzing the data collected for incorporation into the Initial Study Report.

6. Wetland Study

- All fieldwork associated with the Wetlands Study has been completed and I&M's subconsultant is currently compiling and analyzing the data collected for incorporation into the Initial Study Report.

7. Recreation Survey

- All fieldwork associated with the Recreation Survey has been completed. The online recreation survey was also closed at the end of the 2019 recreation season. I&M's subconsultant has completed a draft study report that is currently undergoing internal review for incorporation into the Initial Study Report.

8. Cultural Resources Survey

- All tasks related to the Cultural Resources Survey have been completed. I&M's subconsultant has completed a draft study report that is currently undergoing internal review for incorporation into the Initial Study Report.

If there are any questions regarding this progress report, please do not hesitate to contact me at (614) 716-2240 or jmmagalski@aep.com.

Sincerely,



Jonathan M. Magalski
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Constantine Hydroelectric Project (FERC No. 10661)
Third Quarterly Study Progress Report
January 9, 2020
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Director
St. Joseph River Basin Commission
227 West Jefferson Boulevard
1120 County-City Boulevard
South Bend, IN 46601

Yayac, Maggie

Subject: FW: I&M Constantine Hydroelectric Project No. 10661: FERC Relicensing Initial Study Report Meeting

From: Jonathan M Magalski <jmmagalski@aep.com>

Sent: Tuesday, January 28, 2020 11:06 AM

To: Hicks, Scott <scott_hicks@fws.gov>; Oun, Amira (EGLE) <OunA@michigan.gov>; Thiamkeelakul, Kesiree (DNR) <ThiamkeelakulK@michigan.gov>; Kruger, Kyle (DNR) <KRUGERK@michigan.gov>

Cc: Elizabeth B Parcell <ebparcell@aep.com>; Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Hanson, Danielle <Danielle.Hanson@hdrinc.com>

Subject: I&M Constantine Hydroelectric Project No. 10661: FERC Relicensing Initial Study Report Meeting

Good morning,

Per the FERC relicensing schedule for Indiana Michigan Power's (I&M) Constantine Hydroelectric Project (FERC Project No. 10661), I&M must file an Initial Study Report (ISR) for all studies approved in FERC's Study Plan Determination by April 14, 2020 and hold an ISR meeting no more than 15 days thereafter. In order to give stakeholders some time to review the ISR and for internal logistical reasons, I am proposing to hold the meeting on April 23 at a to-be-determined location in Lansing. If you have meeting space at your office that is available and you would be willing to host, please let me know. Otherwise, I will look for a venue somewhere in Lansing, possibly the Hannah Community Center where we held the Proposed Study Plan meeting in December 2018.

The details of the ISR meeting will be provided to all stakeholders with the ISR filing, but I wanted to reach out to you all in advance to get it on your calendars and work on securing meeting space. While the meeting may not require a full day, the plan to set it up that way to provide sufficient time for discussion if needed.

We look forward to continuing to work with you all through this relicensing process. If you have any questions, have a meeting space that you'd be willing to make available for the April 23 meeting or have meeting venue suggestions, please let me know. Thank you....Jon



JONATHAN M MAGALSKI | ENVIRONMENTAL SPEC CONSULT
[JMMAGALSKI@AEP.COM](mailto:jmmagalski@aep.com) | D:614.716.2240
1 RIVERSIDE PLAZA, COLUMBUS, OH 43215

Yayac, Maggie

Subject: FW: I&M Constantine Hydroelectric Project No. 10661: FERC Relicensing Initial Study Report Meeting

From: Thiamkeelakul, Kesiree (DNR) [mailto:ThiamkeelakulK@michigan.gov]

Sent: Monday, March 16, 2020 8:11 AM

To: Jonathan M Magalski <jmmagalski@aep.com>; Hicks, Scott <scott_hicks@fws.gov>; Oun, Amira (EGLE) <OunA@michigan.gov>; Kruger, Kyle (DNR) <KRUGERK@michigan.gov>

Cc: Elizabeth B Parcell <ebparcell@aep.com>; Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Hanson, Danielle <Danielle.Hanson@hdrinc.com>

Subject: RE: I&M Constantine Hydroelectric Project No. 10661: FERC Relicensing Initial Study Report Meeting

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Jon,

Unfortunately we have been told to restrict all non-essential work travel for the next 60 days, so we will request that a conference line be provided so that we can participate remotely.

Best,
Kesiree

From: Jonathan M Magalski <jmmagalski@aep.com>

Sent: Tuesday, January 28, 2020 11:06 AM

To: Hicks, Scott <scott_hicks@fws.gov>; Oun, Amira (EGLE) <OunA@michigan.gov>; Thiamkeelakul, Kesiree (DNR) <ThiamkeelakulK@michigan.gov>; Kruger, Kyle (DNR) <KRUGERK@michigan.gov>

Cc: Elizabeth B Parcell <ebparcell@aep.com>; Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Hanson, Danielle <Danielle.Hanson@hdrinc.com>

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Good morning,

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We look forward to continuing to work with you all through this relicensing process. If you have any questions, have a meeting space that you'd be willing to make available for the April 23 meeting or have meeting venue suggestions, please let me know. Thank you....Jon



JONATHAN M MAGALSKI | ENVIRONMENTAL SPEC CONSULT

JMMAGALSKI@AEP.COM | D:614.716.2240
1 RIVERSIDE PLAZA, COLUMBUS, OH 43215

Yayac, Maggie

Subject: FW: Study Plan Results Meeting in April for the Constantine Project.

From: Lee Emery <Lee.Emery@ferc.gov>

Sent: Thursday, March 19, 2020 9:39 AM

To: Jonathan M Magalski <jmmagalski@aep.com>

Subject: [EXTERNAL] Study Plan Results Meeting in April for the Constantine Project.

This is an **EXTERNAL** email. **STOP. THINK** before you **CLICK** links or **OPEN** attachments. If suspicious please click the '**Report to Incidents**' button in Outlook or forward to incidents@aep.com from a mobile device.

Hi Jon:

I am working from home as our agency has required everyone to telework.

I know the Study Plan meeting is coming up in early April. Probably less than 10 people expected for the meeting. I don't know what restrictions MI has on public gatherings and meetings. However, I want to participate, but not physically be at the meeting.

The ISR is due on 4/14/2020, and you will have to hold a meeting within 15 days. Please describe how you plan to hold the meeting (in person/teleconference) and I will need to teleconference, so a line needs to be set up so I can participate in that manner.

Hope you are well and taking precautions against the coronavirus!

Regards

lee

Lee Emery
Fishery Biologist
Office of Energy Projects
Federal Energy Regulatory Commission
Phone (202) 502-8379
FAX (202) 219-0205

Yayac, Maggie

Subject: FW: Study Plan Results Meeting in April for the Constantine Project.

From: Jonathan M Magalski [mailto:jmmagalski@aep.com]

Sent: Thursday, March 19, 2020 7:49 AM

To: Lee Emery <Lee.Emery@ferc.gov>

Cc: Quiggle, Robert <Robert.Quiggle@hdrinc.com>; Hanson, Danielle <Danielle.Hanson@hdrinc.com>; Elizabeth B Parcell <ebparcell@aep.com>

Subject: RE: Study Plan Results Meeting in April for the Constantine Project.

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Lee,

AEP has also implemented telecommuting for those that can and has imposed travel restrictions for the foreseeable future. MDNR and MDEQ are on a travel ban as well until mid-May. I heard USFWS is doing something similar. In light of these unprecedented circumstances, we will be holding the ISR meeting virtually (audio and visual) on April 23. Additional details will be provided with the ISR. Please let me know if you have any questions or need anything in the meantime. Stay safe and healthy....Jon



JONATHAN M MAGALSKI | ENVIRONMENTAL SPEC CONSULT

JMMAGALSKI@AEP.COM | D:614.716.2240
1 RIVERSIDE PLAZA, COLUMBUS, OH 43215

From: Lee Emery <Lee.Emery@ferc.gov>

Sent: Thursday, March 19, 2020 9:39 AM

To: Jonathan M Magalski <jmmagalski@aep.com>

Subject: [EXTERNAL] Study Plan Results Meeting in April for the Constantine Project.

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Hope you are well and taking precautions against the coronavirus!

Regards

lee

Lee Emery
Fishery Biologist
Office of Energy Projects
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Phone (202) 502-8379
FAX (202) 219-0205



American Electric Power
1 Riverside Plaza
Columbus, OH 43215
aep.com

Via Electronic Filing

April 9, 2020

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, D.C. 20426

**Subject: Constantine Hydroelectric Project (FERC No. 10661)
Fourth Quarterly Study Progress Report**

Dear Secretary Bose:

Indiana Michigan Power Company (I&M), a unit of American Electric Power (AEP), hereby submits the Fourth Quarterly Study Progress Report for the Constantine Hydroelectric Project (Project) (FERC Project No. 10661) relicensing.

I&M has elected to utilize the Integrated Licensing Process (ILP) for the relicensing of the Project as defined in 18 Code of Federal Regulations (C.F.R.) Part 5. As proposed in I&M's March 15, 2019 Revised Study Plan (RSP) and approved in the Commission's April 9, 2019 Study Plan Determination (SPD), I&M is hereby filing the Fourth Quarterly Study Progress Report for the Project. This progress report describes the activities performed since the SPD, as well as ILP activities generally expected to be conducted in quarter 2 (Q2) of 2020. Unless otherwise described, all relicensing studies have been conducted in conformance with the approved RSP and the Commission's SPD.

1. Botanical Resources Study

- I&M's subconsultant has completed a draft study report that is currently being incorporated into the Initial Study Report, which will be filed with FERC by April 14, 2020.

2. Shoreline Stability Assessment

- I&M's subconsultant has completed a draft study report that is currently being incorporated into the Initial Study Report, which will be filed with FERC by April 14, 2020.

3. Water Quality Study

- I&M's subconsultant has completed a draft study report that is currently being incorporated into the Initial Study Report, which will be filed with FERC by April 14, 2020.

4. Fisheries Survey

- I&M's subconsultant is currently developing a draft study report. The results of the fish tissue sampling are still pending from the laboratory. A summary of the available data from the Fisheries Survey will be incorporated into the Initial Study Report, which will be filed

Constantine Hydroelectric Project (FERC No. 10661)
Fourth Quarterly Study Progress Report
April 9, 2020
Page 2 of 3

with FERC by April 14, 2020.

5. Mussel Survey

- I&M's subconsultant has completed a draft study report that is currently being incorporated into the Initial Study Report, which will be filed with FERC by April 14, 2020.

6. Wetland Study

- I&M's subconsultant has completed a draft study report that is currently being incorporated into the Initial Study Report, which will be filed with FERC by April 14, 2020.

7. Recreation Survey

- I&M's subconsultant has completed a draft study report that is currently being incorporated into the Initial Study Report, which will be filed with FERC by April 14, 2020.

8. Cultural Resources Survey

- I&M's subconsultant has completed a draft study report that is currently being incorporated into the Initial Study Report, which will be filed with FERC by April 14, 2020.

9. Initial Study Report and Meeting

- As previously mentioned, I&M's Initial Study Report will be filed with FERC by April 14, 2020. The Commission's regulations at 18 C.F.R. § 5.15(c) require I&M to hold a meeting with participants and FERC staff within 15 days of filing the Initial Study Report. Accordingly, I&M will hold an Initial Study Report Meeting via Webex on April 23, 2020. Additional details regarding the meeting will be provided in the Initial Study Report.

If there are any questions regarding this progress report, please do not hesitate to contact me at (614) 716-2240 or jmmagalski@aep.com.

Sincerely,



Jonathan M. Magalski
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Cc: Distribution List

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