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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, 1993[1]. 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:

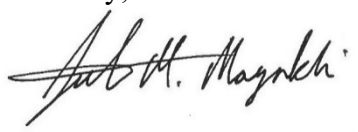
1. Botanical Resources Study;
2. Shoreline Stability Assessment;
3. Water Quality Study;
4. Fisheries Survey;
5. Mussel Survey;
6. Wetlands Study;
7. Recreation Study; and
8. Cultural Resources Study.

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.

Sincerely,



Jonathan M. Magalski
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Enclosure

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Revised Study Plan

Constantine Hydroelectric Project

(FERC No. 10661)

March 15, 2019

Prepared by:

HDR

Prepared for:

Indiana Michigan Power Company

INDIANA MICHIGAN POWER℠

An AEP Company

BOUNDLESS ENERGY™

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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
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)
FR	Federal Register
GIS	Geographic Information System
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
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
USFWS	U.S. Fish and Wildlife 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 30 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 §5.13 of the Commission's regulations, I&M is filing this Revised Study Plan (RSP) with the Commission 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.

During that time 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. Comments and study requests were received from 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. Copies of the letters filed with the Commission are provided in Appendix A of this document.

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. The meeting was held in Lansing, Michigan, and attended by representatives from FERC, U.S. Fish and Wildlife Service (USFWS), MDNR, Michigan Department of Environmental Quality (MDEQ), and Young Energy Services. During the PSP Meeting, I&M presented the basis for the studies as described in the PSP. I&M would like to thank all participants for attending, and I&M believes the dialogue was both important and productive.

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 USFWS, MDEQ, and 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 MDNR and MDEQ concurred with the proposed sampling locations via letters dated February 25, 2019 and March 7, 2019. The USFWS provided comments on the proposed Water Quality Study and sampling locations via letter dated March 6, 2019 (received via email on March 7, 2019). I&M's response to the USFWS' comments is provided in Section 8.6.1 of the Water Quality Study Plan. Agency correspondence is also included in Appendix B of this 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, 2018) 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 formal comments on the PSP from FERC and MDNR and informal comments from the MDEQ. 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. Appendix B of this RSP includes formal and informal comments on the PSP, and I&M has incorporated or addressed these comments within the corresponding study plans.

Relicensing participants may file comments on the RSP within 15 days of this filing (i.e., on or before March 31, 2019). I&M notes that 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 Act[1] 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.

[1] 33 U.S.C. §1251 et seq.

1.2 I&M's 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 criteria set forth in §5.9(b) of the Commission's ILP regulations, as discussed above. 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 relicensing participants, including FERC, MDNR, and MDEQ.

Based on I&M's review of the requested studies, FERC criteria for study requests under the ILP, available information (e.g., associated with the previous licensing effort or resulting from ongoing monitoring activities), the discussion during the PSP Meeting, and formal and informal comments on the PSP, I&M is proposing eight studies to be performed in support of issuing a subsequent 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 RSP 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.

1.3 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 11-¼-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-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.

3 Process Plan and Schedule

The Process Plan and Schedule is presented in Table 3-1. 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 3-1. 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 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
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

Milestone	Responsible Party	Time Frame	Estimated Date
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
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

Milestone	Responsible Party	Time Frame	Estimated Date
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 (DLA) (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
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

Milestone	Responsible Party	Time Frame	Estimated Date
Comments on Preliminary Licensing Proposal or DLA Due (18 CFR §5.16(e))	Stakeholders	Within 90 days of filing Preliminary Licensing Proposal or DLA	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

4 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. Additionally, as part of the Fisheries Survey, I&M will be measuring the average intake velocities at the Project and comparing them to the velocities measured during the previous fish entrainment and impingement study to verify that velocities have not significantly changed since the desktop study was performed. 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 River Association, Inc. 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. For example, based on comments from FERC and further consideration of the challenges involved with accessing and maintaining the water quality loggers during a portion of the year, I&M has proposed a modification to the Water Quality Study related to the year-round water temperature monitoring. I&M discusses the reasons for proposing alternative methods in the individual study methodology section for each proposed study.

5 Study Reports

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 5-1. 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.

Table 5-1. 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)

6 Botanical Resources Study

6.1 Study Requests

The Commission's July 25, 2018 SD1 and November 13, 2018 SD2 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, Eurasian watermilfoil, European frogbit, and Japanese knotweed.

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 on the PAD were received from USEPA, MDNR, and Friends of the St. Joe River Association, Inc. 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. In their comments on the PSP, MDNR concurred with I&M's PSP and offered to further assist I&M with characterizing the extent of any populations of the species documented during this survey. No other comments were filed regarding this study.

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]	*Platanthera leucophaea*
Water Willow[2]	*Justicia americana*
Purple Loosestrife	*Lythrum salicaria*
Eurasian Watermilfoil	*Myriophyllum spicatum*
Japanese Knotweed	*Fallopia japonica*
European Frogbit	*Hydrocharis morsus-ranae*
Starry Stonewort	*Nitellopsis obtusa*
Curly-Leaf Pondweed	*Potamogeton crispus*
Pond Water-Starwort	*Callitriche stagnalis*
Common Reed	*Phragmites australis*
Carolina Fanwort	*Cabomba caroliniana*

[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. I&M will consult with MDNR as necessary to assist with characterizing the extent of any population of species surveyed. 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 to determine if and how core samples should be collected in the field during the first 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 and November 13, 2018 SD2 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 on the PAD were received from MDNR related to geology and soil resources, specifically related to potential erosion as a result of Project operations. In their comments on the PSP, FERC suggested additional requirements for the study, which have been incorporated into Section 7.6.2 of the study plan. In their PSP comment letter, MDNR concurred with I&M's PSP. No other comments were filed regarding this study.

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. There is a boat launch and reservoir fishing access upstream of the

Project 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 conduct the shoreline survey when flow in the St. Joseph River is at a normal rate or below. Additionally, I&M will obtain hourly flow data from the U.S. Geological Survey (USGS) gage on the St. Joseph River at Mottville, Michigan (gage no. 04099000) and record the daily maximum and minimum water surface elevations in the Constantine reservoir during the shoreline survey. These data will be included in the final study report.

I&M will use the Standard Operating Procedure for assessing bank erosion potential (Appendix B) 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 Global Positioning System (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 and November 13, 2018 SD2 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 on the PAD were received from FERC, MDNR, and the Pokagon Band of Potawatomi Tribe related to water quality and sediment contamination. FERC commented on the PSP requesting additional information, which has been incorporated into Section 8.6.3 of this study plan. In their PSP comment letter, MDNR concurred with I&M's proposed Water Quality Study. No other comments were filed regarding this study.

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 reach 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[2]. Figure 8-1 shows the

[2] I&M consulted with the USFWS, MDNR, and MDEQ on proposed locations for the continuous water temperature and DO loggers by letter dated February 5, 2019. The MDNR and MDEQ concurred with the proposed sampling locations via letters dated February 25, 2019 and March 7, 2019. The USFWS provided comments on the proposed Water Quality Study and sampling locations via letter dated March 6, 2019 (received via email on March 7, 2019). See Appendix B for correspondence.

proposed locations for water quality sampling for the continuous water temperature and DO monitoring as well as the in-situ monitoring.

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 and DO data loggers will be deployed from approximately May 1, 2019 through October 31, 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. By letter dated February 5, 2019, I&M consulted with the USFWS, MDEQ, and MDNR regarding proposed water quality sampling locations. In addition, based on FERC's comments on the PSP and further consideration of the challenges involved with accessing and maintaining the water quality monitors during a portion of the year, I&M also proposed a few modifications to the original study plan. The proposed modifications included 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. In their comment response letters, MDEQ concurred with the proposed modification to the study plan, while MDNR and USFWS expressed an interest in the year-round water temperature data being collected. 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 and/or losing the water quality monitors during frozen conditions (winter) and high flows (spring).

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.

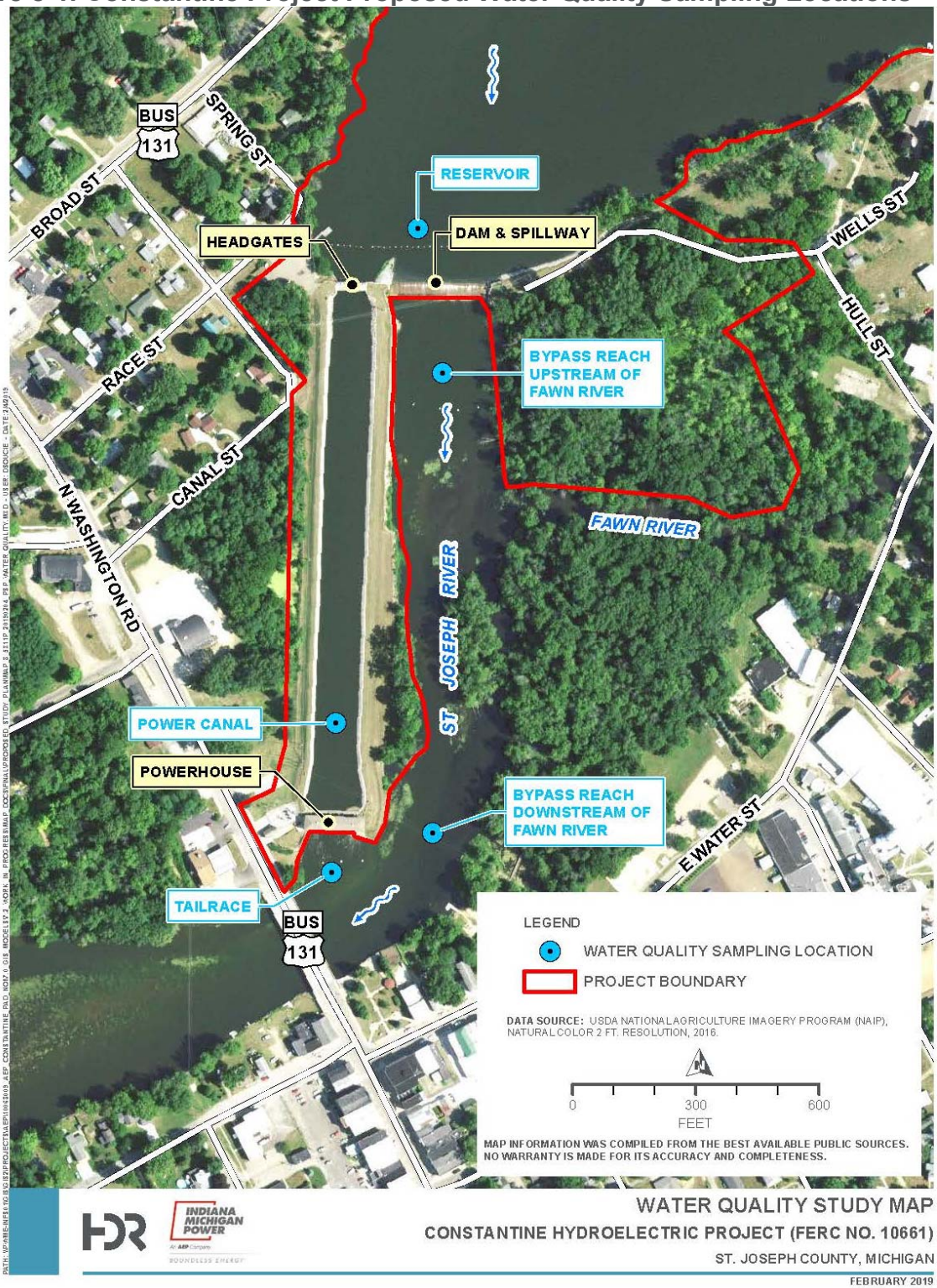
By letter dated March 6, 2019, the USFWS recommended that longitudinal transects be made with multiparameter instruments to determine the spatial variability associated with basic physical and chemical characteristics in the reservoir to identify discrete locations or sampling sites for further water-quality sampling and assessment. The USFWS recommended that the following characteristics be measured (1) temperature, (2) pH, (3) specific conductance, (4) turbidity, (5) DO, (6) phosphorus, (7) nitrogen, and (8) chlorophyll. Additionally, the USFWS recommended that concurrent data be collected from the St. Joseph River immediately upstream of the uppermost influence of the impoundment in order to allow for a more comprehensive evaluation of the water quality and biological impacts of the facility. I&M believes that the current monitoring locations as proposed in this RSP, and shown in Figure 8-1, will provide data that is representative of the water quality conditions in the Project vicinity that may potentially be impacted by continued operation of the Project. I&M believes that the additional parameters and

sampling methods requested by the USFWS are beyond the scope of this relicensing and would not provide information that would be useful in determining future license articles for the Project.

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 October. In addition, similar data will be collected during the fisheries and mussel surveys.

Figure 8-1. Constantine Project Proposed Water Quality Sampling Locations



8.6.3 Task 3 – Sediment Contaminant Sampling

I&M is proposing to conduct sediment contaminant sampling in the Project reservoir. I&M's Mottville Project, which is located approximately seven miles downstream of the Constantine Project, currently conducts periodic sediment sampling per conditions in the 401 Water Quality Certification and as described in Article 408 of the 2003 FERC license. Based on I&M's experience at other projects on the St. Joseph River and recent comments received from resource agencies, I&M is proposing to conduct sediment contaminant sampling as described below.

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 correspondence and/or consultation
- Literature cited

8.8 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 640 hours. I&M estimates that this study will cost approximately $80,000 to complete.

9 Fisheries Survey

9.1 Study Requests

The Commission's July 25, 2018 SD1 and November 13, 2018 SD2 identified the following environmental resource issues to be analyzed in the EA for the Project relicensing.

- 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.

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 on the PAD were received from FERC, USEPA, MDNR, and the Pokagon Band of Potawatomi Tribe related to fisheries resources. FERC commented on the PSP requesting additional information and MDNR provided sources for additional information in their PSP comment letter. Additional information has been incorporated into Section 9.6.3 of this study plan. No other comments were filed regarding this study.

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 impingement and 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 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 dolomieui*), 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).

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	*Pomoxis nigromaculatus*	45	7.1
Bluegill	*Lepomis macrochirus*	296	46.7
Bowfin	*Amia calva*	1	0.2
Bullhead catfishes (family)	Ictaluridae	2	0.3
Common Carp	*Cyprinus carpio*	18	2.8
Channel Catfish	*Ictalurus punctatus*	29	4.6
White Sucker	*Catostomus commersonii*	3	0.5
Hybrid sunfish	*Lepomis sp.*	4	0.6
Largemouth Bass	*Micropterus salmoides*	13	2.1
Longnose Gar	*Lepisosteus osseus*	16	2.5
Logperch	*Percina caprodes*	2	0.3
Northern Pike	*Esox lucius*	1	0.2
Pumpkinseed	*Lepomis gibbosus*	9	1.4
Redhorse	*Moxostoma spp.*	95	15.0
Rock Bass	*Ambloplites rupestris*	4	0.6
Smallmouth Bass	*Micropterus dolomieui*	34	5.4
Spotted Sucker	*Minytrema melanops*	44	6.9
Walleye	*Sander vitreus*	14	2.2

Common Name	Scientific Name	Number	Percent
Yellow Perch	*Perca flavecens*	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 bypassed reach, or supplement the surveying with other information collected outside of the relicensing studies. 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 electrofishing[3]
- 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

[3] 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.

- Time and date
- Weather
- General descriptions of depth, flows, and substrate
- Cover type and estimated percentage of cover

In addition to this supporting data, I&M will collect discrete water quality measurements of water 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 only be 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. I&M's Mottville Project, which is located approximately seven miles downstream of the Constantine Project, currently conducts periodic fish tissue monitoring per conditions in the 401 Water Quality Certification and as described in Article 408 of the 2003 FERC license. Based on I&M's experience at other projects on the St. Joseph River and recent comments received from resource agencies, I&M is proposing to conduct fish tissue sampling as described below. Additionally, I&M will obtain and review any applicable information related to fish tissue, catch-and-release, and consumption data as necessary.

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 600 hours. I&M estimates that this study will cost approximately $75,000 to complete.

10 Mussel Survey

10.1 Study Requests

The Commission's November 13, 2018 SD2 identified the following environmental resource issues to be analyzed in the EA for the Project relicensing.

- Effects of continued project operation on mussels in project-affected waters, including in the project bypassed reach.

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 on the PAD were received from FERC, USEPA and MDNR related to surveying for mussels in the Project area. MDNR filed a PSP comment letter in which they concurred with I&M's proposed Mussel Survey and recommended that I&M refer to the MDNR's mussel survey protocol and contact the Southern Lake Michigan Management Unit regarding survey design. These recommendations have been incorporated into Section 10.6.2 of this study plan. No other comments were filed regarding this study.

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, bypassed reach, and downstream area.

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
Creeper	*Stophitus undulatus*[1]	X	X
Cylindrical Papershell	*Anodontoides ferussacianus*		X
Elktoe	*Alasmidonta marginata*	X	X
Ellipse	*Venustaconcha ellipsiformis*	X	X
Fluted-Shell	*Lasmigona costata*		X
Giant Floater	*Pyganodon grandis*[2]	X	
Mucket	*Actinonaias carinata*		X
Ohio Pigtoe	*Pleurobema cordatum*		X
Pocketbook	*Lampsilis cardium*		X
Purple Wartyback[3]	*Cyclonaias tuberculata*		X
Rainbow Shell	*Villosa iris*		X
Spike	*Elliptio dilatata*	X	X
Wabash Pigtoe	*Fusconaia flava*	X	X

[1] Identified in report as *Stophitus 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 mussel propagation and survival.

10.6 Methodology

10.6.1 Task 1 – Collector's Permit

I&M's consultant will obtain any 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 bypassed reach, and one location downstream of the Project's powerhouse. Specific survey sites will be 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 Procedures[4]. I&M will consult with resource agencies and other stakeholders to determine survey scope and locations, including the MDNR's Southern Lake Michigan Management Unit. 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 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, including water temperature, DO, pH, and specific conductance, 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

[4] Michigan Freshwater Mussel Survey Protocols and Relocation Procedures, 2018 is available at https://www.fws.gov/midwest/eastlansing/te/pdf/MIFreshwaterMusselSurveyProtocolsRelocationProceduresFeb2018.pdf.

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 and November 13, 2018 SD2 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 on the PAD were received from FERC related to wetland resources. MDNR filed a PSP comment letter in which they concurred with I&M's proposed Wetlands Study. No other comments were filed regarding this study.

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 and November 13, 2018 SD2 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.
- 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.

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 recreation facilities in the Project area and identify any need for improved recreational access to the Project's reservoir; 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. To the extent practicable, I&M will identify the entities that own and operate formal public non-Project recreation facilities in the Project area and include this information in the final study report.

12.6.1 Task 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 12.6.2. 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 Task 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	▪ One weekend day (Memorial Day Weekend) ▪ One randomly selected weekday
June	▪ One weekend day that coincides with the Father's Day boat race[1] ▪ One randomly selected weekday
July	▪ One weekend day ▪ One randomly selected weekday
August	▪ One weekend day ▪ One randomly selected weekday
September	▪ 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* (U.S. 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 Task 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 recreationists 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 correspondence 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 320 hours. I&M estimates that this study will cost approximately $40,000 to complete.

13 Cultural Resources Study

13.1 Study Requests

The Commission's July 25, 2018 SD1 and November 13, 2018 SD2 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 in 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 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) and Indian Tribes[5] 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

[5] 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 cultural resources 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).

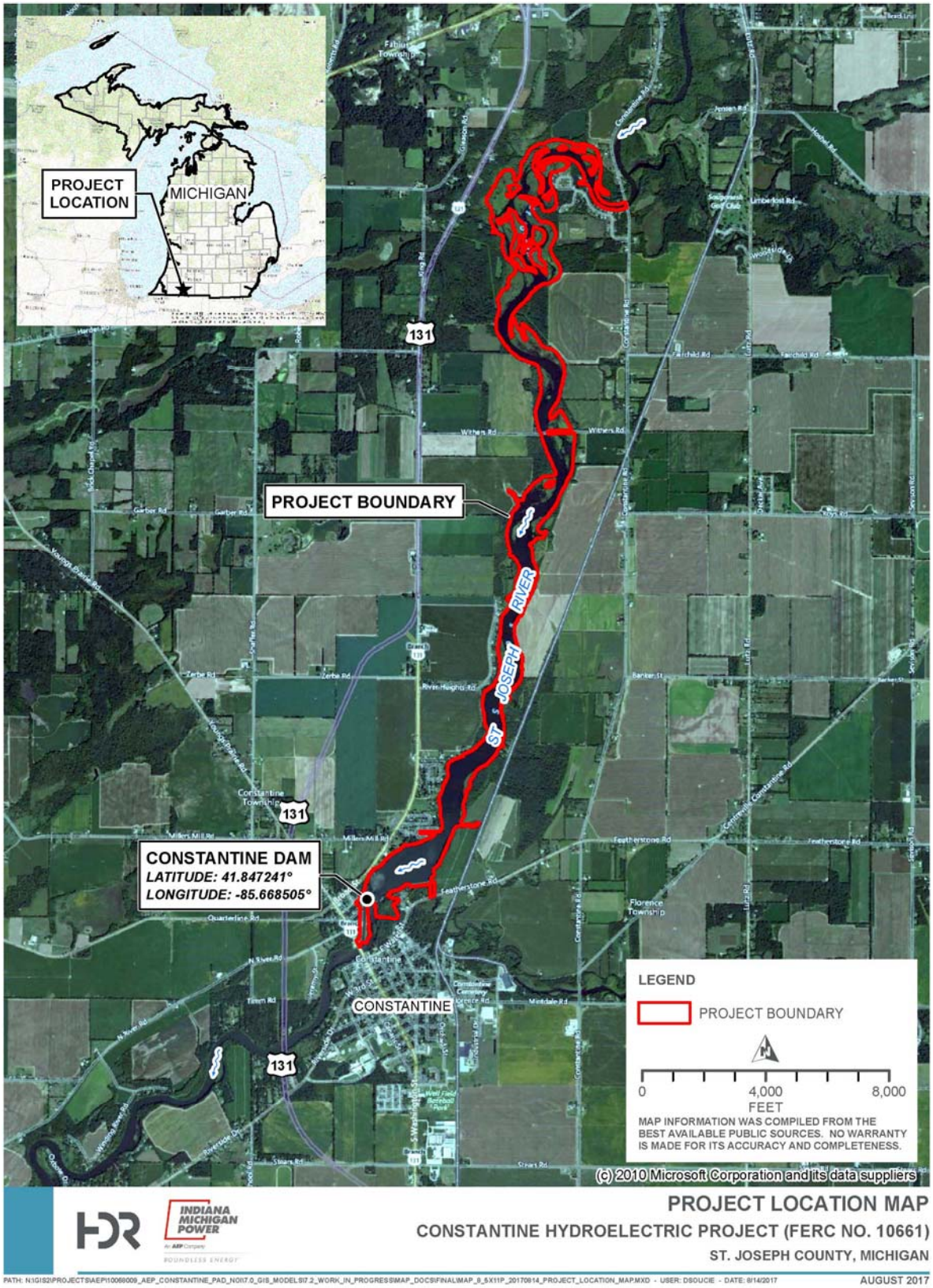
Archaeological fieldwork was conducted in the three parcels of the Constantine Project, which included visual inspection, pedestrian survey, and subsurface testing. Fieldwork was completed in May 1990. The archaeological investigation concluded that there were no historic or prehistoric archaeological sites recorded for the Project site.

No properties listed in or eligible for listing in 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

resource to the Constantine Historic Commercial District and was also individually listed in 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 Project Boundary for the Constantine Project



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)[6].

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.

[6] I&M consulted with the ACHP, FERC, Michigan SHPO, 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 APE for the Project. The Forest County Potawatomi Tribe provided a response on March 7, 2019, which has been included in Appendix B of this RSP. I&M has received no other responses regarding the proposed APE for the Project.

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 professional[7] 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 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*.)[8], and the Council's

[7] 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).

[8] 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

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 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;

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associated artifacts be identified as Native American and to the extent such principles and procedures are consistent with any other applicable requirements.

- 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 $25,000 to complete.

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Appendix A. Comments on Pre-Application Document 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.

If you have any questions, please contact Lee Emery at (202) 502-8379, or via e-mail at lee.emery@ferc.gov.

Sincerely,

Janet Hutzel

Janet Hutzel, Chief
Midwest Branch
Division of Hydropower Licensing

Enclosures: Schedule A
Schedule B
Schedule C

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

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

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[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

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 2 8 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 Inventory[1] (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 instructions[2] for federal projects potentially affecting NRI segments. Under Section 5(d)(1) of the WSRA and related guidance[3], 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 manual[4] 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 guidance[5] 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/Presidental-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 protocols[6].

  Recommendations: If mussels are located within the project area[7], 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.

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[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 Assessment[8] 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

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
LANSING

RICK SNYDER
GOVERNOR

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.

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.

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

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

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

Mr. Davis,

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

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Department of Natural Resources

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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,

Jennifer Kanine, PhD. AWB®
Director, Department of Natural Resources
Pokagon Band of Potawatomi Indians
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Kyle Boone, MS
Environmental Quality Specialist
Pokagon Band of Potawatomi Indians
Kyle.Boone@PokagonBand-nsn.gov
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Desk: 269-782-4880

Appendix B. Comments on Proposed Study Plan and Proposed Study Plan Consultation

Study	Comment No.	Commenter	Comment	I&M Response
Botanical Resources Study	1	MDNR	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).	Comments acknowledged. As discussed in Section 6.6.3 of the Botanical Resources Study, I&M will consult with MDNR as necessary to assist with characterizing the extent of any population of the species surveyed during the Botanical Resources Study.
Shoreline Stability Assessment Study	2	MDNR	The Department agrees with the applicant's proposed shoreline stability assessment.	Comment acknowledged.
Water Quality Study	3	MDNR	The Department agrees with the applicant's proposed water quality study.	Comment acknowledged.
Fisheries Survey	4	MDNR	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.	I&M or their consultant will contact Tom Goniea to obtain a Scientific Collectors Permit prior to conducting the fisheries survey. As discussed in Section 9.6.3 of the Fisheries Survey, I&M will also obtain and review any applicable information related to fish tissue, catch-and-release, and consumption data as necessary.
Mussel Survey	5	MDNR	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.	I&M or their consultant will contact Tom Goniea to obtain a Scientific Collectors Permit prior to conducting the mussel survey. As discussed in Section 10.6.2 of the Mussel Survey, I&M will also contact the Southern Lake Michigan Management Unit regarding the mussel survey design.
Wetlands Study	6	MDNR	The Department concurs with the applicant's proposed wetland study.	Comment acknowledged.
Recreation Study	7	MDNR	The Department concurs with the applicant's proposed recreation study.	Comment acknowledged.
Cultural Resources Study	8	MDNR	The Department concurs with the applicant's proposed cultural resources study.	Comment acknowledged.
Water Quality Study	9	MDEQ	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.	I&M has extended the original proposed sampling period from May 1 through September 30 to May 1 through October 31 to accommodate the MDEQ's request. I&M consulted with the USFWS, MDNR, and MDEQ via letter dated February 5, 2019 requesting concurrence on their proposed water quality sampling locations and proposed modifications to the continuous water temperature sampling period to limit it from one full year to the same six month period as the dissolved oxygen sampling (May 1-October 31). Agency correspondence is included in Appendix B of this RSP.

Study	Comment No.	Commenter	Comment	I&M Response
Shoreline Stability Assessment Study	10	FERC	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.	These requirements have been incorporated into Section 7.6.2 of the Shoreline Stability Assessment Study Plan.
Water Quality Study	11	FERC	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.	I&M consulted with the USFWS, MDNR, and MDEQ via letter dated February 5, 2019 requesting concurrence on their proposed water quality sampling locations and proposed modifications to the continuous water temperature sampling period to limit it from one full year to the same six month period as the dissolved oxygen sampling (May 1-October 31). Additional correspondence regarding this modification to the PSP is included in Appendix B.
	12	FERC	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.	I&M has provided additional information in Section 8.6.3 of the Water Quality Study Plan.
Fisheries Survey	13	FERC	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.	I&M has provided additional information in Section 9.6.3 of the Fisheries Survey Study Plan.

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
LANSING

GRETCHEN WHITMER
GOVERNOR

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
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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

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 Hutzel, 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.

American Electric Power
1 Riverside Plaza
Columbus, OH 43215
aep.com

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 comment[1]. 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 106[2], 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

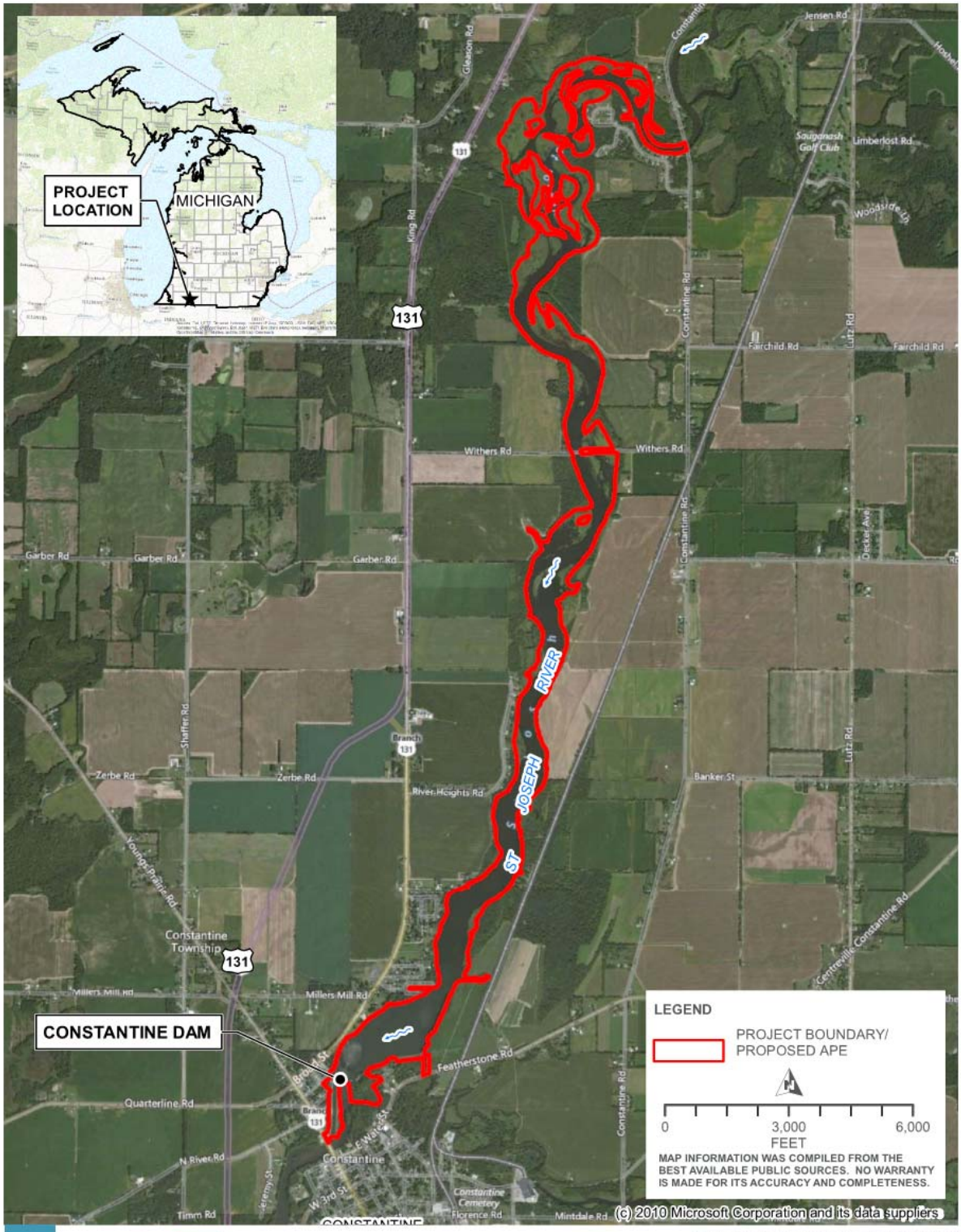
Indian Tribes

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

PATH: I:\SYR-SRV01\GIS\PROJECTS\AEP\10068009_AEP_CONSTANTINE_PAD_NOI\7.0_GIS_MODELS\7.2_WORK_IN_PROGRESS\MAP_DOCS\DRAFT\MAP_8_5X11P_20171106_PROJECT_LOCATION_APE_MAP.MXD - USER: KAUSTIN - DATE: 1/30/2019

JANUARY 2019

American Electric Power
1 Riverside Plaza
Columbus, OH 43215
aep.com

February 5, 2019

Ms. Amira Oun
Environmental Engineer
Michigan Department of Environmental Quality
525 West Allegan Street
P.O. Box 30473
Lansing, MI 48909

Ms. Kesiree Thiamkeelakul
Resource Analyst
Michigan Department of Natural Resources
Constitution Hall
525 West Allegan Street
P.O. Box 30028
Lansing, MI 48909

Mr. Jack Dingledine
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. 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 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.

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.

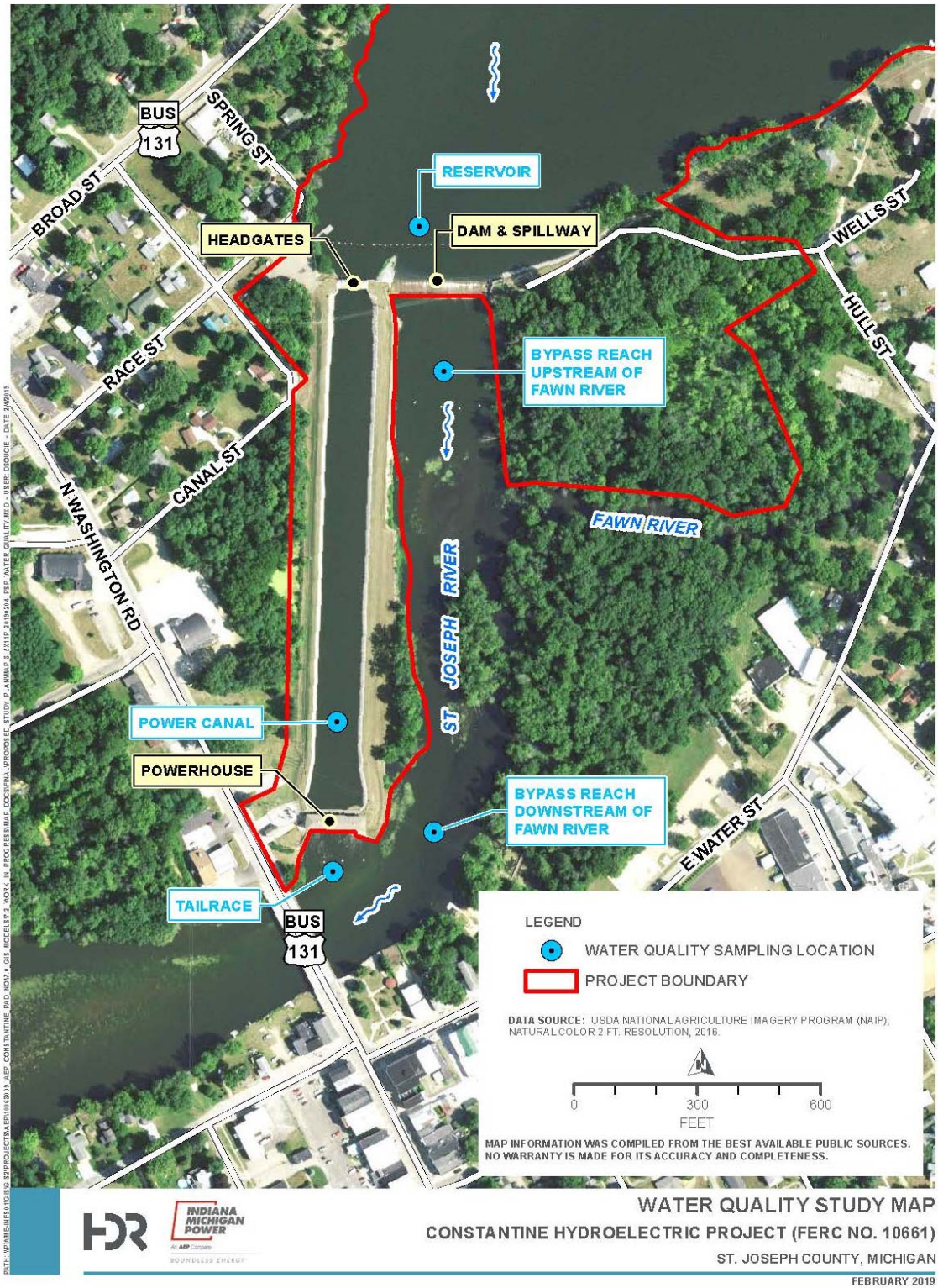
If there are any questions regarding this submittal or other aspects of Project relicensing, please do not hesitate to contact me by phone at (614) 716-2240 or by email at jmmagalski@aep.com.

Sincerely,

Jonathan M. Magalski
Environmental Specialist Consultant
American Electric Power Services Corporation, Environmental Services

Enclosure

Figure 1. Constantine Project Proposed Water Quality Sampling Locations



STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
LANSING

GRETCHEN WHITMER
GOVERNOR

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, MU
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.

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

GRETCHEN WHITMER
GOVERNOR

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,

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

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
Environemental Specialist Consultant
American Electric Power Services
Corporation, Environmantal 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 assocaited site boudaries 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

Email: Michael.LaRonge@FCPotawatomi-nsn.gov

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.

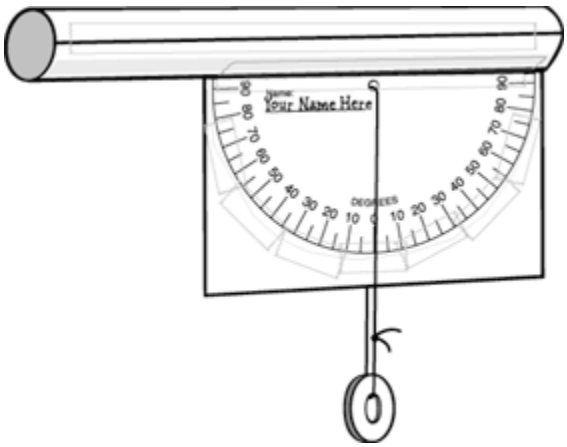
Ratio of root depth to bank height. Root depth is the ratio of the average plant root depth to the bank height, expressed as a percent (e.g., roots extending 2' into a 4' tall bank = 0.50.)

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 90º 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).

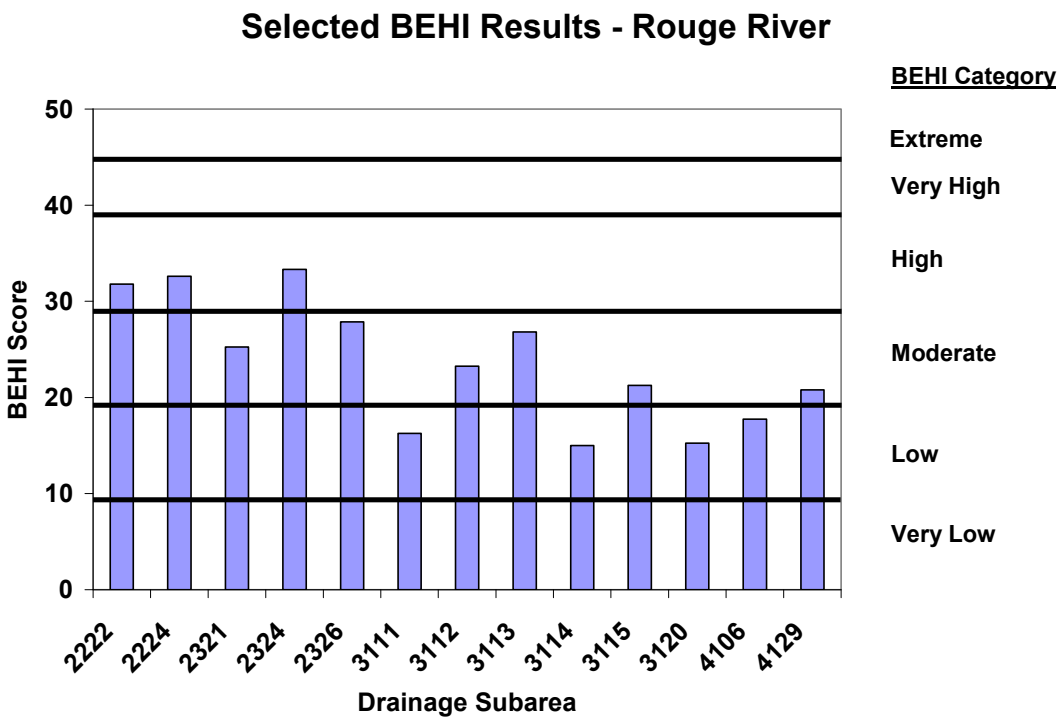
Table 1. Scores for the Complete BEHI.

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



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

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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 ≈ 1.0-1.1

Root Depth/Bank Height ≈ 0.9-1.0

Root Density ≈ 80-100%

Bank Angle ≈ 0-20º ?

Surface Protection ≈ 80-100%

BEHI Score = 7.25 (Very low)

Figure B. Kalamazoo River

Bank Height/Bankfull Height ≈ 1.0-1.1

Root Depth/Bank Height ≈ 0.9-1.0

Root Density ≈ 30-54%, not counting sod slump

Bank Angle ≈ 81-90º

Surface Protection ≈ 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

<u>Bank Height/Bankfull Height</u> ≈ 1.0-1.1 (assuming top of bank = bankfull)

<u>Root Depth/Bank Height</u> ≈ 0.9-1.0

<u>Root Density</u> ≈ 5-14%

<u>Bank Angle</u> ≈ 81-90º

<u>Surface Protection</u> ≈ 10-14%

<u>BEHI Score</u> = 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

<u>Bank Height/Bankfull Height</u> ≈ > 2.8

<u>Root Depth/Bank Height</u> ≈ 0.3-0.49 at best

<u>Root Density</u> ≈ 5-14%

<u>Bank Angle</u> ≈ 81-90º

<u>Surface Protection</u> ≈ 10-14%

<u>BEHI Score</u> = 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☐ Constantine Tailwater Fishing Access☐ Constantine Portage and Reservoir Fishing Access☐ Riverview Park☐ Riverview Park Boat Launch☐ Shelby Park☐ American Legion Boat Launch☐ Other☐**		
Home Zip Code:	_____	**Date:**	_____
Age:	_____	**Time:**	_____
Are you:	**Male ☐**	**Female ☐**	**Prefer not to answer ☐**
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 ☐

Q-4. Which of the following recreation areas at or near the Constantine Project did you visit for recreation during the past 12 months? **(Please select all that apply)**

- ☐ Constantine Boat Launch
- ☐ Constantine Tailwater Fishing Access
- ☐ Constantine Portage and Reservoir Fishing Access
- ☐ Riverview Park
- ☐ Riverview Park Boat Launch
- ☐ Shelby Park
- ☐ American Legion Boat Launch
- ☐ None of the above
- ☐ Other (Please list)

_____

_____

Q-5. About how many miles did you travel to get to the Constantine Project area?

A. _____miles

Q-6. Are you staying overnight in the Constantine Project area (not including at your own home) on this trip?

1. Yes 2. No

Q-7. If you answered yes to **Q-6**, at what type of accommodations will you be staying? (**Please select one)**

1. RV/Auto/Tent Campground
2. Motel/hotel
3. Bed and Breakfast
4. Vacation or rental home
5. Other (Please specify: _____)

Q-8. How many people (including you) are in your group?

A. _____people

Q-9. Which of the following best describes your group during this trip?

1. Individual
2. Adult group (over 21)
3. Youth group (under 21)
4. Family (with children)
5. Mixed group (families and friends of various ages)

Q-10. On this trip to the Constantine Project area, in which of the following activities have you or do you expect to participate? (**Please select all that apply**)

1. Bank fishing	5. Picnicking	8. Hunting
2. Boat fishing	6. Swimming	9. Wildlife viewing

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.