



Via Electronic Filing

May 8, 2020

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

**Subject: Constantine Hydroelectric Project (FERC No. 10661)
Summary of Initial Study Report Meeting**

Dear Secretary Bose:

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

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

Pursuant to 18 CFR § 5.15(c), I&M filed the Initial Study Report (ISR) with the Commission on April 14, 2020. The timely filing of the ISR was consistent with the requirements of the ILP and with the pre-filing process plan and schedule presented in I&M's June 4, 2018 Pre-Application Document and in the Commission's Scoping Document 1 and Scoping Document 2, dated July 25, 2018 and November 13, 2018, respectively.

The Commission's regulations direct license applicants to convene an Initial Study Report Meeting (ISR Meeting) within 15 days of filing the ISR. Therefore, concurrent with the April 14, 2020 filing of the ISR, I&M filed notification that the ISR Meeting would be held on April 23, 2020.

The ISR Meeting was held from 9:00 a.m. to approximately 12:00 p.m. on April 23, 2020. The Commission's regulations at 18 CFR § 5.15(c)(3) require I&M to file this summary of the ISR Meeting, including any proposed modifications to ongoing studies or new studies proposed by the Licensee, within 15 days of the ISR Meeting.

1.0 Purpose and List of Participants

1.1 Purpose

In accordance with 18 CFR § 5.15(c)(2), I&M held an ISR Meeting with the relicensing participants and the Commission staff via Webex to discuss the study results and the Licensee's or other participant's proposals, if any, to modify the study plan in light of the progress of the study plan and data collected.

The study plan approved by the Commission directed I&M to conduct 8 studies in support of relicensing the Project:

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

The purpose of this ISR Meeting was to discuss available study results and any proposals to modify the study plans in light of the progress of studies and data collected.

In furtherance of these objectives, I&M presented information regarding the relicensing process for the Project, and specific information regarding each approved study, including:

- Study status;
- Summary of study methods and results; and
- Variances from the approved study plan.

A copy of the presentation is attached to this ISR Meeting Summary.

1.2 Participants

Concurrent with the April 14, 2020 filing of the ISR, resource agencies, Tribes, non-governmental organizations, and other interested parties were invited to participate in the ISR Meeting. Table 1 presents the meeting participants and their respective organization/affiliation.

**TABLE 1
 CONSTANTINE PROJECT ISR MEETING PARTICIPANTS**

Participant	Organization / Affiliation
Lee Emery	Federal Energy Regulatory Commission (FERC)
Colleen Corballis	Federal Energy Regulatory Commission (FERC)
Michael Davis	Federal Energy Regulatory Commission (FERC)
Laura Washington	Federal Energy Regulatory Commission (FERC)
Paul Makowski	Federal Energy Regulatory Commission (FERC)
Scott Hicks	U.S. Fish and Wildlife Service (USFWS)
Kyle Kruger	Michigan Department of Natural Resources (MDNR)
Kesiree Thiamkeelakul	Michigan Department of Natural Resources (MDNR)
Amira Oun	Michigan Department of Environmental Quality (MDEQ) now known as Michigan Department of Environment, Great Lakes, and Energy (EGLE)
Bob Stuber	Michigan Hydro Relicensing Coalition
Jon Magalski	American Electric Power (AEP)
Liz Parcell	American Electric Power (AEP)
Christina Svoboda	American Electric Power (AEP)
Yun Gao	American Electric Power (AEP)
Rob Quiggle	HDR Engineering, Inc. (HDR)
Danielle Hanson	HDR Engineering, Inc. (HDR)
Dennis McCauley	Great Lakes Environmental Center, Inc. (GLEC)
Bill Arnold	Great Lakes Environmental Center, Inc. (GLEC)
Philip Mathias	EnviroScience, Inc. (EnviroScience)
Ryan Schwegman	EnviroScience, Inc. (EnviroScience)

2.0 Summary of ISR Meeting

As noted above, I&M presented information regarding the relicensing process, approved pre-filing schedule, and study activities to date. This information is summarized in the presentation attached to this ISR Meeting Summary. The following sections summarize the information presented and the discussion/questions in regards to the approved studies.

2.1 Introduction

Jon Magalski (AEP) provided an introduction to the meeting and everyone introduced themselves to the group. Jon Magalski discussed the filing of the ISR, purpose of the ISR Meeting, and reviewed the agenda. The overall Process Plan and Schedule for the Project was also reviewed. The logistics and requirements for requesting modifications or new studies were presented to the

group as well upcoming ILP milestones. An opportunity was given for general questions regarding process, etc. There were no questions from the group.

2.2 Botanical Resources Study

Dennis McCauley (GLEC) presented the objectives of, methods for, and results of the Botanical Resources Study.

Summary of Study Methods and Results

- The main goal of this study was to describe the vegetation types within the Project boundary. All observations and data collected were within the Project boundary.
- Historically, the Project area was described as a “mixed hardwood community”. However, as a result of this study GLEC further described the Project area as more of a floodplain forest.
- There were a number of rare, threatened and endangered (RTE) species as well as invasive plant species that were identified to search for and document during the surveys. A list of these plant species was developed and is included in Table 1 of the Botanical Resources Study Report.
- Habitat maps were developed using historical inventories from the Michigan Natural Features Inventory and GoogleEarth. Those maps were then taken into the field to be ground-truthed.
- Field biologists paid specific attention to RTE and invasive species during the surveys. It was noted that the Project area is heavily agricultural.
- Three map figures are included in the Botanical Resources Study Report. Figure 1 shows RTE species locations, Figure 2 shows invasive species locations, and Figure 3 shows vegetation and land cover.
- Table 1 of the study report lists the 11 species of interest for the study. During the inventory, a total of 23 non-native species were discovered. In addition to this study AEP conducts annual invasive plant surveys, which began in 2016. GLEC relied heavily on this information for this study. Purple loosestrife is most concentrated in the island areas in the upper reservoir and Eurasian watermilfoil is present throughout the Project area.
- GLEC also searched for wild rice beds and did not find any, although they have been documented in the area historically.
- Jon Magalski clarified that AEP has been conducting invasive species surveys as early as the 1990s and those reports have all been filed with FERC. For clarity, invasive species surveys for purple loosestrife and Eurasian watermilfoil formally began in 1998.
- Figure 2 from the study report was presented to the group showing the invasive species locations. Dennis McCauley pointed out that the main invasive species were purple loosestrife and Eurasian watermilfoil.

Variances from FERC-approved Study Plan

- The study plan stated that high resolution aerial imagery would be used. However, this was not available for the Project area and GoogleEarth was used for field mapping and ESRI imagery was used to develop the maps that are included in the study report.

- The vegetation community in the Project area was previously described as “mixed hardwood”, but based on field observations GLEC biologists recharacterized the Project area as a floodplain forest.

Questions

- There were no questions from the group related to this study.

2.3 Shoreline Stability Assessment

Dennis McCauley presented the objectives of, methods for, and results of the Shoreline Stability Assessment.

Summary of Study Methods and Results

- The field work associated with this study was completed in the summer of 2019. The goal of this study was to observe the entire reservoir and focus on spots of instability or erosion. The Rosgen Method was used to score each site as high, medium, or low.
- Sites were visited in June and September concurrent with the Fisheries Survey. In June, 57 sites were visited, with 12 of those sites located in the bypass reach and 45 in the reservoir. In September, 31 sites were evaluated, with 8 of those sites located in the bypass reach and 23 in the reservoir.
- As mentioned previously, the Rosgen Method was used to score the sites based on root depth, root density, surface protection, and bank angle. The sites that were evaluated in June ranged from low to moderate; there were no high ratings. Similar results were recorded in September. Site BA 16 was rated as moderate with some soil falling into the bypass reach. There was also very little vegetation cover at this site.
- There were no areas of high erosion or instability documented in the study area. Some of the photos in the study report show areas of hardened shorelines that include riprap, which was taken into account when trying to apply the Rosgen Method so that the values were not being over or under estimated.

Variances from FERC-approved Study Plan

- There were no variances from the FERC-approved Study Plan.

Questions

- Paul Makowski (FERC) asked if there was a figure in the study report that showed the locations of the sites that were assessed and noted that it would be helpful for the reader.
- Dennis McCauley stated that Figure 1 shows the locations of the sites, but it would be good to update the figure to include the site numbers.
- Paul Makowski also asked what was used for the root depth if the Rosgen Method does not take into account the hardened areas. He inquired if those sites with hardened areas would be the ones labeled as Not Applicable.
- Dennis McCauley responded that the hardened areas were recorded as Not Applicable.

2.4 Water Quality Study

Dennis McCauley presented the objectives of, methods for, and results of the Water Quality Study.

Summary of Study Methods and Results

- Continuous water temperature and dissolved oxygen (DO) monitoring was conducted from May 1 through October 31, 2019. On a monthly basis GLEC conducted discrete multi-parameter water quality sampling using an YSI ProDSS handheld unit at each of the continuous monitoring locations. During the monthly data collections, GLEC calibrated data loggers and replaced any missing data loggers.
- Additionally, discrete water quality data was collected during the Fisheries Survey and is provided in the Fisheries Survey Report.
- GLEC collected sediment samples in the upper, middle, and lower reservoir along transects.
- Figure 1 in the Water Quality Study Report shows the locations of all of the water quality sampling sites.
- All of the water quality data collected has been plotted and is included in the appendices of the Water Quality Study Report. The data collected shows typical diurnal fluctuation.
- There was a lot of vandalism with the data loggers. Sometimes they were pulled out of the water and a few of the data loggers were actually cut from the cables and removed.
- For the continuous data loggers, a backup logger was deployed at each location in case there were any issues. In most instances when there were issues with the loggers, data was able to be used from the backup data logger. A lot of times the issues experienced were due to human interference and people pulling the loggers out of the water.
- There were a few occasions where the river flows pushed the data loggers up onto the shore and the loggers were temporarily out of the water. Some instances of rapidly declining DO occurred when the logger was desiccated and out of the water, but those instances were very low.
- Primary observations during the study:
 - Water quality data collected in the reservoir and power canal fell within the state thresholds for the entire monitoring period.
 - Water temperature was exceeded downstream of the Fawn River in October, but it was very close to the accuracy range of the data logger.
 - In the tailrace, DO readings were below the state thresholds on July 16, 2019. Due to probe damage and malfunction, only one data logger was recording in July so there was not a second set of data to verify low DO readings.
 - Instantaneous DO readings in the bypass reach were below the state threshold on multiple dates in August. During this time there was no water coming over the spillway and all of the water was going through the power canal.
 - All of the data collected is plotted and provided in Appendix A of the Water Quality Study Report.
- FERC's Study Plan Determination (SPD) did not require I&M to conduct sediment chemistry sampling. However, it was conducted at the request of MDNR and EGLE. Samples were compared to published sediment quality guidelines. Sediment chemistry is affected greatly by agricultural and industrial influences beginning upstream of Three Rivers. Sediment chemistry results are pretty homogenous throughout the St. Joseph River.
- In the Project area, mercury was slightly above the threshold, lead was equal to the threshold, and arsenic exceeded the threshold. Even though the levels were at or above the

thresholds they are not likely to have an adverse effect on aquatic life or human health. Mercury and lead concentrations were measured at or near the Threshold Effects Level and Effect Range Low which would indicate a very low risk to aquatic life. Arsenic concentrations in the lower reservoir were measured at concentrations that may adversely affect aquatic life, but were at concentrations less than the median effects level.

Variations from FERC-approved Study Plan

- There was physical disturbance of the data loggers due to human interference and high flows in the bypass reach.
- Data is missing from the bypass reach upstream of the Fawn River from June 27 through August 1, 2019 because both data loggers were discovered to be missing.
- FERC did not require I&M to conduct sediment sampling, but I&M conducted it per resource agencies' requests.

Questions

- There were no questions from the group related to this study.

2.5 Wetlands Study

Dennis McCauley presented the objectives of, methods for, and results of the Wetlands Study.

Summary of Study Methods and Results

- Field work was completed in 2019 when everything was in bloom and the river flows were low. The study included a field inventory and mapping portion.
- Bill Arnold (GLEC) stated that the maps developed for the Wetlands Study Report were based on USFWS' National Wetland Inventory (NWI) maps. The existing wetland acreage to be reviewed was clipped out within the Project boundary.
- Field biologists visited the wetland areas identified in the NWI maps to verify and update any wetland classifications as necessary. Biologists went to all of the wetland areas and documented any changes they noticed in relation to the NWI maps. There were very few minor changes in the upper reservoir area. The only larger change was an island near the powerhouse. GLEC biologists reclassified the wetland from Freshwater Emergent Wetland (PEM1C) to Forested Shrub Wetland (PFO1C).
- Wetlands were accessed via boat and biologists stepped out to make observations from shore if possible, or observations were made from the boat if they were unable to access the shoreline. No wetland delineations were performed as part of this study.
- Field survey notes for the 48 sites that were visited are included in Section 7 of the Wetlands Study Report. Biologists identified any changes to wetland types and updated acreages as necessary.
- Figure 1 of the Wetlands Study Report shows the locations of wetlands and labels the 48 sites that were visited during the survey. There were some slight changes in classifications from scrub-shrub to emergent due to the purple loosestrife infestations. The island between the powerhouse and the bypass reach was reclassified as a Forested Shrub Wetland instead of a Freshwater Emergent Wetland.

- The observations made by the field biologists were similar to what was described in the Pre-Application Document (PAD). The total acreage was also similar to what was reported in the PAD, with minor changes to classifications. There is a lot of purple loosestrife present in the Project area that is changing the wetland areas in the upper reservoir.

Variations from FERC-approved Study Plan

- Section 11 of the Revised Study Plan (RSP) variously describes the wetlands study area as wetlands within or adjacent to the Project boundary. Biologists made observations of wetlands within the FERC Project boundary.
- Soil survey maps were not used in the wetlands survey or post-survey mapping exercises as it was determined to be unnecessary.
- Section 7 of the Wetlands Study Report provides field survey notes that document where biologists have agreed with NWI wetland classifications or proposed minor changes to wetland types.
- The RSP stated that USFWS NWI and EGLE wetland maps would be used during the study. These maps appeared to be the same so GLEC only used the NWI maps.

Questions

- There were no questions from the group related to this study.

2.6 Recreation Study

Danielle Hanson (HDR) presented the objectives of, methods for, and results of the Recreation Study.

Summary of Study Methods and Results

- The Recreation Study was conducted by Young Energy Services.
- A Recreation Facility Inventory and Condition Assessment was performed for all existing Project and non-Project recreation facilities in the Project area.
- Visitor use data was also collected at all existing recreation sites through a combination of in-person surveys, field reconnaissance, and photographic documentation.
 - Recreation visitor use data was collected from May through September of 2019, generally from 8:00 AM until 6:00 PM.
- Field surveys were conducted on May 22 and 27, June 15, 16 and 28, July 1 and 21, August 15 and 25, and September 27 and 29.
- A team of two technicians rotated between the recreation sites in random order and conducting interviews with willing participants. Technicians also recorded relevant conditions, including observed recreational activities, estimated number of vehicles, and number of recreational users, along with other general information. A total of 21 recreation surveys were completed in the field.
- I&M also developed an online version of the interview questions for respondents to provide survey responses electronically.

- The online survey was available from May 1 through September 30, 2019. A notice of the online survey was posted to AEP's relicensing website and signs were posted at each of the Project's recreation facilities notifying recreationists of how to complete the survey.
- Seven online surveys were completed during the study period.
- Results of the survey show that the existing Project and non-Project recreation facilities are well maintained and utilized by the public.
- Overall, the public is pleased with the recreation facilities provided by I&M, St. Joseph County, and the Village of Constantine.
 - The cooperative effort of I&M and local governments has resulted in recreation facilities that meet the goals and objectives of the relevant recreation plans and also contribute to the economies of the area. This is evident based on the number of people that travel to the area for the annual boat race and other individuals that travel to the area to canoe/kayak, and fish the river and reservoir. One individual that completed the survey traveled approximately 600 miles, while a couple of other survey respondents traveled 200 and 150 miles to the Project area.
- The primary recreation activities observed were boat fishing, bank fishing, fishing in the trailrace area, and pleasure boating.
- Survey respondents indicated that their overall experience at the Project was totally acceptable.
- Overall, survey respondents appear to be very satisfied with the existing recreation facilities in the Project area.
 - Suggested improvements at the recreation sites were detailed in Section 2.3.1 of the Recreation Study Report.
 - Recommended improvements were signage improvements, identifying Americans with Disabilities-accessible parking, and improvements to vegetation management.
 - The Project recreation site with the most recommended improvements was the canoe portage. Suggested improvements were: better signage, upgraded walking surface, and increasing the trail width.

Variations from FERC-approved Study Plan

- There were no variations from the FERC-approved Study Plan.

Questions

- There were no questions from the group related to this study.

2.7 Cultural Resources Study

Rob Quiggle (HDR) presented the objectives of, methods for, and results of the Cultural Resources Study.

Summary of Study Methods and Results

- The Cultural Resources Study was conducted by the Commonwealth Heritage Group (Commonwealth).
- The study was initiated by consulting with the Michigan State Historic Preservation Office (SHPO) and Tribes regarding the Area of Potential Effects (APE). I&M received a response from the Forest County Potawatomi concurring with the general APE. I&M never received a response from the SHPO.
- Commonwealth conducted a background literature review and architectural and archaeological investigations. The background research was conducted using the APE consistent with the FERC Project boundary, including an additional one-mile buffer.
- The Project facilities were surveyed and recommended as eligible for the National Register of Historic Places.
- I&M was in the process of distributing hardcopies of the Cultural Resources Study Reports to the SHPO and Tribes.
- I&M will continue to consult with the SHPO and Tribes regarding Traditional Cultural Properties.
- The Tribes were interested in the presence of wild rice in the Project area. No wild rice beds were identified during the Botanical Resources Survey.

Variances from FERC-approved Study Plan

- There were no variances from the FERC-approved Study Plan.

Questions

- Michael Davis (FERC) asked for clarification that the SHPO and Tribes had not yet received copies of the Cultural Resources Study Reports. Rob Quiggle stated that the reports were being mailed out the following day.

2.8 Fisheries Survey

Dennis McCauley presented the objectives of, methods for, and results of the Fisheries Survey.

Summary of Study Methods and Results

- Field work was completed in 2019. GLEC received the scientific collector's permit prior to conducting field work and notified the appropriate individuals when they were on-site conducting surveys.
- Two sampling events were completed: one in the late spring/early summer and one in late summer/early fall. The gear types used for both sampling events were boat electrofishing and fyke nets. Various habitat types were targeted during the surveys.
- Intake velocities were also measured upstream of the trashracks. Due to interference with the equipment and the hydro plant, intake velocity measurements were moved further upstream from the trashracks than stated in the RSP.
- Kyle Kruger (MDNR) asked what distance upstream of the trashracks the velocity measurements were taken. Dennis McCauley stated that he was not sure of the exact distance and would have to double check, but he thought it was approximately 100 feet

upstream of the trashracks. Kyle Kruger commented that MDNR usually looks for velocity data to be collected right at the trashracks and that MDNR will take another look at the data provided in the Fisheries Survey Report.

- Lee Emery (FERC) asked for a list of fish species that were collected in the power canal during a different survey that was conducted by another contractor in 2019. Dennis McCauley referred to Table 3 in the Fisheries Survey Report that includes several surveys conducted by other contractors, including the survey conducted in the power canal in 2019.
- Lee Emery asked what the depth was in the bypass reach. Dennis McCauley did not know the water depth offhand, but stated that it was more difficult to electrofish in the summer because the boat was bouncing off objects in the river.
- Lee Emery asked if I&M had a separate report for the fish collection effort and mussel relocation that was performed in 2019. Jon Magalski stated that I&M has the report for that effort and could either email it to Lee Emery or efile it with FERC. The subject report was efiled concurrently with this ISR Meeting Summary.
- Two figures were presented to the group. Figure 1 showed all of the electrofishing and fyke net locations, and Figure 2 showed where the velocity transects were recorded.
- Fish tissue samples were not required by FERC's SPD, but I&M decided to collect them anyways based on comments from the resource agencies and because they were required in the Mottville Project's license (next Project downstream, owned by AEP).
- During fish collections in June and September of 2019, 46 species of fish were documented. There were several fish species collected in past surveys that were not collected during the 2019 survey. There were also several species collected in the 2019 survey that had not been collected during past surveys. Almost 2,500 fish were collected during the 2019 surveys.
- Intake velocities collected in 2019 were similar to those collected during the previous survey in 1990-1991. Intake velocities were compared to fish swim speeds in Table 11 of the Fisheries Survey Report.
- Lee Emery inquired as to whether there was a good variation of age classes among the fish that were collected during the 2019 surveys. Dennis McCauley recalled that there appeared to be a good age class distribution in the 2019 survey.

Variances from FERC-approved Study Plan

- At some of the fish collection locations, Secchi disk readings were not able to be collected due to the swift current.
- Intake velocity measurements were collected further upstream than 1-foot in front of the trashracks because of interference experienced with the Acoustic Doppler Current Profiler.
- The power canal was not sampled due to issues with access and safety concerns. However, based on data from a previous survey in 2019 and consultation with MDNR it was determined that sampling the power canal was not necessary.
- There were not enough Common Carp or Channel Catfish collected during the survey for the fish tissue sampling so Shorthead Redhorse were substituted to represent the bottom

feeder species. GLEC still has samples of the fish tissues that were collected and would be willing to share them with the resource agencies if requested. The fish tissue samples are still at the lab being analyzed and will be provided to stakeholders once the analyses are complete.

Questions

- Questions were received from the group throughout the discussion and are included in the Summary of Study Methods and Results section above.

2.9 Mussel Survey

Philip Mathias (EnviroScience) presented the objectives of, methods for, and results of the Mussel Survey.

Summary of Study Methods and Results

- The mussel surveys were completed in 2019. The study area is classified as a Group 2S stream known to host threatened and endangered species. EnviroScience submitted a Mussel Survey Sampling Plan with the scientific collector's permit application.
- The survey was a qualitative survey, with a semi-quantitative component, that used both visual and tactile methods.
- The study plan stated that two sampling sites would be located in the Project's reservoir, one above Fawn River, and one below Fawn River. One of the sampling locations in the bypass reach ended up being at the mouth of the Fawn River due to access issues with maneuvering the 24-foot boat around all of the rocks in the river.
- Discrete water quality samples were collected at each of the sampling sites.
- Thirty subsamples were collected at each sampling location. Approximately five hours of diving and searching was performed at each site.
- A lot of the species found during the 2019 were also found in previous studies. Table 4 of the Mussel Survey Report compares the species collected in the EnviroScience 2019 survey to other previous studies. A total of 19 different species have been found in previous surveys. EnviroScience found 12 species during the 2019 survey. The headrace study conducted by Cardno in 2019 found 11 species.
- It was documented that there was quite a bit of recruitment in the downstream area of the Project.
- Appendix B of the Mussel Survey Report contains shell length histograms of each species. Most of the histograms had a bell-shape curve.
- The state-listed threatened and species of concern were found during the surveys. They were only found dead in the downstream area and were found live in the headrace. Table 1 of the Mussel Survey Report details the state-listed species and species of concern that were collected during the surveys.
- There were a few species that had been found in previous studies that were not found in the 2019 EnviroScience survey.

- Zebra mussels were present in the downstream areas. Based on the small number of zebra mussels (one or two) present on the mussels collected, it did not appear to be a large infestation.

Variations from FERC-approved Study Plan

- There were no variations from the FERC-approved Study Plan.

Questions

- There were no questions from the group related to this study.

3.0 Conclusion

I&M is filing this ISR Meeting Summary in accordance with 18 CFR § 5.15(c)(3) of the Commission's regulations. After review of the ISR Meeting Summary, stakeholders may file disagreements with the meeting summary, request modifications to ongoing studies, or request new studies. Disagreements with the ISR Meeting Summary and any requests to amend the study plan to include new or modified studies must be filed with the Commission no later than 30 days after the filing of the ISR Meeting Summary (on or before June 7, 2020). In requesting modifications to ongoing studies or new studies, stakeholders must take into account the following criteria:

- *Criteria for Modification of Approved Study (18 C.F.R. 5.15(d)).* Any proposal to modify an ongoing study must be accompanied by a showing of good cause why the proposal should be approved, and must include, as appropriate to the facts of the case, a demonstration that:
 - (1) Approved studies were not conducted as provided for in the approved study plan; or
 - (2) The study was conducted under anomalous environmental conditions or that environmental conditions have changed in a material way.
- *Criteria for New Study (18 C.F.R. 5.15(e)).* Any proposal for new information gathering or studies must be accompanied by a showing of good cause why the proposal should be approved, and must include, as appropriate to the facts of the case, a statement explaining:
 - (1) Any material changes in the law or regulations applicable to the information request;
 - (2) Why the goals and objectives of any approved study could not be met with the approved study methodology;
 - (3) Why the request was not made earlier;
 - (4) Significant changes in the project proposal or that significant new information material to the study objectives has become available; and
 - (5) Why the new study request satisfies the study criteria in 18 C.F.R. § 5.9(b).

I&M will have 30 days to respond to any disagreements or requests to amend the study plan (July 7, 2020). The Commission's Director of the Office of Energy Projects will resolve any disagreement and amend the approved study plan, as appropriate, within 30 days of the due date for I&M's response (no later than August 6, 2020).

Constantine Hydroelectric Project (FERC No. 10661)
Summary of Initial Study Report Meeting
May 8, 2020
Page 14 of 14

If there are any questions regarding this filing, please do not hesitate to contact me at (614) 716-2240 or jmmagalski@aep.com.

Sincerely,

A handwritten signature in black ink, appearing to read "Jonathan M. Magalski". The signature is written in a cursive style with a large initial "J" and "M".

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

Attachments:

Attachment A – ISR Meeting Presentation

Attachment B – Constantine Project Stranded Fish and Mussel Survey Report

Cc: Distribution List
Liz Parcell (AEP)
Rob Quiggle (HDR)

Constantine Hydroelectric Project (FERC No. 10661) Distribution List

Federal Agencies

Mr. John Eddins
Office of Federal Agency Programs
Advisory Council on Historic Preservation
401 F Street NW, Suite 308
Washington, DC 20001-2637

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

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

Mr. Michael Pentony
Regional Administrator
NOAA Fisheries Service
Greater Atlantic Regional Fisheries Office
55 Great Republic Drive
Gloucester, MA 01930-2276

Mr. Martin J. Rosek
State Soil Scientist
US Department of Agriculture
Natural Resources Conservation Service
3001 Coolidge Road, Suite 250
East Lansing, MI 48823

Ms. Mary Manydeeds
Bureau of Indian Affairs, Midwest Region
US Department of the Interior
Norman Pointe II Building
5600 W. American Boulevard, Suite 500
Bloomington, MN 55437

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

Mr. Lindy Nelson
Regional Environmental Officer, Office of
Environmental Policy & Compliance
US Department of the Interior
Philadelphia Region
Custom House, Room 244
200 Chestnut Street
Philadelphia, PA 19106

Ms. Liz Pellosso
Wetland/Environmental Scientist, Region 5
US Environmental Protection Agency
77 West Jackson Boulevard (E19-J)
Chicago, IL 60604

Mr. Ken Westlake
Chief, NEPA Implementation Section - Region 5
US Environmental Protection Agency
77 West Jackson Boulevard (E19-J)
Chicago, IL 60604

Mr. Jack Dingedine
Assistant Field Office Supervisor/Michigan
Ecological Services Field Office
US Fish and Wildlife Service
2652 Coolidge Road, #101
East Lansing, MI 48823

Ms. Alisa Shull
Chief, Endangered Species - Midwest Region
(Region 3)
US Fish and Wildlife Service
5600 American Boulevard West, Suite 990
Bloomington, MN 55437-1458

Mr. Derrick Hubbell
Michigan Water Science Center
US Geological Survey
6520 Mercantile Way, Suite 5
Lansing, MI 48911-5991

Mr. Tom Weaver
Michigan Water Science Center
US Geological Survey
6520 Mercantile Way, Suite 5
Lansing, MI 48911-5991

US Geological Survey
1451 Green Road
Ann Arbor, MI 48105

Hon. Aaron Miller
US Congressman, 59th District
US House of Representatives
N-993 House Office Building
PO Box 30014
Lansing, MI 48909

Constantine Hydroelectric Project (FERC No. 10661) Distribution List

Mr. Michael Reynolds
Acting Director, Headquarters
US National Park Service
1849 C Street, NW
Washington, DC 20240

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

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

State Agencies

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

Mr. Chris Antieau
Great Lakes Shorelands Unit - Water Resources
Division
Michigan Department of Environmental Quality
525 West Allegan Street
PO Box 30473
Lansing, MI 48909-7973

Kalamazoo District Office
Michigan Department of Environmental Quality
7953 Adobe Road
Kalamazoo, MI 49009-5025

Ms. Jessica Mistak
Michigan Department of Natural Resources
PO Box 30028
Lansing, MI 48909

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

Ms. Kesiree Thiamkeelakul
Michigan Department of Natural Resources
Mio Field Office
191 S. Mt. Tom Road
Mio, MI 48647

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

Local Governments

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

Mr. Robert Hile
Mayor
City of Sturgis
130 North Nottawa
Sturgis, MI 49091

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

St. Joseph County
PO Box 189
Centerville, MI 49032

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

Mr. Mark R. Brown
Supervisor
Township of Constantine
425 Centerville Street
Constantine, MI 49042

Constantine Hydroelectric Project (FERC No. 10661) Distribution List

Mr. George E. Morse
Supervisor
Township of Sturgis
70669 Stubey Road
Sturgis, MI 49091

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

Mr. Mark Honeysett
Village Manager
Village of Constantine
115 White Pigeon Street
Constantine, MI 49042

Ms. Marcia Skelton
Village of Constantine
115 White Pigeon Street
Constantine, MI 49042

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

Tribes

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

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

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

Non-governmental Organizations

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

Mr. Kevin Richard Colburn
National Stewardship Director
American Whitewater
PO Box 1540
Cullowhee, NC 28779

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

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

Michigan Environmental Council
602 West Ionia Street
Lansing, MI 48933

Mr. Bob Stuber
Fisheries Biologist
Michigan Hydropower Relicensing Coalition
1620 High Street
Traverse City, MI 49684

Michigan Loon Preservation Association
10181 Sheridan Road
Millington, MI 48746

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

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

Attachment A - ISR Meeting Presentation

**AMERICAN
ELECTRIC
POWER™**

BOUNDLESS ENERGY™

Constantine Hydroelectric Project

Initial Study Report Meeting
April 23, 2020



BOUNDLESS ENERGY™



Initial Study Report

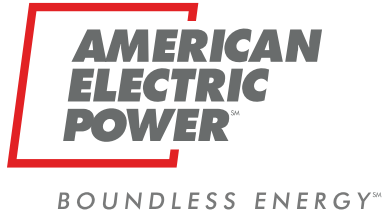
- Indiana Michigan Power Company (I&M) is pursuing a new license for the Project from the Federal Energy Regulatory Commission (FERC or Commission) in accordance with FERC's Integrated Licensing Process (ILP) at 18 CFR Part 5.
- Pursuant to the ILP, I&M developed an Initial Study Report (ISR) that was filed with the Commission on April 14, 2020.
 - The ISR describes I&M's overall progress in implementing the study plan and schedule approved in FERC's April 9, 2019 Study Plan Determination (SPD), the data collected, and any variances from the study plan and schedule.
- The Commission's regulations at 18 C.F.R. § 5.15(c) requires I&M to hold an ISR Meeting within 15 days of filing the ISR.
- The purpose of the ISR Meeting is to discuss available study results and any proposals to modify the study plans in light of the data collected.

*BOUNDLESS ENERGY*SM



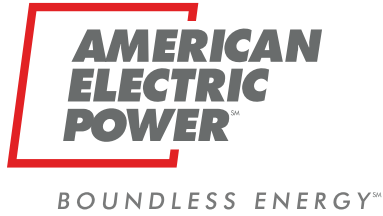
Meeting Agenda

April 23, 2020	Schedule
Welcome and Introduction	9:00 AM – 9:10 AM
Botanical Resources Study	9:10 AM – 9:50 AM
Shoreline Stability Assessment Study	9:50 AM – 10:30 AM
Water Quality Study	10:30 AM – 11:10 AM
<i>Break</i>	11:10 AM – 11:20 AM
Fisheries Survey	11:20 AM – 12:00 PM
Mussel Survey	12:00 PM – 12:40 PM
<i>Lunch Break</i>	12:40 – 1:30 PM
Wetlands Study	1:30 PM – 2:10 PM
Recreation Study	2:10 PM – 2:50 PM
Cultural Resources Study	2:50 PM – 3:30 PM
Discussion and Questions	3:30 PM – 4:00 PM



Process Plan and Schedule

Major Milestones	Responsible Party	Dates
File PAD and NOI (18 CFR §5.5(d))	I&M	June 4, 2018
Issue Notice of PAD/NOI and SD1 (18 CFR §5.8(a))	FERC	August 3, 2018
File Proposed Study Plan (PSP) (18 CFR §5.11)	I&M	November 16, 2018
Study Plan Meeting(s) (18 CFR §5.11(e))	I&M	December 11, 2018
Comments on PSP (18 CFR §5.12)	Stakeholders	February 14, 2019
File Revised Study Plan (RSP) (18 CFR §5.13(a))	I&M	March 16, 2019
Comments on RSP Due (18 CFR §5.13(b))	Stakeholders	March 31, 2019
Issuance of Study Plan Determination (18 CFR §5.13(c))	FERC Director	April 9, 2019
Initial Study Report (ISR) (18 CFR §5.15(c))	I&M	April 14, 2020
File Draft License Application (18 CFR §5.16(a))	I&M	May 3, 2021
File Updated Study Report (USR) (18 CFR §5.15(f)) (if necessary)	I&M	April 14, 2021
File Final License Application (18 CFR §5.17)	I&M	September 30, 2021



Studies Approved in the SPD

FERC's April 9, 2019 SPD directed I&M to conduct 8 studies:

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

*BOUNDLESS ENERGY*SM



Proposals to Modify Studies or for New Studies

At this time, I&M has completed all of the studies approved in the Commission's April 9, 2019 SPD and is not proposing any modifications or new studies.

- I&M will file an ISR Meeting Summary with the Commission on or before May 8, 2020.
- Stakeholders and FERC may file comments on the meeting summary, request modifications to studies, or request new studies on or before June 7, 2020.
 - If requesting modifications to studies, stakeholders must take into account FERC's Criteria for Modification of Approved Studies (18 C.F.R. § 5.15(d)).
 - If requesting new studies, stakeholders must take into account FERC's 7 Criteria for New Study (18 C.F.R. § 5.15(e)).

*BOUNDLESS ENERGY*SM



Upcoming ILP Milestones

Milestone	Responsible Party	Date
File Initial Study Report Meeting Summary (18 CFR §5.15(c)(3))	I&M	5/8/2020
File Meeting Summary Disagreements (18 CFR §5.15(c)(4))	Stakeholders	6/7/2020
File Responses to Meeting Summary Disagreements (18 CFR §5.15(c)(5))	I&M	7/7/2020
Resolution of Disagreements (18 CFR §5.15(c)(6))	FERC	8/6/2020



BOUNDLESS ENERGY™

Botanical Resources Study



BOUNDLESS ENERGY™



Botanical Resources Study

Study Status

I&M initiated and completed the Botanical Resources Study in accordance with the schedule and methods described in the RSP and SPD.

Summary of Study Methods and Results:

- The Project's FERC-approved Project boundary was surveyed and locations of RTE and invasive species were mapped and photographed. Additionally, GLEC searched for and documented the presence of any wild rice beds.
- Botanical resources were inventoried in August and September of 2019. Specific attention was given to the discovery of state and federal RTE species, such as wild rice, American water willow (*Justicia americana*) and eastern prairie fringed orchid (*Platanthera leucophaea*), as well as the presence and abundance of invasive plant species, such as, Eurasian watermilfoil (*Myriophyllum spicatum*), purple loosestrife (*Lythrum salicaria*), Carolina fanwort (*Cabomba caroliniana*) and crispy pondweed (*Potamogeton crispus*).
- Principal habitat types were described as a result of the inventory and consisted primarily of a mixture of floodplain forested communities, residential areas and scrub/shrub and emergent wetlands.
- Results were compared to historical inventories from the Michigan Natural Features Inventory, previous assessments and historical (pre-reservoir) maps. Notable differences were noted between the southern, midsection and northern reaches of the Project.

BOUNDLESS ENERGYSM



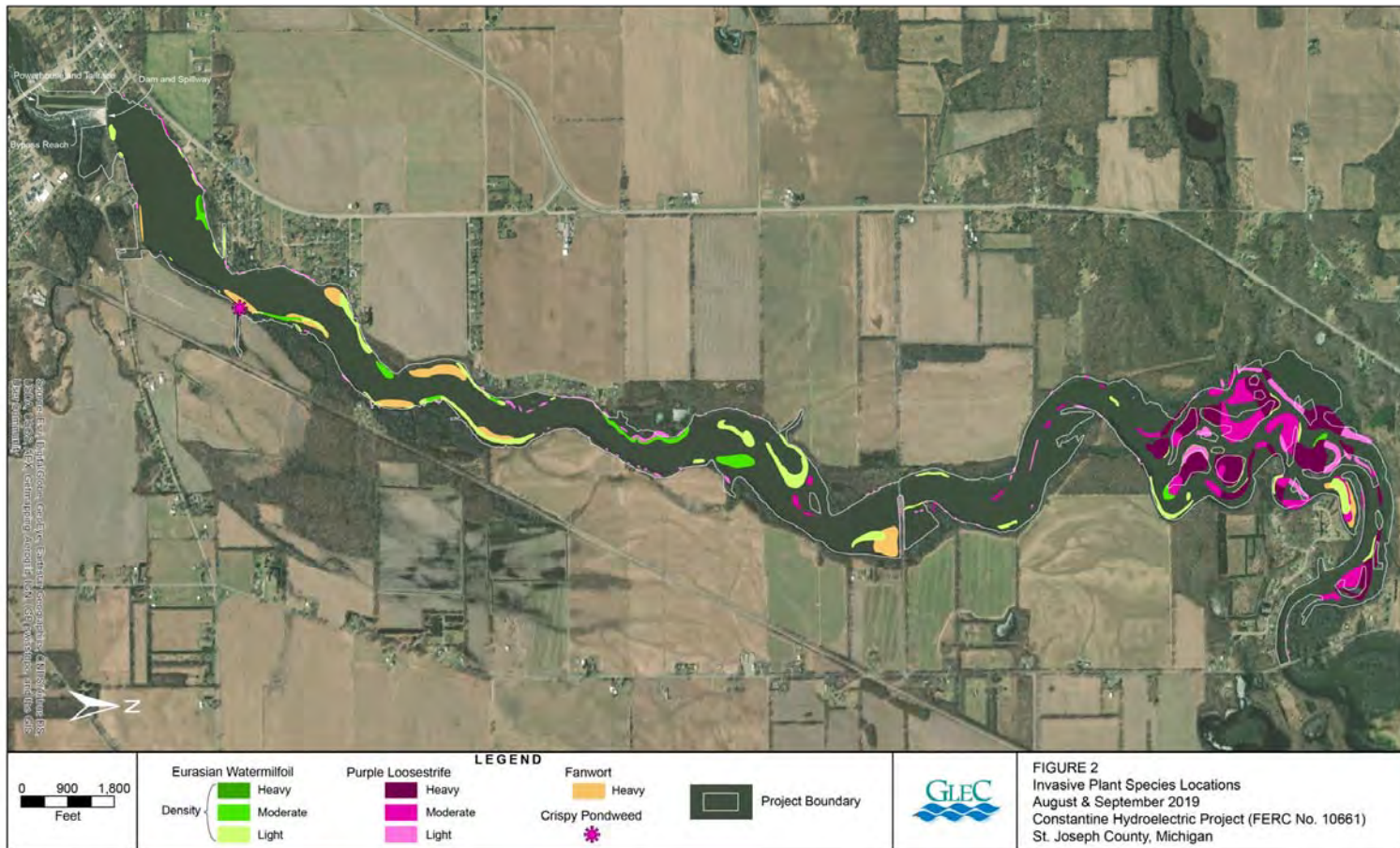
BOUNDLESS ENERGY™

Botanical Resources Study

- Twenty-three non-native plants were discovered in the inventory.
- Purple loosestrife abundance was noted as a specific threat to the existing wetlands, particularly in the northern sections of the Project boundary. Eurasian watermilfoil was also noted as becoming more abundant than previously noted in the other assessments. Both purple loosestrife and Eurasian watermilfoil have the greatest potential to significantly alter the native habitats in the wetland and off-shore aquatic communities in the Project area.
- Based on this assessment and the annual invasive species assessments, it continues to appear that in general, the light and heavy infestations within the Project boundary continue to increase including the Eurasian watermilfoil. The overall assessment of the botanical resources at the Constantine Project remains similar to that described in the Pre-Application Document (PAD) and the 1993 assessment (FERC 1993).

BOUNDLESS ENERGY™

Botanical Resources Study





Variations from FERC-approved Study Plan

Variations from FERC-approved Study Plan:

- The actual Botanical Resources Survey and study methods applied some interpretations of and minor variations from the method details outlined in Section 6 Botanical Resources Study of the March 15, 2019 RSP. Under Task 6.6.1 Desktop Mapping of Vegetation, the RSP indicates that I&M “will obtain high-resolution aerial imagery to characterize the vegetation in the Project area, to the extent practical.” For this study, the research biologists and Geographic Information System (GIS) specialists utilized standard satellite imagery provided by Google Earth and ESRI ArcMap streaming services for feature interpretation. No other “special” high resolution imagery was obtained or utilized for the study.
- Existing information regarding botanical resources in the Project area, presented in Section 5.5 of the PAD, classifies the vegetation as a “mixed hardwood community of predominantly oak, with some ash, beech, hickory, maple, cottonwood, and aspen” and falling within the Beech-Maple Association of Eastern Deciduous Forest (I&M 1988, Bailey 1978). For this study, the classification and description scheme developed by the Michigan Natural Features Inventory was used to update and further expound upon the forest cover types (Kost et al. 2007). Preliminary descriptions of the Project area state that 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). Upon the completion of Meander surveys and a full species list, this study determined that this fringe of trees within the lower third, to half, of the reservoir is more specifically classified as floodplain forest and the lowland areas within the upper reaches of the reservoir are primarily forested and emergent wetlands, dominated by willow (*Salix* spp.) and silver maple trees.

*BOUNDLESS ENERGY*SM



BOUNDLESS ENERGY™

Shoreline Stability Assessment Study



BOUNDLESS ENERGY™



Shoreline Stability Assessment Study

Study Status

I&M initiated and completed the Shoreline Stability Assessment Study in accordance with the schedule and methods described in the RSP and SPD.

Summary of Study Methods and Results

- Prior to conducting field surveys, a literature review was performed to review any existing information on geology and soils in the study area that may be useful to assess bank composition and erosion potential in the study area.
- Shoreline observations of the reservoir and bypass reach were made June 2-4 and September 24-27, 2019. Assessed sites were located at various points along the shoreline within the reservoir and bypass reach.
 - During the June survey event, 57 sites were evaluated. Of the 57 sites evaluated, 12 were located in the bypass reach and 45 were located in the reservoir.
 - During the September survey event, 31 sites were evaluated. Of the 31 sites evaluated, 8 were located in the bypass reach and 23 were located in the reservoir.

*BOUNDLESS ENERGY*SM



Shoreline Stability Assessment Study

In summary, primary observations and conclusions from the Shoreline Stability Assessment are:

- In June, modified Bank Erosion Hazard Index (BEHI) scores in the Project area ranged from Very Low to Moderate at 57 individual sites. In the bypass reach, sites were scored as; 5 Very Low, 1 Low, 3 Moderate, and 3 not applicable (NA). In the reservoir area, sites were scored as; 2 Very Low, 20 Low, 12 Moderate, and 11 NA.
- In September, BEHI scores in the Project area ranged from Low to Moderate at 39 sites. In the bypass reach, sites scored as; 5 Low, 2 Moderate, and 1 NA. In the reservoir area, sites were scored as; 19 Low and 12 Moderate.

*BOUNDLESS ENERGY*SM



Shoreline Stability Assessment Study

- Based on observations used to calculate the modified BEHI, three areas may require additional assessment to confirm and possibly mitigate potential future erosion hazards within the Project:
 1. Site BA03 located at the downstream end of the Project. This site has an area of erosion located against concrete at the base of the bridge extending under the overhanging vegetation. This erosion area is likely caused by current hitting the bank from the tailrace.
 2. Site BA16 located at the upstream end of the bypass reach. This isolated point has no vegetation and soil is actively falling into the bypass reach.
 3. In the reservoir, the area from site SJR05 to SJR12. This area is located in a more riverine section of the Project along an outside bend in the river channel. This area has had the riparian vegetation removed for home construction and maintained turf grass lawns.

*BOUNDLESS ENERGY*SM



Variations from FERC-approved Study Plan

The Shoreline Stability Assessment was conducted in full conformance with the Commission's SPD.

*BOUNDLESS ENERGY*SM

**AMERICAN
ELECTRIC
POWER**

BOUNDLESS ENERGY™

Water Quality



*BOUNDLESS ENERGY*SM



Water Quality Study

Study Status

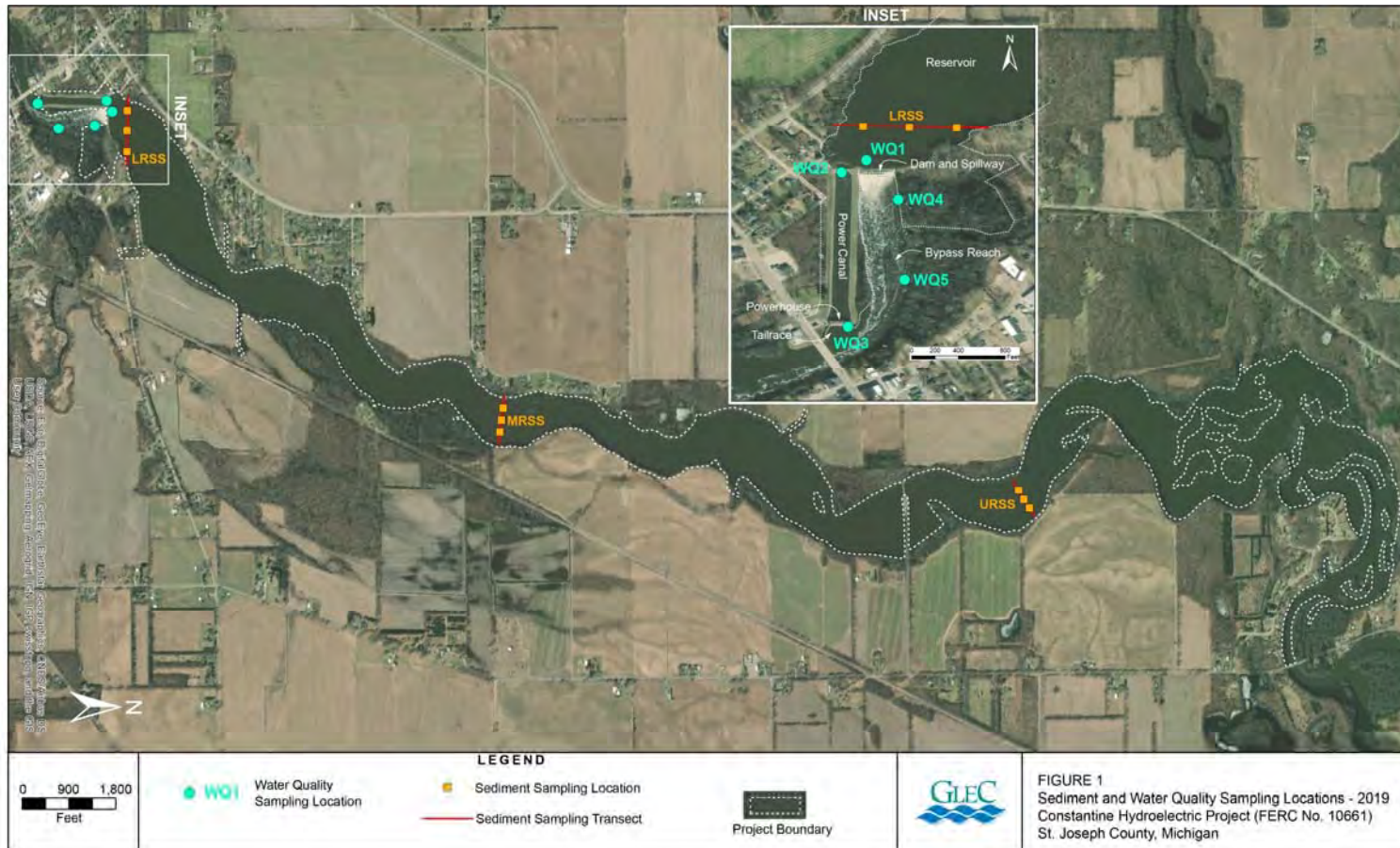
I&M initiated and completed the Water Quality Study in accordance with the schedule and methods described in the RSP and SPD.

Summary of Study Methods and Results

- Water quality data was collected at five locations (reservoir, power canal, tailrace and two locations in the bypass reach) using calibrated Onset® HOB0 U26 dissolved oxygen (DO) Data Loggers set to record water temperature and DO at 15-minute intervals.
- Discrete multi-parameter water quality measurements of temperature, DO, pH, and specific conductance were also collected at the monitoring locations using a calibrated YSI ProDSS water quality meter.
- Continuous water temperature and DO measurements were recorded from May 1 through October 31, 2019. Discrete multi-parameter water quality measurements were collected at each of the five monitoring locations on a monthly basis from May through October.
- Additionally, sediment contaminant sampling was conducted along three transects in the Project reservoir.
 - Although FERC's SPD did not require I&M to perform sediment contaminant sampling, based on I&M's experience at other projects (i.e., Mottville Project) and the resource agencies' interest in these data, I&M agreed to conduct the sampling and provide this information to resource agencies.

*BOUNDLESS ENERGY*SM

Water Quality Study





BOUNDLESS ENERGY™

Water Quality Study

In general, the DO and water temperature plots demonstrate a typical diurnal fluctuation that is reflective of day and night respiration (dissolved oxygen) and the relatively rapid change in water temperature due to changes in air temperature. However, there were several instances when this pattern was interrupted possibly due to meter malfunctioning, meter desiccation (temporarily out of the water) or vandalism. Specifically;

- the mid-June and mid-July DO data for the tailrace,
- rapidly declining DO and temperature data in late August for the bypass reach upstream of the Fawn River,
- the rapid decline and then increase in water temperature mid- to late September in the tailrace, and
- spikes in DO to levels greater than saturation in late September in the bypass reach upstream of the Fawn River.

In each instance the anomalies were investigated by reviewing the field conditions, maintenance and calibration logs and the data from the secondary data logger (if available) to determine the problem.

*BOUNDLESS ENERGY*SM



BOUNDLESS ENERGY™

Water Quality Study

Primary observations from the Water Quality Study include:

- DO readings fell within state threshold limits for the entire duration of the study in both the reservoir and power canal. Water temperature readings were below the monthly maximum threshold limits in the reservoir, power canal, tailrace, and the bypass reach upstream of the Fawn River.
- The monthly water temperature threshold was exceeded on October 1 and 2, 2019 in the bypass reach downstream of the Fawn River for 26 consecutive instantaneous measurements. However, 14 of the 26 measurements were above the threshold by only 0.2°C, which is within the accuracy range of the temperature probe. It's possible that water temperature at this location may be heavily influenced by warm water coming from the Fawn River rather than exceedances only attributable to influences in the St. Joseph River.
- In the tailrace, instantaneous DO readings as well as the daily average DO were below state thresholds on July 16, 2019. Due to probe damage and malfunction, only one logger was recording in the tailrace in July and so there was not a second set of data to verify these low readings. DO values recorded at all other water quality monitoring stations were above the thresholds on this day.
- Instantaneous DO readings below the state threshold were recorded on August 7, 18, and 19, 2019 in the bypass reach downstream of the Fawn River. The daily average DO fell below the threshold on July 21, 2019 and August 19, 2019 for this location.

In the bypass reach upstream of the Fawn River, instantaneous DO values below the threshold were recorded on eight days in August and ten days in September. For five of those days in August and five in September, the daily average DO also fell below the state threshold. The majority of the DO exceedances observed during the Water Quality Study appeared to correspond to water flow away from the bypass reach and into the power canal.

BOUNDLESS ENERGY™

Water Quality Study

Sediment Chemistry

- Sediment analysis results were compared to published sediment quality guidelines (SQG) (MacDonald et al. 2000, Ingersoll et al. 2002, GeoEngineer 2015, and WDNR 2003) to determine the relative risk to aquatic life and human health. Relative risk to aquatic life was determined by comparing the sediment analysis to Probable Effect Levels (PEL), Threshold Effect Levels (TEL), Effect Range Median (ERM) and Effect Range Low (ERL).
 - With the exception of mercury, lead and arsenic, each analyte concentration in the Constantine reservoir sediments were measured at concentrations less than the most restrictive SQG (TEL).
 - Sediment chemistry is typically affected by agricultural runoff within the basin and is not considered to be the result of Project operations.

Mercury

- The sediment mercury concentration in the Lower Reservoir (LRSS) duplicate sample slightly exceeded the TEL (0.17 milligrams per kilogram [mg/kg]) at 0.19 mg/kg in the duplicate sample.

Lead

- Lead concentrations in the LRSS duplicate sample were equal to the TEL and ERL SQG at 35 mg/kg.

Arsenic

- Arsenic concentrations in the LRSS samples exceeded the PEL (17 mg/kg). The LRSS lead concentration was measured at 28.8 mg/kg.



Variations from FERC-approved Study Plan

Variations from FERC-approved Study Plan:

- On or around May 21, 2019, it is suspected that both loggers in the tailrace were pushed up onto the concrete ledge due to upwelling. The primary logger was damaged during this action and quit recording on May 21 while the secondary logger continued to record data from what could have been a position above the water. Because of the damage to the primary logger, data from the secondary logger was used for the month of May. The primary logger was replaced on May 30, 2019.
- Both the primary and secondary continuous temperature and DO loggers were discovered to be missing from the bypass reach upstream of the Fawn River during the monthly download on August 1, 2019. No data exists for that location for June 27 to August 1, 2019. A new primary logger was placed at the site on August 1, 2019. A secondary logger was added the following month. The data collected during this time period from the other water quality monitoring stations suggests that no major adverse events occurred between June 27 and August 1, 2019.
- The Commission's SPD did not require that I&M conduct the sediment contaminant sampling component. However, based on I&M's experience at other projects on the St. Joseph River, I&M decided to proceed with the data collection and analysis.

*BOUNDLESS ENERGY*SM



BOUNDLESS ENERGY™

Fisheries Survey



BOUNDLESS ENERGY™



Fisheries Survey

Study Status

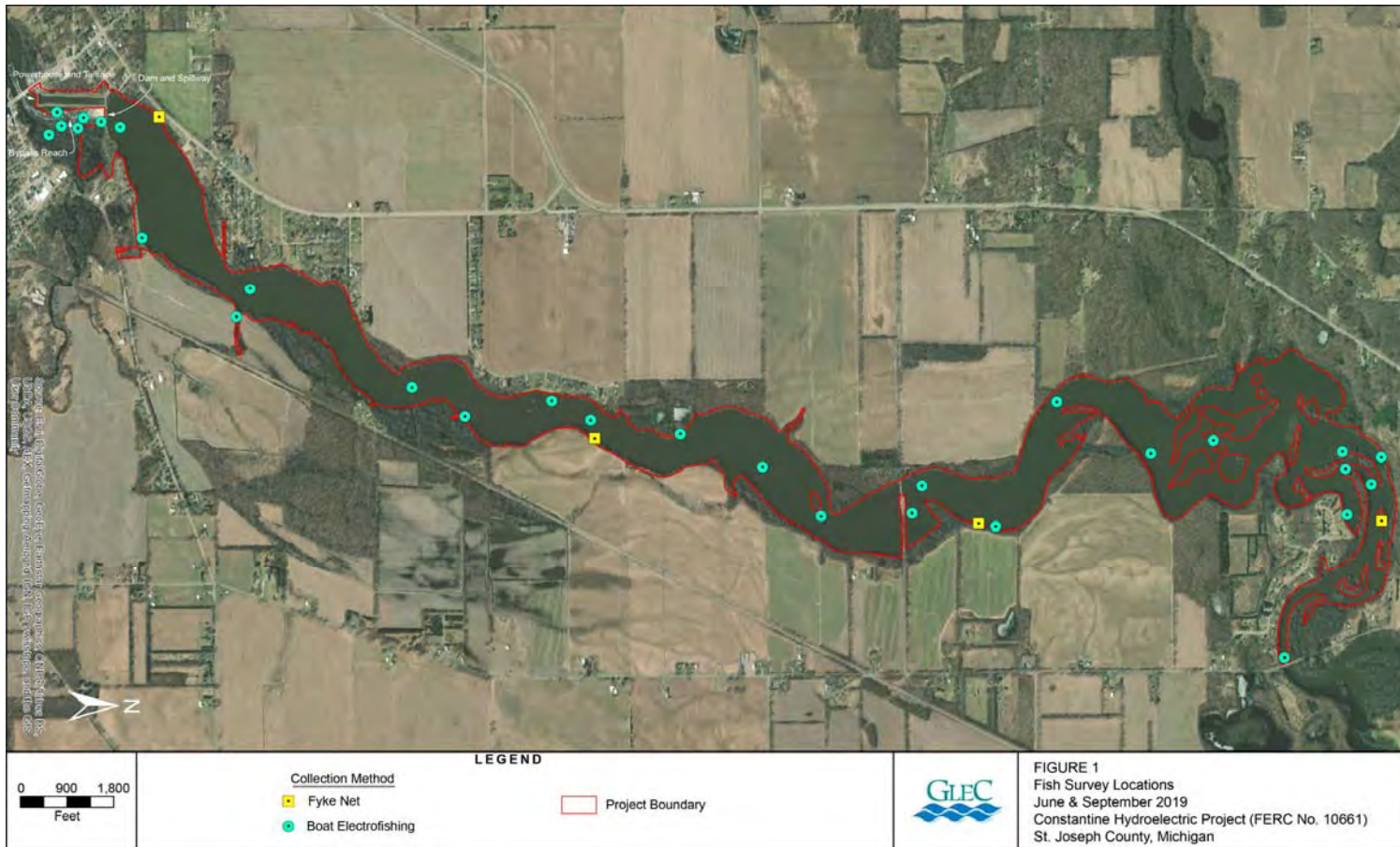
I&M initiated and completed the Fisheries Survey in accordance with the schedule and methods described in the RSP and SPD.

Summary of Study Methods and Results

- Prior to conducting field surveys, the required scientific collector's permit was obtained from the Michigan Department of Natural Resources (MDNR).
- Two sampling events were conducted during daylight hours in the late spring/early summer (May-June) and the late summer/early fall (August-September) of 2019. Fish sampling was conducted using boat electrofishing and fyke nets.
- Both near-shore (shallow) and mid-channel (deep) habitats were sampled to characterize fish communities and life stages that use these different habitat types. Supporting data was recorded at each sampling location, including: (1) location (Global Positioning System [GPS]); (2) sampling gear type; (3) mesohabitat; (4) representative photographs; (5) time and date; (6) weather; (7) general descriptions of depth, flows, and substrate; and (8) cover type and estimated percentage of cover. In addition to this supporting data, discrete water quality measurements of water temperature, DO, pH and specific conductance were also recorded at each sampling location. A secchi disk reading was also taken at each sampling site.
- The average approach velocities 1-foot in front of the existing trashrack structure were also measured. Measurements were collected at the Project's maximum and efficient generation rates using an Acoustic Doppler Current Profiler (ADCP).

*BOUNDLESS ENERGY*SM

Fisheries Survey



Fisheries Survey





BOUNDLESS ENERGY™

Fisheries Survey

- Additionally, fish tissue samples were collected from ten Largemouth Bass (*Micropterus salmoides*) and ten Shorthead Redhorse (*Moxostoma macrolepidotum*) in the Project reservoir that were analyzed for mercury and PCBs. Contaminants that affect fish in the St. Joseph River often come from agricultural runoff and other local sources of pollution within the basin. Any potential contaminants present in fish in the Project area are not considered to be the result of Project operations.
 - Although FERC's SPD did not require I&M to perform fish tissue sampling, based on I&M's experience at other projects (i.e., Mottville Project) and the resource agencies' interest in these data, I&M agreed to conduct the sampling and provide this information to resource agencies. The results of the fish tissue sampling have not been received from the lab at the time the ISR was submitted. The Fisheries Survey Report will be supplemented with this information when available.

BOUNDLESS ENERGYSM



BOUNDLESS ENERGY™

Fisheries Survey

Fish Community Baseline Survey Compared to Historical Community Data

- During fish collections in June and September of 2019 a diverse and abundant fish community was documented. The 2,343 fish representing 46 species are equal in species richness to collections made in the area in the historical record. The June and September fish sampling collected the same or more species than historical sampling records as shown in Table 2.4-1 of the ISR. It appears that the community has not changed significantly since the last major survey.
- Species collected in the past, but missing from this year's collections included Brook (*Lampetra planeri*) and Silver Lamprey (*Ichthyomyzon unicuspis*), Central Stoneroller (*Campostoma anomalum*), Common Shiner (*Luxilus cornutus*), Creek Chub (*Semotilus atromaculatus*), Fathead Minnow (*Pimephales promelas*), Spotted Gar (*Lepisosteus oculatus*), and Stonecat (*Noturus flavus*). During the 2019 fish collection, six species were collected that were not seen in past records including: Brown Bullhead (*Ameiurus nebulosus*), Emerald Shiner (*Notropis atherinoides*), Flathead Catfish, Northern Sunfish (*Lepomis peltastes*), Pirate Perch (*Aphredoderus sayanus*), and White Crappie (*Pomoxis annularis*). Most species collected remain the same from the last broad survey completed by AEP in 1990-1991.

BOUNDLESS ENERGYSM

Fisheries Survey

Intake Velocities for Fish Impingement and Entrainment Potential

- The intake velocities recorded at two locations within the power canal were similar to those reported in the entrainment survey completed in 1991 (AEP 1991).
 - As reported in the PAD, during original licensing in 1988, velocities were measured as 1.8 feet per second (fps) through the trackracks and 1.3 fps at the face of the trackracks (I&M 2018). This is very similar to average velocities measured in the power canal by the ADCP sensors in June, 2019 of 1.57 fps (47.9 centimeters per second [cm/s]) just downstream of the headgate structure (Transect 1) and 1.33 fps (40.5 cm/s) upstream of the trashracks (Transect 2).
 - This supports the assumption made in the PAD that velocities would likely remain unchanged as there have been no change to Project operations or modification of significant Project features.
- Table 2.4-2 of the ISR presents a comparison of published swim speeds for several freshwater fish that include the species collected during the 2019 Fisheries Survey. Entrainment susceptibility may be judged in part by the ability of a fish to swim against the current upstream of the powerhouse. The average swim speeds reported are very similar to the measured water velocity in the power canal, whereas the published maximum or burst swim speeds often exceed the velocity measurements in the power canal.
- Fish entrainment is also affected by the downstream migration or movement of fish and the downstream drift of larval and juvenile fish. No estimates of fish entrainment were completed with this study.

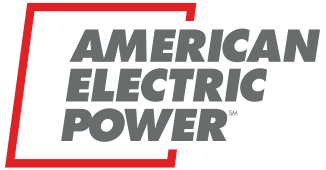


Variations from FERC-approved Study Plan

Variations from FERC-approved Study Plan:

- Visual estimates of the water clarity were made by recording the depth at which a Secchi disk disappeared at fish collection sites, recorded to the nearest tenth of a meter. However, at some fish collection locations the current was too swift to accurately measure transparency using a Secchi disk, these locations were marked as Secchi depth NA.
- During the measurement of intake velocities in the power canal interference to the surveying unit was encountered while trying to record measurements 1-foot upstream of the Project's trashracks as specified in the RSP. In order to record useable measurements, the velocity profile transect for this location was shifted slightly upstream in the power canal to the point where interference was alleviated and velocities could be successfully recorded.
- The Project's power canal was initially included in the fish sampling study area pursuant to the RSP, but there were concerns regarding safety and access to the power canal for effective sampling due to lack of boat access and that the canal is too deep and swift to use other sampling methods safely. The power canal was excluded from the sampling area based on communication with MDNR staff from the Fisheries Division in the Southern Lake Michigan Unit, who agreed that the stranded fish survey of the power canal in spring 2019 provided sufficient data to predict the species present (McCauley, personal communication, July 10-11, 2019). No additional fish collections were made in the power canal during this survey.
- During collection of fish tissue samples field staff were unable to collect enough individuals of either of the preferred bottom-feeding species identified in the RSP, Common Carp or Channel Catfish. Field staff substituted (10) Shorthead Redhorse to represent the bottom feeder fish species.

*BOUNDLESS ENERGY*SM



BOUNDLESS ENERGY™

Mussel Survey



BOUNDLESS ENERGY™

Mussel Survey

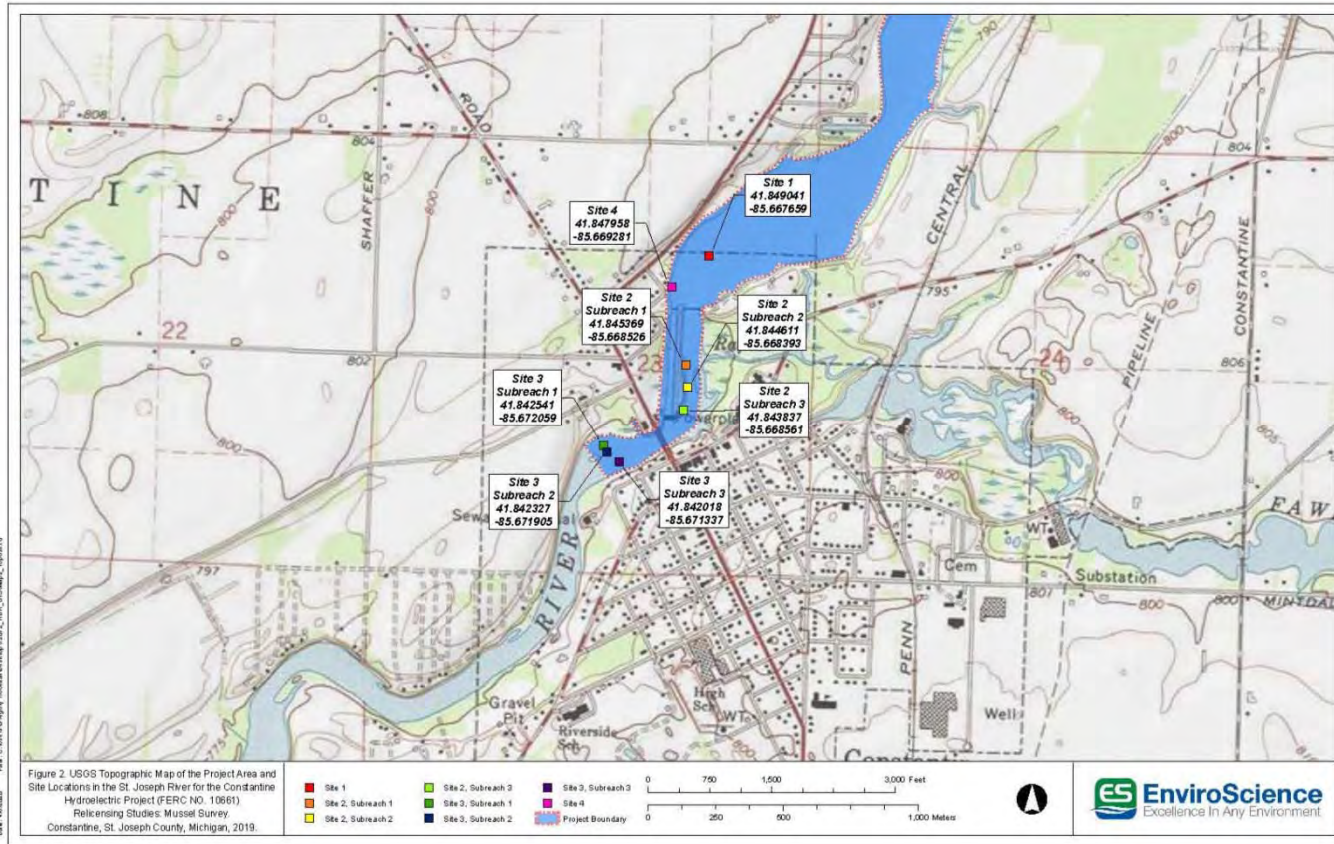
Study Status

I&M initiated and completed the Mussel Survey in accordance with the schedule and methods described in the RSP and SPD.

Summary of Study Methods and Results

- Prior to conducting field surveys, the appropriate required scientific collector's permit was obtained from the MDNR.
- The mussel surveys were conducted in August of 2019, according to MDNR's Michigan Freshwater Mussel Survey Protocols and Relocation Procedures.
- A qualitative mussel survey was conducted at two sites in the reservoir, one site in the bypass reach, and one site downstream of the Project's powerhouse (including multiple sub-reaches). Mussel survey locations are depicted in the following figure.
 - 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 was recorded at each sampling location.
 - Representative photographs were also taken of each species.
 - Additionally, water quality data, including water temperature, DO, pH, and specific conductance were collected from representative locations in the survey areas during the mussel survey.

Mussel Survey





BOUNDLESS ENERGY™

Mussel Survey

- Mussel assemblage in the Project study area was similar to historic records near the area. Nineteen species have been documented in this portion of the St. Joseph River and 12 were observed live in this study.
 - Species observed in this study and not documented downstream by Wesley and Duffy (1999) included the Mapleleaf (*Quadrula quadrula*), Lilliput (*Toxolasma parvum*), and Paper Pondshell (*Utterbackia imbecillis*).
 - Conversely, species observed pre-1999 and not recorded in this study included Cylindrical Papershell (*Anodontooides ferrussacianus*), Purple Wartyback (*Cyclonaias tuberculata*), Ohio Pigtoe (*Pleurobema cordatum*), and Rainbow (*Villosa iris*).
 - An undetectable, and not very diverse, mussel community may occupy the region upstream of the dam. Only six species were reported by Wesley and Duffy (1999) near Three Rivers, Michigan. A study performed near the dam headrace in 2019, associated with a separate project, collected 11 species. Species collected in that survey were like those observed at Sites 2 and 3 in this study, except for Round Pigtoe (live; *Pleurobema sintoxia*) and live Purple Wartyback.
- No federally listed mussel species were detected within the Project area. An undetectable mussel community may occupy the region upstream of the dam, and mussel scarcity is likely due to a lack of habitat and unstable conditions in Sites 1 and 4.
- There appears to be a stable, recruiting mussel community below the dam that has likely persisted for several years based on the diversity and abundances observed in this survey and historical records. The mussels observed would likely not be affected by continued operation assuming relicensing would not alter the existing hydraulics.

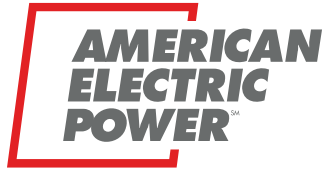
BOUNDLESS ENERGYSM



Variations from FERC-approved Study Plan

The Mussel Survey was conducted in full conformance with the Commission's SPD.

*BOUNDLESS ENERGY*SM



BOUNDLESS ENERGY™

Wetlands Study



BOUNDLESS ENERGY™



Wetlands Study

Study Status

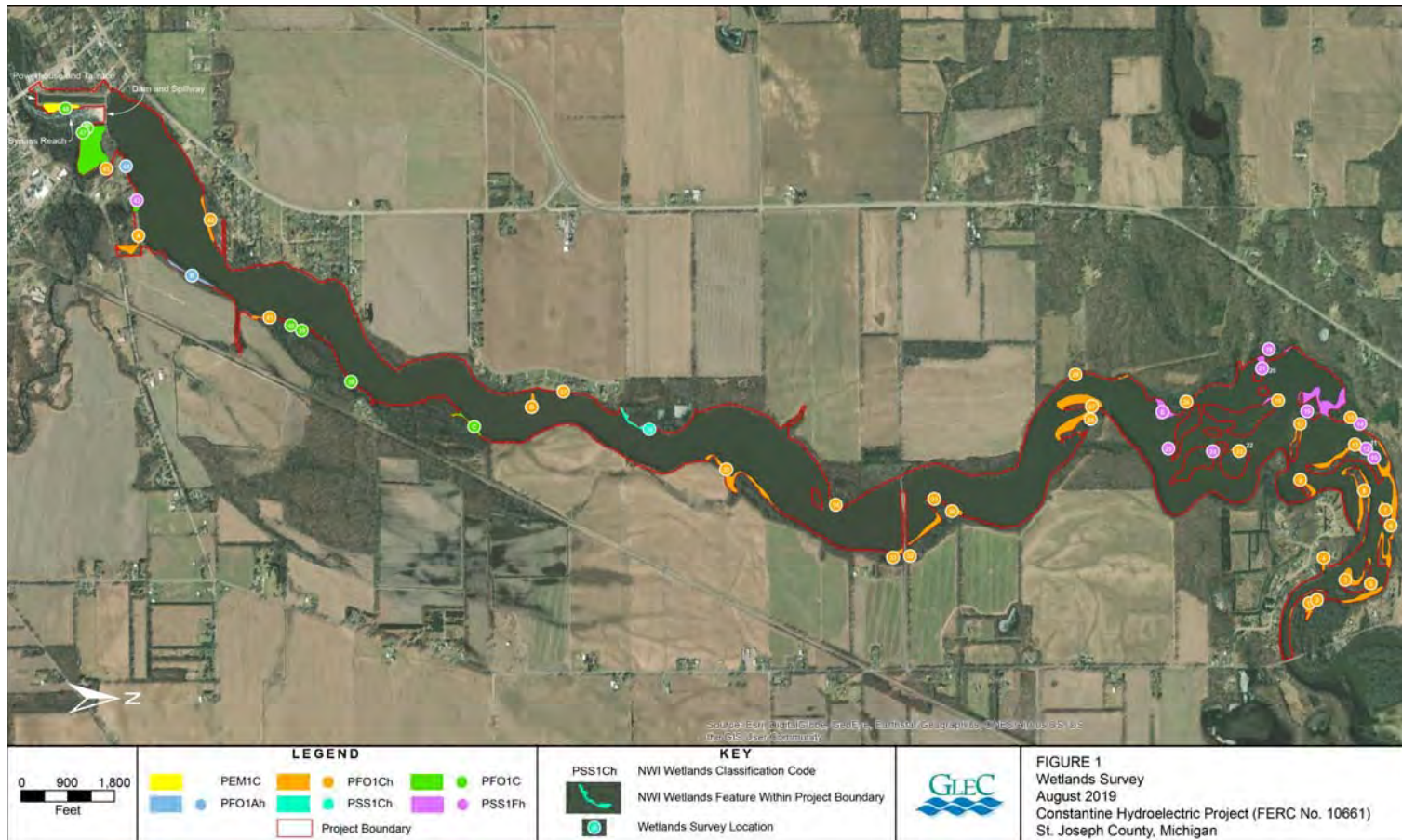
I&M initiated and completed the Wetlands Study in accordance with the schedule and methods described in the RSP and SPD.

Summary of Study Methods and Results

- On August 14-16, 2019, wetland complexes in the Constantine reservoir, bypass reach and tailrace areas within the Project boundary were surveyed. The purpose of the survey was to verify the wetland map features in the Project NWI wetland map that was provided in the PAD. The survey was conducted by boat and walking nearshore areas over the length of the Project.
 - Observations were recorded at 48 stations generally adjacent to or overlying the NWI wetlands features within the Project boundary. Observations of wetland habitats near the Project boundary were recorded at 8 stations (14, 24, 25, 37, 38, 39, 40). Descriptions of the vegetative cover, species composition, and wetland classifications are provided in the field survey notes section of the Wetlands Study Report.
 - Any changes in wetland type or characteristics to the existing NWI classification were noted when relevant. Coordinate positions were recorded with a Global Positioning System (GPS) device at 40 of the 48 stations and marked on a large-scale field map for the remaining 8 stations.

*BOUNDLESS ENERGY*SM

Wetlands Study





BOUNDLESS ENERGY™

Wetlands Study

- The classification of wetlands and the acreages observed in this study vary very little from the results from previous assessments described in the PAD. The most notable change documented was the reclassification of the island between the tailrace and bypass reach from PEM1C Freshwater Emergent Wetland to PFO1C Forested Shrub Wetland. This change was made due to the ground-truthing and identification of a discrepancy in the NWI wetland map.
- Total wetland acreage strictly within the Project boundary was estimated to remain at approximately 35.8 acres across five NWI categories that fall under the system/class categories palustrine forested and palustrine scrub-shrub wetland habitats. The majority of the Project wetland area (20.8 acres) is classified as: PF01Ch Palustrine, Forested, Broad Leaved Deciduous, Seasonally Flooded, and Diked/Impounded. These observations are consistent with the information presented in the PAD.
- Modifications to existing NWI wetlands map classifications were attributable to invasive species competition; purple loosestrife overwhelming the scrub-shrub communities in the modified zones. Modifications are described for each station in Section 7 of the Wetlands Study, which is included in Appendix G of this ISR. As noted in the RSP and PAD, the Constantine Project is operated as run-of-river and has little effect on reservoir levels that could potentially impact wetlands within the Project boundary.

BOUNDLESS ENERGYSM



Variations from FERC-approved Study Plan

Variations from FERC-approved Study Plan:

- Actual wetland survey and study methods had some minor variations from the methods in Section 11 of the RSP. Section 11 variously describes the wetlands study area as wetlands within or adjacent to the project boundary. The survey and mapping tasks addressed wetlands within the FERC Project boundary as relevant to Project operations. Wetland areas adjacent to (i.e., outside) the Project boundary were referenced in some areas to support and verify observations, but were not re-classified or studied to update wetland features relating to the Project. The RSP Task 1 Desktop Mapping approach suggests source data could include maps from NWI and from MDEQ. It was determined that the best source data for wetlands was the USFWS NWI wetlands map.
- Soil maps were not used in the wetlands survey or post-survey mapping exercises. Field notes and the Summary and Discussion section above discuss soil regimes in the study area. However, there is no doubt that the soils are hydric and either somewhat “dried” due to low river conditions, or wet depending on the size of the wetland adjacent to the Project boundary or juxtaposition of the riverine habitat.
- Task 2 Field Verification of Wetland Maps in the RSP prescribes that any map change recommendations include species composition, successional stage, and extent of shoreline. Where changes to Project NWI wetland features were recommended, field measurements were not taken to verify extent of shoreline where the feature was reclassified.

*BOUNDLESS ENERGY*SM



BOUNDLESS ENERGY™

Recreation Study



BOUNDLESS ENERGY™



Recreation Study

Study Status

I&M initiated and completed the Recreation Study in accordance with the schedule and methods described in the RSP and SPD.

Summary of Study Methods and Results

- A Recreation Facility Inventory and Condition Assessment was performed for all existing Project and non-Project recreation facilities in the Project area.
- Visitor use data was also collected at all existing recreation sites through a combination of in-person surveys, field reconnaissance, and photographic documentation.
 - Recreation visitor use data was collected from May through September of 2019, generally from 8:00 AM until 6:00 PM.
 - Field surveys were conducted on May 22 and 27 (Memorial Day), June 15, 16 (Father's Day) and 28, July 1 and 21 (Boat Race), August 15 and 25, and September 27 and 29.
 - A team of two technicians rotated between the recreation sites in random order and conducting interviews with willing participants. Technicians also recorded relevant conditions, including observed recreational activities, estimated number of vehicles, and number of recreational users. General information regarding date, time, and weather conditions was also recorded. A total of 21 recreation surveys were completed in the field.

*BOUNDLESS ENERGY*SM



BOUNDLESS ENERGY™

Recreation Study

- In addition to the personal interviews, I&M developed an online version of the interview questions for respondents to provide survey responses electronically.
 - The online survey was available from May 1 through September 30, 2019. A notice of the online survey was posted to AEP's relicensing website and signs were posted at each of the Project's recreation facilities notifying recreationists of how to complete the online survey.
 - A total of seven surveys were completed online during the study period.
- Results of the Recreation Survey demonstrate that the existing recreation facilities, both Project and Non-Project, are well maintained and utilized by the public.
- Overall, the public is pleased with the recreation facilities provided by I&M, St. Joseph County, and the Village of Constantine.
 - The cooperative effort of I&M and local governments has resulted in recreation facilities that not only meet the goals and objectives of the relevant recreation plans but contribute to the economies of the area. This is evidenced by individuals from outside of St. Joseph County visiting to boat on the Constantine Project reservoir, canoe/kayak the St. Joseph River, and fish the river and reservoir. According to the comments received, the existing facilities contribute to the enjoyment of all participating in those activities.

BOUNDLESS ENERGYSM



BOUNDLESS ENERGY™

Recreation Study

- The primary recreation activities observed are fishing by boat, bank fishing, fishing from the tailwater fishing access platform located adjacent to the powerhouse, and pleasure boating.
- Those surveyed indicated that the overall experience recreating at the Project was totally acceptable.
- Overall, survey respondents appear to be very satisfied with the existing recreation facilities in the Project area.
 - Suggested improvements for each of the existing Project recreation sites are detailed in Section 2.3.1 of the Recreation Study Report included in Appendix H of this ISR.
 - The recommended improvements primarily reflect the need for signage improvements, identifying Americans with Disabilities-accessible parking areas, and improvements to vegetation management.
 - The Project recreation site with the most suggested improvements is the canoe portage below the Project spillway. Suggested improvements include: better signage, upgraded walking surface, and increasing the trail width.

*BOUNDLESS ENERGY*SM



Variations from FERC-approved Study Plan

The Recreation Study was conducted in full conformance with the Commission's SPD.

*BOUNDLESS ENERGY*SM

Cultural Resources Study



BOUNDLESS ENERGY™



Cultural Resources Study

Study Status

- I&M initiated and completed the Cultural Resources study in accordance with the schedule and methods described in the RSP and SPD.

Summary of Study Methods and Results

- I&M consulted with the Michigan State Historic Preservation Office (SHPO), Forest County Potawatomi Community, Pokagon Band of Potawatomi Indians, and Nottawaseppi Huron Band of the Potawatomi Tribes regarding Project's Area of Potential Effects (APE).
- I&M received a response from the Forest County Potawatomi on March 7, 2019, concurring with the general APE as defined by I&M, but noted that field surveys should be conducted in order to adequately determine the potential impact of hydro operations on cultural and historic properties. I&M did not receive a response from the Michigan SHPO or other Tribes.
- I&M retained Commonwealth Heritage Group (Commonwealth) to conduct the cultural resources studies at the Project. Commonwealth conducted: (1) records and literature review, (2) architecture history/field investigations, and (3) archaeological field investigations.

*BOUNDLESS ENERGY*SM

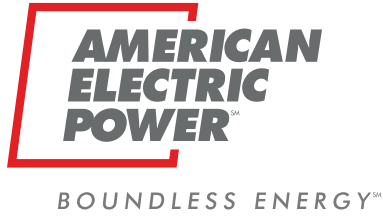


BOUNDLESS ENERGY™

Cultural Resources Study

- Background research to identify previously recorded above-ground resources was conducted in July 2019, prior to field survey. Research was conducted at the Michigan SHPO in Lansing, Michigan, and by utilizing online resources including the National Park Service database. Background investigations revealed that there were no previously recorded historic properties in the APE. The cultural resources field survey for aboveground resources was completed in July 2019.
- Commonwealth surveyed all above-ground properties over 50 years of age in the APE. As a result of this survey, one property, the Constantine Hydroelectric Plant, was identified as retaining historic integrity. Further investigation of the complex, including the powerhouse, headgates, power canal and earthen embankments, dam and spillway, substation, and machine shop led Commonwealth to recommend the property as eligible for listing in the National Register of Historic Places.
- Commonwealth conducted an archaeology survey on July 22 through July 24, 2019, in accordance with the guidelines established by the U.S. Secretary of the Interior and acceptable to the Michigan SHPO. The topographic relief from the water surface to the maximum height of the bank in any portion of the Project's APE is limited, heavily vegetated, and most of the adjacent properties are privately owned. Thus, Commonwealth archaeologists found accessing and inspecting the riverbanks by canoe to be the most efficient method for visual inspection.
- No previously unrecorded archaeological sites were identified during the survey. Commonwealth found no historic properties to be affected by the proposed continued operation of the Project. Based on the results of the Cultural Resources Study, I&M will 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 will provide the Commission with an inventory report in conjunction with the DLA filing.

BOUNDLESS ENERGYSM



Variations from FERC-approved Study Plan

The Cultural Resources Study was conducted in full conformance with the Commission's SPD.

*BOUNDLESS ENERGY*SM



ISR Meeting: Stakeholder Participation

- I&M will file the Initial Study Report Meeting Summary with FERC by May 8, 2020.
- Meeting summary disagreements, requests for modifications to studies, or requests for new studies should be filed with FERC by June 7, 2020.
- I&M will file responses to meeting summary disagreements by July 7, 2020.
- FERC will make a determination on any disputes/amendments to the approved study plan by August 6, 2020.
- Stakeholders can contact I&M with questions or comments:

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

*BOUNDLESS ENERGY*SM

**AMERICAN
ELECTRIC
POWER™**

BOUNDLESS ENERGY™

Closing



BOUNDLESS ENERGY™

Attachment B - Constantine Project Stranded Fish
and Mussel Survey Report

Stranded Fish and Mussel Survey Report

Constantine Dam Head Race, St. Joseph
River Drawdown

St. Joseph County, Michigan

May 13, 2019



Document Information

Prepared for American Electric Power
Client Contact Christina Svoboda
Project Name Constantine Dam Head Race, St. Joseph River Drawdown,
Stranded Fish and Mussel Survey
Project Number Cardno #J080101M32
Project Manager John Richardson (Cardno)
Date May 13, 2019

Prepared for:



C/O Christina Svoboda
13840 East Jefferson Road
Mishawaka, IN 46545-7343

Prepared by:



Cardno
708 Roosevelt Road, Walkerton, IN 46357

Table of Contents

1	Introduction	1
2	Methods	2
2.1	Collectors Permit	2
2.2	Survey and Relocation Methods	2
3	Survey Results	4
3.1	Results.....	4
4	Conclusion.....	6
4.1	Conclusion.....	6

Appendices

Appendix A	Michigan Scientific Collectors Permit and Michigan Threatened and Endangered Species Permit
Appendix B	Representative Mussel Species Photos

Tables

Table 1.	Live mussels collected during stranded mussel survey and relocation effort.....	5
Table 2.	Number of live fish relocated from project area.	6

Figures

Figure 1.	General location map showing Constantine head race channel drawdown area (outlined in red) St. Joseph County, Michigan	1
Figure 2.	Water level in the head race channel on March 27, 2019. Note stone on channel banks and channel bank toe-of-slope just starting to become exposed. Photo taken at downstream end of head race at power house, facing upstream.....	3
Figure 3.	Representative photo of exposed bars and approximate final minimum water level achieved within the head race channel on April 2, 2019. Photo taken approximately 800 feet upstream of power house, facing downstream	3
Figure 4.	Location of fish release point and mussel relocation area	4

1 Introduction

Cardno was contracted to complete a stranded fish and mussel survey and relocation within the St. Joseph River, downstream of the Constantine Dam in the head race portion of the river (Figure 1). The drawdown of the Constantine Dam head race was being completed in response to required maintenance and assessment activities at the Constantine Dam. The maintenance and assessment activities performed by American Electric Power (AEP) required the complete dewatering of the approximately 10 feet deep head race channel to expose the upstream structures on the power house. Permitting requirements of the river drawdown specified the maximum daily water level change was to be 0.5 feet and therefore would occur over a 20 day period. The river drawdown was started on March 11, 2019 and finished on April 4, 2019. It is important to note the head race channel could not be completely dewatered and permeant flow was sustained during the maintenance and assessment activities. Water leaking through the head gates and high water levels at the downstream end of the power house prohibited complete dewatering of the head race channel. The sustained water level within the channel varied from 0.3 feet to 1.5 feet deep. Deeper pools at the upstream and downstream extent of the channel were also present due to localized bed scour areas. The entire head race channel was searched for stranded mussels and fish, an area approximately 1,300 feet by 100 feet (Figure 1). Cardno surveyed the project area on March 27 – 29, April 1, 2, and 4, 2019 for stranded fish and mussels and the results of those efforts are reported here.

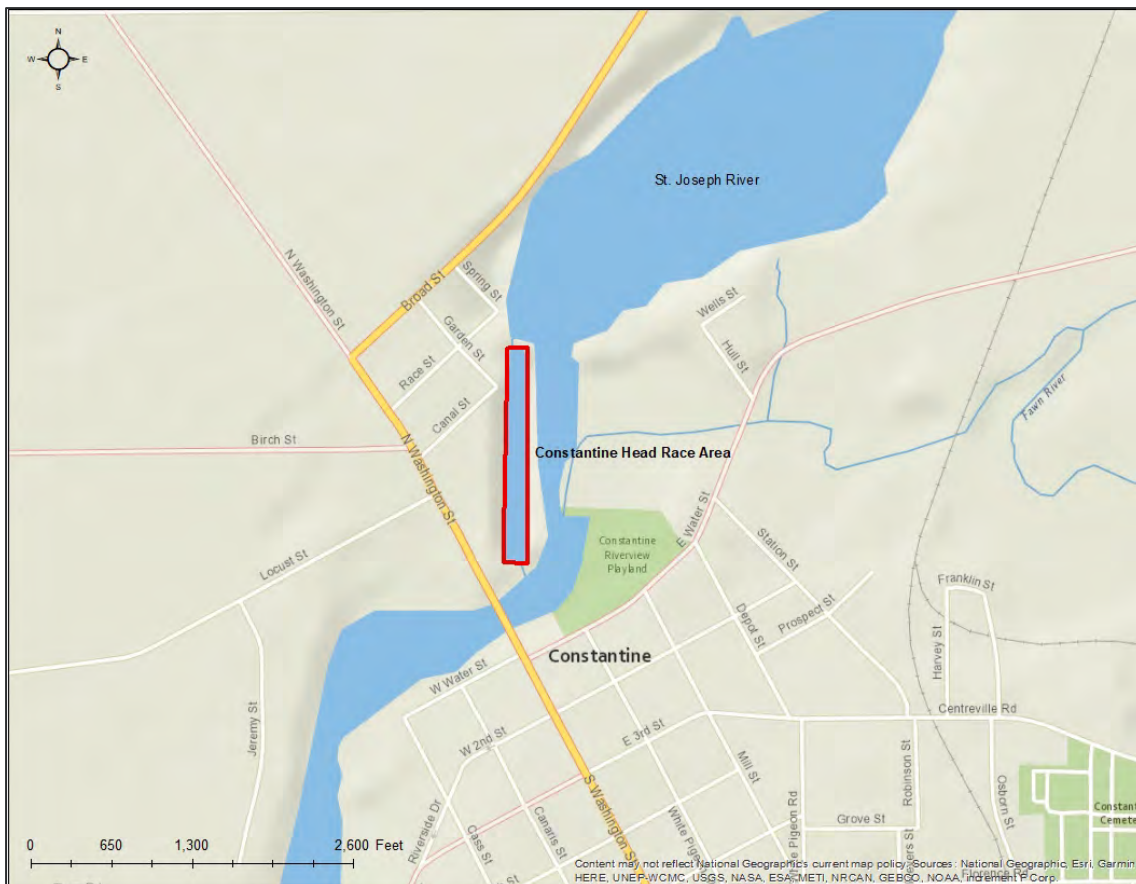


Figure 1. General location map showing Constantine head race channel drawdown area (outlined in red) St. Joseph County, Michigan.

2 Methods

2.1 Collectors Permit

Prior to stranded fish and mussel survey and relocation efforts the necessary State permits were obtained by Cardno. Fish and mussel relocation efforts were completed under the Michigan Scientific Collectors Permit issued to Cardno staff member Thomas Estrem and Michigan Threatened and Endangered Species permit # TE 150 issued to Mr. Estrem. A copy of both State collectors permits can be found in Appendix A.

2.2 Survey and Relocation Methods

River drawdown activities within the head race were initiated on March 11, and completed on April 4, 2019. During that timeframe a stranded mussel and fish survey and relocation was completed on March 27-29 and April 1, 2 and 4. Survey and relocation efforts were not completed until the end of the drawdown period because the banks of the head race channel are composed of stone and therefore not conducive for mussel habitation (Figure 2). Mussel habitat did not become exposed until the bottom three feet of channel banks at which point finer substrates became available (Figure 3). During each day of survey effort all exposed sediments were searched for stranded mussels. Mussels collected were placed in mesh diving bags and kept submerged in flowing water until relocation of individuals was completed at the end of each sampling day. All mussels collected were identified to species, representative species photos taken and transported to the relocation area shown in Figure 4. Mussels were distributed into the relocation area by wading into the channel and placing the individuals by hand. Habitat within the relocation area was suitable for mussel habitation and was a mixture of sand, gravel and cobble, with some submerged and emergent aquatic vegetation. The current was slow to moderate and water depth ranged from 1.5 to 4 feet.

Fish relocation efforts were planned to occur once the water depth within the channel was approximately 1.5 feet or less to allow for efficient removal of individuals utilizing barge electrofishing equipment. Electrofishing activities were completed on March 27 and 28, but suspended after that time when it became apparent that complete dewatering of the channel would not occur and the sustained water level was determined suitable for prolonged fish habitation. Block nets were placed at numerous points within the channel to create smaller reaches which limited the chasing of fish during electrofishing efforts. A Smith Root Type VI barge electrofishing unit with two anodes probes was used to collect fish. Electrofishing activities were completed in an upstream direction and occurred in approximately 500 feet long reaches created by installed block nets. After a 500 feet reach was fished all individuals collected were enumerated and identified to species. Fish were then placed in a water filled cooler and transported to the relocation point for release (Figure 4). Fish collection efforts were effective at removing the majority of individuals within the channel. While individual lengths were not recorded during the effort it was noted that larger individuals and game fish species were collected in greater abundance on the first day of relocation efforts, while on the second day smaller individuals and less game fish species were captured.



Figure 2. Water level in the head race channel on March 27, 2019. Note stone on channel banks and channel bank toe-of-slope just starting to become exposed. Photo taken at downstream end of head race at power house, facing upstream.



Figure 3. Representative photo of exposed bars and approximate final minimum water level achieved within the head race channel on April 2, 2019. Photo taken approximately 800 feet upstream of power house, facing downstream.



Figure 4. Location of fish release point and mussel relocation area.

3 Survey Results

3.1 Results

In total, 233 live mussels, representing 11 species were collected and relocated during the stranded mussel survey (Table 1). Plain pocketbook (*Lampsilis cardium*) was the most abundant species collected accounting for 38% of individuals, followed by creeper (*Strophitus undulatus*; 14%), elktoe (*Alasmidonta marginata*; 13%), mucket (*Actinonaias ligamentina*; 11%) and fluted shell (*Lasmigonia costata* 11%). One species collected, purple wartyback (*Cyclonaias tuberculata*), is listed as threatened in Michigan and accounted for 2% of individuals. Additionally, there were four species collected that are identified as species of special concern in Michigan including elktoe, fluted shell, round Pigtoe (*Pleurobema sintoxia*) and paper pondshell (*Utterbackia imbecillis*). Cumulatively, species listed as threatened or special concern accounted for 30% of the total number of individuals relocated. All other mussel species collected do not have special conservation status designations and are relatively common to the St. Joseph River and southern Michigan as a whole. Representative mussel species photos are available in Appendix B.

The majority of mussels collected were located in exposed sand and gravel bars in the upstream one-third of the channel and on the bottom three feet of the channel banks. Mussels collected from the sand and gravel beds were sometimes completely exposed from the substrate while other individuals were located by siphon holes or depressions in the substrate. Mussels not exposed were found buried in the substrate up to 0.4 feet deep. Mussels found on the channel banks were generally exposed from the substrate. While each individual collected was not measured, overall there was a variety of sizes collected from a minimum of approximately 35 mm up to 130 mm. Mussel mortality resulting from drawdown activities was low and only six individuals were observed. These included two elktoe, three plain pocketbook and one fluted shell. In general, these individuals were located higher on the channel banks than most individuals collected, in isolated areas where marginal mussel habitat was present.

Table 1. Live mussels collected during stranded mussel survey and relocation effort.

Species Name	Common Name	Collection Date						Total
		3/27/2019	3/28/2019	3/29/2019	4/1/2019	4/2/2019	4/4/2019	
<i>Actinonaias ligamentina</i>	Mucket	-	2	17	3	-	5	27
<i>Alasmidonta marginata</i>	Elktoe (SC)	-	2	16	3	1	10	32
<i>Cyclonaias tuberculata</i>	Purple Wartyback (T)	-	-	1	1	-	3	5
<i>Elliptio dilatata</i>	Spike	-	-	2	-	-	-	2
<i>Fusconaia flava</i>	Wabash Pigtoe	-	-	4	2	4	2	12
<i>Lampsilis cardium</i>	Plain Pocketbook	22	9	35	9	2	12	89
<i>Lasmigonia costata</i>	Fluted Shell (SC)	3	1	17	3	1	1	26
<i>Pleurobema sintoxia</i>	Round Pigtoe (SC)	-	-	-	-	1	1	2
<i>Quadrula pustulosa</i>	Pimpleback	-	-	-	-	-	1	1
<i>Strophitus undulatus</i>	Creeper	3	1	11	8	4	6	33
<i>Utterbackia imbecillis</i>	Paper Pondshell (SC)	-	-	3	1	-	-	4
Total		28	15	106	30	13	41	233

(SC)=State Special Concern (T)=State Threatened

Fish relocation efforts collected a total of 930 individuals, representing 21 species (Table 2). None of the fish species collected were on the list as having special conservation status by the State of Michigan. The most abundant species collected was smallmouth bass (*Micropterus dolomieu*) accounting for 35 percent of individuals, followed by rainbow darter (*Etheostoma caeruleum*; 26%), and logperch (*Percina caprodes*; 18%). All other species were collected in relatively low abundance, at 3% or less of total individuals (Table 2). While individual lengths were not collected as part of the effort, in general the following length distributions were observed for gamefish of interest. The majority of smallmouth bass were less than six inches, however, individuals were collected up to 14 inches. All walleye collected were relatively small and less than 12 inches. Other gamefish such as bluegill (*Lepomis macrochirus*), largemouth bass (*Micropterus salmoides*), yellow perch (*Perca flavescens*) and black crappie (*Pomoxis nigromaculatus*) were all represented by smaller individuals, generally below harvestable size. Fish mortality resulting from drawdown efforts was not observed during the effort.

Table 2. Number of live fish relocated from project area.

Scientific Name	Common Name	Collection Date		Total
		3/28/2019	3/29/2019	
<i>Ambloplites rupestris</i>	Rock Bass	9	18	27
<i>Ameiurus natalis</i>	Yellow Bullhead	18	17	35
<i>Etheostoma blennioides</i>	Greenside Darter	-	3	3
<i>Etheostoma caeruleum</i>	Rainbow Darter	69	174	243
<i>Etheostoma nigrum</i>	Johnny Darter	14	16	30
<i>Hypentelium nigricans</i>	Northern Hog Sucker	3	1	4
<i>Ictalurus punctatus</i>	Channel Catfish	-	9	9
<i>Labidesthes sicculus</i>	Brook Silverside	3	-	3
<i>Lepomis cyanellus</i>	Green Sunfish	1	-	1
<i>Lepomis macrochirus</i>	Bluegill	9	7	16
<i>Luxilus cornutus</i>	Common Shiner	1	3	4
<i>Micropterus dolomieu</i>	Smallmouth Bass	186	139	325
<i>Micropterus salmoides</i>	Largemouth Bass	1	1	2
<i>Moxostoma erythrurum</i>	Golden Redhorse	10	7	17
<i>Moxostoma macrolepidotum</i>	Shorthead Redhorse	2	-	2
<i>Noturus flavus</i>	Stonecat	-	1	1
<i>Perca flavescens</i>	Yellow Perch	3	3	6
<i>Percina caprodes</i>	Logperch	70	99	169
<i>Percina maculata</i>	Blackside Darter	3	17	20
<i>Pomoxis nigromaculatus</i>	Black Crappie	-	1	1
<i>Sander vitreus</i>	Walleye	12	-	12
Total Individuals		414	516	930
Total Species		17	17	21

4 Conclusion

4.1 Conclusion

Cardno completed a stranded fish and mussel survey and relocation effort in response to the river drawdown necessary for maintenance activities at the Constantine Dam on the St Joseph River. The drawdown lowered the head race channel approximately 10 feet which reduced the water level in the channel to 0.3 to 1.5 feet deep, with a sustained flow. Complete dewatering of the channel was not achieved due to leaks in the head gates at the dam and high water levels below the power house. Survey and relocation efforts were completed on March 27-29, April 1, 2, and 4, 2019. In total, 233 mussels representing 11 species were relocated from the head race channel into the adjacent main river channel downstream of the dam. One species relocated is listed as threatened by the state (purple wartyback) and four species are listed as species of special concern (elktoe, fluted shell, round Pigtoe, and paper pondshell). Listed mussel species accounted for 30% of individuals relocated during the effort. A total of 930 fish, representing 21 species were relocated from the head race channel and released upstream of the dam at the public boat launch area. None of the fish species collected during the effort were assigned a special conservation status by the state. Overall, a variety of gamefish were collected in addition to sucker and darter species.

Stranded Fish and Mussel Survey
Report, Constantine Dam Head
Race, St. Joseph River

APPENDIX

A

MICHIGAN SCIENTIFIC COLLECTORS PERMIT
AND MICHIGAN THREATENED AND
ENDANGERED SPECIES PERMIT



STATE OF MICHIGAN

DEPARTMENT OF NATURAL RESOURCES

LANSING



GRETCHEN WHITMER
GOVERNOR

DANIEL EICHINGER
DIRECTOR

Date Issued: 3/15/2019

SCIENTIFIC COLLECTOR'S PERMIT
Fish, Crustacean, and Mollusk

Under the provisions of Part 487, Act 451, P.A. 1994, as amended, being section 324.48735, permission is hereby granted to:

Name: Thomas L Estrem Driver's License No.: 4810021248 IN
John B Richardson 3920156789 IN

Address: Cardno JFNew
708 Roosevelt Rd.
Walkerton, IN 46574

to take, catch, or kill and possess the aquatic species from the waters and land within the jurisdiction of this state, as specified below in the special provisions section. This permit limits the take of aquatic species to the **minimum** number needed.

Prior to field activities occurring on any stream, public lake or public lands under this permit, the permittee **must notify** the local fish biologist or Fisheries Division supervisor of the Management Unit where collections will occur. This contact must be made at least 48 hours prior to commencing field work and during normal business hours Monday-Friday between 8 a.m. and 5 p.m. If a set work schedule has been established for the field season, providing a copy to the unit may alleviate the need for additional contacts with a single unit. It is also strongly recommended that the permittee notify the District Law Supervisor for the county where the permit is being used. Failure to notify the law supervisor may result in the disruption of field work. Both of these contacts can be initiated by calling the appropriate operational service center (map and phone numbers provided).

Any survey or sampling gear that is authorized by this permit and left on public lands or waters of the state unattended by the permittee must be clearly marked with either the permittee's name or organized affiliation. Failure to properly attach and display ownership, may result in unattended gear being removed by the DNR.

SPECIAL PROVISIONS: Permittees are authorized for a scientific survey to collect, identify, enumerate, and release all fish and mollusk species. The permittee will follow the protocol specified in the document titled "Michigan Freshwater Mussel Survey Protocols and Relocation Procedures" (2018). Relocation of mussels and fish from construction sites to areas immediately outside the area of impact is authorized. No lethal collection is authorized, and no voucher specimens may be retained. Fish may not be marked, clipped, or tagged in any way prior to their release. Should a species listed in Michigan as special concern, threatened, or endangered be encountered while in the field, the permittees must release it outside the area of impact immediately upon identification with as little further handling as possible. Lists of the Michigan's fish and mollusk species as well as their respective health statuses can be found online at www.michigan.gov/scientificcollectorspermit

Due to the high percentage of protected mussel species in Michigan (19 of 45 native mussels are listed as T or E), the permittees should discuss their survey plans with the Threatened and Endangered Species Unit in Wildlife Division about the potential need to secure a T&E permit. Please contact Casey Reitz at reitzc@michigan.gov or 517-284-6210.

NOTE: The permittees will also engage in macroinvertebrate sampling.

In response to the VHS virus and other aquatic invasive species in Michigan, the following is required:

- 1) All equipment coming in contact with water including: boat hulls, boat trailers, buckets, waders, nets, etc. must be visually inspected and cleaned by hand picking any attached plants, sediments, or other debris. This should be done immediately upon leaving the water body being worked on.
- 2) All equipment coming in contact with water and/or fish and/or specifically working with aquatic invertebrates including: boat hulls, boat trailers, buckets, waders, nets, etc. must be disinfected using a 1 cup of bleach to 10 gallons of water solution at the end of each sampling day or prior to entering each successive water body if more than one is being sampled per day. If long periods of time (week or longer) are anticipated in between sampling events, thorough drying of all equipment in the sun is an acceptable alternative to using the bleach solution.
 - a. A 20 min Virkon Aquatic bath can be substituted as a bleach alternative.
 - b. A 20 min 100% vinegar bath can be substituted as a bleach alternative.
- 3) If using a boat, live wells and bilges must be emptied and disinfected with a solution of 1 cup of bleach to 10 gallons of water at the end of each sampling day or prior to entering each successive water body if more than one is sampled per day.
 - a. A 20 min Virkon Aquatic bath can be substituted as a bleach alternative.
 - b. A 20 min 100% vinegar bath can be substituted as a bleach alternative.

For more information on VHS or invasive species, go to the Fisheries link on the Department of Natural Resources web site at: <http://www.michigan.gov/dnr>

Permitted collection area: St. Joseph River in Berrien County within the Lake Michigan Basin:

Permitted collection gear: Electrofishing; by hand; kick and dip nets.

A copy of all reports and scientific papers using organisms collected with this permit shall be provided to DNR, Fisheries Division in addition to a Collector's Report form.

GENERAL PROVISIONS: This permit must be in permittee's possession during collection and must be made available upon request of any Department representative. Collection is limited to species not threatened or endangered. This permit is not transferable. This permit does not provide any

authorization to circumvent any federal, state, or local laws and ordinances, including, but not limited to restricted entrance to refuges or other areas closed to the public without written permission of the land administrator. For a complete list of provisions, see Guidelines for Holders of Cultural or Scientific Collector's Permits.

In addition to this permit, separate DNR Public Land Use permits are required from:

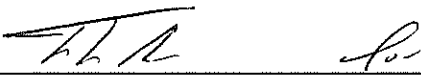
- 1) Parks and Recreation Division for activities in State Parks and Recreation Areas and at the state boat launches;**
- 2) Wildlife Division for activities in State Game Areas; and**
- 3) Forest Resources Division for activities in State Forests**

Public Land Use Permit applications can be obtained online at:

http://www.michigan.gov/dnr/0,16077,7-153-30301_31154_35728---,00.html

Permittees are also advised to contact the US Forest Service and National Park Service about any permit requirements for activities occurring in Michigan's National Forests and National Parks, respectively.

Any violation of the conditions of this permit may result in revocation of this permit and misdemeanor penalties of imprisonment for not more than 90 days or a fine of not more than \$500 or all of the above. Unless revoked, this permit **expires on 12/31/2019**.

By 
James L. Dexter, Chief
Fisheries Division

cc: Fisheries Division
Southern Lake Michigan Management Unit
Threatened and Endangered Species Unit, Wildlife Division



GRETCHEN WHITMER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
LANSING



DANIEL EICHINGER
DIRECTOR

March 26, 2019

Thomas Estrem
Cardno
708 Roosevelt Rd
Walkerton, IN 46574

Dear Mr. Estrem:

This letter is an official attachment to your Threatened and Endangered Species Permit (**TE 150**). Your permit is issued in the *Consultant* category only. Your permit expires on **March 31, 2022**. Renewal information will be sent in December of 2021.

Authorization:

To conduct the scientific activities listed under special conditions on the threatened/endangered species listed below. All activities are subject to the standard permit conditions within this letter.

In addition to the standard requirements listed below:

- Permitted is the collection and temporary holding of mussels for identification for the Constantine Hydroelectric Dam on the St. Joseph River in St. Joseph County.
- The methods described in the June 25, 2018 "Stranded Mussel Survey Report" will be used to relocate mussels found in the work area. Mussels handled must be placed out of harm's way into the nearest suitable habitat to collection site.
- Dead specimens or shells may be collected and salvaged for identification.
- Each state-listed mussel translocated will be identified to species and marked with a GPS point where it is placed.

Standard Permit Conditions

- A. All specimens authorized for collection under this Permit shall be deposited in the collection of an approved public educational or research institution prior to Permit expiration.
- B. None of the specimens collected shall become part of a private collection or private property.
- C. This permit does not allow or grant the right of trespass. Projects shall not take place on any private or public lands without permission from the owner or administrator of such lands.
- D. This permit does not provide authorization to circumvent any federal, state, or local laws and ordinances.

- E. Additionally, federal permits may be required for activities affecting federally listed threatened or endangered species and/or migratory birds. Contact the U. S. Fish and Wildlife Service at 2651 Coolidge Road, East Lansing, MI 48823.
- F. The activities covered under this Permit are not transferable to another person unless specifically authorized.
- G. Unless otherwise noted, within 10 days of the expiration of this Permit, the holder is required to file a report detailing the locations of any threatened and endangered species encountered and the number and disposition of specimens handled. Annual reports for multi-year permits are due at the end of each calendar year.
- H. A person conducting any activities authorized by this permit shall carry a copy of this permit and shall produce a copy of this permit upon request of a Department of Natural Resources employee or law enforcement officer.

All permits require an annual report unless indicated otherwise. You can use the enclosed report form and submit forms via email to reitzc@michigan.gov. In addition, please report any new occurrences of threatened and endangered species as soon as possible instead of waiting until the end of the year. This will allow new data to be incorporated into the Michigan Natural Features Inventory database sooner, thus ensuring greater protection for these species and their habitats.

Thank you for helping protect our threatened and endangered species. Feel free to contact me with any questions or concerns.

Sincerely,



Casey M. Reitz, Permit Specialist
DNR-Wildlife Division
Phone: 517-284-6210
Fax: 517-335-6604
reitzc@michigan.gov
www.michigan.gov/wildlifepermits



APPLICATION FOR A THREATENED/ENDANGERED SPECIES APPLICATION AND PERMIT

By the authority of Part 365, Endangered Species Protection, of the Natural Resource and Environmental Protection Act, Act 451 of 1994, and the rules established thereunder, submittal is required to be considered for a permit.

INSTRUCTIONS: Please type or print all information except the signature and mail with attachments to the Wildlife Division. Federal permits may be required for federally listed or migratory species. A proposal letter is required for any new or amended proposals. Instructions for proposals are on the back of this application.

APPLICANT INFORMATION

<input type="checkbox"/> New Permit <input checked="" type="checkbox"/> Renewal Permit		If Renewal, Permit Number: <u>2092</u>	
<input checked="" type="checkbox"/> Consultant (provide credentials)	<input type="checkbox"/> Education or Scientific	<input type="checkbox"/> Development/Management	<input type="checkbox"/> Live Animal Programs/Salvage
Name of Applicant (First, Last) Thomas Estrem		Applicant's Title (If applicable)	
Organization Name Cardno		Subpermittee John Richardson	
Address 708 Roosevelt Road			
City, State, ZIP Code Walkerton, IN 46574			
Telephone 574-229-8764		E-Mail Address tom.estrem@cardno.com	

SPECIES INFORMATION (PROPOSAL LETTER REQUIRED FOR NEW APPLICANTS)

Species (Scientific or common names)
State listed mussel species

Location (Be specific. Include Michigan county(ies))
Head race upstream of Constantine Hydroelectric Dam, St. Joseph River, St. Joseph County

Time period requested (usually one to three years)
two years

Number of plants and/or animals to be handled, collected, relocated, etc.
Unknown number of mussels. Project involves the relocation of mussels from within the head race for the Constantine Hydroelectric Dam in Constantine MI.

Name and location of public institution where authorized specimens will be placed
No specimens are anticipated to be kept.

Regardless of the category, permit activities are authorized anywhere within the State of Michigan, unless specifically indicated otherwise. This permit does not authorize activities on private or public property without the approval of the land owner or administrator. Permittees and subpermittees shall display this permit, and any required Federal permit, upon the request of any authorized Department personnel

I have read and understand the front and back of this form and agree to abide by the requirements presented, including maintaining any Federal permit that may be required. If I am a new applicant, I have attached a letter of authority prepared in accordance with the instructions on the back of this application. To the best of my knowledge, the information supplied by me is true and correct. I understand this permit does not provide any authorization to circumvent any Federal, State, local zoning, or any other local laws and ordinances. I understand it is my responsibility to know and comply with the requirements of this permit and Federal, State, and local laws

Signature of Applicant 	Date 3/14/2019
----------------------------	-------------------

Mail completed application and all required attachments to:
PERMIT SPECIALIST - WILDLIFE DIVISION
MICHIGAN DEPARTMENT OF NATURAL RESOURCES
PO BOX 30444
LANSING MI 48909-7944
 Or reitzc@michigan.gov, FAX: 517-335-6604

For DNR Use Only		
Permit Number	Issue Date	Expiration Date
TE 150	3/26/19	3/31/22
		3/26/19
Permit Specialist's Signature of Approval		Date

Stranded Fish and Mussel Survey
Report, Constantine Dam Head
Race, St. Joseph River

APPENDIX

B

REPRESENTATIVE MUSSEL
SPECIES PHOTOS



Actinonaias ligamentina, Mucket, right valve



Alasmidonta marginata, Elktoe, right valve



Cyclonaias tuberculata, Purple Wartyback, left valve



Fusconaia flava, Wabash Pigtoe, right valve



Elliptio dilatata, Spike, beak sculpture



Elliptio dilatata, Spike, right valve



Lampsilis cardium, Plain Pocketbook, right valve



Lasmigonia costata, Fluted shell, right valve



Pleurobema sintoxia, Round Pigtoe, right valve



Quadrula pustulosa, Pimpleback, right valve



Strophitus undulatus, Creeper, left valve



Utterbackia imbecillis, Paper Pondshell, right valve