

A CMS Energy Company

William A. Schoenlein Manager Hydro and Renewable Generation

November 3, 2014

Kimberly D. Bose, Secretary Nathaniel J. Davis, Sr., Deputy Secretary Federal Energy Regulatory Commission 888 First Street, NE Washington, D.C. 20426

# LUDINGTON PUMPED STORAGE PROJECT (FERC NO. 2680-108) MICHIGAN RE: REVISED STUDY PLAN

Dear Ms. Bose:

Consumers Energy Company and DTE Electric Company (collectively, "Licensees") file with the Federal Energy Regulatory Commission ("FERC") the enclosed Revised Study Plan ("RSP") document under 18 CFR Part 5 and the Ludington Project Process Plan and Schedule for the relicensing of the Ludington Pumped Storage Project ("Project"). FERC issued the Project's license on July 30, 1969 for an effective period of July 1, 1969 to June 30, 2019.

The Project is located on the east shore of Lake Michigan in Mason and Ottawa Counties, Michigan. The Project's powerhouse and impoundment are located in Pere Marquette and Summit Townships (Mason County). A small satellite recreation area is located in Port Sheldon (Ottawa County), 70 miles south of the powerhouse and impoundment. The Project currently has six generating units with an authorized installed capacity of 1,657.5 MW.<sup>1</sup>

The Licensees are using FERC's Integrated Licensing Process (ILP). In accordance with the ILP the Licensees filed the Pre-Application Document (PAD) and Notice of Intent (NOI) to seek a new license for the Project on January 21, 2014. The PAD provides a complete description of the Project, including its structures, operations, and potentially affected resources.

Following the filing of the PAD, FERC prepared and filed Scoping Document 1 (SD1) on March 20, 2014. FERC also held two agency and public scoping meetings on April 17, 2014. On July 7, 2014 the Proposed Study Plan ("PSP") was filed. The PSP contained the Licensees' Proposed

<sup>&</sup>lt;sup>1</sup> By an Order Amending License dated May 7, 2012, 139 FERC ¶ 62,101, FERC approved Licensees' request to upgrade and overhaul all six pump-turbine/motor generating units at the Project. This upgrade will increase the authorized installed capacity of the Project from 1,657.5 MW to 1,785 MW.

Studies, responses to stakeholder Study Requests and a schedule for conducting the site tour and Study Plan Meeting. The site tour was conducted on July 30, 2014 and the Study Plan Meeting was held on July 31, 2014. Comments on the PSP were received from Pere Marquette Charter Township, FERC, Little River Band of Ottawa Indians and Little Traverse Bay Band of Odawa Indians. In addition joint comments were received from the Michigan Department of Natural Resources, the Michigan Attorney General, the United States Fish and Wildlife Service, and the National Wildlife Federation.

The RSP has been developed in accordance with 18 CFR § 5.13. In addition to the Licensees' revisions to the study plans in the PSP, the RSP also contains brief summaries of the Licensees' study plans, the Licensees' response to stakeholder comments on the PSP, and a record of consultation used to develop these revisions to the study plans. In accordance with the ILP regulations, the RSP is being filed with FERC and distributed to the federal and state agencies, local governments, affected Indian tribes, members of the public and other interested parties listed on the mailing list for the Project.

Please contact David McIntosh of my staff at (231) 779-5506 if you have any questions.

Respectfully,

<u>/s/ William A Schoenlein</u> William A Schoenlein Manager Hydro and Renewable Generation

Copy to: Mailing List (attached)

### CONSUMERS ENERGY COMPANY JACKSON, MICHIGAN

# DTE ELECTRIC COMPANY DETROIT, MICHIGAN

# REVISED STUDY PLAN FOR THE LUDINGTON PUMPED STORAGE HYDROELECTRIC PROJECT (FERC NO. 2680-108)



Submitted by:

Consumers Energy Company One Energy Plaza Jackson, MI 49201 DTE Electric Company One Energy Plaza Detroit, MI 48226

Prepared by:

TRC 14 Gabriel Drive Augusta, ME 04330

**NOVEMBER 2014** 

For copies of the Revised Study Plan contact:

David McIntosh Consumers Energy Company Hydro and Renewable Generation 330 Chestnut Street Cadillac, MI 49601 (231) 779-5506 David.McIntosh@cmsenergy.com

Or download at:

http://www.consumersenergy.com/ludingtonrelicensing

# CONSUMERS ENERGY COMPANY

# DTE ELECTRIC COMPANY

#### LUDINGTON PUMPED STORAGE HYDROELECTRIC PROJECT (FERC NO. 2680 - 108)

# **REVISED STUDY PLAN**

#### **TABLE OF CONTENTS**

1.0	INT	RODUCTION	.1
2.0	APPLICANT'S REVISED STUDY PLAN SUMMARIES		
	2.1	Fish and Aquatic Resources	2
	2.2	Terrestrial	3
		2.2.1 Wildlife	3
		2.2.2 Botanical	4
	2.3	Recreation	5
	2.4	Cultural Resources Surveys	6
		2.4.1 Historical Resources Survey	7
		2.4.2 Archaeological Resources Survey	7
3.0	RE	SPONSES TO STAKEHOLDER PROPOSED STUDY PLAN COMMENTS	8
	3.1	Summary of Stakeholder Comments	12
		3.1.1 Fish and Aquatic Resources	12
		3.1.2 Recreational Resources	20
		3.1.3 Cultural Resources	24

# LIST OF TABLES

# LIST OF FIGURES

Ludington Location Map	A-2
Ludington Location Map	B-2
Ludington Location Map	C-2
Project Boundary Map	C-4
Ludington Location Map	D-2
Project Boundary Map	D-3
Port Sheldon Facility Map	D-4
Project Boundary Map	D-7
Recreation Site Inventory and Assessment Form	D-13
Recreation Site Inventory and Assessment Form	D-17
Ludington Location Map	E-2
Ludington Location Map	F-2
	Ludington Location Map Ludington Location Map Ludington Location Map Project Boundary Map Project Boundary Map Port Sheldon Facility Map Project Boundary Map Project Boundary Map Recreation Site Inventory and Assessment Form Recreation Site Inventory and Assessment Form Ludington Location Map Ludington Location Map

# LIST OF APPENDICES

Appendix A	Fish and Aquatic Resources Revised Study Plan
Appendix B	Wildlife Resources Revised Study Plan
Appendix C	Botanical Resources Revised Study Plan
Appendix D	Recreational Resources Revised Study Plan
Appendix E	Historical Resources Revised Study Plan
Appendix F	Archaeological Resources Revised Study Plan
Appendix G	Summary of Revised Study Plan Consultation

#### CONSUMERS ENERGY COMPANY

#### DTE ELECTRIC COMPANY

#### LUDINGTON PUMPED STORAGE HYDROELECTRIC PROJECT (FERC NO. 2680-108)

#### **REVISED STUDY PLAN**

### **1.0 INTRODUCTION**

Consumers Energy Company (Consumers Energy) and DTE Electric Company (DTEE), Licensees of the Ludington Pumped Storage Project (FERC No. 2680), are in the process of relicensing the existing 1,785 megawatt (MW)<sup>1</sup> Ludington Pumped Storage Project (LPSP or Project) with the Federal Energy Regulatory Commission (FERC). The Project is located along the Lake Michigan shoreline, in the townships of Pere Marquette and Summit in Mason County, Michigan and in Port Sheldon in Ottawa County, Michigan. The Ottawa County portion of the Project is limited to a 1.8 acre satellite recreation site (established as part of the Settlement Agreement approved by Commission Order on January 23, 1996 (74 FERC ¶ 61,055)). The Project's current license expires on June 30, 2019 and the Licensees are seeking a new license to continue to operate the Project.

The Licensees submitted a Pre-Application Document (PAD) and Notice of Intent (NOI) to FERC on January 21, 2014. The filing of these documents initiated the relicensing process for the Project under FERC's regulations governing the Integrated Licensing Process (ILP). On July 7, 2014, the Licensees submitted the Proposed Study Plan (PSP) Document. The PSP contained the Licensees' Proposed Studies, responses to stakeholder Study Requests and a schedule for conducting the Site Tour and Study Plan Meeting. As proposed by FERC, the Site Tour was held on July 30, 2014. The ILP-required Study Plan Meeting was held on July 31, 2014. The purpose of the Study Plan Meeting was to review and comment on the Licensees' PSP, to review

<sup>&</sup>lt;sup>1</sup> On May 7, 2012, FERC issued an Order Amending License to upgrade and overhaul all six pump-turbine/motor generating units at the Project, one unit at a time over the years 2013 through 2019. The proposed overhaul will increase the authorized installed capacity of the Project from the current 1,657.5 MW to 1,785 MW.

and answer questions related to stakeholder study plan requests and to attempt to resolve any outstanding issues with respect to the PSP Document.

The Revised Study Plan (RSP) document has been developed in accordance with 18 CFR §5.13. In addition to the Licensees' Revised Study Plans (Appendices A through F), this document also contains brief summaries of the Licensees' study plans (Section 2.0), the Licensees' response to stakeholder PSP comments (Section 3.0) and a record of consultation used to develop these revised study plans (Appendix G). The filing of the RSP document is an important step in relicensing the Project as required by FERC's ILP. In accordance with the ILP regulations, the RSP document is being filed with FERC and distributed to federal and state resource agencies, local governments, affected Indian tribes, members of the public, and other interested parties.

Electronic copies of the PAD are also available on the Ludington facility Relicensing website http://www.consumersenergy.com/ludingtonrelicensing.

# 2.0 APPLICANT'S REVISED STUDY PLAN SUMMARIES

Consumers Energy and DTEE proposed six study plans as part of its PSP document. The study plans focus on Fish and Aquatic resources, Terrestrial Resources (one plan for Wildlife and one plan for Botanical resources), Recreation, and Cultural Resources (one plan for Historic and one plan for Archaeological resources). Water Quality studies were completed as part of the PAD development and no additional studies were offered or requested. In response to comments about the PSP document, FERC and other stakeholder comments at the July 31, 2014 Study Plan Meeting, and other Resource Working Group (RWG) meetings and correspondence, the Licensees revised all of the proposed study plans, primarily adding detail to the Plans. Summaries of the revised study plans are provided below. The entire collection of study plans is provided in Appendices A through F.

#### 2.1 Fish and Aquatic Resources

Potential fish and aquatic resources effects relevant to the relicensing of the Ludington Project include potential impacts to fish populations as a result of continued operation of the Project.

Revised study plans for fish and aquatic resources are found in Appendix A. This study plan was developed in consultation with the Resource Working Group.

The Plan focuses on an evaluation of existing technologies available to protect fish from entrainment mortality and consider their applicability, feasibility, effectiveness and total cost (Capital and annual operating and maintenance) at the Project. This evaluation will include physical, behavioral, operational, and structural fish protection options, as required for decisionmaking purpose for the relicensing process. Study results will be used to determine if fish entrainment abatement options in addition to or instead of the existing seasonal barrier net are available to further decrease fish entrainment at the LPSP. If such measures are also considered feasible based on study criteria, this information would inform decisions regarding testing, design, and implementation during the new license.

The Plan was revised to include additional information and detail in response to Joint Commenters and FERC suggestions. A process for selecting the expert panel members was included in the Plan. Some of the detail requested will be developed in consultation with the working group and expert panel as a part of the process for evaluating the information developed.

### 2.2 Terrestrial

Potential Project effects to terrestrial resources relevant to the relicensing of the Project include Botanical (addressing special-status plants and invasive plant species) and Wildlife Resources. The revised study plans for Terrestrial Resources can be found in Appendices B and C. These study plans were modified to include additional information and detail in response to FERC suggestions.

#### 2.2.1 Wildlife

The goal of the Wildlife Study Plan is to document upland, wetland, and riparian habitats within and directly adjacent to the Project boundaries, providing information pertinent to existing wildlife (bird, mammal, reptile, and amphibian), and the presence of Rare Threatened and Endangered (RTE) species and/or associated habitats. This study plan has been modified based on FERC's comments to include wetland and riparian species and habitats. In order to understand wildlife resources, habitat capable of supporting these resources will need to be identified. The study plan involves three phases: (1) identify general vegetative cover types through photo interpretation, (2) field verification of the vegetative cover types and noting wildlife observations, and (3) production of a cover type map. A summary of vegetative cover types, after completion of Phase 1, will be shared with the Agencies and other stakeholders in order to identify areas of special concern in advance of the field verification. Final information will be shared after completion of Phase 1. FERC suggested providing quarterly updates, but this will take time away from the field surveys. The Licensees do understand that communicating and gaining input from the Agencies and other interested stakeholders is important to the study process. Therefore as an alternative to quarterly updates, we are proposing to consult with the Agencies and other interested stakeholders prior to the start of Phase 2 (field survey) and after the field survey has been completed.

The Wildlife Study is being proposed for 2015, with field verification during the late Spring to late Summer, 2015. This timeframe represents the Upper Midwest growing season, when specific vegetative cover representing wildlife habitat can be most accurately verified.

Information about habitats within the project boundaries will support the Botanical Study and will allow the Licensees and Agencies to identify areas that require protection and/or special management for RTE.

### 2.2.2 Botanical

The goal of the Botanical Study is to identify and document invasive species, RTE species, and potential RTE habitat. This survey will be conducted using an intuitive meander approach, focusing on areas of invasive species infestations and potential habitat for RTE. Input on general vegetative cover, developed during Phase 1 of the Wildlife Study, will assist in the field survey for RTE and invasive species within the Project boundaries. Additional detail regarding species lists, schedule and updates was added to this revised study plan. Rather than provide quarterly updates, we are proposing to consult with the Agencies and other interested stakeholders prior to the field survey has been completed. Consultation prior to the field

survey would be completed at the same time as the consultation for the Wildlife Study, and consultation after the field season would take place in October, 2015.

The Botanical Study's field survey is being proposed for the late Spring through early Fall, 2015. This period represents the growing season for plants in the Upper Midwest, and the time during which the plants of interest can be identified.

#### 2.3 Recreation

The Revised Recreation Resources Study, located in Appendix D, has been modified based on PSP comments received, and includes the development of a facility inventory and condition assessment, separate spot and calibration count dates, additional sampling dates for months with three-day holidays, the minimum number of hours dedicated to implementing the user contact surveys and locations for these contact surveys, and spot counts for sites where registration information will be collected from the operators of these sites. A map identifying the locations of areas within Project boundaries fenced from public access and open to public access, along with the size of the areas open to public access, has been included in the RSP. The Revised Recreation Study will be completed during one recreational season, described in the Plan as April through October and is based on the dates the Project recreation facilities are open for use. This RSP also includes consultation updates, with target dates listed in the Plan, which can be found in Appendix D.

The Project contains five recreational sites which provide a variety of activities for the public, including camping, picnicking, disc golf, scenic viewing of Lake Michigan, hiking, and fishing. These sites include: Mason County Campground, Mason County picnic area, Upper Reservoir observation platform, Lake Michigan overlook, and Pigeon Lake North Pier.

The Project is a pumped storage facility, with the Upper Reservoir specifically constructed for Project operation and separate from any natural water bodies. This Upper Reservoir currently experiences and will continue to experience large daily fluctuations in water level, and there will continue to be no safe opportunity for recreational access to this Upper Reservoir.<sup>2</sup> The Lower Reservoir is Lake Michigan and access to the Lake in the vicinity of the project is restricted based on land ownership and natural bluffs along the shoreline. The Project itself is a secure area and a protected critical energy infrastructure, so access to areas close to this facility remain limited for security reasons. Additionally, project land associated with the Project is limited to the land needed for operational requirements. Therefore, there is no real opportunity to provide additional access within the current Project boundaries and very little opportunity to do so in the vicinity of the Project without substantial investment in acquiring land resources.

# 2.4 Cultural Resources Surveys

The Cultural Resources Study was revised to separate the proposed study into two studies: one will be a Historical Resources Survey (Appendix E) and the second will be an Archaeological Survey (Appendix F). The goal of the Cultural Resources Surveys is to evaluate the potential effects of Project operations on historic structures and archaeological resources listed or eligible for inclusion in the National Register of Historic Properties (NRHP). The results of these studies will be used to determine if a Historic Properties Management Plan (HPMP) is needed for the management and treatment of historic properties at the Project, and, if needed, the focus of the Plan. Should a HPMP be needed, the Plan will be prepared in consultation with the Michigan SHPO and will address the items listed in FERC's letter of May 16, 2014.

The area of investigation will include the Area of Potential Effect (APE) as defined after consultation with the Michigan State Historic Preservation Office (SHPO). According to FERC, the Project APE includes "the lands enclosed by the Project's boundary and lands or properties outside of the Project's boundary where Project construction and operation or Project-related recreational development or other enhancements may cause changes in the character or use of historic properties, if any historic properties exist." The Licensees will consult with the Michigan SHPO for concurrence with this definition of the APE for historic cultural resources.

 $<sup>^{2}</sup>$  The Upper Reservoir has a maximum water elevation of 942 feet and a minimum water elevation of 875, or an operational bandwidth of 67 feet. The Upper Reservoir is drawn down on a daily basis to support generation of the hydroelectric units. The rate of change in water elevation is about 1 foot per hour per unit operating.

Since the PSP meeting in July, the Licensees initiated consultation with the Michigan SHPO, and Tribes<sup>3</sup> about the APE, and intend to continue consultation after the filing of the Revised Study Plans to define the APE to be used for the Cultural Resources Study Plans. The Licensees will propose that the Ludington APE includes all lands within the FERC Project Boundary. The APE will also include any lands outside of the Project Boundary where historic properties may be affected by Project-related activities that are conducted in compliance with the FERC license.

# 2.4.1 Historical Resources Survey

The purpose of any historical resources investigations required as part of the license renewal is to identify historic resources within the Project APE that are listed in or are eligible for listing in the NRHP and to assess possible effects from Project operations on those resources. This will be accomplished through consultation with the Michigan SHPO and other interested stakeholders and preservation groups; site file and background research; and field studies. The Historical Resources Survey was revised to include additional detail and schedule information.

# 2.4.2 Archaeological Resources Survey

The Licensees propose to conduct a Phase I background research and field survey for the Project. The goal of this work is to assist FERC in meeting its compliance requirements under Section 106 of the National Historic Preservation Act (NHPA) (1966), as amended, by determining whether historic properties (archaeological sites that are eligible for or listed in the NRHP) are present within the Project's APE. The Licensees propose to consult with the Michigan SHPO, federally recognized Indian tribes who have an active interest in the Project and other interested parties in advance of the survey to define and map the APE, determine appropriate areas to be surveyed, and determine appropriate survey methods. The steps in accomplishing this goal include: 1) identification of known cultural resources listed in, or eligible for listing in, the NRHP as historic properties, 2) review of information relating to the extent of prior disturbance within the boundaries of the Project; 3) consultation with the Michigan SHPO and interested

<sup>&</sup>lt;sup>3</sup> Tribes contacted were Grand River Band of Ottawa Indians, Grand Traverse Band of Ottawa and Chippewa Indians, Match-e-be-nash-shee-wish (Gun Lake) Band of Potawatomi, and Burt Lake Band of Ottawa and Chippewa Indians, Little River Band of Ottawa Indians, Notawaseppi Huron Band of Potawatomi, Hannahville Indian Community, Little Traverse Bay Band Odawa.

tribes; 4) review of archaeological and other related data that are pertinent to the formulation of a sensitivity model for determining whether historic properties may be located in the Project APE, and 5) offering a field strategy for archaeological field survey to determine whether such properties are present in the Project's APE.

If any cultural resources are discovered during the survey, the NRHP eligibility of those resources will be determined in consultation with the Michigan SHPO. (If necessary, additional Phase II archaeological evaluations may be conducted to allow a definitive determination of eligibility.) The survey information will be used to develop a HPMP, which will be filed with the Preliminary Licensing Proposal after consultation with the Michigan SHPO. The HPMP will address the elements outlined in the FERC's letter dated May 16, 2014.

# 3.0 RESPONSES TO STAKEHOLDER PROPOSED STUDY PLAN COMMENTS

The Licensees filed their PAD on January 21, 2014 and they proposed to conduct studies for wildlife, botanical, and recreational resources. Prior to submitting the PAD, water quality in the Project vicinity was studied for one season and the data was included in the PAD. FERC issued the Scoping Document 1 on March 20, 2014 and held two public scoping meetings on April 17, 2014 in Pentwater, Michigan. The Environmental tour of the Project was held on July 30, 2014. In accordance with the ILP regulations, comments on the PAD and Scoping Document as well as Study Requests were due to FERC by May 21, 2014. The Licensees' Preliminary Study Plan (PSP) including its response to the comments and Study Requests was filed on July 7, 2014. On July 31, 2014, the Licensees conducted the ILP Study Plan Meeting to discuss stakeholder comments on the PSP. At that time, Resource Working Groups (RWG) were tentatively identified and follow-up meetings discussed in order to set up RWGs and to address outstanding issues in the recreation and fisheries areas.

Fisheries Resources Working Group Contacts. Calls were made to the Little River Band of Ottawa Indians (LRBOI) and the Little Traverse Bay Bands of Odawa Indians (LTBB) in late August and early September to discuss their proposed study requests and to invite their participation in a fishery RWG. LTBB agreed to continue discussions and LRBOI determined that they would not participate in additional meetings, choosing to concentrate their efforts on preparing comments. Contacts have also been made with all members of the Scientific Advisory Team (SAT), which includes representatives from the Michigan Department of Natural Resources, the Michigan Attorney General, the United States Fish and Wildlife Service, the Grand Traverse Band of Ottawa and Chippewa Indians, the LTBB, the National Wildlife Federation, and the Michigan United Conservation Clubs (all associated with the "Joint Commenters" submissions). An SAT discussion of the PSP, which included representatives of the LRBOI and LTBB, was held on October 14 immediately following the scheduled Fall SAT meeting. The SAT plans to continue providing review and input to the Fishery Study Plan and results in much the same manner as they review and input to the study of fish protection impacts from the unit upgrades developed in 2011.

<u>Recreational Resources Working Group.</u> A meeting was held in September with Pere Marquette Charter Township (PMCT) during which PMCT provided an overview of a more focused request for recreational survey and identified issues with the Father Marquette area. Consumers' staff attending the meeting relayed this information to its upper management for review and discussion. Both PMCT and Consumers agreed to meet again in November.

<u>Cultural Resources Study Consultation.</u> Consumers contacted eight Tribes by phone in late August in order to determine their level of participation in the relicensing, and ask about their level of involvement in determining the APE for the cultural resources study. A representative of the Grand Traverse Bay Band of Ottawa and Chippewa Indians indicated interest in participating in the APE determination. Another Tribe, Nottawaseppi Huron Band of Potawatomi requested copies of the documents issued to date; the PAD and NOI were sent and internet links to the other documents were provided. The other Tribal representatives did not respond to the messages left. The Michigan SHPO was also contacted in late August and in mid-September to discuss the Revised Study Plans for Cultural Resources, a determination of APE, and to provide the SHPO with a copy of the PSP. Consultation with the Tribes and Michigan SHPO will continue through the end of 2014.

In accordance with ILP regulations, comments on the PSP document were due to FERC by October 3, 2014. PMCT provided comments on September 15, 2014 and FERC provided

9

comments on September 25, 2014. On October 3, 2014, comments were submitted by LTBB, LRBOI, and Joint Commenters.

The Licensees have reviewed these comments, the meeting summary from the Study Plan Meeting, and other communications with RWGs and other stakeholders according to the FERC's seven criteria for study requests (18 CFR §5.9(b)). As a result of comments received, the Licensees have made modifications to all study plans. Table 1 presents a summary of how stakeholder comments on the PSP have been addressed. The Licensees' determination on the appropriateness of a study request is based on the seven criteria for study requests contained in the ILP regulations (18 CFR § 5.9(b)). These seven criteria are as follows:

- 1. Describe the goals and objectives of each study proposal and the information to be obtained;
- 2. If applicable, explain the relevant resource management goals of the agencies or Indian tribes with jurisdiction over the resource to be studied;
- 3. If the requester is not a resource agency, explain any relevant public interest considerations in regard to the proposed study;
- 4. Describe existing information concerning the subject of the study proposal, and the need for additional information;
- 5. Explain any nexus between Project operations and effects (direct, indirect, and/or cumulative) on the resource to be studied, and how the study results would inform the development of license requirements;
- 6. Explain how any proposed study methodology (including any preferred data collection and analysis techniques, or objectively quantified information, and a schedule including appropriate field season(s) and the duration) is consistent with generally accepted practice in the scientific community or, as appropriate, considers relevant tribal values and knowledge; and
- 7. Describe considerations of level of effort and cost, as applicable, and why any proposed alternative studies would not be sufficient to meet the stated information needs.

Commenter	Study Plan	Comment Resulted in Modification to Study Plan	Comment Did Not Result in Modification to Study Plan
РМСТ	PSP Section 5.0		See Section 3.1.2
	PSP Section 6.0	See Recreation Study Plan, Appendix D	
	Recreation (PSP Section 7.4)		See Section 3.1.2
	Cultural Resources (PSP Section 7.5)		See Section 3.1.3
FERC Staff	General Comments – quarterly reports		See Section 3.0
	General Comments – justification for length of study season	See discussions in Section 2.0 above below.	
	Fish and Aquatic Resources	See Appendix A	
	Wildlife Resources	See Appendix B	
	Recreational Resources	See Appendix D	
LTBB	Fish and Aquatic Resources		See Section 3.1.1
LRBOI	Fish and Aquatic Resources		See Section 3.1.1
Joint Commenters (Michigan Department of Natural Resources, Michigan Attorney General, US Fish and Wildlife Service, and National Wildlife Federation)	Fish and Aquatic Resources	See Appendix A	See Section 3.1.1

<b>Table 1 Summary</b>	y of stakeholder	comments on	the PSP	and Licensees'	responses
------------------------	------------------	-------------	---------	----------------	-----------

#### 3.1 Summary of Stakeholder Comments

Comments on the PSP were received from PMCT, FERC, LRBOI, LTBB and the Joint Commenters as indicated in Table 1. Based on these comments, the Study Plans for Fish and Aquatic Resources, Wildlife Resources, Botanical Resources, Recreational Resources, and Historic Resources were revised. The RSPs are found in Appendices A through F. This section presents a discussion of and responses to stakeholder comments that did not result in modifications to study plans.

#### 3.1.1 Fish and Aquatic Resources

Comments provided by FERC and the Joint Commenters pertained to the proposed Fish and Aquatic Resources Study Plan. Comments provided by the LRBOI and LTBB pertained to their study requests which were not adopted by the Licensees. General responses to each of these entities are provided below.

# FERC

FERC provided comments on the Fish and Aquatics Study Plan on September 25, 2014. In general, comments pertained to the need for more detail on plan components, a schedule for deliverables, and adjusting the schedule to coincide with the initial study update meeting. To the extent feasible at this time, the revised study plan addresses FERCs comments (Appendix A).

### Joint Commenters

By letter dated October 3, 2014, the Joint Commenters provided comments on the proposed Fish and Aquatic Resources Study Plan. In general, their comments focused on three main points: 1) the plan was lacking details regarding study elements; 2) the study plan needed a process to select a panel of experts to assist in evaluation of study results; and 3) the Joint Commenters believed that the plan inferred that no reliable entrainment abatement measures would be determined to be viable and therefore did not allow for field testing of potential methodologies.

With regard to the first comment, the study plan has been revised (see Appendix A) to provide detail as appropriate at this time. The originally proposed study plan provided the outline for basic study components as well as consultation with the SAT. This consultation was intended to

provide a collaborative forum to help ensure the concerns of the Joint Commenters would be addressed. Additionally, the entrainment abatement and engineering alternatives evaluation were always intended to be comprehensive. While details have been added to the revised study plan to include examples of technologies, structural, and engineering options for consideration as requested, some of the specifics (e.g. potential technologies) will be better defined during the course of the study. All entrainment abatement measures including the current barrier net system will be summarized into a matrix that allows for side by side comparison of the strengths and weaknesses of each. Components of the matrix will include elements of species (with attention to native and other highly desirable species) and size specific theoretical effectiveness, seasonal effectiveness, constructability, engineering feasibility, costs (capital and O&M), and effects on Project operations. Not only will the matrix provide a relatively simple means to evaluate each methodology relative to the others, it will also show where methodologies may complement each other when used together. The comments also questioned the references to the Stone and Webster Study (1988) and the most recent Entrainment Abatement Report (2011). The Licensees maintain that these are valuable sources of information that will be important components of the proposed study. As such, we recommend that individuals from the organizations comprising the Joint Commenters who may be participating in the study efforts (see revised study in Appendix A) review these documents in detail to help inform discussions as the process moves forward.

A process for selecting a panel of experts has been incorporated into the revised study plan. In their comments, the Joint Commenters acknowledged that the SAT may be lacking sufficient expertise, particularly in the arena of engineering, to perform adequate reviews of the study results. As such, a panel of experts will be assembled to provide input to study tasks and also provide an independent review of study results that can be used for decision making purposes during relicensing.

The comment that the licensees predetermined that no viable methodologies would be identified and therefore did not allow for field testing of potentially viable alternatives is inaccurate and likely the result of miscommunication. The intent of the proposed study was and continues to be meeting the request of the Joint Commenters and conducting a study that will provide FERC and other stakeholders with the necessary information for decision making purposes for the relicensing process. The evaluation, as proposed has to run its course and the results will determine the next steps. Next steps may include more in depth evaluation for specific technologies, site specific data collection, and prototype design and testing. Such a step-wise process would be needed prior to implementing a full-scale abatement system at the Project. Such a process would be a multi-year effort and could be expected to extend well beyond the relicensing process. Therefore, should study results warrant actions that extend beyond the relicensing period, they could be included as part of a Fisheries Management Plan that would be associated with the new license. Such an approach meshes well with the results of the recent Fish Protection Impact Evaluation study (Alden Research Laboratory, 2011) associated with the ongoing unit upgrades. This study involved a successful collaborative effort of input, review, and feedback by the SAT and concluded in recommendation of a continued monitoring and adaptive management approach to explore any remediation alternatives.

# Little River Band of Ottawa Indians (LRBOI)

The LRBOI provided comments on October 3, 2014. The comments largely pertained to the Licensees reasoning as to why the LRBOI's request to study the potential of winter entrainment of lake sturgeon was not adopted. Further the LRBOI contends that this information is needed in order to more fully assess species specific entrainment abatement technologies. In general, the LRBOI did not agree with the Licensees' reasoning as to why entrainment of lake sturgeon during the period when the seasonal barrier net is not deployed isn't warranted and provided a number of references supporting their position. The Licensees have reviewed all references provided. The references document movement of lake sturgeon during warm water periods of the year, and none of them document movement specific to the colder weather period when the barrier net is not deployed. The references cited generally pertain to distances that lake sturgeon as well as other sturgeon species have been documented to move over a period of time. While these distances can be substantial, they do not demonstrate cold weather movement patterns. Examples of winter movements and habitat utilization found in the existing literature are provided below. The Licensees do not debate that lake sturgeon have been documented to move

substantial distances but the Licensees are unaware of information indicating such movements occur during the winter months when the seasonal barrier net is not deployed.

It should be noted lake sturgeon is currently a species receiving substantial attention in terms of research and restoration efforts. As such, an abundance of information is available from a number of talented researchers such as those cited by the LRBOI. Little of this information however, pertains to winter movements. While much of the available information, including those cited by the LRBOI, is based on studies conducted within river systems it is still valuable information that lends itself to the understanding of this species.

Pertinent information on winter movements and habitat utilization obtained by the Licensees, indicate limited movements and a preference for habitats not consistent with or unique to the intake area. For example, winter habitats have been documented to consist of low water velocity (which is common to most of the Lake Michigan shoreline with the exception of the intake area) and fine substrates (which are common to the vast majority of shoreline in the Ludington area). This information needs to be viewed collectively and not specific to the site conditions occurring where the research was conducted. While some movement may occur during the periods without the seasonal barrier net in place, this time period would be very limited. The information that is available supports the contention that lake sturgeon seek out deeper areas during the colder months, seek lower velocity areas and exhibit limited movement. This information includes:

- Adult lake sturgeon move to deeper water in lakes and riverine refuge pools during the winter when they are relatively sedentary prior to the spawning season (Kerr et al 2010).
- During the winter, adult lake sturgeon move to deeper water (i.e., 6 11 m) in lakes and in riverine refuge pools having low water velocity (McKinley et al. 1998, Threader et al. 1998, Aadland and Kuitunen undated).
- Refuge pools of 6 11 m in depth are required for overwintering. (McKinley et al. 1998, Threader et al. 1998, Aadland and Kuitunen undated).
- Overwintering sites in Lake of the Woods had depths greater than 6 7 m, and rarely deeper than 10 m. (Rusak and Mosindy 1997).
- Overwintering sites had depths ranging from 1 40 m (Shaw 2010).

- Movements of lake sturgeon in Black Lake (Michigan) were positively correlated to water temperature (i.e., greater movements during warmer temperatures) Hay-Chmielewski 1987).
- Sedentary behavior is exhibited during the summer and winter (Fortin et al. 1993, Friday and Chase 2005).
- In the Rupert River, adult lake sturgeon preferred low flow areas (less than 0.4 m/s), depths less than 8 m and silt and sand dominated substrates in the summer, while in the winter they preferred areas of lower flow (less than 0.2 m/s) and deeper waters (2-16 m) (Environnement Illimité Inc. 2003).
- Annual movements generally involve a spring migration to spawning areas, a postspawning dispersal to feeding grounds, and a fall migration to overwintering sites (Phoenix 1991, Wilson and McKinley 2004, Shaw 2010).
- Shaw (2010) observed that fall migrations to overwintering areas occurred at water temperatures from 4° to 9° C but high site-fidelity and short travel distance reflected a significant decrease in movement during the winter season. After spawning, return to home areas and/or feeding areas followed by late summer migration to wintering areas (Rusak and Mosindy 1997, Thuemler 1997, Block 2001, Adams et al. 2006).
- During winter, they are often found in aggregations and display sedentary behavior (Fortin et al. 1993, Environnement Illimité Inc. 2004, Friday and Chase 2005, Snellen 2008).
- Generally, they do not feed as actively as other times of the year (Werner and Hayes 2005).
- Overwintering sites are dominated by fine substrates (Shaw 2010).

The Licensees provided information from current Michigan DNR study efforts because of its pertinence to the study area and the general winter movement characterization is consistent with other available information. The criticism for not being peer reviewed data can also be applied to LRBOI data on lake sturgeon collections during the fall and winter, especially since details on numbers and sampling efforts are lacking. Even so, the Licensees acknowledge the presence of some lake sturgeon in the Ludington area is likely but are unaware of any characteristics that would attract them to the immediate vicinity of the Project in general or to the tailrace (i.e., pump intake) area in particular compared to other habitats throughout the region. As stated above, low water velocities and fine substrates may be preferred during the winter and these habitats are common throughout the region. The intake area, however, has higher water velocities even

though fine substrates are present. Therefore, based on the available information that addresses cold weather movement of the species as provided above, the Licensees maintain that lake sturgeon are seeking habitats that are inconsistent with those near the Project tailrace, especially within the velocity barriers, and that entrainment risk is thus low in the winter months.

In the LRBOI's original study request, they identified their position on study objectives, lake sturgeon restoration goals, and why they contend the study is important to understand entrainment potential in order to better inform decisions regarding entrainment abatement. The LRBOI stresses that their desire is to protect lake sturgeon from entrainment and the current protection measures may be lacking the ability to do so. The Licensees contend that the proposed Fish and Aquatic Study Plan will evaluate entrainment abatement and engineering alternatives in a manner that considers species and size of fish present, the seasonality the various measures can be employed, and potential effectiveness. Therefore the existing study will consider how to protect sturgeon from entrainment at all times.

The LRBOI acknowledges the challenges of conducting a study under the existing winter conditions at the Project and proposes using hydroacoustic technology as a viable alternative. As pointed out by the LRBOI, the current Settlement Agreement mandates that the Licensees and SAT investigate the feasibility of using hydroacoustics to evaluate fish populations proximate to the plant and if feasible, deploy such technology upon governmental approvals. The SAT is currently advancing this directive through the development of a scope-of-work. The site specific applicability, size and number of hydroacoustic arrays, coverage area, year-round deployment, and sampling location to confirm entrainment are some of the questions that remain. Therefore, it is likely that in order to collect meaningful information with a low sturgeon population and a potentially large area requiring multiple hydroacoustic arrays to provide substantial coverage, multiple years of study at more than the estimated \$200,000 per year will be required.

The Licensees are committed to lake sturgeon restoration efforts as has been demonstrated by their active support of lake sturgeon projects conducted through the GLFT. However, the Licensees maintain that there is not sufficient evidence to support a specific study of winter time

lake sturgeon entrainment losses that would add value to the proposed exhaustive investigation of abatement technology alternatives.

#### Little Traverse Bay Bands of Odawa Indians (LTBB)

In their letter dated October 3, 2014, the LTBB provided discussion reiterating their position that small-bodied and larval fish in the vicinity of the Project need to be studied in order to sufficiently evaluate their entrainment abatement and engineering alternatives. The LTBB's position is that the fish community is changing toward more abundant native species which did not have much consideration during previous entrainment abatement evaluations.

The Licensees agree that the fish community is changing and protection of native species is an important consideration in the entrainment abatement evaluation. The species and size groups of fish present are important aspects needed for the proposed Fish and Aquatic Study Plan which will evaluate entrainment abatement and engineering alternatives. The Licensees contend, however, that sufficient information in this regard is available, and that relative abundance data is not needed to substantively affect the evaluation. The evaluation will consider how the various options will potentially protect fish by species, size, and by season, to the extent feasible. Further, it is likely that juvenile/larval fish sampling would produce variable results from year to year due to the fact that year-class strength varies based on the environmental conditions. Therefore the Licensees do not believe that the collection of such data over a several (i.e. 2 to 3) year period will benefit the ultimate goal of identifying viable protection measures. If the LTBB does have data available that would be useful in the evaluation, the Licensees ask that it be provided.

Further, even though the current gillnetting monitoring protocol is not effective at capturing fish less than 4" (except perhaps round goby), the seasonal barrier net is designed to provide increased protection of small fish in the inshore area. The first 1,175 feet of net from the shoreline, in both the north and south wings, is made of ½-inch bar mesh, while the remainder of the net is constructed with ¾-inch bar mesh. The intent of using the ½-inch bar mesh for the near shore panels is to improve the net's effectiveness in excluding small fish which typically inhabit shallow waters especially in early summer. The proposed Fish and Aquatic Resources

Study will consider the potential effectiveness of various methods to protect small fish from entrainment, including alternatives that would either function instead of or work in combination with the existing seasonal barrier net.

The Licensees asked a reputable consultant to provide a cost estimate to conduct the study as requested. That estimate was \$250,000 to \$325,000 per year (including laboratory processing of ichthyoplankton samples) and as suggested by the LTBB, this would be a 2-3 year effort which the Licensees consider to be a minimum due to the substantial variability of environmental conditions that often dictate spawning and subsequently year-class strength. While the Licensees acknowledge the importance of protecting the native fish community, they do not believe this study will provide information needed to do so.

# 3.1.1.1 References

Aadland, L. P. and A. Kuitunen. Undated. Habitat suitability criteria for stream fishes and mussels of Minnesota. Minnesota Department of Natural Resources. St. Paul, Minnesota. 167 p.

Adams, W. E., L. W. Kallemeyn, and D. W. Willis. 2006. Lake sturgeon (*Acipenser fulvescens*) movements in Rainy Lake, Minnesota and Ontario. Canadian Field-Naturalist 120:71-82.

H. Beamish, and R. S.McKinley [eds.]. Sturgeons and Paddlefish of North America. Kluwer Academic Publishers. Boston, Massachussetts.

Environnement Illimité Inc. 2003. Centrale de l'Eastmain-1-A et dérivation Rupert – Esturgeon jaune. Rapport sectoriel 2002-2003. Gendron, M., F. Burton., et G. Guay. Report submitted to Société d'énergie de la Baie James (SEBJ), Montréal, QC. 124 p. + 4 apps.

Environnement Illimité Inc. 2004. Caractérisation de la population d'esturgeon jaune. Rapport sectoriel, 2002-2003. Rapport présenté à la Société d'energie de la Baie James. Montréal, Québec. 137 p. + appendices.

Fortin, R., J.-R. Mongeau, G. Desjardins, and P. Dumont. 1993. Movements and biological statistics of lake sturgeon (*Acipenser fulvescens*) populations from the St. Lawrence and Ottawa River systems, Quebec. Canadian Journal of Zoology 71:638-650.

Friday, M. J. and M. E. Chase. 2005. Biology and management of lake sturgeon (*Acipenser fulvescens*) in the Kaministiquia River. Technical Report, Upper Great Lakes Management Unit. Ontario Ministry of Natural Resources. Thunder Bay, Ontario. 45 p.

Hay-Chmielewski, E.M. 1987. Habitat preferences and movement patterns of the lake sturgeon (*Acipenser fulvescens*) in Black Lake, Michigan. Mich. Dept. Nat. Res. Fish. Div. Fish. Res. Rep. 1949: 39p.

Kerr, S. J., M. J. Davison and E. Funnell. 2010. A review of lake sturgeon habitat requirements and strategies to protect and enhance sturgeon habitat. Fisheries Policy Section, Biodiversity Branch. Ontario Ministry of Natural Resources. Peterborough, Ontario. 58 p. + appendices.

McKinley, S., G. Van Der Kraak, and G. Power. 1998. Seasonal migrations and reproductive patterns in the lake sturgeon (*Acipenser fulvescens*) in the vicinity of hydroelectric stations in northern Ontario. Environmental Biology of Fishes 51:245-256.

Phoenix, R. D. 1991. Movements of lake sturgeon in the upper Groundhog River, 1988-89. Ontario Ministry of Natural Resources. Kapuskasing, Ontario. 41 p.

Rusak, J. A. and T. Mosindy. 1997. Seasonal movements of lake sturgeon in Lake of the Woods and the Rainy River, Ontario. Canadian Journal of Zoology 74:383-395.

Shaw, S. L. 2010. Lake sturgeon (*Acipenser fulvescens*) population attributes, reproductive structure, and distribution in Namakan Reservoir, Minnesota and Ontario. M.Sc. Thesis. South Dakota State University. Brookings, South Dakota. 110 p.

Snellen, G. 2008. Habitat use of lake sturgeon (*Acipenser fulvescens*) in the Mississippi River. M.Sc. Thesis. Western Illinois University. Macomb, Illinois. 64 p.

Threader, R. W., R. J. Pope, and P. R. H. Schaap. 1998. Development of a habitat suitability index model for lake sturgeon (*Acipenser fulvescens*). Report H07015.01-0012 prepared for Ontario Hydro. Toronto, Ontario.

Thuemler T. F. 1997. Lake sturgeon management in the Menominee River, a Wisconsin-Michigan boundary water. Environmental Biology of Fishes 48:311317.

Werner, R. G. and J. Hayes. 2005. Contributing factors in habitat selection by lake sturgeon (*Acipenser fulvescens*). Final report submitted to the Great Lakes National Program Office, United States Environmental Protection Agency. Albany, New York.19 p.

Wilson, J. A. and R. S. McKinley. 2004. Distribution, habitat and movement. Chapter 2 *In* G. T. O., LeBreton, F. W.

### 3.1.2 Recreational Resources

In PMCT's letter dated September 15, 2014, it provided comments on PSP Sections 5.0

(Requested Studies Not Adopted), 6.0 (Additional Information Requested) and 7.4 (Proposed Recreation Study Plan).

In its comments on Section 5.0, PMCT refers to language used in 18 CFR 4.51(f)(5), Report on recreational resources (a portion of the Environmental Report in the License Application), referring to "…for the purpose of creating, preserving, or enhancing recreational opportunities at the project and in its vicinity."<sup>4</sup> This phrase is used two times in this section, under sub-sections (iii) and (iv). Under sub-section (iii), the phrase is preceded by "A description of any measures or facilities recommended by the agencies consulted…". Under sub-section (iv) this phrase is preceded by "A statement of the existing measures or facilities to be continued or maintained and the new measures or facilities proposed by the applicant…". In neither case is this phrase associated with the need to complete studies of recreational facilities not under the direct control of the applicant in order to inform the report on recreation for the Application. The Licensees appreciate that PMCT has narrowed its study request to two Township sites – the Lake Michigan Public Beach site adjacent to Buttersville Park (Buttersville Beach) and the site locally referred to as the Twin Bridges site. (Please refer to Map 1) However, the sites are located 3 to 4 miles north of the project boundary and the Licensees.

Comments provided on Section 6.0 are associated with the amount of land open to the public versus land not open to the public (and associated with Project security, operations and public safety). In response to this request, Figure 4 was added to the Revised Recreation Study. This figure provides total acres associated with recreational facilities, total acres reserved for Project operations and the area of the upper reservoir, and indicates Township lines. All recreation facilities at the Project site are within PMCT boundaries.

PMCT's comments on Section 7.4 (Recreation Study) provides a summary of a meeting held between PMCT and Consumers staff regarding recreation, and a description of the two sites for which PMCT would like further development. The Licensees are continuing to talk to PMCT regarding their request and believe it is important to separate this effort from the Project's

<sup>&</sup>lt;sup>4</sup> In 18 CFR 5.9 (f)(vi), a similar phrase "...within or in the vicinity of the proposed project boundary..." is used and refers to inclusion in or designated for study for inclusion in the National Wild and Scenic Rivers System, or that have been designated as wilderness area, recommended for such designation or designated as a wilderness study area under the Wilderness Act. None of these designations applies to the project boundary of the Ludington Pumped Storage Project.



recreation study plan. As stated earlier in this section, the statement containing 'at the project and in its vicinity' are related to facilities recommended by Agencies as a result of consultation and facilities the Licensees propose in the License Application. Neither reference is connected to the Project's recreation studies. PMCT also states that the funding for disabled access at the two piers in Ludington and the inclusion of the satellite site at Port Sheldon are reasons for addressing the two PMCT sites at this time. The funding and the Port Sheldon site were the direct result of the 1996 Settlement Agreement. At that time, the Port Sheldon site represented an opportunity to provide access to Lake Michigan at a site that was owned and controlled by the Licensees.<sup>5</sup> The Buttersville Beach site is currently owned by Dow Chemical, with a lease to PMCT for site operation. The Twin Bridges site is owned by Dow Chemical as well as Michigan DNR. In its comments, PMCT also includes rationale for including these sites in the Project's recreation study plan, using the seven criteria outlined in 18 CFR 5.9 (b). The Licensees' response to each of these is as follows.

Section 7.4.2, Goals and Objectives. PMCT cites 18 CFR 2.7 as rationale for adding the two sites to the recreation study plan. This comment suggests that the current recreation facilities are inadequate. The Licensees believe that making that determination is premature. Adequacy of the existing recreation sites can only be made after the recreation use study of existing facilities is completed. PMCT does not offer goals and objectives for including the two sites in the Project recreation study, therefore the requirements of 18 CFR 5.9 (b)(1) are not met.

Section 7.4.3, Known Resource Management Goals. PMCT does not provide additional information about recreational use goals of the Township in its letter, and the requirement of 18 CFR 5.9 (b)(2) are not met.

Section 7.4.4, Background and Existing Information. The Licensees' revised study plan will provide information needed by FERC to assess the current use and condition of the existing recreation sites, and will provide information about the potential need for additional recreation associated with the Project. Questions of recreational users will provide input to the potential need for additional access. Consultation after the studies are complete can and should be used to

<sup>&</sup>lt;sup>5</sup> The Port Sheldon access is located at the Campbell Coal Plant, owned and operated by Consumers Energy.

determine whether and where any additional recreation access would be proposed, not the studies.

Section 7.4.6, Methodology. The recreation study has been modified to address both PMCT's and FERC's comments regarding details about methodology and increased study efforts.

Section 7.4.9, Cost and Level of Effort. PMCT states that the cost to add the two sites they have proposed to the recreation study would not be a significant added cost, PMCT does not provide an estimate of the additional effort and cost to survey these two sites.

### 3.1.3 Cultural Resources

PMCT offers comments on PSP Section 7.5, Cultural Resources, by requesting that the Father Marquette site be included in the archaeological resources study. While the site may be important to the area, PMCT also states that they do not believe that the site is deteriorating due to Project operation. This site is located along the northwest shore of Pere Marquette Lake (not Lake Michigan), about 4 miles north of the Project Powerhouse. (Please see Map 1.) This is out of the influence of the operation of the project, is not being affected by Project Operation and thus there is no Project Nexus.

# APPENDIX A

# FISH AND AQUATIC RESOURCES REVISED STUDY PLAN

#### CONSUMERS ENERGY COMPANY

# DTE ELECTRIC COMPANY LUDINGTON PUMPED STORAGE HYDROELECTRIC PROJECT (FERC NO. 2680-108) FISH AND AQUATIC RESOURCES REVISED STUDY PLAN

#### **1.0 DESCRIPTION OF ISSUE** (18 CFR 5.11 (d)(1))

Consumers Energy (Consumers) and DTE Electric (DTEE), the Licensees, own and operate under a license issued by the Federal Energy Regulatory Commission (FERC) the Ludington Pumped Storage Project (Project). The Project is located along the Lake Michigan shoreline, in the townships of Pere Marquette and Summit in Mason County, Michigan and in Port Sheldon in Ottawa County, Michigan. The Ottawa County portion of the Project is limited to a 1.8 acre satellite recreation site (established as part of the Settlement Agreement approved by Commission Order on January 23, 1996 (74 FERC ¶ 61,055)). (Figure 1)

On May 21, 2014, the Michigan Department of Natural Resources (DNR), the Michigan Attorney General (MAG), the United States Fish and Wildlife Service (USFWS), the Grand Traverse Band of Ottawa and Chippewa Indians (GTB), the Little Traverse Bay Bands of Odawa Indians (LTBB), the National Wildlife Federation (NWF), and the Michigan United Conservation Clubs (MUCC), collectively the Joint Commenters, filed a study request to "comprehensively identify and evaluate the feasibility and effectiveness of all available measures, including additional technologies and Project design and operation changes, to eliminate or reduce to the greatest possible extent, fish entrainment and mortality caused by operation of the Project." The Licensees acknowledge this request and propose an appropriate level of study as described below.

On October 3, 2014, the Joint Commenters submitted comments on the Proposed Study Plan.



# **2.0 PROJECT EFFECTS** (18 CFR 5.11 (d)(4))

Potential effects of Project operations on the Lake Michigan fishery have been a consideration since the Project was first constructed. Several agencies and non-governmental organizations (NGOs) identified this issue as of primary concern. Over the past 30 years, this issue has been and continues to be intensively studied with the results of these studies evaluated by FERC, the Licensees, resources agencies, tribes, NGOs and other stakeholders.

# 3.0 RELEVANT EXISTING INFORMATION (18 CFR 5.11 (d)(2) and 5.11 (d)(3))

As stated above, fish entrainment has been intensively studied at the Project for more than 30 years. Therefore a synopsis of this issue's history at the Project is warranted.

Unavoidable fish entrainment mortality has been a consideration throughout the life of the Project. In 1986, stakeholders, including the MUCC and the NWF, initiated legal actions against the Licensees for their perceived failure to identify and install fish barrier facilities to protect the fishery resources in the vicinity of the Project under Article 38 of the FERC license. The State of Michigan, which filed a separate action in state court seeking compensation for fish losses, also intervened in the federal licensing proceeding to require installation of devices to minimize future fish losses. At the time, the Licensees were actively evaluating measures to prevent fish losses. Evaluations included in-situ testing, consultation with fisheries experts, and consideration of engineering alternatives.

Since 1989 the Licensees have annually installed a seasonal barrier net around the Project jetties and breakwater to minimize fish losses at the Project due to entrainment. In 1991, after considerable testing and modification of the barrier net, the Licensees submitted the "Plan for Permanently Mitigating Fish Mortality." The Plan consisted of continued operation and effectiveness monitoring of the seasonal barrier net, mitigation for unavoidable fish losses, and funding for additional recreational facilities. The barrier net was eventually selected by the parties to the Settlement (discussed below) as the most effective fish protection measure available at the time, based on a detailed Stone and Webster engineering evaluation titled "Fish Mortality Mitigation Study: Ludington Pumped Storage Project" (1988). The report evaluated a number of potential alternatives, considering biological effectiveness, engineering technology, and economic factors. The PAD for the Ludington Project, filed on January 20, 2014, provides details regarding the existing measures employed by the Project to prevent and reduce fish entrainment and mortality (see Section 5.3.3).

After nearly ten years of working toward a resolution of this issue, the MUCC, NWF, the U.S. Department of the Interior, and several Indian tribes joined the state of Michigan in a comprehensive settlement with the Licensees in 1996. The comprehensive settlement involves separate FERC and State Court settlement components, including the installation and monitoring of the seasonal (April 15 –October 15) barrier net to reduce future losses of fish at the Project as part of the FERC Settlement, and compensation for past damages to the fishery resource and annual payments for unavoidable future losses as part of the State Settlement. The FERC and State Court settlements remain in place for the term of the original FERC license that expires in 2019.

Essential components of the State Court settlement, approved by the Michigan Public Service Commission in 1996, included the creation of the Great Lakes Fishery Trust (GLFT). The GLFT allocates funds provided by the Licensees for mitigation of unavoidable fish losses. Initial formation of the GLFT included a cash payment by the Licensees of \$5 million and the transfer of approximately 10,800 acres of company properties. The settlement also included annual compensation payments to the GLFT for unavoidable future fish losses occurring at the Project, the transfer of over 15,600 acres of undeveloped company lands to the State of Michigan, funding of seven fishing access improvements near other Great Lakes shoreline generating facilities individually owned by the Licensees, and annual payments to support the work of a Scientific Advisory Team (SAT).

The SAT is composed of representatives of the organizations serving on the GLFT Board of Trustees (except for the MAG) and currently includes representatives from Consumers and DTEE, the Chippewa Ottawa Resource Authority, GTB, LRBOI, LTBB, Michigan State University Department of Fisheries and Wildlife, USFWS, NWF, MUCC, and Michigan DNR. The SAT not only serves in an advisory role but also has some independent responsibilities with respect to overseeing and approving certain technical provisions of the FERC license requirements for the Project and fish-loss prevention strategies. The SAT meets regularly to review current data and to direct the next round of research. For example, they determine if additional research, monitoring, or adaptive management techniques to improve fish protection performance are indicated. An important role is monitoring developments in fish entrainment abatement technology, and evaluating whether current mitigation measures are sufficient. As part of this ongoing effort, the Licensees have also monitored performance of the barrier net against established performance standards since 1989, and in consultation with the SAT since its inception following approval of the Settlement. The annual barrier net monitoring program undertaken by the Licensees consists of twice weekly gill net sets (weather permitting) at eight locations, four inside the barrier net and four proximally outside. Data collected by this effort is provided to the SAT and reviewed on at least an annual basis.

The Licensees agree with the Joint Commenters that the current relicensing process provides an opportunity to consider alternatives to the current fish entrainment abatement measures, i.e., the seasonal barrier net. However, the Licensees wish to note that the current measures were developed in close consultation with the organizations represented by the Joint Commenters, and that these measures have been reviewed by the Joint Commenters on a regular basis since implementation and consistently found to be the most viable entrainment abatement option at the Project. Periodic reviews of entrainment abatement technologies are conducted every 5 years, under the FERC-approved settlement, and were most recently conducted in 2001, 2006, and 2011. Pursuant to the FERC approved settlement, the next review is scheduled for 2016. These periodic reviews include an evaluation of current technologies, and provide conclusions and recommendations pertaining to the utilization of any new technologies at the Project. None of the past reviews have resulted in recommended additional or alternative entrainment abatement measures from either FERC or any of the Joint Commenters.

Considered in the periodic entrainment abatement reviews, among other things, is the current effectiveness of the existing seasonal barrier net. Data collected from 1991 through 2012 demonstrate that the barrier net effectively excludes the majority of target species. From 1991 through 2012, target species effectiveness has averaged 92 percent. Effectiveness for the large
game fish (>5 inches) component has averaged 83 percent with annual values historically ranging between 70 and 90 percent for salmonids and 80 to 100 percent for yellow perch. Effectiveness for large forage (alewife and smelt >5 inches) has averaged about 94 percent. Some fish, however, are subject to entrainment given the seasonal nature of the barrier net's installation, the net's design and the dynamic environment in which it is deployed. The Settlement parties, which include the Licensees and the resource agencies, acknowledged this reality and agreed upon a monetary mitigation plan as part of the State Court settlement which provides for annual payments by the Licensees to the GLFT as compensation for the unavoidable losses as discussed above.

The initial and annual payments by the Licensees to the GLFT are the sole source of GLFT funding and annual payments will continue until the end of the current license term in 2019. Approximately \$50 million in grants have been awarded to date from the GLFT. Funded grant projects and related activities focus on the types of Great Lakes fishery projects specifically identified in the State Court settlement and discussed in more detail below. The GLFT has worked cooperatively with research institutions; state, tribal, and federal management agencies; regional authorities; non-governmental organizations; and private foundations to maximize the effectiveness of its grant programs and to encourage collaboration to address issues of common concern. The GLFT has also contributed resources to seminars, forums, and conferences to encourage collaboration and transfer of information on the Great Lakes fishery and ecosystem among researchers, managers, funders, and stakeholders (GLFT 2008).

GLFT grants give preference to Lake Michigan projects with a focus on the following activities:

- Research directed at increasing the benefits associated with Great Lakes fishery resources;
- Rehabilitation of lake trout, lake sturgeon, and other native fish populations;
- Protection and enhancement of fisheries habitat, including Great Lakes wetlands;
- Public education concerning the Great Lakes fisheries; and
- Acquisition of real property for the above purposes, or to provide access to the Great Lakes fisheries.

Under the terms of the settlement, the GLFT trustees are also authorized to grant funds for other purposes consistent with the types of projects outlined above (GLFT 2008). The GLFT is administered by a board of trustees representing the parties to the State Court settlement. The board consists of six members plus two provisional members. The Michigan DNR director is the permanent chair of the board. Detailed information on the GLFT, its history, goals, accomplishments as well as the grants funded to date can be found at: www.glft.org.

## 4.0 **PROJECT NEXUS (18 CFR 5.11 (d)(4))**

Fish entrainment and entrainment mortality has been well documented at the Project. Currently, deployment of the seasonal barrier net effectively eliminates most entrainment of the target species. However some level of entrainment and entrainment mortality remains.

## 5.0 NEED FOR ADDITIONAL INFORMATION (18 CFR 5.11 (d)(3))

Fish protection at water intakes of all sizes has been an issue considered at facilities around the world for decades. As such, many different measures have been considered, tested and implemented. At the Project, extensive research and innovative methods have been utilized to substantially reduce entrainment. However, some level of entrainment remains. Therefore, additional information is needed to determine if feasible methods exist to further reduce or eliminate entrainment.

Entrainment abatement measures can be quite expensive and effectiveness can be site and/or species/size specific. Therefore, a phased approach which begins by conducting a desktop evaluation on the volume of work completed on this topic along with site-specific considerations including theoretical effectiveness, costs, and feasibility are consistent with commonly accepted practices in the hydroelectric industry and is particularly appropriate for the Project where this issue has been extensively evaluated throughout the Project's history. The results from the desktop evaluation will then be used to guide the next phases of the evaluation as warranted. Subsequent phases could potentially include targeted evaluation of a specific technology, field research, prototype design, and full scale design and implementation.

#### 6.0 STUDY PLAN

#### 6.1 Purpose of Study and Use of Study Results (18 CFR 5.11 (d)(1))

The purpose of this study is to evaluate existing technologies available to protect fish from entrainment mortality and consider their applicability, feasibility, effectiveness and total cost (Capital and annual operating and maintenance) when applied to the Project. To the degree required for decision making purpose for the relicensing process, this evaluation will include physical, behavioral, operational, and structural fish protection options.

Study results will be used to determine if fish entrainment abatement options in addition to or instead of the seasonal barrier net to further decrease fish entrainment at the LPSP are available. If such measures are also considered feasible based on study criteria, this information would inform decisions regarding testing, design and implementation during the new license.

#### 6.2 Relevant Resource Management Goals, Standards and Guidelines (18 CFR 5.11 (d) (2))

The Joint Commenters' stated goal is to minimize all fish entrainment mortality associated with the operation of the Project and appropriately compensate the public for any continuing unavoidable impairment or lost use of fishery resources caused by Project operations.

#### 6.3 Relevant Public Interest Considerations

Lake Michigan supports an important recreational and commercial fishery which represents a substantial economic resource to the State of Michigan. Detrimental effects on the fishery's viability would likewise have detrimental impacts to the citizens of Michigan. Further as stated by the Joint Commenters in their May 21, 2014 letter, the MUCC and the NWF, like the Agencies and Tribes, share the goal of protecting the fishery resources of Lake Michigan and connecting waters and preserving and enhancing the ecological integrity of those waters as well as the sustainable and beneficial use of those fishery resources and waters by their respective members and the public as a whole.

#### 6.4 Study Methodology (18 CFR 5.11 (d)(5))

The general methodology proposed to achieve the study goals and objectives is to conduct a desktop evaluation based on existing information to assess potential fish entrainment abatement measures and engineering alternatives as they may apply to the Project and the Lake Michigan fish community. Components of the evaluation are provided below.

#### **Study Components**

The study will be based on existing information as applied to the Project and consist of two major components:

- An evaluation of fish entrainment abatement technologies; and
- An engineering alternatives evaluation.

The study will be conducted in consultation with the SAT to ensure that the concerns of the Joint Commenters are addressed as intended. The SAT was chosen to be a participating party to this effort because it is an established entity familiar with fish entrainment and entrainment abatement issues at the project. As stated earlier, the SAT also includes all stakeholders that have expressed an interest in the fish and aquatic species study associated with the Project relicensing. Their experience and professional expertise will be a valuable asset throughout the study. The following provides a stepwise progression of the study path.

#### Task 1: Meet with the SAT

Commencement of the study will begin by having a meeting with the SAT to review the study plan components, establish communication and meeting protocols, expectations of study deliverables and discuss timelines and initial steps associated with Tasks 2 and 3. Additionally, a review of the fish protection issue at the Project including key species of concern and their vulnerability will be conducted.

#### Task 2: Establish a Panel of Experts

A panel of experts will be established to provide expertise during the conduct of the study and provide expert opinions with regard to study results. Such opinions will then be considered

during the decision making process regarding appropriate actions when moving forward with a new project license.

The Licensees will submit the proposed panel of experts along with their qualifications to the SAT for concurrence and input. It is anticipated that at a minimum the group will consist of a fisheries biologist experienced in fish protection technologies; an engineer with fish protection design and implementation expertise; and a hydro engineer experienced with pumped storage project design and operations. Candidates for participation in the panel may be solicited from organizations such as: the Center for Energy Advancement through Technological Innovation (CEATI), Electric Power Research Institute (EPRI), Edison Electric Institute (EEI), National Marine Fisheries Service (NMFS), United States Fish and Wildlife Service (USFWS), Universities, private consultants, other governmental agencies, tribal parties and industry organizations.

#### Task 3: Identify Entrainment Abatement and Engineering Alternatives

The SAT and expert panel will be solicited to identify potential fish entrainment abatement and engineering alternatives that should be considered. Additionally, professional organizations and/or individuals with specific expertise that should be consulted will be identified. These may include: CEATI, EPRI, EEI, NMFS, USFWS, Universities, private consultants, private manufacturers, other governmental agencies, tribal parties, FERC, other hydroelectric facility owners, steam electric facility operators, scientific organizations, hydro design engineers, turbine manufacturers and industry organizations. Entrainment abatement and engineering technologies identified would likely include but not be limited to:

- Physical Barriers
  - Submerged traveling screens
  - Inclined diversion screens
  - Eicher screens
  - Hanging chains
  - Fixed screens
  - Mechanized screens
  - Louvers
  - Bar racks at various locations

- Porous dike
- Porous dike with pipes
- Dike with offshore intakes
- Porous dike with barrier net
- Gunderboom
- Behavioral Barriers
  - Sound (Acoustics)
  - Electric Barriers
  - Hybrid Systems
  - Air Bubble Curtain
  - Water Jet Curtain
  - Visual keys, strobe lights

The deliverable for this task will be a report identifying potential data sources and technologies as well as documenting the process steps completed in Tasks 1 and 2. (During this phase, the SAT and expert panel should meet at least twice to review progress and intermediate results.)

It is anticipated that the Task 3 report will be completed and submitted to the SAT by April 1, 2015. The report will also be filed with the Commission either as part of a progress report or as a separate filing.

#### Task 4: Entrainment Abatement Evaluation

The Study will review the feasibility of a variety of fish entrainment abatement technologies identified in Task 3.

The fish entrainment abatement technology evaluation will be modeled after the 2011 evaluation previously reviewed and accepted by the SAT. The current evaluation will build on the 2011 report to the extent possible by including information on new technologies and research that may have been developed since the publication of that document. Technologies that would enhance the current barrier net effectiveness will also be considered. New methodologies, results or conclusions relative to the 2011 report will be specifically identified.

The entrainment abatement alternatives identified will be evaluated in terms of:

• Applicability to the Project;

- Engineering feasibility and practicality;
- Biological effectiveness for the species and life stages present;
- Order of magnitude capital costs;
- O&M costs; and
- Potential impacts to Project operations and reliability.

The deliverable will be a report consisting of a more comprehensive effort than conducted in 2011. Additionally, the report will include a memo from the Expert Panel providing their opinion with regard to the task results and recommendations for further evaluation and/or research needs. A draft entrainment abatement study report will be completed and submitted to the SAT by September 30, 2015. After input from the SAT, it will be filed with the Initial Study Report (ISR). During this phase, the SAT and expert panel should meet regularly to review progress and intermediate results. (Note that meetings may be held either in-person or by conference call.)

#### Task 5: Engineering Alternatives Evaluation

Concurrent with the entrainment abatement evaluation, an engineering alternatives evaluation will be conducted to review the existing design and operation of the Project as it relates to the entrainment of fish and consider potential options for altering the design and operation of the Project to reduce the entrainment of fish. Alternatives evaluated will be based on the results of Task 3.

The engineering alternatives evaluation will use the 1988 Stone and Webster Report as a starting point for the current evaluation. While the concepts evaluated in the 1988 report were not considered to be feasible to meet fish protection goals at that time, they will be evaluated in terms of currently accepted engineering knowledge and practices as well as the current aquatic community to determine the current validity of the conclusions made over 25 years ago.

In addition to the engineering alternatives provided in the 1988 report, new concepts, determined as part of Task 3, will be included as appropriate.

The engineering alternatives identified will be evaluated in terms of:

- Applicability to the Project;
- Engineering feasibility and practicality;
- Biological effectiveness for the species and life stages present;
- Order of magnitude capital costs;
- O&M costs; and
- Potential impacts to Project operations and reliability.

The results of this evaluation will be described and documented in the text of the report. Additionally, the report will include a memo from the Expert Panel providing their opinion with regard to the task results and recommendations for further evaluation and/or research needs. A summary report of Task 5 will be submitted to the SAT by March 1, 2016. After input from the SAT, it will be filed with the ISR.

#### 6.5 Data Analysis and Reporting

Data analysis will consist of a review of potential opportunities for fish protection at the Project and the identification of alternatives that may be economically feasible, biologically effective for the target fish species and size groups, constructible from an engineering perspective and that do not affect Project or public safety.

Reporting will be done in accordance with the schedules identified in Section 6.6. The final study report will include the results of all tasks which will culminate in a matrix summarizing the major components of each alternative, their strengths and weaknesses as well as those of the current barrier net program. This will readily allow comparisons of the alternatives to identify which alternatives may be effective and where a combination of alternatives may complement each other. The intent is to provide sufficient information for decision making purposes during the relicensing process.

The report will also identify what, if any alternatives warrant further evaluation or testing along with recommendations with regard to the next steps. Recommendations may include a more indepth engineering evaluation of select alternatives, conceptual design, prototype testing, or

additional research. Project construction and operation schedule considerations will be taken into account when evaluating additional research/data collection needs and any potential testing activities.

It is anticipated that while the researchers will consult with and update the Expert Panel throughout the study, the Expert Panel will provide an independent review of study results and recommendations regarding next steps in the evaluation process. This memo will be submitted to the FPWG and filed with FERC by July 15, 2016.

#### 6.6 Schedule

The deliverables for each study task are provided above. It is anticipated that the study will commence in January 2015 with selection of a consultant to perform the study following final FERC approval of the study plan. The completed memos and reports will be filed with the Commission either as part of progress reports, the ISR, or as separate filings.

Task 1: Kick-off meeting with the SAT	January 1 – 31, 2015
Task 2: Establish a Panel of Experts	January 1 – February 15, 2015
Task 3: Identification Entrainment Abatement and Engineering Alternatives	February 15 – April 15, 2015
(SAT and expert panel meeting dates to be determined)	
Task 4: Entrainment Abatement Evaluation	April 15 – August 1, 2015
(SAT and expert panel meeting dates to be determined)	
Task 5: Engineering Alternatives Evaluation	June 1, 2015 – March 1, 2016
(Regular updates to the expert panel with dates to be deter	mined)
Draft report to SAT for review and comment	June 1 – June 30, 2016
Final Report	July 15, 2016

#### 6.7 Level of Effort (18 CFR 5.11 (d)(6))

The estimated cost for the desktop evaluation using existing information is \$200,000 to \$250,000. Should additional evaluation and/or field testing be required during the relicensing process, costs would increase accordingly (field testing or data collection activities will take into consideration the construction and operation schedules for the Project). The Licensees believe

that the proposed level of effort is adequate to obtain information on fish entrainment abatement alternatives for decision making purposes during the relicensing process.

#### 6.8 Discussion of Alternative Approaches

It is the Licensees' intent to meet the intent of the Joint Commenter's study request. Therefore, no alternative approaches have been proposed at this time.

#### 7.0 **REFERENCES**

None.

## **APPENDIX B**

## WILDLIFE RESOURCES REVISED STUDY PLAN

#### CONSUMERS ENERGY COMPANY

## DTE ELECTRIC COMPANY LUDINGTON PUMPED STORAGE HYDROELECTRIC PROJECT (FERC NO. 2680-108) WILDLIFE RESOURCES REVISED STUDY PLAN

#### **1.0 DESCRIPTION OF ISSUE** (18 CFR 5.11 (d)(1))

Consumers Energy (Consumers) and DTE Electric (DTEE), the Licensees, own and operate under a license issued by the Federal Energy Regulatory Commission (FERC) the Ludington Pumped Storage Project (Project). The Project is located along the Lake Michigan shoreline, in the townships of Pere Marquette and Summit in Mason County, Michigan and in Port Sheldon in Ottawa County, Michigan. The Ottawa County portion of the Project is limited to a 1.8 acre satellite recreation site (established as part of the Settlement Agreement approved by Commission Order on January 23, 1996 (74 FERC ¶ 61,055)). (Figure 1)

A review of the Michigan Natural Features Inventory (MNFI) and U.S. Fish and Wildlife Service (USFWS) data sources indicated that state and federally threatened wildlife species are documented to occur within the Project vicinity (MNFI 2013, USFWS 2013); however, these species have not been documented within the Project boundary.

The Licensees propose to conduct a reconnaissance level wildlife survey within the Project boundary to identify and document wildlife habitat, rare, threatened or endangered species (RTE), and potential RTE habitat. This survey will be conducted using an intuitive meander approach, focusing on areas of high quality or unique habitat.

The Ludington Project area provides habitat for a variety of wildlife species. An understanding of the habitat in the Project area would provide information on the wildlife species potentially affected by Project operation.



## **2.0 PROJECT EFFECTS** (18 CFR 5.11 (d)(4))

The Project operation has been consistent for over 40 years with little to no effect on wildlife resources within the Project boundary. No change in operation is being proposed by the Licensees, however, there may be opportunities for protection of RTE if observed within the Project boundary. An understanding of the wildlife resources within the Project boundary would provide information on the type and quantity of habitat potentially affected by Project operations.

# 3.0 RELEVANT EXISTING INFORMATION (18 CFR 5.11 (d)(2) AND 5.11 (d)(3))

#### 3.1 Overview

The Project is located along the eastern shore of Lake Michigan, near the City of Ludington and within the Town of Port Sheldon located in Mason and Ottawa counties, respectively. The Project facilities and most recreational facilities are located in Mason County. One satellite recreation facility is located near Pigeon Lake in Port Sheldon. Other than the Project's associated structures and facilities, development is limited in the immediate vicinity of the Project. The majority of lands in and around the Project are forested with scattered agricultural fields, some residences (primarily along Lakeshore Drive and on the Lakeside Links Golf course), and a few businesses adjacent to the Project area. Wildlife habitats and associated wildlife resources in the vicinity of the Project are determined primarily by the influences of the surrounding lands and associated uses.

The MNFI database does not identify any threatened or endangered wildlife species within the Project boundary (MNFI, 2013). Correspondence received from the USFWS, dated July 1, 2011, indicate that while federally listed threatened and endangered species occur within the vicinity of the Project in Mason County, no impacts from continued hydroelectric pumped storage operations were anticipated (USFWS, 2011). A portion of Lake Michigan and the upper reservoir are located within the Project boundary, with Pigeon Lake located about 70 miles south of the Project; however, no alterations to these waterways are planned or anticipated. Based on publically available information and anticipated ongoing Project activities, no issues have been identified relative to wildlife resources. Comments on the Pre-application Document (PAD),

received from the previously mentioned Joint Commenters do not provide any comments on wildlife resources. Comments on the PAD, filed by Pere Marquette Charter Township (PMCT), note that the double-crested cormorant (DCCO) (*Phalacrocorax auritus*), listed in the species table in the PAD, utilizes the Project breakwater. PMCT cites the report "Final Environmental Assessment: Double-crested cormorant damage management in Michigan (USDA, et al. 2011), and states that use of the Project breakwater is discussed at length in the report. This report presents an assessment of alternatives for management of DCCO damage in Michigan. The Licensees currently provide access to the breakwater for the USDA for a DCCO control program, and will continue supporting this program, which is consistent with the proposal in the report for control of DCCO.

Based on the available information on habitats within proximity of the Project, a diverse array of wildlife species may occupy or have the potential to occupy the immediate vicinity of the Project. The immediate area provides forested, early successional, wetland and lake shoreline habitats. A generalized list of wildlife occurring or potentially occurring within the vicinity of the Project is included in Table 1 below.

#### 3.2 Habitats in the Project Vicinity

In general, the area around the Project in Mason and Ottawa Counties provides a diversity of habitats such as mixed hardwood and pine forests, wetlands, agricultural land, and the Lake Michigan shoreline. These mixed habitats are characterized by a dense canopy and often have well-established shrub and sapling layers. Project lands in Mason County are relatively well distributed around the perimeter of the reservoir and discrete habitat types within these lands are relatively small in area and disjointed. The Project boundary itself encompasses only a small amount of habitat outside of the wetted portions of the Project impoundment (Figure 1). Most of the natural habitats and the associated wildlife resources surrounding the impoundment occur outside of the Project boundary on private lands. They are distributed in a patchwork around the impoundment and powerhouse, interspersed with open habitats which include agricultural areas and features associated with the Project such as the impoundment dike slopes and transmission line corridors.

Land associated with the satellite recreation site located in Ottawa County is part of Consumers Energy's J. H. Campbell Generating Complex, containing a mix of industrial (fossil power generation) and forest, while the area along Lake Michigan is primarily residential.

A portion of the lands surrounding the Project in both Mason and Ottawa counties contains open dunes. No known significant wildlife habitats are associated with the Project. Investigation of potential RTE species habitat in the Project area will include consultation with Michigan DNR and the USFWS to determine if these agencies are aware of any newly identified (since preparation of the PAD) state or federal RTE wildlife species in or adjacent to the Project area.

Wetland, riparian, and littoral habitats within the Project boundary are primarily associated with the margins and near shore areas of Lake Michigan. Very little of these habitats are contained within the Project boundary. USFWS National Wetlands Inventory (NWI) data and digital orthophotography of the Project vicinity show that vegetated wetlands within and adjacent to the Project boundary include palustrine and lacustrine wetlands with unconsolidated bottoms.

#### **3.3** Wildlife Resources in the Project Vicinity

The wildlife species assemblage known or considered likely to occur in the area surrounding the Project is typical of those found in Mason and Ottawa counties (Table 1). A representative listing of vertebrate RTE wildlife species known or considered likely to occur in the vicinity of the Project based upon habitat and life history information is also included Table 2 below.

COMMON NAME	SCIENTIFIC NAME	
Mammals		
Cottontail rabbit	Sylvilagus floridandus	
Deer mouse	Peromyscus msniculatus	
Eastern chipmunk	Tamias striatus	
Eastern coyote	Canis Latrans	
Fox squirrel	Sciurus niger	
Gray squirrel	Sciurus carolinensis	
Little brown bat	Myotis lucifugus	
Meadow vole	Microtus pennsylvanicus	
Opossum	Didelphis marsupialis	
Raccoon	Procyon lotor	
Red fox	Vulpes vulpes	
Shortailed shrew	Blarina brevicauda	
Silver-haired bat	Lasionycteris noctivagans	
Southern flying squirrel	Glaucomys volans	
Striped skunk	Mephitis mephitis	
White-footed mouse	Peromyscus leucopus	
White-tailed deer	Odocoileus virginianus	
Woodchuck	Marmota monax	
Birds		
American crow	Corvus brachyrhynchos	
American goldfinch	Carduelis tristis	
American kestrel	Falco sparverius	
American redstart	Setophaga ruticilla	
American robin	Turdus migratorius	
Bald eagle	Haliaeetus leucocephalus	
Bank swallow	Riparia riparia	
Barred owl	Strix varia	
Black-capped chickadee	Poecile atricapillus	
Blue jay	Cyanocitta cristata	
Bonaparte's gull	Larus Philadelphia	
Broad winged hawk	Buteo platypterus	
Brown thrasher	Toxostoma rufum	
Brown-headed cowbird	Molothrus ater	
Bunting	Passerina cyanea	
Canada goose	Branta Canadensis	
Chipping sparrow	Spizella passerine	
Common grackle	Quiscalus quiscula	
Common merganser	Mergus merganser	
Common tern	Sterna hirundo	

# Table 1: Common Wildlife Species Knownor Considered Likely to Occur in the Project Vicinity

COMMON NAME	SCIENTIFIC NAME
Common yellowthroat	Geothlypis trichas
Double-crested cormorant	Phalacrocorax auritus
Downy woodpecker	Dendrocopus pubescens
Eastern bluebird	Sialia sialis
Eastern kingbird	Tyrannus tyrannus
Eastern phoebe	Sayornis phoebe
Eastern towhee	Pipilo erythrophtalmus
European starling	Strunus vulgaris
Field sparrow	Spizella pusilla
Great blue heron	Ardea Herodias
Great Crested flycatcher	Myiachus crinitus
Grey catbird	Dumetella carolinenius
Herring gull	Larus argentatus
Horned lark	Eremophilia alpestris
House sparrow	Passer domesticus
House wren	Troglodytes aedon
Least sandpiper	Calidris minutilla
Mallard	Anas platyrhynchos
Meadowlark	Sturnella magna
Mourning dove	Zenaida macroura
Northern cardinal	Cardinalis cardinalis
Northern flicker	Colaptes auratus
Osprey	Pandion haliaetus
Purple martin	Progne subis
Red-eyed vireo	Vireo olivaceus
Red-tailed hawk	Bueto jamaicensis
Red-wing blackbird	Agelaius phoeniceus
Ring-billed gull	Larus delawarensis
Rock dove	Columba livia
Rose-breasted grosbeak	Pheicticus ludovicianus
Ruby-throated hummingbird	Archilochus colubris
Savannah sparrow	Passerculus sandwichensis
Song sparrow	Melospiza melodia
Spotted sandpiper	Actitis macularia
Tree swallow	Tachycineta bicolor
Vesper sparrow	Pooecetes gramineus
White-breasted nuthatch	Sitta carolinensis
Yellow warbler	Dendroica petechia
Reptiles	
Blanding's turtle	Emys blandingii
Common map turtle	Graptemys geographica
Common snapping turtle	Chelydra serpentina

COMMON NAME	SCIENTIFIC NAME
Eastern garter snake	Thamnophis sirtalis
Eastern hog-nosed snake	Heterodon platirhinos
Eastern milk snake	Lampropeltis triangulum triangulum
Northern ribbon snake	Thamnophis sauritus septentrionalis
Painted turtle	Chrysemys picta
Amphibians	
Blue spotted salamander	Ambystoma laterale
Eastern American toad	Bufo americanus
Eastern tiger salamander	Ambystoma tigrinum tigrinum
Fowler's toad	Bufo fowleri
Gray tree frog	Hyla versicolor and H. chrysoscelis
Green frog	Rana clamitans
Northern leopard frog	Rana pipiens
Northern spring peeper	Pseudacris crucifer
Western chorus frog	Pseudacris triseriata triseriata
Wood frog	Rana sylvatica

Source: Michigan State University, 2013 & Michigan DNR, 2014

COMMON NAME	SCIENTIFIC NAME	<b>STATUS</b> <sup>a</sup>	COUNTY
Birds			
Bald eagle	Haliaeetus leucocephalus	SC	Mason
Marsh wren	Cistothorus palustris	SC	Mason
Piping plover	Charadrius melodus	FE	Mason
Fish			
Bigmouth shiner	Notropis dorsalis	SC	Ottawa
Cisco (lake herring)	Coregonus artedi	Т	Ottawa
River redhorse	Moxostoma carinatum	Т	Ottawa
Insects			
Karner blue butterfly	Lycaeides Melissa samuelis	FE	Mason
Mammals			
Indiana bat	Myotis sodalis	FE	Mason, Ottawa
Northern long-eared bat	Myotis septentrionalis	PFE	Mason, Ottawa
Reptiles and Amphibians			
Eastern box turtle	Terrapene carolina	SC	Mason
Eastern massasauga	Sistrurus catenatus	FC	Mason

## Table 2: Rare, Threatened, and Endangered (RTE)Wildlife Species that Occur in the Project Vicinity

<sup>a</sup> E (State Endangered), T (State Threatened), SC (State Special Concern), FE (Federal Endangered), FT (Federal Threatened), FC (Federal Candidate), PFE (Proposed Federal Endangered)

Source: Michigan Natural Features Inventory. 2013. Michigan Natural Features Inventory Database (GIS Application). [Accessed Oct 9, 2013]

Source: U.S. Fish and Wildlife Service. 2013. Michigan County Distribution of Federally-Listed Threatened, Endangered, Proposed, and Candidate Species. <u>http://www.fws.gov/midwest/endangered/lists/michigan-cty.html</u> [Accessed Nov 21, 2013]

The Licensees propose a wildlife habitat survey within the Project boundary to identify any potential RTE habitat. This survey will be conducted using a meander approach on lands within the Project boundary. No species-specific surveys are planned at this time.

#### **3.4** Temporal and Spatial Distribution of Wildlife Resources

Many of the species occurring in the vicinity of the Project are seasonal migrants that travel substantial distances between breeding and wintering areas. Examples of this are avian species that breed in the area, but then winter elsewhere. Other species may have life history and habitat requirements that result in seasonal shifts of habitat usage within the Project area or region, such as deer movement to preferred wintering habitats. At the most limited end of the species movement spectrum, certain other species will simply remain in the immediate area of the

Project year round, or make only very limited movements between closely associated habitats, as dictated by their life history, overall mobility, and occurrence of acceptable habitat conditions within a relatively small area.

## 4.0 **PROJECT NEXUS (18 CFR 5.11 (d)(4))**

The Ludington Project area provides habitat for a variety of wildlife species. An understanding of the habitat in the Project area would provide information on the wildlife species potentially affected by Project operation.

### 5.0 NEED FOR ADDITIONAL INFORMATION (18 CFR 5.11 (d)(3))

The Licensees are not aware of any wildlife inventories that have been conducted within the Project boundary.

#### 6.0 STUDY PLAN

The Licensees propose to conduct a wildlife survey within the Project boundary to identify and document wildlife habitat, RTE, and potential RTE habitat.

#### 6.1 Purpose of Study and Use of Study Results (18 CFR 5.11 (d)(1))

A reconnaissance level field survey of the Project area with respect to wildlife resources will be undertaken. The survey is designed to provide information pertinent to:

- 1. Existing wildlife (bird, mammal, reptile, amphibian) habitats in natural areas of the Project and along the Lake Michigan shoreline.
- 2. The presence of RTE species or associated habitats.

To provide information pertinent to Project effects on wildlife resources, a field survey of wildlife habitat and RTE habitat within the Project boundary will be conducted. This field survey will document vegetation types and land use classifications and the presence of RTE species or habitats, if observed.

The results of this survey will provide the information necessary to:

• Describe wildlife habitats within the Project area.

• Identify and map occurrences or likely habitat for RTE species.

#### 6.2 Relevant Resource Management Goals, Standards and Guidelines (18 CFR 5.11 (d)(2))

Michigan DNR and USFWS have responsibilities for protecting wildlife resources. FERC must consider the effects of continued Project operations on natural resources and must balance the uses of the Project. This study will provide the necessary information to assess wildlife resources (species and habitats) within the Project boundary.

This study is consistent with the Michigan DNR goals to protect natural and cultural resources, ensure sustainable recreation use and enjoyment, enable strong natural resource-based economies, improve and build strong relationships and partnerships, foster effective business practices and good governance.

This study is consistent with USFWS relicensing goal of working with others to conserve, protect and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people, as well as their roles and responsibilities under federal law.

#### 6.3 Relevant Public Interest Considerations

Project relicensing participants have indicated that wildlife surveys are of interest in this proceeding. Pere Marquette Charter Township specifically expressed concern regarding double breasted cormorants within the Project area.

## 6.4 Study Methodology (18 CFR 5.11 (d)(5))

The habitat survey will involve three phases of work. The first phase will identify general vegetative cover types through photo interpretation. The second phase will be a field verification of the vegetative cover types. The third phase will be the production of a cover type map. Vegetation types and land use classifications will also be assigned. Additional data collected during the second phase field verification will describe the characteristics of each mapped cover type including species composition, stand structure, habitat quality, and land use. Information collected during desktop analysis and field surveys will include:

- Plant species composition, including the dominate and more prominent associated species in each vegetation layer (tree, shrub and herbaceous layers);
- Structure data, including estimates of aerial cover of the dominant cover types;
- Predominant land use(s) associated with each cover type; and
- Rare, unique, and particularly high quality habitat.

In general, the field survey will be conducted with an intuitive meander methodology, which is a visual inspection of habitats. Intuitive meander survey methodology focuses on specific habitat types and habitat likely to contain species of interest, opposed to walking set transect lines. This will include closer inspection of any potential microhabitats that might support individuals or populations of rare species as noted by USFWS or MNFI as potentially present but may not have been previously identified within the Project boundary. This type of "Lévy-walk" search has been found to "optimize the intermittent search strategy in the critical situation of rare targets" (Lomholt et al. 2008). Surveyors will walk through the land of the Project area, documenting dominant vegetative species and common wildlife species observed within each community type utilizing a survey rate of approximately 200 acres per day. Surveys at the Pigeon Lake Facility will be limited to those areas visible and accessible from the boardwalk.

Field crews will document general wildlife observations, including species observed and general abundance (few, common, or abundant), as well as RTE species observed and/or suitable habitats. Documentation will include site photos, GPS mapping, size of appropriate RTE habitat, notes on habitat type, habitat quality, and dominant vegetative species. Findings will be summarized in the wildlife survey report and RTE species occurrences will be reported to the MNFI.

Information collected for each RTE species occurrence (if observed) during field surveys will include:

- Species name
- GPS location
- Number of individuals
- Habitat type in which species was observed

• Habitat quality

#### 6.5 Data Analysis and Reporting

The Initial Study Report will summarize the wildlife habitats, common wildlife species, RTE species, and potential RTE habitats encountered within the Project boundary. If observed, RTE species occurrence data will be shared with the MNFI. The report will include a description of plant species composition, structure data, predominant land use, and a description of rare, unique, and particularly high quality habitat. Captioned photographs of typical and/or significant habitat conditions and habitat mapping will also be included in the report.

#### 6.6 Schedule

Consultation with USFWS and Michigan DNR	January 1 – March 31, 2015
Desktop Analysis	February 1 – March 31, 2015
Consultation regarding desk top results	April, 2015
Field Data Collection	June 1 – July 31, 2015
Study Report Draft	August 1 – October 31, 2015
BWG comment on draft study report/resolve issues	November 1 – December 1, 2015
Final Study Report	December 31, 2015

## 6.7 Level of Effort (18 CFR 5.11 (d)(6))

The estimated cost for the reconnaissance-level survey is \$30,000, based on a field survey rate of approximately 200 acres per day. The Licensees believe that the proposed level of effort is adequate to obtain information on wildlife habitat in the Project vicinity.

#### 6.8 Discussion of Alternative Approaches

No alternative approaches were provided during the comment period.

## 7.0 **REFERENCES**

Lomholt, M.A., K. Tal, R. Metzler, and K. Joseph. 2008. Lévy strategies in intermittent search processes are advantageous. Proc. Natl. Acad. Sci. 105(32): 11055-11059.

Michigan DNR. 2014. Wildlife Species. <u>http://www.michigan.gov/dnr/0,4570,7-153-10370\_12145---,00.html</u> [Accessed October 3, 2014]

MNFI. 2013. Michigan Natural Features Inventory Database (GIS Application). [Accessed Oct 9, 2013]

Michigan State University Extension. 2013. Michigan Natural Features Inventory. <u>http://mnfi.anr.msu.edu/</u>

USDA, USFWS, and NPS. 2011. Final Environmental Assessment: Double-crested cormorant damage management in Michigan. Prepared by United Stated Department of Agriculture Animal and Plant Health Inspection Service Wildlife Services, In Cooperation with United States Department of the Interior Fish and Wildlife Service and the United States Department of the Interior National Park Service Sleeping Bear Dunes National Lakeshore. June 2011. Available on-line at:

http://www.aphis.usda.gov/regulations/pdfs/nepa/MI\_2011\_Final\_DCCO\_EA.pdf

USFWS. 2013. Michigan County Distribution of Federally-Listed Threatened, Endangered, Proposed, and Candidate Species. <u>http://www.fws.gov/midwest/endangered/lists/michigan-cty.html</u> [Accessed Nov 21, 2013]

## **APPENDIX C**

## BOTANICAL RESOURCES REVISED STUDY PLAN

#### CONSUMERS ENERGY COMPANY

## DTE ELECTRIC COMPANY LUDINGTON PUMPED STORAGE HYDROELECTRIC PROJECT (FERC NO. 2680-108) BOTANICAL RESOURCES REVISED STUDY PLAN

#### **1.0 DESCRIPTION OF ISSUE** (18 CFR 5.11 (d)(1))

Consumers Energy (Consumers) and DTE Electric (DTEE), the Licensees, own and operate under a license issued by the Federal Energy Regulatory Commission (FERC) the Ludington Pumped Storage Project (Project). The Project is located along the Lake Michigan shoreline, in the townships of Pere Marquette and Summit in Mason County, Michigan and in Port Sheldon in Ottawa County, Michigan. The Ottawa County portion of the Project is limited to a 1.8 acre satellite recreation site (established as part of the Settlement Agreement approved by Commission Order on January 23, 1996 (74 FERC ¶ 61,055)). (Figure 1)

Invasive species can alter natural areas by displacing native species and altering community dynamics and habitat value for wildlife. Invasive species are generally more prevalent in developed areas that receive regular disturbance from human activities. Invasive species can spread by wind, animals, and human transport on boots or vehicles that could occur during regular operations and maintenance activities.

A review of the Michigan Natural Features Inventory (MNFI) indicated that state and federally threatened plant species are documented to occur within the Project vicinity. However, these species have not been documented within the Project boundary.

The Licensees propose to conduct a botanical survey within the Project boundary to identify and document invasive species, rare, threatened or endangered species (RTE), and potential RTE habitat. This survey will be conducted using an intuitive meander approach, focusing on areas of invasive species infestations and potential habitat for RTE.



## **2.0 PROJECT EFFECTS** (18 CFR 5.11 (d)(4))

The Project operation has been consistent for over 40 years with little to no effect on botanical resources within the Project boundary. Even though no change in operation is being proposed by the Licensees, there may be opportunities for invasive species management or protection of RTE if observed within the Project boundary. The Project provides habitat for a variety of botanical species. An understanding of the botanical resources within the Project boundary would provide information on the type and quantity of habitat potentially affected by Project operations.

# 3.0 RELEVANT EXISTING INFORMATION (18 CFR 5.11 (d)(2) AND 5.11 (d)(3))

### 3.1 Overview

The Project lies within the Michigan Lake Plain Level IV Ecoregion (USEPA 2012) on the eastern shore of Lake Michigan in Mason and Ottawa counties. This sandy coastal strip region has beaches, high dunes, beach ridges, mucky interior-dune depressions, and swales. The climate moderation by Lake Michigan, as well as the beach and dune plant communities, differentiates it from inland areas of Michigan. Plant communities include oak and pine forest found on stabilized dunes and beech-sugar maple forest on dunes and moraines. The relatively moderate climate has also made this area a center for fruit and vegetable farming in Michigan (USEPA 2012), and it is the most heavily farmed region in the state. The Project satellite recreation area in Ottawa County is limited to the parking area, walking path and boardwalk; botanical resources associated with this site are located outside of the Project boundary.

## 3.2 Habitat Communities and Species

Much of the natural habitat abutting the Project boundary has been altered by agricultural practices. Agricultural uses include fruit orchards and row crops (Figure 2).

Plant communities within the Project area are dominated by second growth of hardwood mixed with eastern white pine, successional communities, open field, and maintained lawn. Natural communities found in this region include dry-mesic northern forest, Great Lakes barrens, open dunes, and wetland, riparian, and littoral habitats primarily associated with the margins and near



shore areas of Lake Michigan (Michigan 2007). Each of these plant communities are generally described in the Pre-application Document (PAD).

Invasive species have become a part of the landscape throughout the Project area. The Michigan Department of Natural Resources (DNR) has published a plan that describes and documents the status and distribution of invasive plants within the State of Michigan (Michigan DNR 2009). A generalized list of invasive plants occurring or potentially occurring within the vicinity of the Project is included in Table 1.

#### **3.3 Unique Plant Communities and Botanical Resources**

The Project area and immediate vicinity include upland and shoreline habitat associated with Lake Michigan and Pigeon Lake. No records for rare or exemplary natural communities within the Project boundary were found. A review of the MNFI indicated that pitcher's thistle and ginseng have been documented within the Project vicinity (MNFI 2013); however, these species have not been documented within the Project boundary. A management goal of the Michigan DNR is to ensure that RTE and natural resources in the State of Michigan are maintained and perpetuated for their intrinsic and ecological values.

Pitcher's thistle (*Cirsium pitcheri*) is endemic to the shoreline and sand dunes of the Great Lakes. It requires open, sparsely vegetated habitat on sand dunes or beach ridges (Michigan DNR 2014). Pitcher's thistle is characterized by its blueish-green vegetation, numerous white-woolly hairs, few spines, and cream colored flowers (MNFI 2014). Mature plants may reach a height up to 3.5 feet before producing pale cream colored to pinkish flowers (Michigan DNR 2014). Flowers bloom between June and September, which coincides with the best time to conduct surveys for this species (third week of June through the third week of September) (MNFI 2014). Native plants associated with appropriate Pitcher's thistle habitat include, but are not limited to dune willow, balsam poplar, ground juniper, sand cherry, beach heath, sea rocket, wormwood, beach pea, sand cress, Lake Huron tansy, hairy puccoon, beachgrass, dune grass, fescue, wood lily, horizontal juniper, northern white cedar, and moonworts (MNFI 2014). According to the MNFI (2014) pitcher's thistle was last documented in Mason County in 2006 and Ottawa County in 2012. Ginseng (*Panax quinquefolius*), is an herbaceous plant found in high quality forest areas. Appropriate habitat includes shady woodlands with dense canopies and loamy soil (MNFI 2014). Plants are characterized by palmately compound leaves with five leaflets, greenish-white stalked flower clusters, and red berries. Surveys may be conducted between the first week of June and the fourth week of October (MNFI 2014). Native plants associated with appropriate ginseng habitat include, but are not limited to sugar maple, eastern hemlock, beech, yellow birch, white pine, red oak, white cedar, ironwood, balsam fir, baneberry, wild leek, wild sarsaparilla, jack-inthe-pulpit, blue cohosh, blue-bead lily, twisted stalk, nodding trillium, common trillium, maiden hair fern, and clubmoss (MNFI 2014). Ginseng plants have been threatened due to aggressive collection of root material for medicinal purposes. According to the MNFI (2014) ginseng was last documented in Mason County in 1985 and Ottawa County in 2010.

### 3.4 Invasive Species

The Michigan DNR defines invasive species as "non-native species that have the potential to become established and the potential to spread widely and cause ecological or economic harm or pose a risk to human health" (Michigan DNR 2014). Table 1 lists common problematic species considered invasive within the vicinity of the Project area. Due to the land use history in Mason and Ottawa Counties, many of these invasive species are present in the Project area. Pere Marquette Charter Township specifically expressed concern regarding autumn olive within the Project area, which is abundant throughout Mason County.

Common Name	Scientific Name	Region*
Terrestrial Plants		
Amur cork-tree	Phellodendron amurense	Southern Lower Peninsula
Amur honeysuckle	Lonicera maackii	Both**
Autumn olive	Elaeagnus umbellate	Both
Baby's breath	<i>Gypsophila paniculatus</i>	Both
Bell's honeysuckle	Lonicera X bella	Both
Black alder	Alnus glutinosa	Southern Lower Peninsula
Black jetbead	Rhodotypos scandens	Both
Black locust	Robinia pseudoacacia	Both
Canada thistle	Cirsium arvense	Both
Common buckthorn	Rhamnus cathartica	Both
Common reed	Phragmites australis	Both
Common St. John's-wort	Hypericum perforatum	Northern Lower Peninsula
European fly honeysuckle	Lonicera xylosteum	Southern Lower Peninsula
European highbush cranberry	Viburnum opulus	Both
Flowering rush	Butomus umbellatus	Both
Garlic mustard	Alliaria petiolata	Both
Giant hogweed	Heracleum mantegazzianum	Both
Giant knotweed	Polygonum sachalinensis	Both
Glossy buckthorn	Frangula alnus	Both
Japanese barberry	Berberis thunbergii	Northern Lower Peninsula
Japanese hedge-parsley	Torilis japonica	Northern Lower Peninsula
Japanese honeysuckle	Lonicera japonica	Southern Lower Peninsula
Japanese knotweed	Fallopia japonica	Both
Japanese stilt grass	Microstegium vimineum	Both
Kudzu	Pueraria lobata	Southern Lower Peninsula
Leafy spurge	Euphorbia esula	Both
Money-wort	Lysimachia nummularia	Northern Lower Peninsula
Morrow's honeysuckle	Lonicera morrowii	Both
Multiflora rose	Rosa multiflora	Both
Norway maple	Acer platanoides	Both
Oriental bittersweet	Celastrus orbiculatus	Both
Privet	Ligustrum obtrusifolium	Northern Lower Peninsula
Purple loosestrife	Lythrum salicaria	Both
Reed canary grass	Phalaris arundinacea	Both
Reed mannagrass	Glyceria maxima	Both
Russian olive	Elaeagnus angustifolia	Both
Scotch pine	Pinus sylvestris	Both
Spotted knapweed	Centaurea maculosa	Both
Swallowwort	Vincetoxicum species	Both

## Table 1: Potential Invasive Species within the Project Vicinity

Common Name	Scientific Name	Region*
Swamp thistle	Cirsium palustre	Northern Lower Peninsula
Tartarian honeysuckle	Lonicera tatarica	Both
Tree-of-heaven	Ailanthus altissima	Both
Wild parsnip	Pastinaca sativa	Northern Lower Peninsula
Aquatic Plants		
Curly-leaf pondweed	Potamogeton crispus	Both
Eurasian water-milfoil	Myriophyllum spicatum	Both
European frog-bit	Hydrocharis morsus-ranae	Northern Lower Peninsula
European water-clover	Marsilea quadrifolia	Northern Lower Peninsula
Hydrilla	Hydrilla verticillata	Southern Lower Peninsula
Lesser naiad	Najas minor	Southern Lower Peninsula
Variable water-milfoil	Myriophyllum heterophyllum	Both
Water-hyacinth	Eichhornia crassipes	Southern Lower Peninsula

Source: Michigan DNR 2009.

\* Regions are defined in Michigan DNR 2009.

\*\* "Both" includes the Northern Lower Peninsula and Southern Lower Peninsula, as defined in Michigan DNR, 2009.

#### 4.0 PROJECT NEXUS (18 CFR 5.11(d)(4); 18 CFR 5.11(d)(4))

The Ludington Project provides habitat for a variety of wildlife and botanical species. An understanding of the botanical resources within the Project boundary would provide information on the type and quantity of habitat potentially affected by Project operations.

## 5.0 NEED FOR ADDITIONAL INFORMATION (18 CFR 5.11 (d)(3))

The Licensees are not aware of any botanical inventories that have been conducted within the Project boundary.

#### 6.0 STUDY PLAN

The Licensees propose to conduct a botanical survey within the Project boundary to identify and document invasive species, RTE, and potential RTE habitat. This survey will focus on areas of invasive species infestations and potential habitat for ginseng and pitcher's thistle.

#### 6.1 Purpose of Study and Use of Study Results (18 CFR 5.11 (d)(1))

The botanical survey within the existing Ludington Project boundary is designed to provide information pertinent to:

- 1. The location and extent of invasive botanical species.
- 2. The presence of RTE botanical species or potential RTE habitat.

To provide information pertinent to Project effects on botanical resources, a field survey of botanical species (including invasive and RTE species) within the Project boundary will be conducted. This field survey will document the location and general abundance of invasive plant species present in the Project boundary. The presence of RTE species or habitats, if observed, will also be documented.

The results of this survey will provide the information necessary to:

- Describe invasive species infestations within the Project vicinity.
- Delineate, describe, and map invasive species infestations within the Project boundary.
- Identify and map occurrences or likely habitat for RTE species, including ginseng and pitcher's thistle.

#### 6.2 Relevant Resource Management Goals, Standards and Guidelines (18 CFR 5.11 (d)(2))

Michigan DNR and USFWS have responsibilities for protecting terrestrial resources such as native habitat and wildlife. FERC must consider the effects of continued Project operations on natural resources. This study will provide the necessary information to assess potential effects of project operation on the botanical resources, specifically invasive species and RTE species and habitats within the Project boundary.

This study is consistent with the Michigan DNR goal of ensuring that wildlife and natural resources in the State of Michigan are maintained and perpetuated for their intrinsic and ecological values, for their economic contribution, and for their recreational, scientific and educational use by the people of the State.

This study is consistent with USFWS goals to evaluate the need for protection, mitigation and enhancement measures necessary to meeting state and federal fish and wildlife objectives; and conserve, protect, and enhance the habitats for wildlife and plant species that may be affected by the Project.

#### 6.3 Relevant Public Interest Considerations

Project relicensing participants have indicated that botanical surveys are of interest in this proceeding. Pere Marquette Charter Township specifically expressed concern regarding autumn olive within the Project area.

#### 6.4 Study Methodology (18 CFR 5.11 (d)(5))

The botanical survey will be conducted using an intuitive meander approach within the Project boundary. Intuitive meander survey methodology focuses on habitat likely to contain species of interest, opposed to walking set transect lines. Surveyors will walk through the land of the Project area, searching vegetated areas for invasive species utilizing a survey rate of approximately 100 acres per day. Surveys at the Pigeon Lake Facility will be limited to those areas visible and accessible from the boardwalk.

#### 6.4.1 Invasive Species Survey

The invasive species survey will focus on non-native species listed in Table 1, examining disturbed habitats (including areas adjacent to infrastructure and roadside ditches) and natural terrestrial habitats (woodlands, meadows, Lake Michigan shoreline) where invasive species are observed or likely to occur. Surveys will be conducted during the summer months (June 21 through September 23) to maximize invasive species detection. Each invasive species occurrence will be mapped with a handheld GPS unit or hand-sketched and depicted on an aerial photograph. For the purpose of this survey, an invasive species occurrence is defined as an individual plant or patch of plants of the same species within a defined geographic area. Data will be recorded for each invasive species occurrence, including species name, area covered, and relative density. Density will be broken down into Low (1 - 14%), Medium (15% - 49%), or High (50% - 100%) categories based on percent cover of invasive species and depicted on Project maps. Representative photos will be taken and general observations will be noted
regarding habitat and site conditions within the Project area and adjacent lands. Findings will be summarized in the botanical survey report. Lands adjacent to the Project area will be viewed and photographed from inside the Project area and publically accessible areas to document invasive species present and general abundance. This will be done to characterize the general extent of invasive species present within the Project vicinity that may affect Project land.

Information collected for each invasive species occurrence during field surveys will include:

- Species name
- GPS location
- Relative density (low, medium, or high)
- Area of infestation (square feet)
- Site photographs
- Notes on habitat type and quality

#### 6.4.2 RTE Species Survey

The RTE species survey will focus on appropriate habitat for Pitcher's thistle and ginseng. The survey will be conducted using an intuitive meander approach, focusing on the shoreline of Lake Michigan and woodland areas within the Project boundary. Surveys at the Pigeon Lake Facility will be limited to those areas visible and accessible from the boardwalk.

Surveys will be conducted during the summer months (June 21 through September 23) to maximize RTE species detection. If observed, RTE species occurrences will be mapped with a handheld GPS unit and depicted on an aerial photograph. Data will be recorded for each RTE species occurrence, including species name, number of individuals, approximate density, area covered, and dominant species within the vicinity of the RTE. Each RTE species occurrence will be photo documented and general observations will be noted regarding habitat and site conditions. Areas of appropriate RTE habitat will also be documented, even if no RTE species are observed. Documentation will include site photos, GPS mapping, size of appropriate habitat, notes on habitat type, habitat quality, and dominant species. Findings will be summarized in the botanical survey report and RTE species occurrences will be reported to the MNFI. Information collected for each RTE species occurrence during field surveys will include:

- Species name
- GPS location
- Number of individuals
- Approximate density (number of plants / square foot)
- Area of occurrence (square feet)
- Dominant species within the vicinity of the RTE
- Site photographs
- Notes on habitat type and quality

#### 6.5 Data Analysis and Reporting

The Initial Study Report will summarize the botanical invasive and RTE species and potential RTE habitats encountered within the Project boundary. If observed, RTE species occurrence data will be shared with the MNFI. The report will include invasive species occurrence data, mapping of invasive and RTE resources, and habitat descriptions. The total number of search hours expended will be documented. Captioned photographs of typical and/or significant habitat conditions will be included in the report.

#### 6.6 Schedule

Consultation with Agencies/stakeholders	January 1 – March 31, 2015
Field Data Collection	June 21 – September 23, 2015
Post field survey consultation	October 1 – 15, 2015
Study Report Draft	November 15, 2015
Final Study Report	December 31, 2015

#### 6.7 Level of Effort (18 CFR 5.11 (d)(6))

The estimated cost for the reconnaissance-level survey is \$40,000, based on a field survey rate of approximately 100 acres per day. The Licensees believe that the proposed level of effort is adequate to obtain information on botanical species and habitat in the Project vicinity.

#### 6.8 Discussion of Alternative Approaches

No alternative approaches were considered.

## 7.0 **REFERENCES**

Michigan DNR. 2007. Natural Communities of Michigan: Classification and Description. Prepared by Michigan Natural Features Inventory. Report No. 2007-21. September 30, 2007, Updated July 9, 2010.

Michigan DNR. 2009. Meeting the Challenge of Invasive Plants: A Framework for Action. Michigan Department of Natural Resources. Prepared by Michigan Natural Features Inventory. Report No. 2009-11. March 9, 2009.

Michigan DNR. 2014. Michigan DNR Endangered and Non-game Wildlife. http://www.michigan.gov/dnr/0,4570,7-153-10370\_12141---,00.html [Accessed June 3, 2014]

Michigan Natural Features Inventory. 2013. Michigan Natural Features Inventory Database (GIS Application). [Accessed Oct 9, 2013]

Michigan Natural Features Inventory. 2014. Michigan's Special Plants. <u>http://mnfi.anr.msu.edu/</u> [Accessed June 3, 2014]

USEPA. 2012. Level III and IV Ecoregions of Michigan. U.S. EPA Office of Research and Development (ORD) - National Health and Environmental Effects Research Laboratory (NHEERL). Corvallis, OR. [Online] URL: <u>http://www.epa.gov/wed/pages/ecoregions/level\_iii\_iv.htm</u>.

U.S. Fish and Wildlife Service. 2013. Michigan County Distribution of Federally-Listed Threatened, Endangered, Proposed, and Candidate Species. <u>http://www.fws.gov/midwest/endangered/lists/michigan-cty.html</u> [Accessed Nov 21, 2013]

# APPENDIX D

# RECREATIONAL RESOURCES REVISED STUDY PLAN

#### CONSUMERS ENERGY COMPANY

# DTE ELECTRIC COMPANY LUDINGTON PUMPED STORAGE HYDROELECTRIC PROJECT (FERC NO. 2680-108) RECREATIONAL RESOURCES REVISED STUDY PLAN

#### **1.0 DESCRIPTION OF ISSUE (18 CFR 5.11 (d)(1))**

Consumers Energy (Consumers) and DTE Electric (DTEE), the Licensees, own and operate under a license issued by the Federal Energy Regulatory Commission (FERC) the Ludington Pumped Storage Project (Project). The Project is located along the Lake Michigan shoreline, in the townships of Pere Marquette and Summit in Mason County, Michigan and in Port Sheldon in Ottawa County, Michigan. (Figure 1) Under their current FERC license, the Licensees provide five formal recreation facilities located within the Project boundary: Mason County Campground, Mason County Picnic Area, Upper Reservoir Observation Platform, Lake Michigan Overlook, and Pigeon Lake North Pier. These facilities provide a variety of amenities, including but not limited to camp sites, picnic tables and pavilion, disc golf courses, angler access, remote control aircraft airfield, and interpretive displays. The recreation facilities, with the exception of the Pigeon Lake North Pier, are located on Project lands in Mason County, while the Pigeon Lake North Pier, a 1.8 acre satellite recreation site (established as part of the Settlement Agreement approved by Commission Order on January 23, 1996 (74 FERC ¶ 61,055)), is located on Project lands in Ottawa County approximately 70 miles to the south. (Figures 2 and 3)

FERC regulations require that the license application discuss existing and proposed recreational facilities and opportunities at the Project. The report must be prepared in consultation with local, state, and regional recreation agencies and planning commissions, the National Park Service, and any other state or Federal agency with managerial authority over any part of the project lands (18 CFR 4.51 (f)(5)). In addition, recreation is a recognized project purpose at FERC-licensed projects under Section 10(a) of the FPA.







# **2.0 PROJECT EFFECTS** (18 CFR 5.11 (d)(4))

Specific Project effects on recreational use and opportunities have not been documented. While the Licensees must provide public access and recreational opportunities on Project lands, portions of these lands such as the upper reservoir, the powerhouse and appurtenant facilities, and the tailrace area are restricted to the public for safety and security reasons. Other Project lands are available for public access and recreational use, though some may be operated on a seasonal basis.

# 3.0 RELEVANT EXISTING INFORMATION (18 CFR 5.11 (d)(2) AND 5.11 (d)(3))

Recreation use at the Project includes fishing, camping, sightseeing, walking, picnicking, disc golf, and flying remote control aircraft.

Recreational use data for the Project was most recently collected during 2008 for the FERC required "Licensed Hydropower Development Recreation Report (Form 80) and submitted to FERC on April 27, 2009. The Form 80 provides an estimate of recreation use as "recreation days" that occurs within the Project area. A recreation day is defined by FERC as each visit by a person to a Project development for recreational purposes during any potion of a 24-hour period. The Form 80 also estimates the percent capacity at which Project recreation facilities are used.

The 2009 Form 80 Report for the Project reported that the total annual daytime use was 13,411 recreation days, and the total annual nighttime use was 8,245 recreation days. The peak weekend daytime average use was 485 recreation days, and the nighttime average was 27 recreation days. Project facility use capacities are low and range from 25% (playground areas and trails) to 60% (camping areas and tent/trailer/RV sites).

The Licensees are currently collecting Project recreational use data for the 2015 Form 80 that will be filed with FERC by April 1, 2015.

In response to comments submitted on the PSP, the Licensees have included a map showing the acres of land within the project boundary available for public access and the acres of land within the project boundary that are not accessible to the public for security and safety reasons. (Figure

4.) The land within the project boundary that is open to the public represent the two recreation areas, and are highlighted on Figure 4.

# 4.0 **PROJECT NEXUS (18 CFR 5.11 (d)(4))**

Public access to recreational use of Project land is a key component of the public benefits for a Project and having an understanding of the effects of Project operation on the recreational facilities is a component of the environmental assessment.

## 5.0 NEED FOR ADDITIONAL INFORMATION (18 CFR 5.11 (d)(3))

The Application for a new Major License must contain within the Environmental Report (18 CFR 4.51 (f)(5)), a report of recreational resources, which must address:

- a description of any existing recreational facilities at the project, indicating whether the facilities are available for public use;
- an estimate of existing and potential recreational use of the project area, in daytime and overnight visits;
- a description of any measures or facilities recommended by the agencies consulted for the purpose of creating, preserving, or enhancing recreational opportunities at the project and in its vicinity (including opportunities for the handicapped), and for the purpose of ensuring safety of the public in its use or project lands and waters;
- a statement of the existing measures or facilities to be continued or maintained and the new measures or facilities proposed by the applicant for the purpose of creating, preserving, or enhancing recreational opportunities at the project and in its vicinity, and for the purpose of ensuring the safety of the public in its use of project lands and waters, including an explanation of why the applicant has rejected any measures or facilities recommended by an agency and described under paragraph (f)(5)(iii) of this section;
- identification of the entities responsible for implementing, constructing, operating, or maintaining any existing or proposed measures or facilities;
- a schedule showing the intervals following issuance of a license at which implementation of the measures or construction of the facilities would be commenced and completed;
- an estimate of the costs of construction, operation, and maintenance of any proposed facilities, including a statement of the sources and extent of financing;



- a map or drawing that conforms to the size, scale, and legibility requirements of \$4.39 showing by the use of shading, cross-hatching, or other symbols the identity and location of any facilities, and indicating whether each facility is existing or proposed; and
- a description of any areas within or in the vicinity of the proposed project boundary that are included in, or have been designated for study for inclusion in, the National Wild and Scenic Rivers System, or that have been designated as a wilderness area, recommended for such designation, or designated as a wilderness study area under the Wilderness Act.

The only information currently available on recreational use of Project Facilities is information collected as part of the FERC Form 80 surveys and is not of sufficient detail to produce the recreational resources portion of the Environmental Report.

# 6.0 STUDY PLAN

# 6.1 Purpose of Study and Use of Study Results (18 CFR 5.11 (d)(1))

The purpose of the study is to compile existing data and develop additional information to support a new FERC license application for continued operation of the Project pursuant to 18 CFR 4.51 (f)(5).

The primary goals of this study are to:

- Develop an inventory and condition assessment of the existing Project recreation facilities;
- Estimate the existing level of daytime and nighttime recreational use occurring at the Project;
- Develop a survey/questionnaire and administer the survey to Project recreational users to gather their perceptions and input on level of use, condition and adequacy, and potential enhancements of Project recreation facilities;
- Project future daytime and nighttime Project recreational use; and
- Identify the entities that operate, and maintain the existing Project recreation sites and facilities.

# 6.2 Relevant Resource Management Goals, Standards and Guidelines (18 CFR 5.11(d)(2))

The resource management goals are to enhance the recreational opportunities associated with the operation of the Project.

#### 6.3 Relevant Public Interest Considerations

Public interest considerations on this issue are primarily related to appropriate and adequate public recreational opportunities provided by the Licensees.

#### 6.4 Study Methodology (18 CFR 5.11 (d)(5))

#### 6.4.1 Recreation Site and Facility Inventory and Condition Assessment

The Licensees will use a standardized recreational site/facility inventory and condition assessment form (See Figure 5) to evaluate each existing formal and significant informal recreational site and facility to record and assess available amenities and general conditions. Significant informal recreational sites and facilities are defined as areas within the Project boundary that: receive regular use; do not have formal improvements; are not managed, maintained or operated by a managing entity; and are not identified as a Project recreation facility. Each site will be photo documented and geo-referenced.

#### 6.4.2 Recreational Use Study

The Licensees will develop a random sampling methodology and schedule to conduct recreational user counts and administer user contact surveys at Project recreation sites and facilities. Field data collection will vary by days of the week, time of day and site order. Field data collection (user counts and contact surveys) will be conducted from mid-April through mid-October 2015 to coincide with the operating season of the Project recreation sites. (During the winter months, the recreation sites are closed, gated entry is locked and roads into these sites are not plowed.) Field data will be supplemented with user registration data from those Project recreation sites that require user registration.

Recreation user counts will consist of spot counts and calibration counts. Spot and calibration counts will be conducted on separate schedules and will total eight (8) days per month during the survey period.

Spot counts will be conducted at each formal Project recreation facility, including those managed sites with user registration records. Spot counts will be conducted four (4) days per month on two (2) randomly selected weekdays and two (2) randomly selected weekend days. For months

containing a three-day holiday weekend, an additional spot count will be conducted during the holiday weekend. The spot counts represent short-term counts (approximately 5 minutes per site) and will record the number of vehicles on site, the number of users observed and their observed recreational activity.

Calibration counts will be conducted at each formal Project recreation site that does not have daily user registration information that can be obtained by the Licensees. Calibration counts will be conducted four (4) days per month on two (2) randomly selected weekdays and two (2) randomly selected weekend days. For months containing a three-day holiday weekend, an additional calibration count will be conducted during the holiday weekend. Calibration counts will record the number of rtwo hours per site on calibration count days. Calibration counts will record the number of vehicles on site and entering/leaving the site, the number of users observed on site and per vehicle/group, and the primary recreational activity observed for each person/group using the site for the two hour period.

Calibration and spots counts will be conducted on different schedules so that each full month has at least eight days of data. The number of April and October calibration and spot count days will be prorated based on the opening and closing dates of Project recreation facilities.

For those Project recreation facilities with user registration or count information, the Licensees will contact the managing entities to obtain this data.

The Licensees have developed a user contact survey (Figure 6) that will be administered to Project recreation site users and visitors during calibration counts. The survey will be conducted at all Project recreation sites and facilities, including those managed by other entities. Surveys will be conducted at the Mason County Campground, the radio controlled model airplane field, the Mason County Picnic Area (including the disc golf course), the Upper Reservoir Observation Platform, the Lake Michigan Overlook, and the Pigeon Lake North Pier. The survey will collect user data on the number of people in their party, their primary reason (recreational activity) for visiting the Project, their perception of level of use, and their opinions with regard to the amount and types of recreation opportunities offered within the Project boundary. The Licensees will also review readily available municipal, county, state, federal and NGO recreation plans for information regarding recreation use within the Project boundary and immediate vicinity. The Licensees will consult with municipal and county recreation departments and recreation/open space committees in those towns and counties where the Project is located.

#### 6.5 Data Analysis and Reporting

An inventory summary that provides a description of each site, the existing facilities, amenities, and available services at that site, condition assessment, ownership and management responsibilities, site and facility photo documentation, and a location map of all sites will be developed.

The spot count, calibration count, user registration, and user survey data will be statistically analyzed to develop recreational use figures for the Project and will be summarized by season and activity type for each site. Information such as the number of recreation days spent at the Projects' recreation sites, average number of persons per party, and the percent of the facilities' capacity that is currently being utilized will be determined. The Licensees will project changes to Project recreation use over the term of a new FERC license by applying an accepted model such as the "U.S. Outdoor Recreation Participation Projections to 2060" (2012, J.M. Bowker, Ashley Askew) to the use estimate derived from this task.

This information will be used to complete the recreation portion of the license application, as well as a Recreation Management Plan. The report for this study will include a recreation site and facility inventory, the location of recreation sites and facilities in relation to the Project boundary including sites, facilities, and amenities that may straddle the Project boundary, the types and number of facilities or amenities provided at each site, the condition of the facility/amenities, entities responsible for the operation and maintenance of the sites and facilities, fees, if any, associated with site or facility use, hours/season of operation, photographs, use figures for each recreation site, overall recreational use figures for the Project, projected future use figures, and a compilation of responses to the user contact survey.

#### 6.6 Schedule

Field data collection for this study will take place in April 2015 through October 2015. Data will not be collected during the winter months, October to March, because these sites are closed, access gates locked and roads not plowed. Statistical analysis of the data will occur in fourth quarter of 2015 and a report filed in the second quarter of 2016.

#### 6.7 Level of Effort (18 CFR 5.11 (d)(6))

The Licensees believe the proposed level of effort as described above is sufficient to obtain current information on recreational usage and demand within the Project area, and from which to project future use and demands. The estimated cost for the recreation inventory and user contact survey outlined in this plan is approximately \$70,000 to \$85,000.

#### 6.8 Discussion of Alternative Approaches

No alternatives to the revised study are being considered at this time. The Licensees are continuing to talk with the Pere Marquette Charter Township (PMCT) to address other recreational concerns in the Township. The Licensees believe these concerns fall outside the vicinity of the Project, and thus these concerns should be addressed outside of the Project relicensing process.

# 7.0 **REFERENCES**

Code of Federal Regulations, 18 CFR, Chapter 1, Subchapter B, Part 4, Subpart F Section 4.51 (f)(5)

Consumers Electric Company and DTE Electric Company, Pre-Application Document for the Ludington Pumped Storage Hydroelectric Project (FERC No. 2680), January 2014

Federal Energy Regulatory Commission, Licensed Hydropower Development Recreation Report (Form 80), Ludington Pumped Storage, 2009

Federal Energy Regulatory Commission, Study Requests and Comments on Preliminary Study Plan, 2014

U.S. Outdoor Recreation Participation Projections to 2060, J.M. Bowker, Ashley Askew, 2012

# Ludington Pumped Storage Project Recreation Site Inventory and Assessment Form

Inspector:		Date:	:	_ Time:	Photo No:
Project:	ct: Site Name/Code:			Weather:	
Facilities pro	ovided:				
Campground Angler Acces	Picnic A	Area Day	Use/Overlook_	Inform	nal Launch Trail
Access:					
Water Paved Unpay Unpay ORV Foot a	r access l access ved access (co ved access (4V access (ATV) access	nventional mot VD vehicle)	or vehicle)	i	# of lanes # of lanes # of lanes width width
Ownership/N	Management				
Ownership Management	Licensees	Federal St	ate County	Local	Private Other
<b>Operations:</b>					
Staffed	Private	Seasonal	Commerc	cial	Fee Open/Closed
General Are Associated w Potential/nee Topography: Erosion/Soils Approximate ADA complia	a: with other facility d for expansion :: :: Shoreline For ant/Obstacles_	ities or activitie n/enhancement 	s: Grou Grou Com Vanc	nd/canopy paction: lalism:	cover:
Sanitation F	acilities: (Yes	/No)			
Type: Flush Composting Vault Pit Portable	# of Units Unisex 	# of Units Women	# of Units Men	N   	Notes (ADA, etc)
Wilderness					

#### Site Facilities:

#	Туре	Repairs	Material Code	Other Info
	Picnic Tables		Couc	
	Grills			
	- Firepit/ring			
	Trails (specify use)			Length?
	Shelter			
	Potable Water			
	Dumping Station			
	Boardwalk			
	_ Angler Platforms			
	Playground			
	Showers			
	Benches			
	_ Interpretive Display:			
	Store			
	Visitor Center			
	Bathhouse			
	Other:			

Material codes; (A) asphalt, (B) Brick, (C) concrete, (CG) compacted gravel, (CRS) crushed gravel, (FE) metal, (G) grass, (GTF) geo-tech fabric, (NS) native soil, (O) other/specify, (P/F) plastic/fiberglass, (RC) rock crib, (S) sand, (W) wood.

Activities observed: Picnicking Camping Walking/hiking Disc Golf RC Aircraft Sightsee Fishing	# of	Adults	# of Minors		Notes	
Parking Lots: # ADA spaces # standard spaces # Vehicle & trailer sr	 	Surfac	ce Code	Dimens	sions/Notes	
# of vehicles in lot		Spaces deline	eated	_ Curbs_		
Angler Access: (Yes	/No)					
Dock/Pier: Float: Boardwalk: Platforms: Other: Other:	Number 	Dimensions	Material	ADA	Notes	

# Campground/Campsite:

		RV sites	Cabin sites	Tent sites	Wilderness sites
# of Group Sites					
# of single sites					
Access (foot, orv	, car, boat)				
On-site parking					
Water front					
ADA compliant					
Utilities					
Store: * (E) Electric, (S) Sa	Visitor Cent anitation, (W) V	er: Water, (O) other	Office: (specify)	Othe	er:
Boat Launch Fa	cilities:				
Hard surface	Gravel	Unim	proved	Carry In	_ Launch/Load prep area:
Docks/Piers/Flo	<b>ats</b> Total Do	cks	Total	Slips	
Material code:	#1	#2	#3	#4	#5
Dimensions:	#1	#2	#3	#4	#5
# of slips:	#1	#2	#3	#4	#5
ADA compliant:	#1	#2	#3	#4	#5
Overlooks/Obse	ervation Dec	:ks:			
Covered: I	Dimensions:	M	aterial: A	DA:	
Notes:					
Site Aesthetics:					
Viewshed from s	site:				
1 – No noticeabl	e developme	ent	2	4 – Six (6) to ten	(10) buildings in view
2 - Very limited	primitive de	velopment	4	5 – Ten (10) or n	nore buildings in view
3 - Five (5) or le	ss buildings	in view	6	5 – Highly devel	oped
Nature of abuttin	ng developme	ent/land use: _			
Audio perception	ns from site:				
Evidence of use	at site:				
*(C) Compaction, (I (V) Vandalism, (VF	E) Erosion, (G) C) Vegetation re	Garbage, (GD) emoval, (O) Othe	Ground disturband er (Specify)	ce, (HW) Human w	aste, (UI) Unauthorized improvements,
Evidence of Ove *(A) Anecdotal Unauthorized sit	rcrowding: _ information, (F es, (W) Waitin	A) facility/amen g lines, (O) Othe	ity @ capacity, (I) r (Specify)	) Improper parking,	(S) Signage, (SD) site degradation, (U)
Notes:					

Sketch:

# **Recreation User Perception Survey Ludington Pumped Storage Project**

Inte	erviewer:	Date/Time:	Rec Si	te:	
We	ather:	Ai	ir Temp:	_ Declined Survey: _	
Goo Luc thei pro rem	od Afternoon. My na lington Pumped Stora r views on the public vide CE and DTE wi ain anonymous. Wo	ame is and I a age Project area for 6 recreation sites and th user perceptions would you mind answe	m conducting a recre Consumers Electric a l facilities associated with Project facilities ering a few questions	ation user survey of nd DTE. We are su with the Project. Yo . Responses from th ?	visitors to the rveying users for our responses will his survey will
1.	Have you participate	ed in this survey effo	ort before?		
	Yes Thank yo No Continue y	u for your time. We with Survey	e are only interviewin	g each person once	with this survey.
2.	How many in your g	roup, including you	rself?		
3.	Have you ever visited the Ludington Pumped Storage Project area before? YesNo				
4.	What is your Zip Code? or Country of Residency?				
5.	What is your primary reason for this visit today?				
	Biking $\Box$ Birding $\Box$ Camping $\Box$ Disc Golf $\Box$ Dog Walking $\Box$				
	Driving for Pleasure   Educational Programs   Fishing from Boat				
	Fishing from Shore/Pier  Flying RC Aircraft Hiking Hunting				
	Nature Observation $\Box$ Orienteering $\Box$ Other: Photography $\Box$				Photography
	Picnicking □ Ru	unning   Sightsee	eing 🗆 Skiing 🗆	Snowshoeing □	Walking
6.	During your visit too	day what is your per-	ception of the amoun	t of use occurring at	this site?
	1	2	3	4	5

1	2	3	4	5
Not Crowded		Somewhat		Extremely
		Crowded		Crowded

7. Please rate the following amenities at this location.

		Excellent		Fair		Poor	
	Facility Condition	1	2	3	4	5	
	Variety of Amenities	1	2	3	4	5	
	Parking	1	2	3	4	5	
	Accessibility	1	2	3	4	5	
	Overall Quality	1	2	3	4	5	
	Please explain any poor rati	ngs.					
		C					
						•	
				· · · · · · · · · · · · · · · · · · ·			
0	What if anything anhanced	your rooraction	ovnorion	as to day?			
0.	what, if anything, enhanced	your recreation	experien	ce today?			
0	What if easthing dataseted	<b>6</b>					
9.	what, if anything, detracted	from your recre	eation exp	erience toda	y:	· · · · · · · · · · · · · · · · · · ·	
10	Describio respective facility		antol V	Vac N	-		
10.	Does this recreation facility s	serve your inter	ests? r	es N	0		
	16 / 1 0						
	If not why?						
11.	Do you have any additional of	comments regai	rding recr	eation opport	tunities as	sociated with the	
	Ludington Pumped Storage I	Project?					

\_\_\_\_\_

Thank you for your time and input.

# **APPENDIX E**

# HISTORICAL RESOURCES REVISED STUDY PLAN

#### CONSUMERS ENERGY COMPANY

# DTE ELECTRIC COMPANY LUDINGTON PUMPED STORAGE HYDROELECTRIC PROJECT (FERC NO. 2680-108) HISTORICAL RESOURCES REVISED STUDY PLAN

#### **1.0 DESCRIPTION OF ISSUE** (18 CFR 5.11 (d)(1))

Consumers Energy (Consumers) and DTE Electric (DTEE), the Licensees, own and operate under a license issued by the Federal Energy Regulatory Commission (FERC) the Ludington Pumped Storage Project (Project). The Project is located along the Lake Michigan shoreline, in the townships of Pere Marquette and Summit in Mason County, Michigan and in Port Sheldon in Ottawa County, Michigan. The Ottawa County portion of the Project is limited to a 1.8 acre satellite recreation site (established as part of the Settlement Agreement approved by Commission Order on January 23, 1996 (74 FERC ¶ 61,055)). (Figure 1)

A historic structures investigation is required as part of the license renewal to identify historic resources within the Project Area of Potential Effect (APE). The area of investigation needs to be defined in consultation with the Michigan State Historic Preservation Office (SHPO), and other interested stakeholders. The Licensees have proposed that the Ludington APE includes all lands within the FERC Project Boundary. The APE also includes any lands outside of the Project Boundary where historic properties may be affected by Project-related activities that are conducted in compliance with the FERC license. The Licensees will consult with the Michigan SHPO and interested Indian tribes for concurrence with this definition of the APE for historic architectural resources prior to conducting the historic structures investigation.



## 2.0 **PROJECT EFFECTS**

The Project operation has been consistent for over 40 years with little to no effect on the limited, if any, historical resources within the Project boundary. The Licensees are proposing no change in operation and no additional changes to the project facilities beyond the current unit upgrades, thus no project effects are anticipated.

On May 7, 2012, FERC issued an Order Amending License to upgrade and overhaul all six pump-turbine/motor generating units at the Project, one unit at a time over the years 2013 through 2019. As part of the 2011 "Application for Non-Capacity Amendment of License," the Licensees consulted with the Michigan SHPO regarding historical resources.

At the request of the Licensees, Commonwealth Cultural Resources, Inc. (CCRG) conducted an evaluation of the Ludington Pumped Storage Facility, including powerhouse, reservoir and associated structures (Facility) and concluded that the Facility retains integrity of location, design, setting, materials, workmanship, feeling and association and meets National Register of Historic Places (NRHP) Criteria A, C and D, and Criteria Consideration G. The Facility possesses significance at the state level under Criterion A for its contribution to the state's hydroelectric generating and transmitting capabilities; Criterion C for its significant design and engineering; and Criterion D for its ability to provide answers to research questions beyond those posed for construction and engineering. The Facility also meet the standard of exceptional importance as required in Criteria Consideration G for resources less than 50 years old. CCRG has recommended the Facility is eligible for listing on the NRHP at the state level. The CCRG report was provided to the Michigan SHPO for in August 2011.

In a February 2012 letter reviewing the effects of the proposed upgrades, the Michigan SHPO stated "it is the opinion of the State Historic Preservation Officer (SHPO) that the effects of the proposed undertaking do not meet the criteria of adverse effect [36 CFR Part 800.5(a)(1)], therefore, the Project will have no adverse effect on the Ludington Pumped Storage Hydroelectric Plant, which appears to meet the criteria for listing in the National Register of Historic Places." The Licensees will seek a formal determination of NRHP eligibility for the Project from the Michigan SHPO and will further consult with the Michigan SHPO to determine

whether any additional investigations are needed to define under which Criteria the facility is NRHP-eligible.

# 3.0 RELEVANT EXISTING INFORMATION (18 CFR 5.11 (d)(2) AND 5.11 (d)(3))

Above-ground resources within the Project boundaries consist of the powerhouse, office building, storage/maintenance building and a building associated with the Mason County Park (constructed as part of the Park and recently upgraded by Mason County). The Project was constructed between 1969 and 1973, and, while properties less than 50 years old are not typically considered eligible for the NRHP, they can be eligible under Criterion Consideration G, which recognizes more recent resources that are considered exceptionally important examples of engineering or architecture.

The Project is unique in that it is Michigan's only pumped storage hydroelectric facility. At the time it was constructed, the Project had the largest generating capacity in the world for pumped storage facilities, and it remains the third largest pumped storage facility in the world and the second largest in the United States. As part of the 2011 "Application for Non-Capacity Amendment of License," the Licensees conducted an NRHP-eligibility study for the Ludington Pumped Storage Project prior to initiating consultation with the Michigan SHPO. This assessment found that the Project "meets several of the eligibility criteria for NRHP listing." No additional action was taken at that time.

# 4.0 **PROJECT NEXUS (18 CFR 5.11 (d)(4))**

If, following consultation with the Michigan SHPO, it is determined that the NRHP-eligibility of historic structures within the APE still needs to be addressed as part of the Section 106 review process, an historic structures survey will be conducted. The survey will identify historic resources within the Project's APE listed or determined eligible for listing in the NRHP and provide assessments of existing and potential Project-related effects to historic resources.

Following fieldwork and the preparation of a final report with survey findings, the Michigan SHPO will make any NRHP eligibility determinations and/or clarifications for resources within

the Project APE and will also assess any potential effects from continued Project operations on historic resources.

Information developed during the course of the historic structures survey, along with information from the Archaeological Resources Study, will be used as the basis for preparing a Historic Properties Management Plan (HPMP). Guiding the Licensees' actions relating to Section 106 during the term of the new license, the HPMP will discuss how to avoid potential adverse effects and/or how they will be mitigated. The final HPMP will be filed with the Preliminary Licensing Proposal.

## 5.0 NEED FOR ADDITIONAL INFORMATION (18 CFR 5.11 (d)(3))

The APE will be defined in consultation with the Michigan SHPO, Indian tribes and other interested stakeholders. Other than an assessment of the potential historical significance of the Ludington Generating Facility, the Licensees are not aware of any historical resources inventories that have been conducted within the Project boundary.

#### 6.0 STUDY PLAN

The Licensees propose to conduct a historical resources investigation within the Project boundary. This study will be conducted to gain concurrence regarding the definition of the APE and identify historic resources within the Project APE that are listed in or are eligible for listing in the NRHP and to assess possible effects from Project operations on those resources.

#### 6.1 Purpose of Study and Use of Study Results (18 CFR 5.11 (d)(1))

The goal of this study is to assist FERC in meeting its compliance requirements under Section 106 of the National Historic Preservation Act of 1966, as amended (Section 106), by determining whether historic properties (historic structures that are eligible for or listed in the NRHP) are present within the Project's APE. This will be accomplished through consultation with the Michigan SHPO and other interested stakeholders and preservation groups; site file and background research; and field studies.

The specific area of investigation, APE, will be defined in consultation with the Michigan SHPO, interested Tribes and other stakeholders. According to FERC regulations, the Project APE includes "the lands enclosed by the Project's boundary and lands or properties outside of the Project's boundary where Project construction and operation or Project-related recreational development or other enhancements may cause changes in the character or use of historic properties, if any historic properties exist." The Licensees will consult with the Michigan SHPO, interested Tribes and other stakeholders for concurrence with this definition of the APE for historic architectural resources.

The survey information will be used to develop a Historic Properties Management Plan (HPMP) to address the elements outlined in FERC's letter dated May 16, 2014. The HPMP will be filed with the Preliminary Licensing Proposal after consultation with the Michigan SHPO and other interested parties.

#### 6.2 Relevant Resource Management Goals, Standards and Guidelines (18 CFR 5.11 (d)(2))

The goal of the study is to assist FERC in meeting its compliance requirements under Section 106 by determining if licensing of the Project will have an adverse effect on historic properties. The objective of the study is to identify cultural resources listed in or eligible for listing in the NRHP. If it is confirmed that historic properties are present, the Licensees will identify and assess any potential adverse effects to historic properties from the continuing operation and maintenance of the Project.

#### 6.3 Relevant Public Interest Considerations

Section 106 requires that federal agencies, Licensees, and those receiving federal assistance take into account the effects of proposed undertakings on any resource that is listed in or is eligible for the NRHP. As the lead agency, FERC is responsible for fulfilling the requirements of Section 106 in its decision to issue a new license to the Project.

As stipulated by the regulations that implement Section 106 (36 CFR Part 800), the Michigan SHPO represents the interests of the State and its citizens, and advises and assists FERC in determining the significance of historic resources within the APE. The Licensees propose

consulting with the Michigan SHPO in the establishment of the APE, development of the survey methodology, identification of NRHP-listed and -eligible historic resources (and the applicable NRHP Criteria), assessment of effects (if any) to the NRHP-listed and -eligible resources, and development of a Programmatic Agreement (PA) and HPMP, if needed.

Addressing any possible adverse effects to such properties (now or in the future) involves preparing a PA and drafting an HPMP that identifies how adverse Project effects on NRHP listed or eligible properties will be addressed.

#### 6.4 Study Methodology (18 CFR 5.11 (d)(5))

In advance of completing work under this study, the Licensees will consult with the Michigan SHPO, interested Tribes and other stakeholders to develop the APE for the Project. The Licensees will seek a formal determination of NRHP eligibility for the Project from the Michigan SHPO and will determine whether any additional investigations or surveys are needed to define under which Criteria the facility is NRHP-eligible. Any proposed historic structures survey will conform to the professional standards and guidelines established by the Michigan SHPO. The Licensees will employ a professionally qualified architectural historian who meets the Secretary of the Interior's Standards (36 CFR Part 61) to conduct the architectural studies.

Following consultation with the Michigan SHPO, the Licensees' consultant will complete background research, including a brief review of Project correspondence, including previous determinations of NRHP-eligibility, and a review of previous surveys in the area.

A field survey will include an examination of the previously identified above-ground resources within the Project APE. Information about the current appearance, including the setting, physical condition, and character-defining architectural features of the resources will be recorded. High-resolution digital photographs will be taken of each resource. Additional photography will include general context views that show the resources in relation to one another and their surroundings. If any cultural resources are discovered during the survey, the National Register-eligibility of the resources will be determined.

The survey information, along with information resulting from the archaeological study plan (Appendix F), will be used to develop a HPMP for the Project, which will be filed with the Preliminary Licensing Proposal after consultation with the Michigan SHPO, interested Tribes, and other stakeholders. The HPMP will address the elements outlined in FERC's letter dated May 16, 2014:

- 1. Identification of the APE for the project and inclusion of a map or maps that clearly show the APE in relation to the project boundary;
- 2. Completion, if necessary, of identification of historic properties within the project's APE;
- 3. Maintenance and operation of the project, which constitutes a National Register-eligible Hydropower Historic District, as a historic property according to the Secretary of the Interior's, "Standards for the Treatment of Historic Properties" (36 CFR Part 68), and applicable National Park Service Preservation Briefs;
- 4. Continued use and maintenance of historic properties;
- 5. Treatment of historic properties threatened by project-induced shoreline erosion, other project-related ground-disturbing activities, and vandalism;
- 6. Consideration and implementation of appropriate treatment that would minimize or mitigate unavoidable adverse effects on historic properties;
- Treatment and disposition of human remains that may be discovered, taking into account any applicable State laws and the Advisory Council's "Policy Statement Regarding Treatment of Burial Sites, Human Remains, and Funerary Objects," February 23, 2007;
- 8. Discovery of previously unidentified properties during project operations;
- 9. A list of activities (i.e., routine repair, maintenance, and replacement in kind at the project) not requiring consultation with the Michigan SHPO because these activities would have little or no potential effect on historic properties;
- 10. A procedure to address effects on historic properties in the event of a project emergency; and
- 11. A review of the HPMP by the Licensee, the Michigan SHPO and consulting parties to ensure that the information continues to assist the licensee in managing historic properties and updating the HPMP based on agency and tribal consultations.

#### 6.5 Data Analysis and Reporting

Upon completion of the field investigations, the Licensees will prepare a final report that will contain a narrative description of the resources identified during the survey, including

information about the general setting and current physical condition. The narrative will provide a statement of integrity that addresses changes that have occurred over time.

Recommendations will include a narrative statement of significance that will define the applicable National Register criteria, criteria considerations (if any apply), areas of significance, and periods of significance. The narrative will include a summary statement of significance that will establish the level(s), period(s), and areas of significance. Other components of the report will consist of a bibliography of sources consulted and graphical information, including a map of the Project that clearly outlines the APE. The map will be prepared in ArcGIS format and will include the scale, north arrow, and legend.

#### 6.6 Schedule

Following consultation in early 2015, background research would be completed in spring 2015, followed by a field survey also in spring 2015. A draft report summarizing the findings would be completed and available for review and comment in the summer 2015, with a final report to be completed by fall 2015.

Consultation	January – April, 2015
Background Research	April – June, 2015
Field Survey	May – July, 2015
Draft Report	July – September, 2015
Final Report	November 15, 2015

#### 6.7 Level of Effort

The estimated costs for consultation with the Michigan SHPO, Tribes and other interested stakeholders, background research, any required field survey, and report preparation are approximately \$10,000 to \$12,000. The Licensees believe that the proposed level of effort is adequate to obtain and update the information on historic structure resources within the Project's APE.

#### 6.8 Discussion of Alternative Approaches

No alternative approaches were considered.

# 7.0 **REFERENCES**

None.

# **APPENDIX F**

# ARCHAEOLOGICAL RESOURCES REVISED STUDY PLAN

#### CONSUMERS ENERGY COMPANY

# DTE ELECTRIC COMPANY LUDINGTON PUMPED STORAGE HYDROELECTRIC PROJECT (FERC NO. 2680-108) ARCHAEOLOGICAL RESOURCES REVISED STUDY PLAN

#### **1.0 DESCRIPTION OF ISSUE**

Consumers Energy (Consumers) and DTE Electric (DTEE), the Licensees, own and operate under a license issued by the Federal Energy Regulatory Commission (FERC) the Ludington Pumped Storage Project (Project). The Project is located along the Lake Michigan shoreline, in the townships of Pere Marquette and Summit in Mason County, Michigan and in Port Sheldon in Ottawa County, Michigan. The Ottawa County portion of the Project is limited to a 1.8 acre satellite recreation site (established as part of the Settlement Agreement approved by Commission Order on January 23, 1996 (74 FERC ¶ 61,055)). (Figure 1)

Background research and field surveys will be conducted to assist FERC in meeting its compliance requirements under Section 106 of the National Historic Preservation Act of 1966, as amended (Section 106), by determining whether historic properties (including archaeological sites) that are eligible for or listed in the National Register of Historic Places (NRHP) are present within the Project's Area of Potential Effect (APE). The Licensees have proposed that the Ludington APE includes all lands within the FERC Project Boundary. The APE would also include any lands outside of the Project Boundary where historic properties may be affected by Project-related activities that are conducted in compliance with the FERC license.

#### **2.0 PROJECT EFFECTS** (18 CFR 5.11 (d)(4))

The Project operation has been consistent for over 40 years with little to no effect on historical resources within the Project boundary. The Licensees are proposing no change in operation or addition of facilities that could affect land resources, thus Project effects are unlikely.


# 3.0 RELEVANT EXISTING INFORMATION (18 CFR 5.11 (d)(2) AND 5.11 (d)(3))

The state archaeological site files, maintained by the State Archaeologist, in the Michigan State Historic Preservation Office (SHPO) at the Michigan Historical Center (MHC) show that no known and eligible sites are located within the Project area.<sup>6</sup> Recent studies conducted for Consumers associated with two separate applications for land removal from the Project boundary identified known sites within two miles of the Project. One of these studies discovered the presence of two new archaeological sites on Michigan Department of Transportation (MDOT) lands, which were recently removed from the Project boundary<sup>7</sup>. Neither site was determined to be eligible for listing on the NRHP. Similarly, to the Licensees knowledge, no religious or cultural significance has been associated with any of the lands included within the Project boundary.

The Michigan SHPO files show 21 previously recorded archaeological sites within about 2.0 mi (3.6 km) of the general Project area. Archaeological sites in West Michigan include the entire cultural sequence for the region from the Paleoindian period to the twentieth century. The Pre-European Contact chronology is broadly subdivided into three periods: the Paleoindian period (12,000 Before Present (BP) to 9000 BP), the Archaic period (9000 BP to 4000 BP), and the Woodland period (4000 BP to AD 1600). After European contact, time frames are typically described in terms of centuries – seventeenth, eighteenth, etc.

The presence of known prehistoric sites within the general Project area indicates a moderate to high potential for the discovery of archaeological sites in similar environmental settings. The prehistoric sites identified in the general area all appear to be directly associated with bodies of water (Lake Michigan as well as other lakes rivers and streams).

<sup>&</sup>lt;sup>6</sup> Two previously known sites were identified within the Project boundaries. These sites were identified as destroyed and were identified as NRHP Class III, not eligible for NRHP listing.

<sup>&</sup>lt;sup>7</sup> On October 17, 2013, Consumers, on behalf of the Licensees, provided a report documenting the Phase I survey results to the Michigan SHPO for review. The Michigan SHPO provided their review in a letter to the FERC dated November 25, 2013, concurring with the conclusion that the sites are not eligible for listing on the NRHP. The Licensees filed a request to remove this MDOT property from the Project boundary on December 18, 2013 and FERC approved this request in an order dated May 13, 2014.

# 4.0 **PROJECT NEXUS (18 CFR 5.11 (d)(4))**

The proposed investigations will provide information on all archaeological sites located within the Project's APE and will define any potential adverse effects to historic properties resulting from continued operation of the Project. Once the potential adverse effects are determined, the information that is developed during the course of the survey will be used as the basis for preparing a Historic Properties Management Plan (HPMP). Guiding the Licensees' actions relating to Section 106 during the term of the new license, the HPMP will discuss how to avoid potential adverse effects or how they will be mitigated. The final HPMP will be filed with the Preliminary Licensing Proposal.

# 5.0 NEED FOR ADDITIONAL INFORMATION (18 CFR 5.11 (d)(3))

The archeological resource investigations will provide information on archaeological sites located within the Project's APE and will define any potential adverse effects to historic properties that would be created by the continued operation of the Project.

## 6.0 STUDY PLAN

The Licensees propose to conduct a Phase 1 background research and field survey for the Project in consultation with Michigan SHPO. If necessary, additional Phase II archaeological evaluations may be conducted to allow a definitive determination of eligibility.

## 6.1 Purpose of Study and Use of Study Results (18 CFR 5.11 (d)(1))

The goal of this study is to assist FERC in meeting its compliance requirements under Section 106 by determining whether historic properties (archaeological sites that are eligible for or listed in the NRHP) are present within the Project's APE. The Licensees propose to consult with the Michigan SHPO, federally recognized Indian tribes who have an active interest in the Project and other interested parties in advance of the survey to define and map the APE, determine appropriate areas to be surveyed, and determine appropriate survey methods. The steps in accomplishing this goal include: 1) identification of known cultural resources listed in, or eligible for listing in, the NRHP as historic properties, 2) review of information relating to the extent of prior disturbance with the boundaries of the Project; 3) consultation with the Michigan

SHPO and interested tribes; 4) an archaeological field survey to determine whether such properties are present in the Project's APE.

For any cultural resources discovered during the survey, a Phase II survey may be completed in order to determine the NRHP eligibility of those resources if the site disturbance is anticipated and site avoidance or protection is not possible. The survey information will be used to develop the HPMP, which will be filed with the Preliminary Licensing Proposal after consultation with the Michigan SHPO. The HPMP will address the elements outlined in the FERC's letter dated May 16, 2014.

## 6.2 Relevant Resource Management Goals, Standards and Guidelines (18 CFR 5.11 (d)(2))

Section 106 requires that federal agencies, licensees, and those receiving federal assistance take into account the effects of proposed undertakings on any resource that is listed on or is eligible for the NRHP. If NRHP-eligible properties are present in the APE, consultation on ways to avoid, minimize, or mitigate adverse project effects must take place. One possible strategy for addressing adverse effects to such properties involves preparing a Programmatic Agreement (PA) and drafting a HPMP that identifies how adverse project effects on NRHP listed or eligible properties will be addressed. As the lead agency, FERC is responsible for fulfilling the requirements of Section 106 in its decision to issue a new license to the Project.

As stipulated by the regulations that implement Section 106 (36 CFR Part 800), the Michigan SHPO represents the interests of the State of Michigan and its citizens, and advises and assists FERC in determining the significance of cultural resources within the APE. The Michigan SHPO administers cultural resource management reviews under Section 106, which involves providing technical guidance and professional advice on the potential effect of licensed projects, such as the Ludington Project, on the State's historic, architectural, and archaeological resources. Section 106 and its implementing regulations also define a special role for federally-recognized Indian tribes in consultation regarding any properties of religious or cultural significance that might be affected by a licensed project or other undertaking.

#### 6.3 Relevant Public Interest Considerations

Section 106 requires that federal agencies, licensees, and those receiving federal assistance take into account the effects of proposed undertakings on any resource that is listed in or is eligible for the NRHP. As the lead agency, FERC is responsible for fulfilling the requirements of Section 106 in its decision to issue a new license to the Project.

As stipulated by the regulations that implement Section 106 (36 CFR 800), the Michigan SHPO represents the interests of the State and its citizens, and advises and assists FERC in determining the significance of historic resources within the APE. The Licensees propose consulting with the Michigan SHPO in the establishment of the APE, development of the survey methodology, identification of NRHP-listed and -eligible historic resources (and the applicable NRHP Criteria), and assessment of effects (if any) to the NRHP-listed and -eligible resources, and development of a HPMP, if needed.

#### 6.4 Study Methodology

A literature and archives research will be completed in order to identify known sites noted in the records within the APE. Since the relicensing is a Section 106 project, a Phase 1 field survey will be conducted following the literature research. The scope of work that will be required to complete a cultural resources survey and evaluation of this Project for Pre-contact and Historic period archaeological resources for this Project will be identified through consultation with the Michigan SHPO, federally recognized Indian tribes who have an active interest in the Project and other interested parties. All methods used to conduct either additional survey for archaeological sites or for the NRHP-eligibility evaluation of sites will conform to the Michigan SHPO guidelines (the Michigan SHPO website http://www.michigan.gov/mshda/0,4641,7-141-54320---,00.html).

For any cultural resources identified during the Phase 1 survey, a Phase II archaeological evaluation may be conducted to determine NRHP eligibility as needed. If sites identified during the literature search and Phase I surveys will not be disturbed, Phase II surveys may not be needed. Need for the surveys will be determined in consultation with the Michigan SHPO.

The survey information will be used to develop a HPMP, which will be filed with the Preliminary Licensing Proposal after consultation with the Michigan SHPO and other interested parties. The HPMP will address the elements outlined in FERC's letter dated May 16, 2014:

- 1. Identification of the APE for the project and inclusion of a map or maps that clearly show the APE in relation to the project boundary;
- 2. Completion, if necessary, of identification of historic properties within the project's APE;
- 3. Maintenance and operation of the project, which constitutes a National Register-eligible Hydropower Historic District, as a historic property according to the Secretary of the Interior's, "Standards for the Treatment of Historic Properties" (36 CFR Part 68), and applicable National Park Service Preservation Briefs;
- 4. Continued use and maintenance of historic properties;
- 5. Treatment of historic properties threatened by project-induced shoreline erosion, other project-related ground-disturbing activities, and vandalism;
- 6. Consideration and implementation of appropriate treatment that would minimize or mitigate unavoidable adverse effects on historic properties;
- Treatment and disposition of human remains that may be discovered, taking into account any applicable State laws and the Advisory Council's "Policy Statement Regarding Treatment of Burial Sites, Human Remains, and Funerary Objects," February 23, 2007<sup>8</sup>;
- 8. Discovery of previously unidentified properties during project operations;
- 9. A list of activities (i.e., routine repair, maintenance, and replacement in kind at the project) not requiring consultation with the Michigan SHPO because these activities would have little or no potential effect on historic properties;
- 10. A procedure to address effects on historic properties in the event of a project emergency; and
- 11. A review of the HPMP by the Licensee, the Michigan SHPO and consulting parties to ensure that the information continues to assist the licensee in managing historic properties and updating the HPMP based on agency and tribal consultations.

<sup>&</sup>lt;sup>8</sup> In addition to Advisory Council's policy statement, Michigan Attorney General's Opinion 6585 of 1989 notes that when human remains are inadvertently discovered, the discoverer must notify the police authority in the jurisdiction within which the remains are found. Law enforcement must be given an opportunity to determine whether the discovery may be a police matter. If the authorities conclude that the discovery is not a police matter, the state archaeologist must be notified.

## 6.5 Data Analysis and Reporting

Upon completion of the field investigations, the Licensees will prepare a final report that will contain a narrative description of the resources identified during the survey, including information about the general setting and current physical condition. The narrative will provide a statement of integrity that addresses changes that have occurred over time.

Recommendations will include a narrative statement of significance that will define the applicable National Register criteria, criteria considerations (if any apply), areas of significance, and periods of significance. The narrative will include a summary statement of significance that will establish the level(s), period(s), and areas of significance. Other components of the report will consist of a bibliography of sources consulted and graphical information, including a map of the Project that clearly outlines the APE. The map will be prepared in ArcGIS format and will include the scale, north arrow, and legend.

All of the field investigation methods used will follow all applicable Federal and Michigan guidelines, including those contained in the Michigan Historic Preservation's website (see the Michigan SHPO website referred to above). In particular, the Michigan SHPO-approved level II Pre-contact period and Historic period archaeologists will be employed to undertake field and site evaluations.

#### 6.6 Schedule

The schedule for the Phase I field survey effort as described in the above methods will occur in the summer of 2015. A draft report will be prepared for review and comment by the Michigan SHPO, currently scheduled for the fall and winter of 2015. Follow-up Phase II studies to identify whether any of the archaeological sites discovered during Phase I survey are eligible for listing to the NRHP (if needed) are currently scheduled for spring through early summer of 2016. A Phase II report will be provided to the Michigan SHPO for review and comment, and a final report provided to FERC and the Michigan SHPO. A draft HPMP will be provided to the Michigan SHPO, Indian tribes involved in the cultural resources survey, and other interested parties involved in the survey for review and consultation. When consultation is completed, the HPMP will be completed and provided to these same individuals for final written concurrence, then filed with FERC along with filing the Preliminary Licensing Proposal.

Consultation (Michigan SHPO, interested Tribes)	January – April, 2015
Literature and Archives Research	April – June, 2015
Phase I Field Survey	June – August, 2015
Phase 1 Report	October – November 2015
Consultation (Michigan SHPO)	December 2015 – January 2016
Phase II Survey (as needed)	April – July, 2016
Phase II Report (as needed following Phase II survey)	August – September, 2016

#### 6.7 Level of Effort (18 CFR 5.11 (d)(6))

The cost for completion of the archives research and Phase I archaeological investigation of this Project is estimated to be \$50,000.

Should Phase II surveys be required, they would be completed in year 2 studies and an estimated cost be developed based on the number of sites to be surveyed.

#### 6.8 Discussion of Alternative Approaches

No alternative approaches were considered.

## 7.0 **REFERENCES**

16 U.S.C. §§ 470a et seq. National Historic Preservation Act of 1966, as amended through 2006.

Michigan SHPO. 2014. Archeology in Michigan. http://www.michigan.gov/mshda/0,4641,7-141-54320---,00.html [accessed October 3, 2014]

Report – R-1113 Dated September 2013 – 95 Acre MDOT Phase I Property Survey

Report – R-1085 Dated July 2013 – 35 Acre Data Center Property Survey

# APPENDIX G

# SUMMARY OF REVISED STUDY PLAN CONSULTATION

Meeting			
held	Date:	Subject and summary:	Outcomes and next steps:
with:	0/4/2014		
PMCT	9/4/2014	Recreation. Discussed PMCT's recreation and study desires, including a possible recreation opportunity for partnering with PMCT and Pere Marquette site	Consumers would take the recreation and site preservation topics for upper management review and input. Schedule another meeting in November.
IDDOI	0/2/2014	Fisherias	The LDDOL do not believe on in
LKDOI	(conference call)	Discussed LRBOI study request to understand the genesis of the request; offered to meet with LRBOI and LTBB	rife ERBOI do not believe an in- person meeting prior to the October 3rd comment deadline would be beneficial. Since their proposed study efforts were rejected, they believe the time would be better spent developing their response.
LTBB	8/27/2014	Fisheries.	Agreement was not reached
	(conference call)	LTBB and Consumers discussed their relative positions regarding the need for the larval and small fish study.	regarding studies, but discussions will continue. The group suggested an in-person meeting with LRBOI in September. (Without the interest from LRBOI, the September meeting was not held.)
Michigan SHPO	8/20/2014	Cultural Resources. Discussed the licensing studies proposed and revisions in process as well as a desire to define the APE. Let SHPO know FERC requested that the APE be defined in consultation with THPOs as well as SHPO. He suggested we do this in parallel.	Michigan SHPO suggested that a formal request be made for APE and they would review this along with the studies being proposed. Since they did not log the PSP in their system, we were asked to provide this. SHPO would not comment on study plans at this time. No additional consultation was scheduled or agreed to.
	9/23/2014	Another call was made to SHPO to ask how they wanted to receive the PSP.	Per the discussion, the PSP was e-mailed to SHPO.

Appendix G Summary of Consultation regarding Revised Study Plans

<b>Meeting</b> held	Date:	Subject and summary:	Outcomes and next steps:
with:	Dutt		
Tribes	8/28/2014	Calls were made to the following Tribal contacts in order to invite their participation in the APE determination, and asked if they have knowledge sites: Bruce Hamlin, Burt Lake Band of Ottawa and Chippewa Indians; Cindy Patek, Grand Traverse Band of Ottawa and Chippewa Indians; Ed Pigeon, Gun Lake Band of Potawatomi Match-e-be- nash-shee-wish; Jay Sam, LRBOI; Ron Yob, Grand River Band of Ottawa; Jeff Chivis, Nottawaseppi	Messages were left and no responses have been received. Only Jeff Chivis answered the call and requested a copy of the PAD and NOI (due to personnel changes, he did not have these documents.)
	8/29/2014	Sent PAD and NOI to Jeff Chivis, Nottawaseppi Huron Band of Potawatomi and provided directions on how to access additional documents. and requesting a copy of the APE and NOI	Documents sent to Jeff Chivis. No additional response has been received regarding future participation.
	9/3/2014	Call to Earl Mishiguad, Hannahville Indian Community inviting their participation in the APE determination	Message left; no response
	9/17/2014	Received an e-mail response to an earlier note, dated 8/4/2014. Desmond Berry (LTBB) expressed interest in participating in APE determination and discussing LPSP relicensing.	Include LTBB in the APE determination.

Meeting held with:	Date:	Subject and summary:	Outcomes and next steps:
	10/15/2014	Meeting with Joint Commenters (SAT) post annual fall meeting, to discuss PSP.	Members were supplied list of abatement alternatives evaluated in prior studies and figures of numerous intake engineering alternatives evaluated in Stone & Webster (1988). Several issues discussed; necessity for the study to incorporate higher flows resulting from the unit upgrades, evaluations specific to species and life stages impacted, no evaluations toward compensation/ just abatement technologies. No specific recommendations for panel of experts. MDNR rep stated she "likes HDRs work". Requested continuation of SAT review and input as has been done historically.