Appendix C – Cultural Resources Study

Gile Flowage Storage Project
FERC No. 15055

Study Plan

Cultural Resources Study

Prepared for

Prepared by

Mead & Hunt

meadhunt.com

April 2021

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1. Introduction

Northern States Power Company – Wisconsin (NSPW or Applicant), d/b/a Xcel Energy, is currently seeking to obtain an original license from the Federal Energy Regulatory Commission (FERC or Commission) to operate and maintain the existing Gile Flowage Storage Project (Gile Flowage or Project). The Project is owned, operated, and maintained by the Applicant.

On January 19, 2021, FERC issued Scoping Document 1 and requested that stakeholders provide comments on the Pre-Licensing Application (PAD) and study requests within 60 days. During the 60-day comment period, the Applicant received comments and study requests from several entities. FERC requested that NSPW include a Phase 1 archaeological survey of the Project's area of potential effect (APE) and consult with the Wisconsin Historical Society – Division of Historic Preservation Office (SHPO) and federally recognized tribes who have an interest in the Project prior to conducting any surveys.

Friends of the Gile Flowage (FOG) requested that a historic/cultural study be completed to identify sites within or adjacent to the Gile Flowage and the Montreal River corridor to be evaluated for their National Register of Historic Places (NRHP) eligibility.

The Licensee is proposing to conduct a Cultural Resources Study to evaluate potential impacts to cultural resources caused by continued Project operations within the Project APE.

2. Study Plan Elements

2.1 Study Goals and Objectives

The objective of the Cultural Resources Study and associated consultation is to determine if National Register eligible properties are present in the APE, assess the potential effects of proposed undertakings on any resource that is listed on or is eligible for the listing in the National Register, and consult on ways to avoid, minimize, or mitigate any potential adverse Project effects on any eligible properties.

2.2 Resource Management Goals

FERC's issuance of an original license for the continued operation of the Gile Flowage Storage Project is subject to the requirements of Section 106 of the National Historic Preservation Act (16 USC § 470f), and the implementing regulations at 36 CFR Part 800, requiring federal agencies, applicants, and those receiving federal permits, to consider the effects of proposed undertaking on any resource that is listed as or is eligible for the National Register.

In accordance with FERC's regulations, 18 CFR § 5.5(e), the NSPW requested that FERC authorize NSPW as the non-federal representative to conduct informal consultation associated with this Project subject to Section 106. The assessment of historic properties will be conducted in consultation with FERC, Wisconsin SHPO, any federally recognized tribes which express an interest in the Project and other interested parties.

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2.3 Public Interest

FERC and FOG expressed interest in this study. Per the Commission's telephone memo dated April 14, 2021, no additional federally recognized tribes expressed interest.

2.4 Background and Existing Information

The Project dam was authorized by the Wisconsin Public Service Commission in 1937. The dam was built at the site of the former Montreal River Log Company Dam dating back to the late 1800's. Lake Superior District Power Company, which was later acquired by NSPW, was the initial owner. The dam was completed in 1940 and the reservoir began filling in 1941 with the spring snowmelt (FOG, 2019).
The Wisconsin SHPO maintains a Wisconsin Historic Preservation Database (WHPD) that includes information on the locations of historic buildings, historic sites, and archaeological sites in the National Register of Historic Places (NRHP). NSPW conducted a thorough literature search of the WHPD to identify known historic and archaeological resources within the proposed boundaries of the Project when preparing the Pre-Licensing Application Document (PAD). This review did not identify any historic structures or archaeological sites or history of surveys within the Project APE (NSPW, 2020).

2.5 Project Nexus

The proposed Cultural Resources Study will provide information on archaeological and historic resources potentially eligible for the National Register that could be located within the Project APE and will identify any potential adverse effect to historic properties resulting from continued operation of the Project. If any adverse effects on historic properties are identified, NSPW will use the study results as a basis to prepare a Historic Properties Management Plan (HPMP), which will be filed with FERC after consultation with the Wisconsin SHPO, interested federally recognized tribes, and other interested parties.

2.6 Project Description

The Gile Flowage Storage Project is a headwater storage reservoir located on the West Fork of the Montreal River (West Fork) in the towns of Carey and Pence in Iron County Wisconsin. The Project consists of (1) a 3,317-acre reservoir with a usable storage capacity of 37,064 acre-feet at a water surface elevation of 1,490.0 feet NGVD; (2) a 30 foot-high by 899 foot-long dam consisting of, from west to east: (a) a 300 foot-long, 30 foot-high earthen embankment with a crest elevation of 1,495 feet NGVD; (b) a 24 foot-long, 30 foot-high concrete spillway section with a crest elevation of a 6 foot-wide, 6 foot-high sluice gate with an invert elevation of 1,465.5 feet NGVD and a 16 foot-wide by 12 foot-high Tainter gate with a crest elevation of 1,478 feet NGVD; and (c) a 575 foot-long, 30 foot-high earthen embankment with a crest elevation of 1,495 feet NGVD; and (3) appurtenant facilities. The Project does not contain any generating facilities. The Project is operated to augment flows in the Montreal River during summer and winter low-flow periods for hydroelectric power generation downstream Saxon Falls (P-2610) and Superior Falls (P-2587) Projects. The Project has a maximum drawdown of 15 feet, but typically operates with a summer drawdown that averages 5.2 feet and a winter drawdown that averages 6.8 feet.

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2.7 Project APE

The APE for the Gile Flowage Storage Project is defined as all lands and waters enclosed within the proposed Project boundary and any other lands or waters outside the proposed Project boundary where Project operation may affect historic properties. The Project APE includes all project facilities, dam, reservoir, and shoreline areas to the maximum allowed reservoir elevation of 1,490 feet NGVD and includes approximately 43 islands within the project reservoir. The APE also includes Applicant owned lands and the portion of the West Fork, extending approximately 85 feet downstream of the Project dam. The APE is shown in Appendix 1.

2.8 Methodology

2.8.1 Programmatic Agreement (PA)

The proposed Cultural Resources Study will follow the Pre-Licensing Procedure identified in the *Programmatic Agreement Among the Federal Energy Regulatory Commission, the Advisory Council on Historic Preservation, the State of Wisconsin, State Historic Preservation Officer and the State of Michigan, State Historic Preservation Officer, for Managing Historic Properties that may be Affected By New and Amended Licenses Issuing for the Continued Operation of Existing Hydroelectric Projects in the State of Wisconsin and Adjacent Portions of the State of Michigan* (Programmatic Agreement), executed in December 1993 (ACHP, 1993).

2.8.2 Identification of Historic Buildings, Structures, and Objects

The Applicant's archaeologist will utilize a literature search to identify historic buildings, structures and objects associated historically, structurally, spatially, or functionally within the Project and Project APE. Upon completing this identification, the Applicant will submit two copies of resulting reports prepared in accordance with the guidelines, *Architecture/History Survey Report Specification for Compliance Driven Surveys to the Wisconsin SHPO* pursuant to 36 CFR Part 800 at § 800.4.

2.8.3 Identification of Archaeological Properties

Per the terms of the PA, the Applicant's archaeologist will conduct a Phase 1 survey of Project shoreline areas within the APE to identify archaeological sites currently subject to erosion in accordance with the *Wisconsin Archaeological Survey Guideline for Conservation Archaeology in Wisconsin,* prepare reports based on the results of the surveys and submit reports along with appropriate documentation to SHPO for review and comment. All supporting photographic documentation will be submitted as original prints.

2.8.4 Evaluation of Identified Properties

If archaeological properties are identified to be impacted by Project operations, the Applicant's archaeologist will apply the Criteria of Evaluation, 36 CFR Part 60 at § 60.4, and as appropriate, the principles set forth in *Hydroelectric Development in the United States, 1880-1940*, to every historic building, structure, object, and archaeological property identified in accordance with 36 CFS Part 800 at § 800.4.

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- For each property to which the Criteria of Evaluation is applied the Applicant will report its results in written form. For each individual property that the Applicant finds to be eligible for listing on the National Register, the results will be reported on a *National Park Service Form 10-900* (Form).
- The Applicant will complete the Forms according to the National Register Bulletin Nos. 15 and 16, and the *Wisconsin Supplementary Manual*, and submit to the Wisconsin SHPO an original and two copies of each Form completed along with other supporting materials. Other supporting materials include the following:
    - For archaeological properties, a professionally written report detailing the results of the Phase 1 Survey, describing any analysis and interpretation of the data undertaken subsequent to the Phase 1 Survey.
    - All supporting photographic documentation will be included as original prints, for each of the three copies submitted to the Wisconsin SHPO, submitted as physically separate documents.
    - A cover letter summarizing the Applicant's determination of eligibility for each of the properties documented on the Forms.
- On eroding sites, the requirement to conduct an evaluation may be avoided by consulting with the Wisconsin SHPO and employing means acceptable to the SHPO for stabilizing the property in place.
- Once the SHPO deems the documentation completed, two signed copies will be returned to the Applicant, who will then file one copy with the Commission with all of the supporting materials.

2.9 Consistency with Generally Accepted Scientific Practice

This Cultural Resources Study follows the terms of the Programmatic Agreement which is the generally accepted scientific practice in place regarding cultural resources at hydropower projects in Wisconsin.

2.10 Project Schedule and Deliverables

NSPW anticipates the research, field work, evaluation of eligible properties, and analysis of potential Project impacts will be completed in the spring and summer of 2022. Two draft reports (one for historic properties and one for archaeological properties) will be prepared for comment by the Wisconsin SHPO and interested federally recognized tribes and will be included in the Initial Study Report. A final report will be provided to the Wisconsin SHPO and included in the Updated Study Report, if necessary. The report will be kept confidential and filed with FERC and other consulting parties as a "privileged," non-public document.

NSPW anticipates that the field work, evaluation of properties eligible for listing on the National Register, analysis of potential project impacts, and study reports will be completed by early September 2022. Study reports will be included in the Initial Study Report.

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For future reference, within one year of license issuance and per the terms of the PA, the Applicant will develop a HPMP meeting the standards set forth in the PA. The HPMP will address the following items:

- 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;
- Completion, if necessary, of identification of historic properties within the Project's APE; continued use and maintenance of historic properties;
- Treatment of historic properties threatened by project-induced shoreline erosion, other project-related ground disturbing activities, and vandalism;
- 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, considering any applicable state laws and the Advisory Council's "Policy Statement Regarding Treatment of Burial Sites, Human Remains, and Funerary Objects," February 23, 2007, and the Native American Graves Protection and Repatriation Act (24 USC § 3001);
- Discovery of previously unidentified properties during Project operation;
- Public interpretation of the historic and archaeological properties at the Project;
- A list of activities (i.e., routine repair, maintenance, and replacement in kind at the Project) not requiring consultation with the Wisconsin SHPO because these activities would have little or no potential effect on historic properties;
- A procedure to address effects on historic properties in the event of a Project emergency; and
- A review of the HPMP by the Applicant, the Wisconsin SHPO, and consulting parties to ensure that the information continues to assist the applicant in managing historic properties and updating the HPMP based on agency and tribal consultations.

2.11 Level of Effort and/or Cost

NSPW estimates that this study will cost approximately $25,000 to complete.

2.12 Discussion of Alternative Approaches

NSPW has generally incorporated FERC comments on their request to provide additional detail on the Cultural Resources Study. The proposed methods for this study are based on the Programmatic Agreement described in Section 2.8.1 and are consistent with accepted professional practices. The overall approach is used in all Wisconsin relicensing proceedings. No alternative approaches to this study are warranted.

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3. References

Advisory Council on Historic Preservation (ACHP). 1993. Programmatic Agreement among the Federal Energy Regulatory Commission; the Advisory Council on Historic Preservation; the State of Wisconsin, State Historic Preservation Officer; and the State of Michigan, State Historic Preservation Officer, for Managing Historic Properties That May Be Affected By New and Amended Licenses Issuing for the Continued Operation of Existing Hydroelectric Projects in the State of Wisconsin and Adjacent Portions of the State of Michigan, executed in December 1993.

Friends of the Gile Flowage. 2019. Brief History of the Gile Flowage. http://www.friendsofthegile.org/home/flowage-. Accessed September 12, 2019.

Northern States Power Company – Wisconsin, dba Xcel Energy. 2020. Pre-Application Document-Gile Flowage Storage Reservoir Project. Prepared by Mead & Hunt, October 27, 2020.

Wisconsin Historical Society - State Historic Preservation Office. Wisconsin Historic Preservation Database. Accessed September 17, 2019.

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Appendix 1 – Project APE

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Proposed Project Boundary

Proposed Project APE

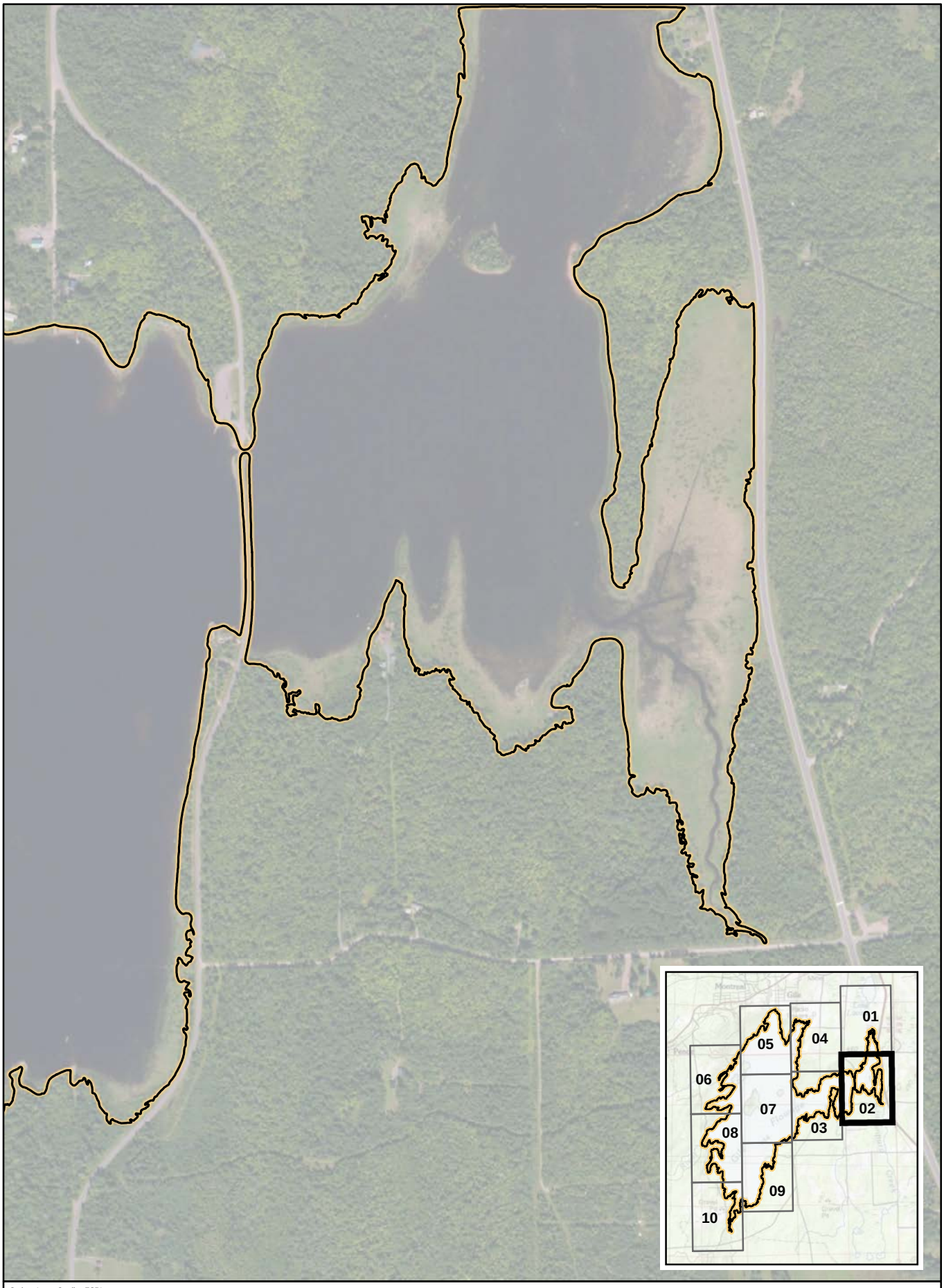
Map Sheet

N

0 375 750

Feet

Gile Flowage Storage Reservoir Project
Proposed Project Area of Potential Effects
Map Sheet 01 of 10
FERC No. 15055



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Proposed Project Boundary

Proposed Project APE

Map Sheet

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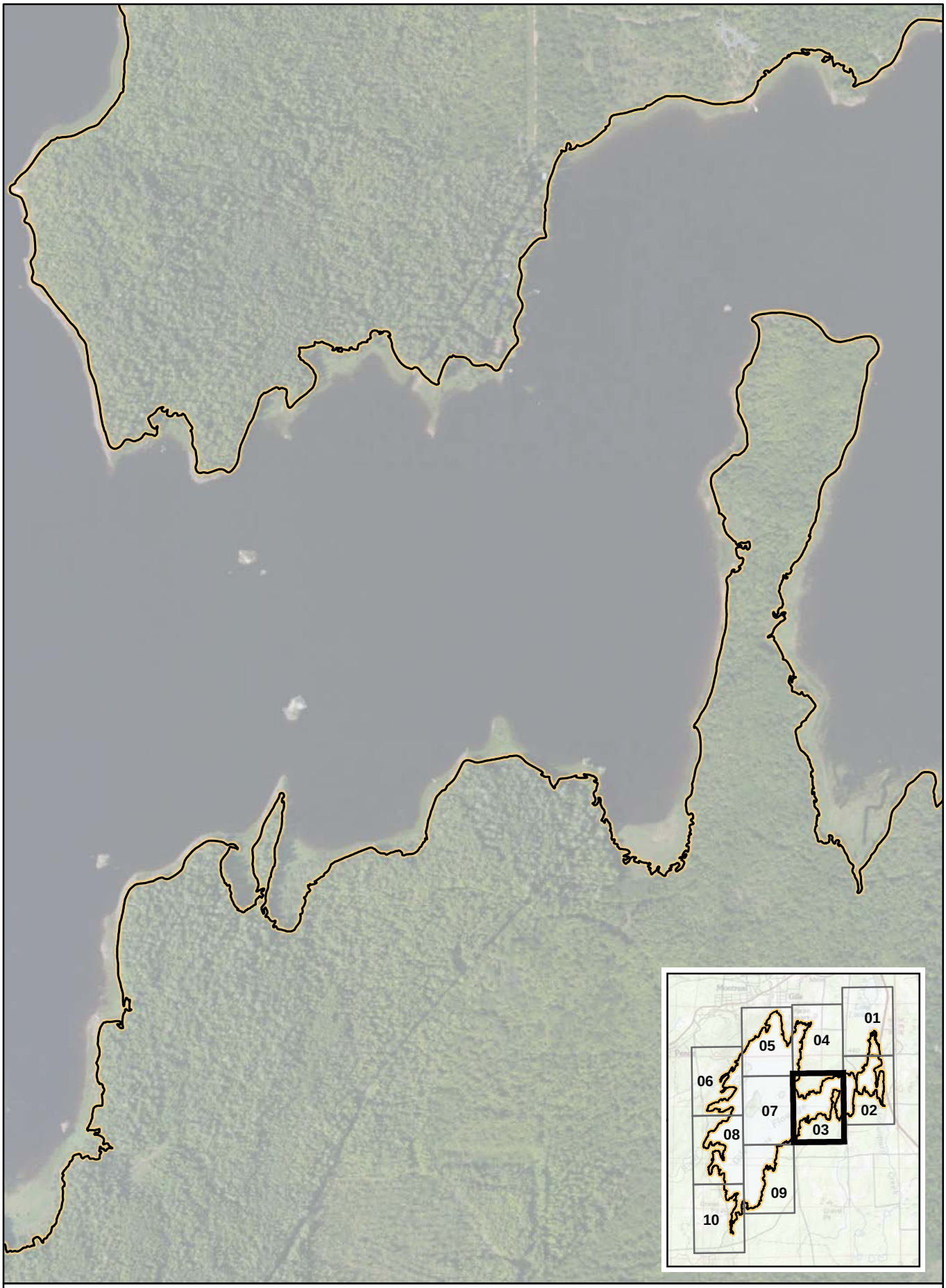
Gile Flowage Storage Reservoir Project
Proposed Project Area of Potential Effects
Map Sheet 02 of 10
FERC No. 15055



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Proposed Project Boundary

Proposed Project APE

Map Sheet

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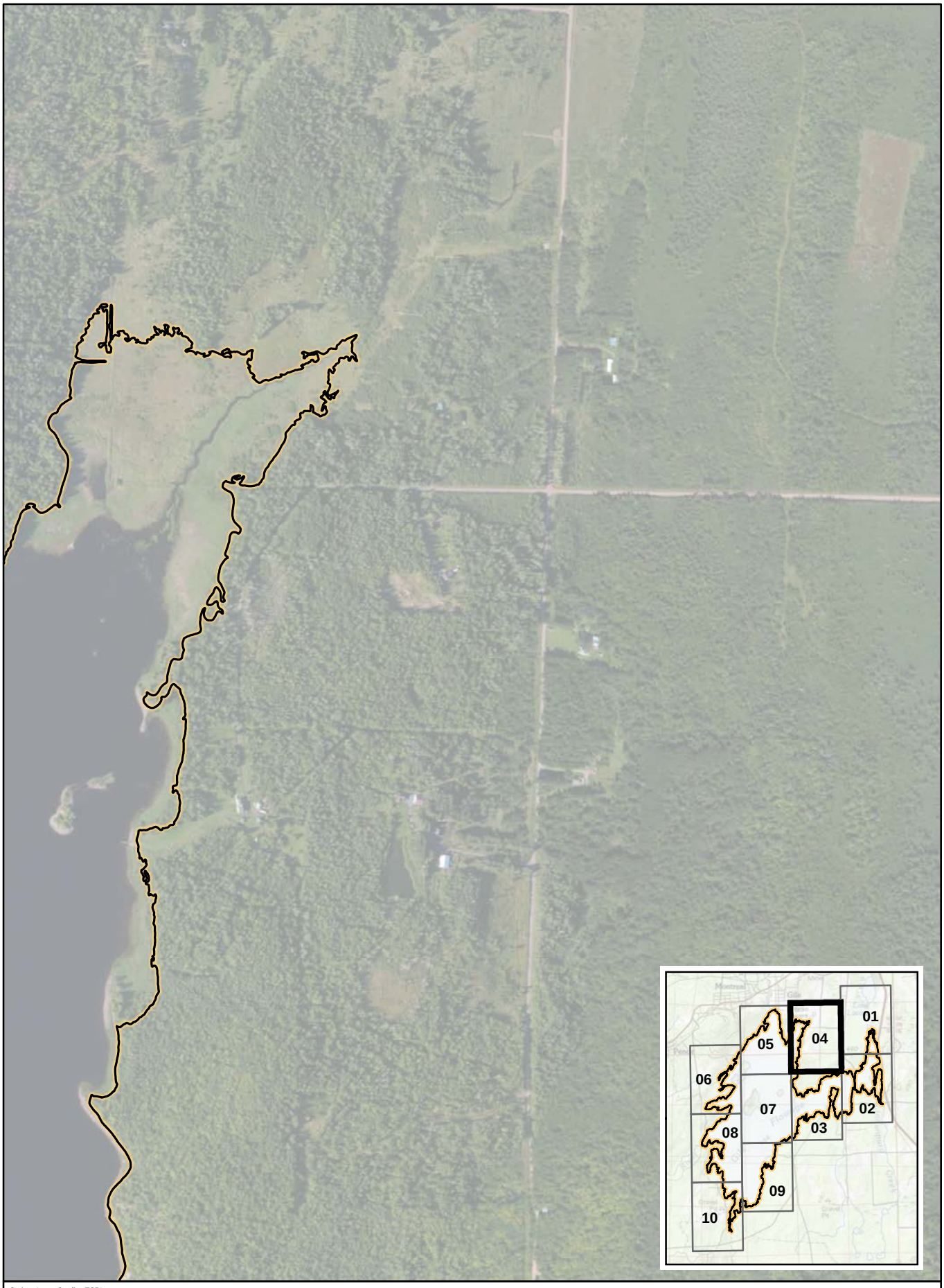
Gile Flowage Storage Reservoir Project
Proposed Project Area of Potential Effects
Map Sheet 03 of 10
FERC No. 15055



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Proposed Project Boundary

Proposed Project APE

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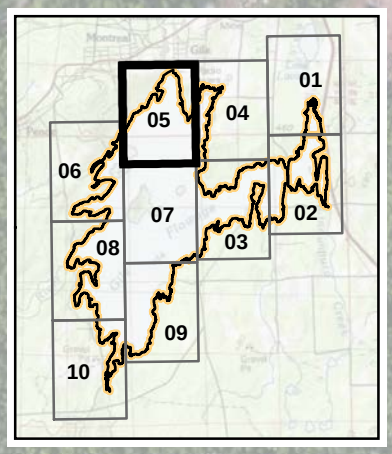
Gile Flowage Storage Reservoir Project
Proposed Project Area of Potential Effects
Map Sheet 04 of 10
FERC No. 15055



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Proposed Project Boundary

Proposed Project APE

Map Sheet

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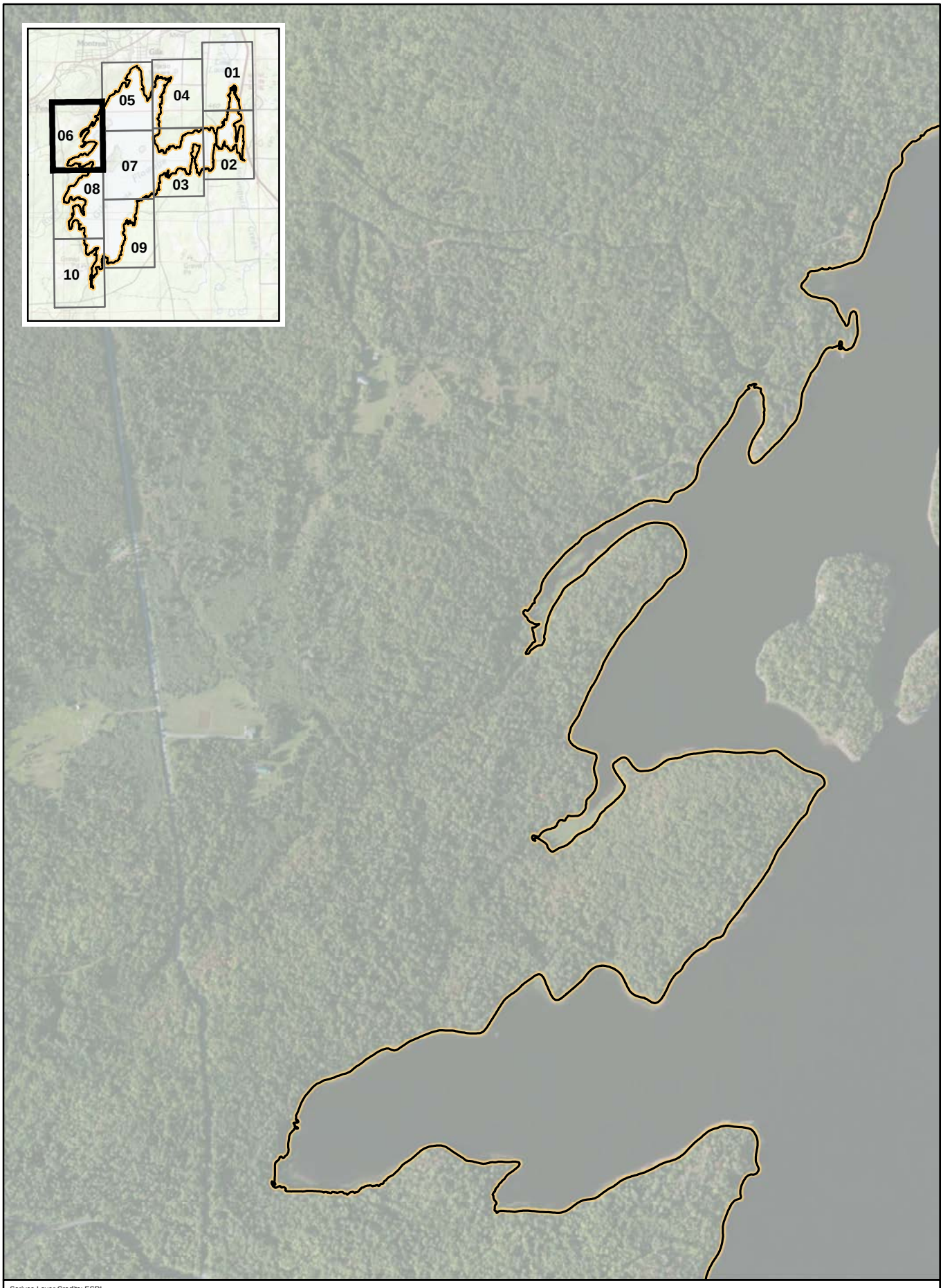
Gile Flowage Storage Reservoir Project
Proposed Project Area of Potential Effects
Map Sheet 05 of 10
FERC No. 15055



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Proposed Project Boundary

Proposed Project APE

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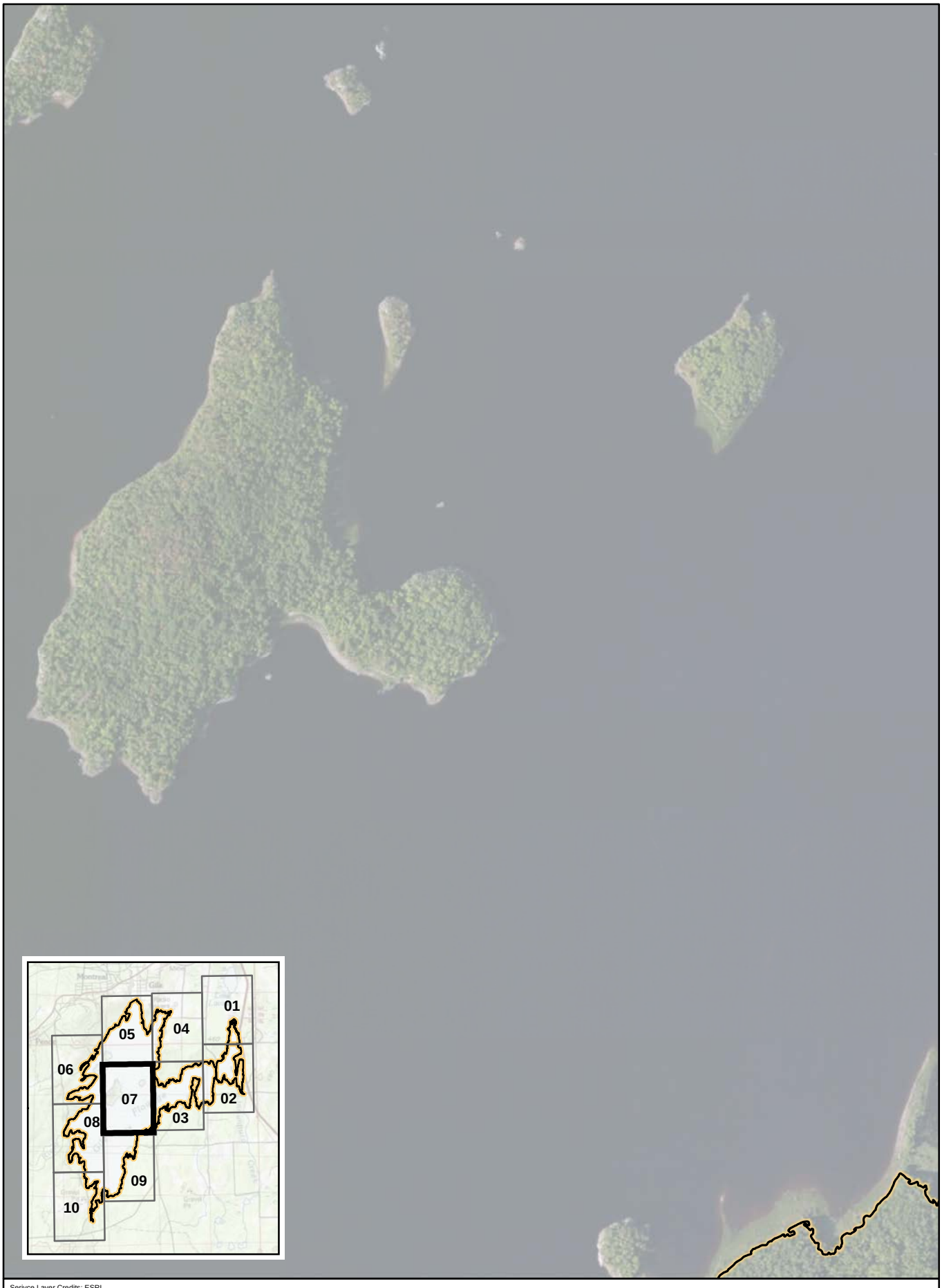
Gile Flowage Storage Reservoir Project
Proposed Project Area of Potential Effects
Map Sheet 06 of 10
FERC No. 15055



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Proposed Project Boundary

Proposed Project APE

Map Sheet

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Gile Flowage Storage Reservoir Project
Proposed Project Area of Potential Effects
Map Sheet 07 of 10
FERC No. 15055

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Proposed Project Boundary

Proposed Project APE

Map Sheet

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Gile Flowage Storage Reservoir Project
Proposed Project Area of Potential Effects
Map Sheet 08 of 10
FERC No. 15055

Serivce Layer Credits: ESRI

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Proposed Project Boundary

Proposed Project APE

Map Sheet

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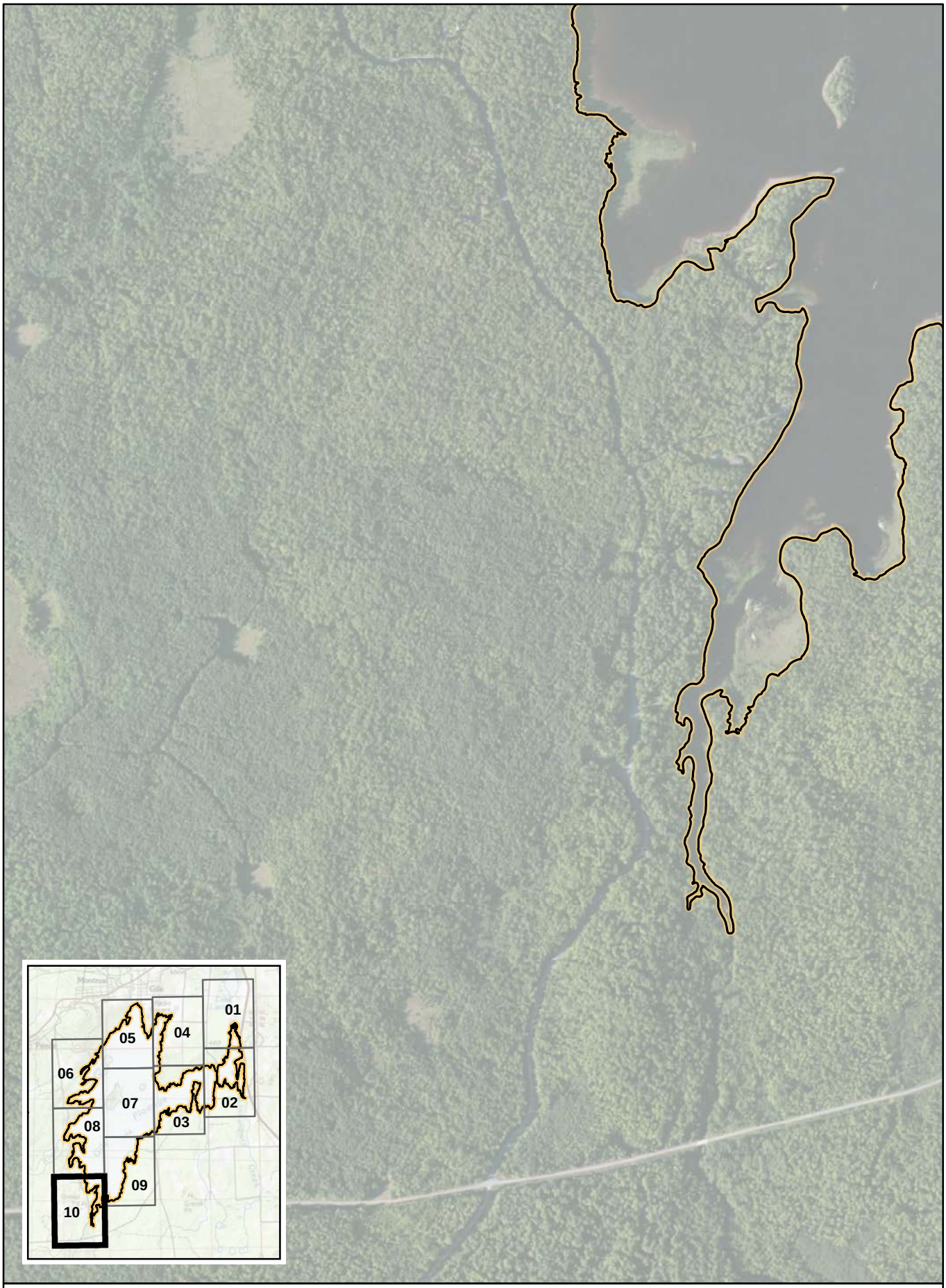
Gile Flowage Storage Reservoir Project
Proposed Project Area of Potential Effects
Map Sheet 09 of 10
FERC No. 15055



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Proposed Project Boundary

Proposed Project APE

Map Sheet

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Gile Flowage Storage Reservoir Project
Proposed Project Area of Potential Effects
Map Sheet 10 of 10
FERC No. 15055

Appendix D – Minimum Flow Habitat Evaluation Study

Gile Flowage Storage Project
FERC No. 15055

Study Plan

Minimum Flow Habitat Evaluation Study

Prepared for

Xcel Energy®

Prepared by

Mead & Hunt

meadhunt.com

April 2021

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1. Introduction

Northern States Power Company – Wisconsin (NSPW or Applicant), d/b/a Xcel Energy, is currently seeking to obtain an original license from the Federal Energy Regulatory Commission (FERC or Commission) to operate and maintain the existing Gile Flowage Storage Project (Gile Flowage or Project) under FERC Docket Number P-15055-000. The Project is owned, operated, and maintained by the Applicant.

On January 19, 2021, FERC issued Scoping Document 1 and requested that stakeholders provide comments on the Pre-Licensing Application (PAD) and study requests within 60 days. During the 60-day comment period, the Applicant received comments and study requests from several entities. Only the Wisconsin Department of Natural Resources (WDNR) requested that the Applicant complete a study to assess the effect of minimum flows on aquatic resources downstream of the Project dam.

WDNR requested two studies that address the impacts of minimum flows on aquatic resources downstream of the Project dam on the West Fork of the Montreal River. The first request was for an assessment of minimum flow, drawdowns, and resource impacts. The goal of this study request is to determine if the minimum flow of 10 cfs, a maximum drawdown of 15 feet, and drawdowns during the summer and winter are providing sufficient flows for aquatic resources. The second request was for an assessment of stream flows channel dimensions and linear gradient. The goal of the study request is to determine the impact the Project has on the existing stream flows, channel dimensions, and linear gradient on the West Fork, downstream of the Project dam.

The applicant is proposing to conduct a Minimum Flow Habitat Evaluation Study to determine if the current minimum flow is sufficient to protect aquatic resources in the West Fork of the Montreal River (West Fork) downstream of the Project dam.

2. Study Plan Elements

2.1 Study Goals and Objectives

The objective of this Minimum Flow Habitat Evaluation Study is to evaluate whether the existing minimum flow at the Project is sufficient to provide aquatic resources in the West Fork downstream of the Project dam.

2.2 Resource Management Goals

Provide equal consideration to non-power resources such as aquatic resources that could potentially be impacted by Project operations.

2.3 Public Interest

WDNR expressed interest in this study.

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2.4 Background and Existing Information

There is no existing data available regarding the amount of habitat available in the West Fork during minimum flows. A minimum flow of 10 cfs has historically been passed in accordance with an agreement with the City of Montreal (NSPW, 2020). A review of flows released from the Project dam from April 29, 2017 to February 1, 2021 was conducted. The minimum flow released during this timeframe was 12 cfs, which is 20% higher than the required minimum flow. The mean flow during this time period was approximately 113 cfs. A review of the data showed that flows of at least 30 cfs (300% of minimum flow requirements) was released approximately 63% of the time (Xcel, 2021).

In the WDNR study request for assessment of fisheries at Gile Flowage, the WDNR indicates a 2017 fish survey was completed downstream of the Gile on the Montreal River. The data was not provided to the Applicant during the scoping for information to develop the Pre-Application Document. The Applicant received the data on April 28, 2021. The Applicant has proposed this Minimum Flow Habitat Evaluation Study, excluding fish sampling, since there is current information available regarding fisheries downstream of the Project dam.

2.5 Project Nexus

Project operations may affect the impact of the aquatic resources downstream of the Project dam.

2.6 Study Area

The study will survey two representative reaches (stations) downstream of the Project dam. Exact reaches will be determined in the field by the group completing the survey, upon review of the 2017 WDNR fishery data, using the guidelines outlined in WDNR's Guidelines for Evaluating Habitat of Wadable Streams (WDNR Guidelines).

2.7 Methodology

2.7.1 General Sampling Procedures

The sampling methodology for each station will follow the general sampling procedures outlined in WDNR Guidelines. However, no fishery data will be collected because fishery data was collected in 2017 by the WDNR.

2.7.2 Data Collection

The Applicant proposes, as the WDNR guidelines recommend, the following three sheets (Station Summary, Station Flow Data, and Transect Data) be used in the habitat evaluation.

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2.7.2.1 Station Summary Sheet

The data recommended by the WDNR Guidelines will be collected for one station summary sheet for each station except for the following parameters which the WDNR Guideline lists as optional and would require additional equipment to gather the data or is being collected by other proposed studies:

1) Water Conductivity;
2) Water Turbidity;
3) Total Dissolved Solids;
4) Dissolved Oxygen;
5) Dissolved Oxygen Saturation, and;
6) pH.

The Applicant also proposes to use a modern method to determine the Site Mile instead of the map wheel method recommended in the WDNR Guidelines.

The Applicant also intends to collect representative photos of the Station.

2.7.2.2 Station Flow Data Sheet

The data recommended by the WDNR Guidelines will be collected for each station except for the data being collected solely to determine flow. This data is not necessary because the flow in the stream in cfs will be determined by the flow release from the dam based upon gate opening.

Depth data will be collected and will be used to determine the amount of aquatic habitat available at varying flows.

2.7.2.3 Transect Data Sheet

The data recommended by the WDNR Guidelines will be collected for each transect station except for bank erosion. The bank erosion information is being collected as part of the Applicant-proposed Shoreline Stability Study.

Each transect will be displayed on a scaled cross-section drawing with the habitat and water depth displayed on each drawing. This information will be combined with the additional water depth measurements collected at the various flows described in Section 2.7.2 to scale changes in inundated aquatic habitat at various minimum flows.

2.7.2 Additional Data Collection

The objective of this Minimum Flow Habitat Evaluation Study is to evaluate whether the existing minimum flow at the Project is sufficient to provide aquatic resources in the West Fork downstream of the Project dam. Therefore, the Applicant proposes to collect water depth information in each of the stations while releasing various flows at 12 cfs intervals (i.e. 12 cfs, 24 cfs, and 36 cfs). The water depth information can be collected by hand measurements or continuous water level monitoring devices.

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2.8 Consistency with Generally Accepted Scientific Practice

This Minimum Flow Habitat Evaluation follows generally accepted scientific practice regarding field data collection and reporting.

2.9 Project Schedule and Deliverables

Results of this study will be summarized in a final study report. The report will include the following elements:

- Project Information and Background
- Study Area
- Methodology
- Study Results
- Analysis and Discussion
- Agency Correspondence and/or Consultation
- Literature Cited

NSPW anticipates that field work will be completed by early September 2022. The study report will be included in the ISR when it is filed with FERC, no later than September 28, 2022.

2.10 Level of Effort and/or Cost

NSPW estimates that this study will cost approximately $30,000 to complete.

2.11 Discussion of Alternative Approaches

NSPW has generally incorporated WDNRs requests but added additional data collection steps where the WDNR methodology has fallen short in providing the data required to meet the study objectives. No alternative approaches to this study are warranted.

3. References

Northern States Power Company – Wisconsin, dba Xcel Energy. 2020. Pre-Application Document-Gile Flowage Storage Reservoir Project. Prepared by Mead & Hunt. October 27, 2020.

Wisconsin Department of Natural Resources. 2021. American Whitewater. 2021. Comments on Notice of Intent, Scoping Document 1, Preliminary Application Document, and Studies Request for the Gile Flowage Storage Reservoir Project (P-15055-000) Licensing. March 5, 2021.

Wisconsin Department of Natural Resources. 2015. Nutrient Chemistry Grab Sampling (V3.3). WDNR-PUB-WY-019-2015. February 26, 2015.

Wisconsin Department of Natural Resources. 2022. Wisconsin Consolidated Assessment and Listing Methodology (WisCALM) 2022. Guidance # 3200-2021-01. January 14, 2021.

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Appendix E – Mussel Study

Gile Flowage Storage Project
FERC No. 15055

Study Plan

Mussel Study

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1. Introduction

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On January 19, 2021, FERC issued Scoping Document 1 and requested that stakeholders provide comments on the Pre-Licensing Application (PAD) and study requests within 60 days. During the 60-day comment period, the Licensee received comments and study requests from several entities. The River Alliance of Wisconsin (RAW) and Wisconsin Department of Natural Resources (WDNR) requested the Applicant to complete a mussel study as part of relicensing.

The RAW and WDNR requested that the Applicant complete a mussel study to determine mussel species density and diversity, including characterizing mussel habitat in the reservoir.

The Applicant has proposed this mussel study to provide the requested information.

2. Study Plan Elements

2.1 Study Goals and Objectives

Provide freshwater mussel density and diversity baseline data, with a focus upon state and federally threatened or endangered freshwater mussel species that could be adversely impacted by Project operations (see Section 2.2). This also includes characterizing mussel habitat within the proposed Project boundary.

2.2 Resource Management Goals

The WDNR provided the following statement for goals in their request: *"This information will help the resource agencies determine if any best management practices are needed to protect listed species, as well as any management measures to protect or enhance the existing freshwater mussel populations."* RAW deferred to the resource agencies on the management goals. Neither the WDNR nor the RAW provided a clear resource management goal as required in their request. Since there are no clear management goals for species that are not listed as protected, NSPW believes the study should be focused upon avoiding adverse impacts to threatened or endangered freshwater mussel species if they are present and being impacted by Project operations.

2.3 Public Interest

RAW and WDNR expressed interest in this study.

2.4 Background and Existing Information

There is no recent survey information on freshwater mussel species in or near the Project area. Cylindrical papershell *(Anodontoides ferusscianus)* and eastern elliptio *(Elliptio complanata)* have been found within the Montreal River and its tributaries in Iron County based on 1975 records from the Wisconsin Mussel Monitoring Database (NSPW, 2020).

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2.5 Project Nexus

The operations of the Project could influence freshwater mussel species located within the Project boundary.

2.6 Study Area

The study area consists of two 1,000-foot-long river reaches. One is located downstream of the dam and one is located in a riverine portion of the reservoir near the upstream Project boundary. The study areas are depicted in Appendix 1.

2.7 Methodology

2.7.1 Mussel Survey

The 2015 Wisconsin Department of Natural Resources Guidelines for Sampling Freshwater Mussels in Wadable Streams (Guidelines) and other standard survey methodologies were reviewed and used to develop the mussel survey for the Projects (Piette, 2015). The Guidelines provide information on minimum survey efforts for wadable conditions and have been modified for non-wadable conditions. Normal to low water conditions and good visibility must be present to conduct the field work; project activities will be planned accordingly.

Two riverine reaches will be surveyed at the Project. Reach 1 is a 1,000-meter reach in a riverine portion of the Gile Flowage reservoir beginning near the Sucker Hole Boat Launch and extending approximately 1,000 meters upstream. Reach 2 begins at the Project tailrace and extends approximately 1,000 meters downstream.

Both reaches are 1,000 meters in length. In each reach, surveys will consist of transects extending bank to bank that will be spaced every 100 meters creating a series of 10 transects per reach. Transects will be numbered 1-10 from downstream to upstream, and a random number selector will be utilized to select five transects for survey in each reach.

In both reaches, searches along each transect will be done in 10-meter-long segments and searching will extend 0.5 meters on each side of the transect. A rapid visual search for signs of freshwater mussels (living or shell material) will be performed within the segment. The rapid visual search entails an initial search of 0.2 minutes per square meter along each 10-meter segment to determine if mussels are present. If mussels are present in a segment, a semi-quantitative search will be triggered, and the time will be extended to 1 minute per square meter. During the semi-quantitative search, divers will visually search, probe the substrate, and turn over rocks to detect small, burrowed mussels.

General stream conditions and morphology within the study area will be recorded. River bottom substrate composition using the Wentworth Scale (% observed of silt, sand, gravel, etc.) will be recorded. The survey will be conducted only when visibility at depth is at least 20 inches.

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In addition to the mussel sampling within the transects, a general description of mussel habitat within the Project boundary including the reservoir and tailrace area will be completed. Normal to low water conditions and good visibility must be present to conduct the field work; project activities will be planned accordingly.

2.7.2 Data and Mussel Handling

Live mussels found will be kept submersed in ambient river water and kept cool and moist during processing. All live mussels will be identified to species, counted, and sexed (sexually dimorphic species only) by the team malacologist. Dead shell specimens will be scored as fresh dead (dead < 1 year; lustrous nacre), weathered dead (dead one to many years; chalky nacre, fragmented, and worn periostracum), or subfossil (dead many years to many decades; severely worn and fragmented). Detailed digital images of the study area and representative mussel species will be recorded. A station location data sheet will also be populated per the Guidelines. Data will be recorded using the forms in Appendix 2 to allow distinction between time searches. Mussel taxonomy will follow the names presented by Williams et al., 2017.

If any living or dead federally listed or state-listed species are encountered, a Licensee representative will be notified immediately. WDNR and the U.S. Fish and Wildlife Service (USFWS) will be notified per surveyor collection permit requirements. No live mussels will be harmed or taken during this project. Any specimens of federally listed or state-listed species that are encountered will be individually hand placed into their places of origin.

2.7.3 Personnel Qualifications

All surveys will be conducted by individuals with prior mussel identification training and experience with aquatic and mussel surveys.[1]

2.8 Consistency with Generally Accepted Scientific Practice

This Mussel Study follows generally accepted scientific practice regarding field data collection and reporting. Similar protocols, developed in coordination with WDNR, have been used by the Applicant in relicensing studies at several of their other hydroelectric projects.

2.9 Project Schedule and Deliverables

Results of this study will be summarized in a Mussel Study Report. The report will include a description of mussel survey activities and provide summary tables of all data collected, including mussel species numbers, sizes, and distribution within the study area. The report will also describe mussel density and diversity within the vicinity of the Project.

[1] Consultant(s) selected to complete the work will be responsible for obtaining any scientific collectors permits required.

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A general description of mussel habitat within the Project boundary, including the Project reservoir and tailwater area, will also be provided. GIS-based mapping will provide further visual presentations of the findings of the survey. Completed survey sheets will be included in the report as well.

NSPW anticipates that field work will be completed between June 15, 2022 and September 1, 2022 to ensure that all mussel surveys and the mussel study report can be completed prior to the September 28, 2022 filing deadline for the Initial Study Report.

2.10 Level of Effort and/or Cost

NSPW estimates that this study will cost approximately $30,000 to complete.

2.11 Discussion of Alternative Approaches

NSPW has generally incorporated WDNR comments on their request for mussel surveys. The overall approach has been used by NSPW in their other relicensing proceedings in Wisconsin. Modifications from WDNR's study request are detailed in Section 3.0 of the Proposed Study Plan. The proposed methods for this study are consistent with FERC's study requirements under the ILP. No alternative approaches to this study are warranted.

3. References

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River Alliance of Wisconsin. 2021. Notice of Intent to File License Application, Filing of Pre-Application Document (PAD), Commencement of Pre-Filing Scoping, Request for Comments on the PAD and Scoping Document and Identification of Issues on the PAD and Scoping Document and identification of Issues Associated with Study Requests. March 17, 2021.

Smith, D.R. 2006. Survey design for detecting rare freshwater mussel species. Journal of the North American Benthological Society, 25:701-711.

Williams, J.D et. al. 2017. A revised list of the freshwater mussels (Mullusca: Bibalvia Unionida) of the United States and Canada. Freshwater Mollusk Biology and Conservation, 20(2), 33-58.

Wisconsin Department of Natural Resources. 2021. Comments on Notice of Intent, Scoping Document 1, Preliminary Application Document, and Studies Request for the Gile Flowage Storage Reservoir Project (P-15055-000) Licensing. March 5, 2021.

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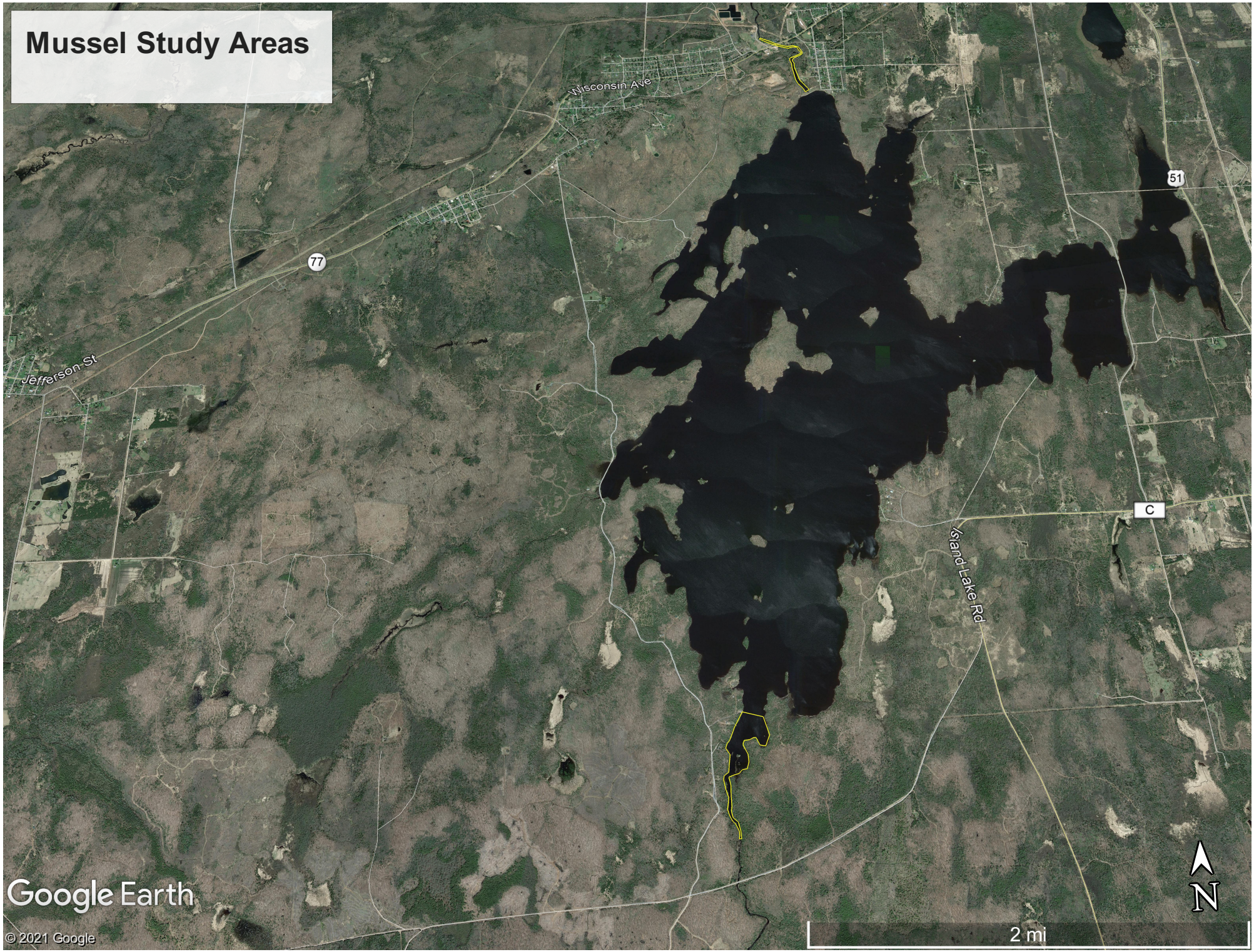
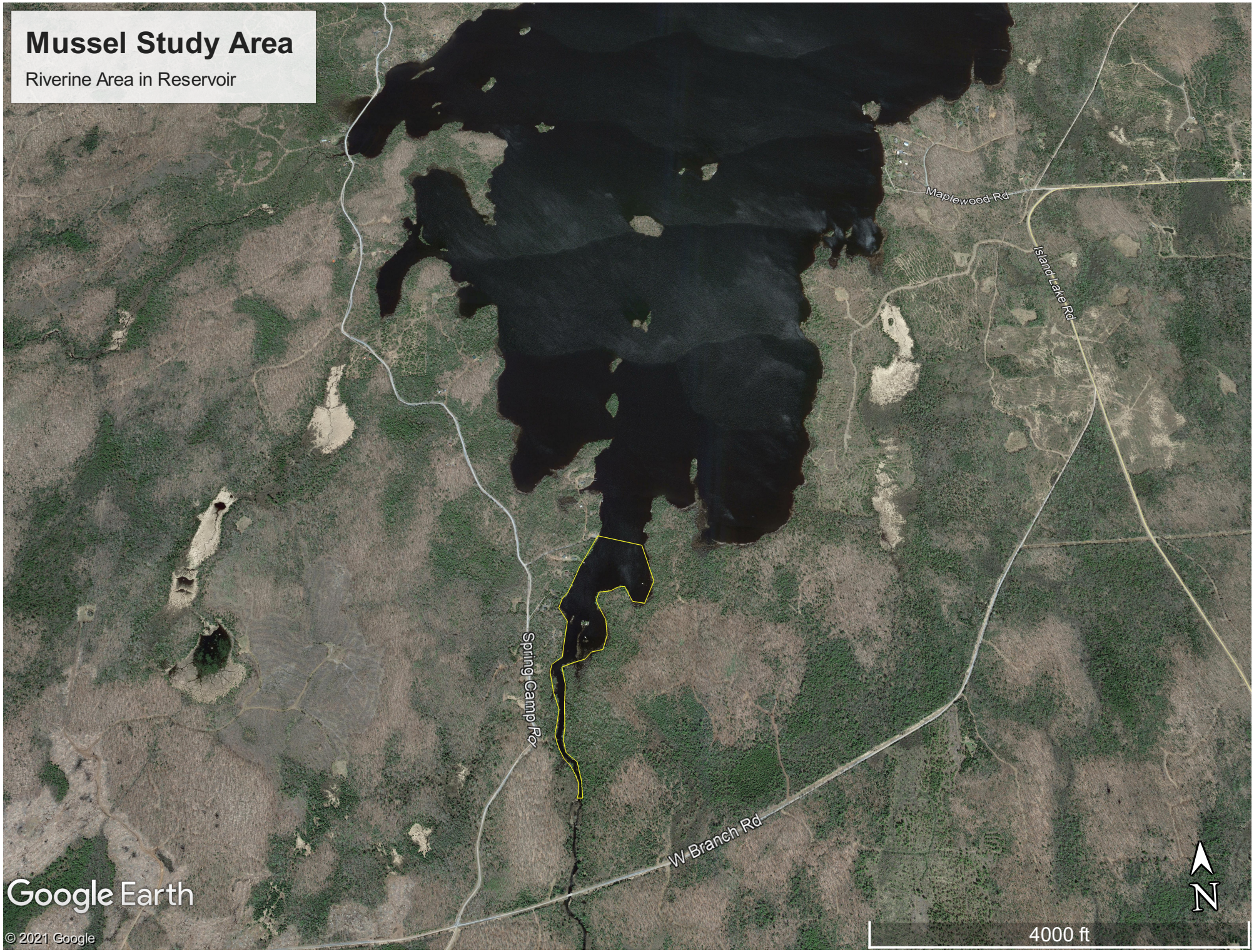
Appendix 1 – Mussel Study Area


Mussel Study Areas
Wisconsin Ave
77
51
Jefferson St
C
Island Lake Rd
Google Earth
© 2021 Google
N
2 mi


Mussel Study Area
Riverine Area in Reservoir
Maplewood Rd
Island Lake Rd
Spring Camp Rd
W Branch Rd
Google Earth
© 2021 Google
N
4000 ft


Mussel Study Area
Downstream Area
Beekston Creek
Kokogan St
Nimikon Ave
Oshkosh Ave
Isabel St
Park St
Park Rd
N
1000 ft
Google Earth
© 2021 Google

Appendix 2 – Mussel Data Forms

Substrate and Water Depth Per Segment										
Reach	Transect	Segment	Water Depth (ft)	Substrate Characteristic (%)						
				Bedrock	Boulder	Cobble	Gravel	Sand	Silt	LWD
Reach 1	T1	10								
	T1	20								
	T1	30								
	T1	40								
	T1	50								
	T1	60								
	T1	70								
	T1	80								
	T1	90								
	T1	100								
	T1	110								
	T1	120								
	T1	130								
	T1	140								
	T1	150								
	T1	160								
	T1	170								
	T1	180								
Reach 1	T2	10								
	T2	20								
	T2	30								
	T2	40								
	T2	50								
	T2	60								
	T2	70								
	T2	80								
	T2	90								
	T2	100								
	T2	110								
	T2	120								
	T2	130								
	T2	140								
	T2	150								
	T2	160								
	T2	170								
	T2	180								
Reach 1	T3	10								
	T3	20								
	T3	30								
	T3	40								
	T3	50								
	T3	60								
	T3	70								
	T3	80								
	T3	90								
	T3	100								
	T3	110								
	T3	120								
	T3	130								

Substrate and Water Depth Per Segment										
Reach	Transect	Segment	Water Depth (ft)	Substrate Characteristic (%)						
				Bedrock	Boulder	Cobble	Gravel	Sand	Silt	LWD
	T3	140								
	T3	150								
	T3	160								
	T3	170								
	T3	180								
Reach 1	T4	10								
	T4	20								
	T4	30								
	T4	40								
	T4	50								
	T4	60								
	T4	70								
	T4	80								
	T4	90								
	T4	100								
	T4	110								
	T4	120								
	T4	130								
	T4	140								
	T4	150								
	T4	160								
	T4	170								
	T4	180								
Reach 1	T5	10								
	T5	20								
	T5	30								
	T5	40								
	T5	50								
	T5	60								
	T5	70								
	T5	80								
	T5	90								
	T5	100								
	T5	110								
	T5	120								
	T5	130								
	T5	140								
	T5	150								
	T5	160								
	T5	170								
	T5	180								
	T1	10								
	T1	20								
	T1	30								
	T1	40								
	T1	50								
	T1	60								
	T1	70								
	T1	80								

Substrate and Water Depth Per Segment										
Reach	Transect	Segment	Water Depth (ft)	Substrate Characteristic (%)						
				Bedrock	Boulder	Cobble	Gravel	Sand	Silt	LWD
Reach 2	T1	90								
	T1	100								
	T1	110								
	T1	120								
	T1	130								
	T1	140								
	T1	150								
	T1	160								
	T1	170								
	T1	180								
Reach 2	T2	10								
	T2	20								
	T2	30								
	T2	40								
	T2	50								
	T2	60								
	T2	70								
	T2	80								
	T2	90								
	T2	100								
	T2	110								
	T2	120								
	T2	130								
	T2	140								
	T2	150								
	T2	160								
	T2	170								
	T2	180								
Reach 2	T3	10								
	T3	20								
	T3	30								
	T3	40								
	T3	50								
	T3	60								
	T3	70								
	T3	80								
	T3	90								
	T3	100								
	T3	110								
	T3	120								
	T3	130								
	T3	140								
	T3	150								
	T3	160								
	T3	170								
	T3	180								
	T4	10								
	T4	20								
	T4	30								

Substrate and Water Depth Per Segment										
Reach	Transect	Segment	Water Depth (ft)	Substrate Characteristic (%)						
				Bedrock	Boulder	Cobble	Gravel	Sand	Silt	LWD
Reach 2	T4	40								
	T4	50								
	T4	60								
	T4	70								
	T4	80								
	T4	90								
	T4	100								
	T4	110								
	T4	120								
	T4	130								
	T4	140								
	T4	150								
	T4	160								
	T4	170								
	T4	180								
Reach 2	T5	10								
	T5	20								
	T5	30								
	T5	40								
	T5	50								
	T5	60								
	T5	70								
	T5	80								
	T5	90								
	T5	100								
	T5	110								
	T5	120								
	T5	130								
	T5	140								
	T5	150								
	T5	160								
	T5	170								
	T5	180								

PROJECT: Gile Flowage

Mussels Observed within West Fork Montreal River, 2022

Species		Reach 1							Reach 2							Overall (All Reaches Together)	
Common Name	Scientific Name	T1	T2	T3	T4	T5	Total Number Reach 1	Relative Abundance (% of total- Reach 1)	T1	T2	T3	T4	T5	Total Number Reach 2	Relative Abundance (% of total- Reach 2)	Total Number	Relative Abundance (% of total)
Abundance (total number of mussels)																	
Number of Species (Live)																	
Effort (size of transect m^2)																	
Surface Density (# per m^2)																	