

**Gile Flowage Storage Reservoir Project  
FERC Project No. 15055**

**Updated Study Report**

**2023 Study Season**

**Prepared for**

**Northern States Power Company  
a Wisconsin Corporation**

**Prepared by**



**September 2023**

## TABLE OF CONTENTS

	Page
<b>1. General</b> .....	<b>1</b>
<b>2. Process and schedule overview</b> .....	<b>2</b>
2.1 Study Plan Development .....	2
2.2 Study Plan Determination .....	3
2.3 Study Reporting Timeline for Updated Study Report.....	4
<b>3. ISR Study Summaries</b> .....	<b>5</b>
3.1 Aquatic and Terrestrial Invasive Species Study .....	5
3.2 Cultural Resources Study .....	6
3.3 Minimum Flow Habitat Evaluation Study .....	7
3.4 Mussel Study.....	7
3.5 Recreation Study.....	8
3.6 Water Quality Monitoring Study .....	8
3.7 Shoreline Stability Study .....	8
3.8 Whitewater Recreation Flow Study.....	9
3.9 Wood Turtle Study .....	10
3.10 Reservoir/Flow Routing Model.....	10
<b>4. Study Variances</b> .....	<b>10</b>
<b>5. USR Study Activities</b> .....	<b>10</b>
<b>6. USR Study Summaries</b> .....	<b>11</b>
6.1 Minimum Flow Habitat Evaluation Study .....	11
6.2 Recreation Study.....	12
6.3 Shoreline Stability Study .....	13
6.4 Reservoir/Flow Routing Model.....	14
<b>7. Requested Study Modifications and Requested New Studies</b> .....	<b>16</b>
7.1 Proposed Study Modifications .....	17
7.2 Requested New Studies .....	17
<b>8. References</b> .....	<b>17</b>

## TABLES

Table 1. Summary of studies completed as part of the ISR .....	2
Table 2. Summary of Commission Staff Recommendations .....	3
Table 3. Reporting and review opportunities associated with the and USR .....	5
Table 4. Summary of study activities for the USR .....	11

## FIGURES

Figure 1. West Wingwall Repair .....	13
--------------------------------------	----

## ATTACHMENTS

- Attachment 1: Virtual Meeting Agenda
- Attachment 2: Minimum Flow Habitat Evaluation Study Report
- Attachment 3: Recreation Study Report
- Attachment 4: Shoreline Stability Study Supplement Report
- Attachment 5: Reservoir/Flow Routing Model Report

## LIST OF ABBREVIATIONS

ACHP .....	Advisory Council on Historic Preservation
APE .....	Area of Potential Effect
ATIS .....	Aquatic and Terrestrial Invasive Species
AWW .....	American Whitewater
Commission.....	Federal Energy Regulatory Commission
DLA .....	Draft License Application
FERC.....	Federal Energy Regulatory Commission
FLA.....	Final License Application
ILP .....	Integrated Licensing Process
ISR .....	Initial Study Report
NGVD .....	National Geodetic Vertical Datum 1929
NPS .....	National Park Service
NSPW.....	Northern States Power Company, a Wisconsin corporation
PAD .....	Pre-Application Document
Project .....	Gile Flowage Storage Reservoir Hydroelectric Project
PSP .....	Proposed Study Plan
RSP .....	Revised Study Plan
SHPO .....	Wisconsin State Historic Preservation Officer
SPD .....	Study Plan Determination
USR .....	Updated Study Report
WDNR .....	Wisconsin Department of Natural Resources

# 1. General

This document presents the Updated Study Report (USR) for the Gile Flowage Storage Reservoir Project (Project), Federal Energy Regulatory Commission (FERC or Commission) Project No. 15055. Northern States Power Company, a Wisconsin corporation (NSPW), owns, operates and maintains the Project. The USR describes NSPW's overall updated progress in implementing its relicensing study plan and schedule and provides an explanation for any variances. The Revised Study Plan (RSP) was filed by NSPW on August 30, 2021 and approved by FERC via their September 24, 2021, study determination letter. The Initial Study Report (ISR) was filed by NSPW on September 28, 2022 ([Accession # 20220928-5127](#)). NSPW held a virtual meeting regarding the ISR on October 6, 2022 and filed the meeting summary with the Commission on October 27, 2022 ([Accession #20221027-5036](#)). Commission staff provided comments on the meeting summary in their November 21, 2022 letter ([Accession #20221121-3017](#)).

Several entities, other than the Commission, provided comments on the ISR. The Sokaogon Chippewa Community provided comments on November 8, 2022 ([Accession #20221101-5124](#)). Friends of the Gile Flowage (FOG) provided comments on November 25, 2022 ([Accession #20221125-5030](#)). Kayla Sturgeon, the National Park Service (NPS), and American Whitewater (AWW) provided comments on November 28, 2022 ([Accession #20221128-5002](#), [Accession #20221128-5058](#), and [Accession #20221128-5123](#)). Many of the comments did not include a request for study modifications.

NSPW filed its response to comments received on the ISR with the Commission on December 27, 2022 ([Accession #20221227-5242](#)).

On January 13, 2023, the Commission issued its determination of requests for study modifications ([Accession # 20230113-3024](#)). Regarding the only comment requesting a study modification, the Commission did not find the modification necessary.

Based upon the information outlined in the ISR, and Commission staff comments on the ISR meeting summary, three updated study reports and a supplemental report are enclosed as Attachments 2, 3, 4, and 5.

Per the Commission's schedule outlined in Scoping Document 2 ([Accession #20210401-3047](#)), NSPW was required to file the Final License Application for the Project with the Commission before August 18, 2023. As a result, those study reports that were finalized after the Commission's January 13, 2023 study determination were previously filed with the FLA on August 18, 2023. Since the studies that were deemed complete as part of the ISR were previously filed as part of the Draft License Application (DLA) on March 17, 2023, they are not included in this report. However, links to those studies are provided below in Table 1 which summarizes the studies finalized as part of the ISR in **Table 1**.

Table 1. Summary of Study	studies completed as part of the ISR Study Consultant(s)	Study Status
Aquatic and Terrestrial Invasive Species Study	GAI Consultants	Study complete. See <a href="#">Accession #20230818-5221</a> , Appendix E-10

Study	Study Consultant(s)	Study Status
Cultural Resources Study	TRC Environmental-Archaeological UW-Milwaukee-NRHP Evaluation	Both studies complete. See <a href="#">Accession #20230818-5221, Appendix E-26</a>
Mussel Study	EnviroScience	Study complete. See <a href="#">Accession #20230818-5221, Appendix E-13</a>
Shoreline Stability Study <sup>1</sup>	Great Lakes Environmental Center	Study complete. See <a href="#">Accession #20230818-5221, Appendix E-5</a>
Whitewater Recreation Flow Study	Mead & Hunt	Study complete. See <a href="#">Accession #20230818-5221, Appendix E-24</a>
Water Quality Monitoring Study	Great Lakes Environmental Center	Study complete. See <a href="#">Accession #20230818-5221, Appendix E-9</a> and <a href="#">Appendix A</a> and <a href="#">Appendix B</a>
Wood Turtle Study	GAI Consultants	Study complete. Accession #20230818-5223, Appendix E-21-Privileged.

Each study report provides the information specified under FERC's Integrated Licensing Process (ILP) requirements (18 CFR § 5.15) and is generally organized as follows:

- Introduction
- Study objectives
- Study area
- Methods
- Results
- Conclusions
- References
- Appendices

## 2. Process and schedule overview

The integrated licensing process (ILP) began with the filing of a Pre-Application Document (PAD) for the Project on November 17, 2020.

### 2.1 Study Plan Development

NSPW filed a Proposed Study Plan (PSP) under 18 CFR § 5.11(a) on April 30, 2021 and hosted a virtual meeting to discuss the PSP on May 20, 2021 pursuant to 18 CFR § 5.8(b)(3)(viii). Following the meeting,

<sup>1</sup> A supplement report has been included with this USR that addresses the two comments on the shoreline stability report provided by Commission staff in their November 21, 2022 ([Accession #20221121-3017](#)) comments on the meeting summary.

comments were received on the PSP under 18 CFR § 5.12. NSPW filed its Revised Study Plan (RSP) on August 30, 2021, under 18 CFR § 5.13(a).

## 2.2 Study Plan Determination

The Commission issued a Study Plan Determination (SPD) on September 24, 2021, within 30 days of the filing of the RSP as required under 18 CFR § 5.13(c), approving seven of the ten studies as proposed by NSPW. The three remaining studies were approved with staff recommended modifications. The SPD recommendations are outlined in **Table 2**.

**Table 2. Summary of Commission Staff Recommendations**

Study	Staff Recommendation(s)	Recommended Modification(s)
Aquatic and Terrestrial Invasive Species Study	Approved	None
Cultural Resources Study	Approved	None
Minimum Flow Habitat Evaluation Study	Approved	None
Mussel Study	Approved with modifications to the study plan	Use a phased study approach that employs a combination of the qualitative and quantitative survey methods.  Select areas to be surveyed under Phase 1 in consultation with the Wisconsin Department of Natural Resources (WDNR). Select areas for quantitative sampling and the number of quadrats to be sampled in consultation with the WDNR. Qualitative and quantitative surveys in the Project reservoir be conducted between 1,490 and 1,475 feet NGVD.
Recreation Study	Approved	None
Shoreline Stability Study	Approved	None
Whitewater Recreation Flow Study	Approved with modifications to study plan	<ul style="list-style-type: none"> <li>• Include documentation of the Level I assessment, including: (1) a summary of literature reviewed, (2) the hydrological assessment, and (3) transcripts and notes from interviews with recreationists and stakeholders.</li> <li>• Complete the Level 2 assessment to provide a more structured and data-driven methodology for selecting flows for the Level 3 assessment. The Level 2 assessment should include consultation with the NPS, AWW and local paddlers to resolve inconsistencies with the 2007 study, determine the need for a site visit, and define study flows prior to the implementation of the Level 3 assessment.</li> <li>• Include a Level 1 desktop assessment of the West Fork of the Montreal River downstream of Highway 2 to the confluence with the Montreal River and from the Montreal River to the Saxon Falls Project.</li> </ul>

Study	Staff Recommendation(s)	Recommended Modification(s)
		<ul style="list-style-type: none"> <li>• Examine egress options downstream between Kimball Falls Park and the confluence and describe the formal and informal access.</li> <li>• Conduct the Level 3 assessment with a minimum of 10 boaters.</li> </ul>
Water Quality Monitoring Study	Approved	None
Wood Turtle Study	Approved	None
Reservoir/Flow Routing Model	Approved with modifications to study plan	<ul style="list-style-type: none"> <li>• Develop the reservoir/flow routing model that predicts the effect of Project operations on: (1) reservoir elevations and generation at Saxon Falls and Superior Falls for simulated inflows, (2) downstream flows and generation for simulated reservoir elevations, (3) Project reservoir levels, downstream flows, and generation at Saxon Falls and Superior Falls both for simulated Project reservoir operations and instream flows.</li> <li>• Power generation and spillage resulting from simulated Project operations should be predicted separately for Saxon Falls and Superior Falls.</li> </ul>

### 2.3 Study Reporting Timeline for Updated Study Report

Consistent with the requirements under 18 CFR § 5.15, NSPW will hold a meeting within 15 days of filing the USR to discuss the 2023 study results with agencies, other interested parties, and Commission staff. Accordingly, **NSPW has scheduled the USR meeting for October 12 at 9:00 a.m. CDT. The meeting will be held virtually** (see Attachment 1 for USR meeting agenda).

Pursuant to 18 CFR § 5.15(c)(3), within 15 days following the USR meeting deadline (i.e., October 28, 2023), NSPW will file a meeting summary. Under 18 CFR § 5.15(c)(4), FERC staff or any agency or other interested party may file a disagreement regarding NSPW's meeting summary within 30 days of its submittal or by November 27, 2023. This filing must set forth the basis of any disagreement with the material content of NSPW's meeting summary and propose any desired alternative modifications to ongoing studies or new studies. Under 18 CFR § 5.15(c)(5), NSPW will then have 30 days, or until December 27, 2023, to respond to any disagreements. Within 30 days of NSPW's response, or by January 26, 2024, and pursuant to 18 CFR § 5.15(c)(6), any remaining disagreements will be resolved by the Commission, and the study plan will be amended as appropriate.

Under 18 CFR § 5.15(d), any proposal to modify an ongoing study must demonstrate that (1) the approved study was not conducted as approved or (2) the approved study was conducted under anomalous environmental conditions, or that environmental conditions have changed in a material way since the study plan's approval.

Under 18 CFR § 5.15(e), any proposal for new information gathering or studies must include an appropriate statement explaining (1) any material changes in the law or regulations applicable to the information request, (2) why the study's goals and objectives cannot be met via the approved study's



methodology, (3) why the request was not made earlier, (4) significant changes in the proposal or significant new information has become available that affects the study, and (5) why the study request meets the criteria of 18 CFR 5.9(b).

The timeline is also presented below in **Table 3**.

**Table 3. Reporting and review opportunities associated with the USR**

<b>Activity or Information Sharing</b>	<b>Commission Deadline</b>
File USR	September 28, 2023
Hold USR meeting (meeting on study results and any proposals to modify study plan)	October 12, 2023 <sup>2</sup>
File USR Meeting Summary	October 28, 2023
File Meeting Summary Disagreements	November 27, 2023
File Responses to Disagreements	December 27, 2023
Commission Resolution of Disagreements	January 26, 2024

### 3. ISR Study Summaries

#### 3.1 Aquatic and Terrestrial Invasive Species Study

The study was completed in 2022.

Invasive species can be introduced to Project waters and lands through recreational activities such as boating, bank fishing, and hiking. These species, once established within the Project boundary, can be transferred outside of the Project boundary by recreationists.

The Aquatic and Terrestrial Invasive Species Study (ATIS), first proposed by NSPW as part of the PSP, was not modified for the RSP and was subsequently approved as proposed in the SPD. The ATIS Study included upstream and downstream inundated areas, and upland areas to the extent possible without accessing private property, included in the proposed Project boundary.

The inundated areas were surveyed for all aquatic plants (emergent and submergent), including invasive plants, according to a point-intercept protocol grid provided by the WDNR, to provide a baseline for both non-invasive and invasive aquatic plants. NSPW's upland property was surveyed by meandering and included identification of both emergent and upland invasive plants. An overall characterization of the terrestrial plant community in each area was also developed to be used as a baseline in the license application.

<sup>2</sup> The date of the scheduled meeting is listed here. The deadline for the meeting is October 13, 2023. The schedule for the deadlines following the meeting is based upon the October 13, 2023 deadline.

Water samples were taken and analyzed for the presence of zebra mussels of veliger size. Sediment samples at existing public boat landings were analyzed for the presence of Asian clam or other invasive macroinvertebrates.

During the point intercept survey upstream of the dam, additional information on bed substrates and water depths was collected at each viable point intercept location. The information was mapped and will help determine which areas of the littoral zone have the potential to be impacted by fluctuations in reservoir elevation.

Overall, there were few invasive species observed throughout the Project and those that were documented occurred in low densities. Invasive species such as tansy and spotted knapweed were primarily limited to areas of high traffic such as road shoulders and Gile Park. Honeysuckle (invasive) was found sporadically throughout the Project and was the most common invasive found on the islands, frequently as individual plants, or small populations.

The other widely spread species was cattail. While some of the cattail populations appeared to be native, having broader and shorter leaves, many infestations of suspected invasive cattail (narrowleaf or hybrid) were observed and documented. These plants were suspected to be of the invasive variety based on having more narrow leaves and growing in a mat-like monoculture, typical characteristics of the invasive cattails. A positive identification was not confirmed due to the lack of seed heads during the Study. The year's late spring, followed by cool weather, may explain the late blooming and lack of seed heads.

The Gile Flowage appears to have a healthy terrestrial and aquatic plant community with low populations of invasive species and high floristic quality indexes. This is further supported by the presence of high-quality indicator species such as Spiny hornwort and Alternate-flowered watermilfoil. Additionally, residential development along the shoreline is light, which historically has been correlated with higher quality systems on other waterbodies (Sass et al. 2010). Increased public education and monitoring would help ensure that the populations of native plant species found on the Flowage remain healthy.

No zebra mussels were identified in the two water samples collected (one in the reservoir and one in the tailwater) during the invasive species surveys. Sediment sampling did not identify the presence of Asian clams, or any other invasive macroinvertebrates.

The ATIS report was filed with the FLA as [Accession #20230818-5221](#), Appendix E-10.

### **3.2 Cultural Resources Study**

The study was completed in 2022.

In the State of Wisconsin, standard archaeological and cultural resource concerns that must be addressed by the licensee or applicant during the FERC licensing or relicensing process are outlined in the pre-licensing procedure section of the Programmatic Agreement among the Federal Energy Regulatory Commission; the Advisory Council on Historic Preservation (AChP); the State of Wisconsin, State Historic Preservation Officer (SHPO); 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 (ACHP, 1993) (Programmatic Agreement).

The Project will be subject to the Programmatic Agreement once it is licensed. Under the terms of the Programmatic Agreement, it is the Licensee's responsibility to ensure historic and archaeological properties are protected throughout the term of its federal license.

As part of the Pre-Licensing Procedure in the Programmatic Agreement, Historic Buildings, Structures and Objects within the Project boundary (a.k.a. Area of Potential Effect or APE) must be identified. In addition, archaeological properties must be identified by completing an archaeological survey of the shorelines within the APE.

The archaeological shoreline survey was first proposed in the PAD, included in the PSP and the RSP as proposed, and approved as proposed in the SPD.

The identification of historical properties was not proposed in the PAD but mentioned as needing additional consultation on the subject with the SHPO. It was first proposed in the PSP and again included in the RSP as proposed and approved as proposed in the SPD.

The literature and archives research revealed one cultural resource and one Government Land Office-mapped trail were overlapped by the reservoir. The archaeological shoreline survey report did not identify any archaeological properties that are being impacted by Project operations and recommended a follow-up survey within 5 years of license issuance for Erosion Site E-3. The report was filed with the FLA as [Accession #20230818-5221, Appendix E-26](#).

The effort to identify historical properties within the APE found one historic structure; however, it was determined as ineligible for the National Register of Historic Places. The report was filed with the FLA as [Accession #20230818-5221, Appendix E-26](#).

### **3.3 Minimum Flow Habitat Evaluation Study**

The study was not complete in 2022. Therefore, the results are summarized in [Section 6](#).

### **3.4 Mussel Study**

The study was completed in 2022.

The operations of the Project could influence freshwater mussel species located within the Project boundary. The Mussel Study provided density and diversity baseline data. It also focused on state and federally threatened or endangered freshwater mussel species that could be adversely impacted by Project operations. This study also characterized mussel habitat within the Project boundary. The Mussel Study was first proposed by NSPW as part of the PSP, was modified by NSPW for the RSP, and approved as modified by Commission staff in the SPD.

Mussel abundance and diversity were low in both the riverine and reservoir locations surveyed. Only one live mussel (Paper Pondshell (*Utterbackia imbecillis*)) was collected in the upstream riverine reach, while no evidence of mussels was observed in the downstream riverine reach. Fifty-eight (58) Paper Pondshell and one Giant Floater (*Pyganodon grandis*) were collected from the reservoir sample locations. Shallower areas near the reservoir shoreline provided more suitable substrate, despite potentially being affected by periodic drawdowns. Mussel abundance was higher near the shore than in the deep silt substrate observed in samples farther from shore. Truncated quantitative sampling supported the results of the Phase 1 reservoir sampling and indicated that mussel density was very low, even in those locations that had the highest abundance timed searches.

The riverine reaches near the Gile Flowage do not appear to provide high-quality mussel habitat. The impounded conditions and loose, unstable substrate within the reservoir and above Gile Falls are also not generally considered suitable for mussels. These reaches appear to support only a few individuals of common, tolerant species. Habitat downstream of Gile Falls consisted of large, very coarse substrate and swift current, likely preventing mussels from burrowing and maintaining position in the substrate.

The study report was filed with the FLA as [Accession #20230818-5221](#), Appendix E-13.

### **3.5 Recreation Study**

The study was not completed in 2022. Therefore, the results are summarized in [Section 6](#).

### **3.6 Water Quality Monitoring Study**

The study was completed in 2022.

The operation of the Project may affect the water quality in the impoundment and downstream of the Gile Dam. The objective of the water quality monitoring study was to evaluate the existing water quality at the Project to determine if the Project meets current state water quality standards.

The Water Quality Monitoring Study was first proposed by NSPW as part of the PSP, was not modified for the RSP, and approved as proposed by NSPW in the SPD.

Analysis of the hydrographic data indicate that the Gile Flowage was not stratified in terms of temperature or dissolved oxygen at any location throughout the study. The results obtained from the monitoring were unremarkable.

The study report was filed with the FLA as [Accession #20230818-5221](#), Appendix E-9 and [Appendix A](#) and [Appendix B](#).

### **3.7 Shoreline Stability Study**

The study was completed in 2022. A supplemental report is summarized in [Section 6](#).

Project operation affects water level and flow patterns in the Project reservoir and downstream of Gile Dam. The water level fluctuation and flow variations may cause shoreline erosion or instability, which in turn could

impact environmental resources. Understanding the Project's influence on shoreline erosion is necessary to determine the effects continued operation of the Project may have on environmental resources.

The objective of this study was to identify areas of erosion, mass soil movement, slumping, or other forms of instability along the reservoir shoreline and downstream of Gile Dam. The Shoreline Stability Study was first proposed by NSPW as part of the PSP, was modified by NSPW for the RSP, and approved as proposed in the SPD.

Four of the five erosion sites identified during the survey were located on small islands within the flowage where the erosion was limited to the thin soil layer atop the bedrock. One site was located along the northwest shoreline of the flowage near the dam. Although located away from the dam and in a wooded area, this site did exhibit significant soil movement and warranted further investigation<sup>3</sup>. The small area of interest in the tailrace adjacent to the dam's west wingwall has been repaired. See [Section 6](#). The study report was filed with the FLA as [Accession #20230818-5221](#), Appendix E-5.<sup>4</sup>

### 3.8 Whitewater Recreation Flow Study

The study was completed in 2022.

Whitewater boating opportunities are available during runoff events in the West Fork Montreal River. The whitewater reach begins downstream of the Gile Dam and continues to either Kimball Falls or U.S. Highway 2. Although there currently are no scheduled whitewater releases from the Gile Dam, the Project affects flows used for whitewater boating in this segment of the river through the timing and magnitude of releases from the reservoir.

The goal of the Whitewater Recreation Flow Study was to evaluate the effects of flow releases from the project on whitewater boating opportunities on the West Fork Montreal River, beginning downstream of the project dam and concluding 5.7 miles downstream at Kimball Falls. More specifically, the study was to: (a) evaluate incremental flow releases to determine optimal boating opportunities for different skill sets; (b) use flow duration curves to determine the number of days per year when river flows equal or exceed optimal whitewater flows and assess the feasibility of recreational flow releases; (c) quantify the effects on downstream generation and on project water levels for any 4-hour period of proposed flow releases; (d) develop an estimate of potential whitewater boating use; (e) identify competing recreation needs or environmental concerns; and (f) verify the difficulty rating for the reach at varying flows.

The Whitewater Recreation Flow Study was first proposed by NSPW as part of the PSP, was modified by NSPW for the RSP, and approved as modified by Commission staff in the SPD.

According to the responses from study participants, 600 cfs was not a sufficient flow, with 13 (76%) boaters indicating a higher flow would be preferable in Reach 1, 14 (82%) in Reach 2, and 13 (87%) in

---

<sup>3</sup> The additional investigation was completed in 2023 and is summarized in [Section 6](#).

<sup>4</sup> A supplement report has been included with this USR that addresses the two comments on the shoreline stability report provided by Commission staff in their November 21, 2022 ([Accession #20221121-3017](#)) comments on the meeting summary. The supplement report is discussed further in [Section 6](#).

Reach 3. One boater indicated they would prefer a much higher flow rate than 600 cfs in Reach 1. The majority of boaters indicated 1,200 cfs was either too high or optimal, with seven boaters (70%) indicating a lower flow would be preferred for Reach 1 and eight boaters (80%) stating the flow was optimal for Reach 2 and Reach 3.

The study report was filed with the FLA as [Accession #20230818-5221, Appendix E-24](#).

### **3.9 Wood Turtle Study**

The study was completed in 2022.

The operations of the Project may affect nesting or overwintering wood turtles in areas with suitable habitat. Identifying whether wood turtles are present within the Project boundary will help determine whether any mitigation measures are necessary as part of licensing.

The objective of the Wood Turtle Study was to determine if there are wood turtles, nesting habitat, or evidence of wood turtle nesting present in three specific areas identified by WDNR as having suitable habitat.

No wood turtles were observed within the Study area. While it is likely that wood turtles are foraging in some of the southern border areas of the Flowage in proximity of the creeks flowing into the Flowage, it is unlikely that wood turtles are nesting in areas other than West Branch Road (outside of the study area and the area inundated by the Project) and possibly Anderson Road.

The study was filed as privileged with the FLA as Accession #20230818-5223, Appendix E-21.

### **3.10 Reservoir/Flow Routing Model**

The study was not completed in 2022. Therefore, the results are summarized in [Section 6](#).

## **4. Study Variances**

Under 18 CFR § 5.15(f), the USR must include “an explanation of any variance from the study plan and schedule.”

NSPW is not proposing any study variances as part of this USR.

## **5. USR Study Activities**

As outlined in Section 6, NSPW does not recommend any study modifications to the approved study plan methodologies or new studies. Additional information that was not available for the ISR report filing in 2022 has been included in this USR under [Section 6](#). As stated in Section 1, the DLA was filed on March 17, 2023, and the FLA was filed on August 18, 2023. **Table 4** provides a summary of study activities for the USR.

**Table 4. Summary of study activities for the USR**

Study	Study Consultant(s)	Study Status
Minimum Flow Habitat Evaluation Study	Great Lakes Environmental Center	Study complete. See <b>Attachment 2</b> .
Recreation Study	EA Engineering and Science	Study complete. Updated study report filed with the FLA <a href="#">Accession #20230818-5221</a> , Appendix E-23 See also <b>Attachment 3</b> .
Shoreline Stability Study Supplement	Great Lakes Environmental Center	Study complete. See <b>Attachment 4</b> .
Reservoir/Flow Routing Model	Mead & Hunt	Study complete. See <b>Attachment 5</b> for the model report. The report was also filed with the FLA <a href="#">Accession #20230818-5221</a> , Appendix E-28. <sup>5</sup>

## 6. USR Study Summaries

### 6.1 Minimum Flow Habitat Evaluation Study

During the 2022 study season, NSPW was unable to reduce the minimum flow through the facility to complete the analyses of the 12 cfs and 24 cfs flows due to an unexpected malfunction of the sluice gate. In 2023, NSPW was able to temporarily modify the spillway gate to effectively regulate the discharge to complete the 12 and 24 cfs analyses.

Study reaches A and B, downstream of the Gile Dam, were selected to represent the habitat conditions within the West Branch of the Montreal River well removed from the immediate influence of the Project’s operation. Although each level of flow (12, 24 and 36 cfs) resulted in a “Good” rating based on the WDNR fish habitat scoring, that scoring method was clearly influenced by the lack of meanders and deep pools in this stretch of the West Branch of the Montreal River.

The consideration of habitat suitability for individual fish, and the estimation of overall habitat suitability based on depth and velocity, provided a more quantitative evaluation of the expected changes in habitat between 12 and 36 cfs. Total available aquatic habitat increased between 8% and 13% as flows increased from 12 to 36 cfs in Reach A. In Reach B, total available aquatic habitat increased between 4.2% and 10.2% as flows increased from 12 to 36 cfs. Habitat changes were slightly greater in Reach A than in Reach B between 12 and 36 cfs. Overall, the average increase in wetted aquatic habitat averaged between 6.1% and 11.6%. Based on the average habitat suitability percentage for all fish, the average suitability changed very little between 12 and 36 cfs.

When combining depth and velocity as an average or overall habitat suitability score, the percent of optimum habitat available to all species averaged between 45.5% and 46.5% between 12 and 36 cfs for Reach A. For Reach B, the average habitat suitability score ranged between 47.4% and 49.8%.

<sup>5</sup> The model files cannot be eFiled on the Commission’s website because they are macro-enabled spreadsheets. As a result, the spreadsheets for the model are available on NSPW’s relicensing website at: <https://hydrorelicensing.com/gile-flowage/> under FLA-Appendix E-28.

Although habitat suitability was variable between fish species, the overall increase in available habitat was modest between 12 and 36 cfs. For example, based on the wetted usable area for individual fish species, the change between 12, 24 and 36 cfs is negligible, considering there was an increase noted for some species and a decrease noted for others. This finding is not surprising due to the river channel's morphology. Although there is an abundance of gravel, cobble and boulder habitat throughout both study reaches, the incremental increase in depth and velocity between 12 and 36 cfs only changed the overall habitat suitability by less than 3 percentage points.

The balance between retaining sufficient water in the impoundment for recreation and the need for adequate flow downstream of the Gile Dam to protect aquatic resources is a notable consideration. The current operation of the Project appears to satisfy both needs and uses of the available resources.

See **Attachment 2** for the updated study Minimum Flow Habitat Evaluation Study report.

## 6.2 Recreation Study

In 2022, NSPW had not yet completed all the site visits before the ISR was required to be submitted. As a result, NSPW completed the remaining site visits subsequent to the submittal of the ISR.

The operation of the Project can influence recreational opportunities within the Project boundary and in the Project vicinity. The purpose of the Recreation Study was to obtain a subjective assessment of recreation facility conditions and needed enhancements; determine capacity of existing facilities to address current and future user demand; and provide sufficient information for making recreation enhancement recommendations.

The Recreation Study was first proposed by NSPW as part of the PSP, modified by NSPW for the RSP, and approved by the Commission as proposed in the SPD.

The existing amenities of the five surveyed recreation resources on Gile Flowage were generally rated as in good condition. The two exceptions were in regard to the Gile Dam Canoe Portage and Sucker Hole Landing. Both facilities needed maintenance regarding a lack of directional signage for certain amenities.

Gile Park produced the most recreational user interviews, followed closely by the County Highway C Landing. The fewest interviews were conducted at Gile Dam Canoe Portage. May accounted for the most monthly interviews and also produced the highest average number of interviews per survey event. June and July yielded a similar number of interviews. Weekends produced nearly twice the number of interviews as weekdays.

Visitors were asked which of the 11 specific activities included on the survey form that they participated in during their visit. The most popular activities were boat fishing followed by shoreline fishing.

See **Attachment 3** for the updated Recreation Study report. The updated report was also filed with the FLA [Accession #20230818-5221](#), Appendix E-23.



### 6.3 Shoreline Stability Study

Wisconsin Administrative Code NR 328.08 categorizes erosion intensity into three groups; low energy, moderate energy, and high energy. Each site inspected during the 2022 and 2023 stability assessments ranked in the low energy category. Site #5 is located along northwest shoreline of the flowage west of the Gile Dam where the erosion appears to be above the waterline and the area between the water line and the eroded embankment is covered with cobble or sandy beach. The area located within the proposed project boundary immediately downstream of the Gile Dam was also inspected for erosion. The only area of concern at this site was the area of erosion adjacent to the west wingwall below the dam gatehouse.

#### West Wingwall below Dam Gatehouse (Downstream Tailrace)

It appears that human traffic, and possibly high springtime flows, have scoured the bank and exposed the soil adjacent to the west concrete wingwall. NSPW remediated this site in August 2023. **Figure 1** shows the completed repair.

**Figure 4. West Wingwall Repair**



#### Site #5

Site #5 is located on the far north end of the Gile Flowage on private property. The site was revisited on July 17, 2023. From the site assessment, it appears that the landowner excavated a portion of a trail that leads to the site, which destabilized the shoreline and caused trees to topple into the reservoir. The proposed Project boundary follows contour elevation 1490.0 feet. The elevation of the Gile Flowage at the time of the 2023 assessment was 1488.03 feet. The shoreline instability at the site, and corresponding erosion, do not appear to be related to Project operation nor does it appear to threaten the integrity of the dam.

It is the opinion of the consultant that Site #5 does not require further assessment.

See **Attachment 4** for the supplemental Shoreline Stability Study report. The initial Recreation Study report was filed with the FLA as [Accession #20230818-5221](#), Appendix E-5.

### **6.4 Reservoir/Flow Routing Model**

Downstream generation at the Saxon Falls and Superior Falls Hydroelectric Projects is affected by reservoir elevation and minimum flow requirements for the Project.

The objective of the Reservoir/Flow Routing Model is to simulate Project flows and reservoir elevations that vary in frequency and duration (i.e., hourly, daily, weekly, monthly, and seasonally). The routing model also predicts the following:

- Reservoir elevations
- Flow in the West Fork Montreal River
- Flow in the Montreal River (main branch)
- Flow that the Saxon Falls Project and Superior Falls Project used for power generation
- The volume of water that exceeds the hydraulic capacities of the powerhouses at the two downstream projects (lost generation).

During the 2022 study season, NSPW was unable to reduce the minimum flow through the Project's spillway to complete the analyses for the 12 and 24 cfs flows due to an unexpected malfunction of the sluice gate. Upon further inspection, the higher than anticipated discharge at the sluice gate's 12 cfs set point appears to be the result of a poor bottom seal on the sluice gate. NSPW is unable to determine with any certainty as to how long the leak has been occurring. Therefore, no additional information could be gained from further inspection of the gate that would have aided in further calibration of the model.

As part of NSPW's August 28, 2023 response to the Commission's additional information request for the Saxon Falls and Superior Falls Hydroelectric Projects ([Accession #20230828-5314](#), [Appendix AIR-1 Saxon Falls](#), [Appendix AIR-1 Superior Falls](#)), and in the FLA ([Accession #20230818-5221](#), Appendix E-28), NSPW provided model-derived information that predicts the effect of Project operations on: (1) reservoir elevations and generation at Saxon Falls and Superior Falls for simulated inflows, (2) downstream flows and generation for simulated reservoir elevations, (3) Project reservoir levels, downstream flows, and generation at Saxon Falls and Superior Falls both for simulated Project reservoir operations and instream flows. The results are discussed below.

### Saxon Falls

Conducting the whitewater releases, as proposed in the FLA,<sup>6</sup> will increase the generation from 4,154 MWh/year to 4,177 MWh/year during a dry season (2012 model year), from 6,360 MWh/year to 6,366 MWh/year during a normal season (2003 model year), and from 9,405 MWh/year to 9,410 MWh/year during a wet season (2016 model year).

Increasing the aesthetic flow, as proposed in the FLA,<sup>7</sup> will decrease the generation from 4,154 MWh/year to 4,142 MWh/year during a dry season (2012 model year), from 6,360 MWh/year to 6,345 MWh/year during a normal season (2003 model year), and from 9,405 MWh/year to 9,401 MWh/year during a wet season (2016 model year).

### Superior Falls

Conducting the whitewater releases at Saxon Falls, as proposed in the FLA,<sup>8</sup> will increase the generation at Superior Falls from 4,569 MWh/year to 4,586 MWh/year during a dry season (2012 model year), from 6,902 MWh/year to 6,911 MWh/year during a normal season (2003 model year), and from 10,446 MWh/year to 10,457 MWh/year during a wet season (2016 model year).

Increasing the aesthetic flow, as proposed in the FLA,<sup>9</sup> will decrease the generation at Superior Falls from 4,569 MWh/year to 4,510 MWh/year during a dry season (2012 model year), from 6,902 MWh/year to 6,857 MWh/year during a normal season (2003 model year), and from 10,446 MWh/year to 10,411 MWh/year during a wet season (2016 model year).

### Gile Storage Reservoir

According to the model results, under the current operation of the facility,<sup>10</sup> for a dry year (2012 model year), the start of year elevation is 1,485.30 feet national geodetic vertical datum (NGVD), the end of year stage is 1,485.02 feet, and the minimum stage during the year is 1,483.32 feet (6.68 feet below 1,490.0 feet NGVD). For a normal year (2003 model year), the start of the year elevation is 1,486.55 feet, the end of year stage is 1,483.45 feet, and the minimum stage during the year is 1482.40 feet (7.6 feet below 1,490.0 feet). For a wet year (2016 model year), the start of year elevation is 1489.90 feet, the end of year elevation is 1,489.83 feet, and the minimum elevation is 1,487.27 feet (2.74 feet below 1,490.0 feet).

With the whitewater releases as proposed in the FLA,<sup>11</sup> and the change in minimum flow proposed at Saxon Falls considered negligible, the model predicted the Gile Flowage elevations resulting from a dry year, a normal year, and a wet year for minimum flows of 12 cfs, 24 cfs, and 36 cfs.

According to the model results for a 12 cfs minimum flow, during a dry year (2012 model year) the start of

---

<sup>6</sup> Each simulated event lasted 5 hours, with the first and last hours at 600 cfs and the remaining hours at 1200 cfs. The events occurred at noon on the last Saturday of June and September for the given data year.

<sup>7</sup> Change releases at Saxon Falls only from the period each year of Saturday before Memorial Day to October 15 where 5 cfs is released 24 hours per day to releasing an additional 5 cfs between 8 am and 8 pm on the weekends.

<sup>8</sup> Each simulated event lasted 5 hours, with the first and last hours at 600 cfs and the remaining hours at 1200 cfs. The events occurred at noon on the last Saturday of June and September for the given data year.

<sup>9</sup> Change releases at Saxon Falls only from the period each year of Saturday before Memorial Day to October 15 where 5 cfs is released 24 hours per day to releasing an additional 5 cfs between 8 am and 8 pm on the weekends.

<sup>10</sup> 10 cfs minimum flow and no whitewater releases.

<sup>11</sup> Each simulated event lasted 5 hours, with the first and last hours at 600 cfs and the remaining hours at 1200 cfs. The events occurred at noon on the last Saturday of June and September for the given data year.

year elevation is 1,485.30 feet national geodetic vertical datum (NGVD), the end of year stage is 1,484.64 feet, and the minimum stage during the year is 1,483.32 feet (6.68 feet below 1,490.0 feet NGVD). During a normal year (2003 model year), the start of the year elevation is 1,486.55 feet, the end of year stage is 1,482.91 feet, and the minimum stage during the year is 1481.94 feet (8.06 feet below 1,490.0 feet). During a wet year (2016 model year), the start of year elevation is 1489.90 feet, the end of year elevation is 1,489.61 feet, and the minimum elevation is 1,487.27 feet (2.74 feet below 1,490.0 feet).

According to the model results for a 24 cfs minimum flow, for a dry year (2012 model year) the start of year elevation is 1,485.30 feet national geodetic vertical datum (NGVD), the end of year stage is 1,483.10 feet, and the minimum stage during the year is 1,483.10 feet (6.9 feet below 1,490.0 feet NGVD). For a normal year (2003 model year), the start of the year elevation is 1,486.55 feet, the end of year stage is 1,481.28 feet, and the minimum stage during the year is 1480.92 feet (9.08 feet below 1,490.0 feet). For a wet year (2016 model year), the start of year elevation is 1489.90 feet, the end of year elevation is 1,489.20 feet, and the minimum elevation is 1,487.25 feet (2.75 feet below 1,490.0 feet).

According to the model results for a 36 cfs minimum flow, during a dry year (2012 model year) the start of year elevation is 1,485.30 feet national geodetic vertical datum (NGVD), the end of year stage is 1,481.06 feet, and the minimum stage during the year is 1,481.06 feet (8.94 feet below 1,490.0 feet NGVD). During a normal year (2003 model year), the start of the year elevation is 1,486.55 feet, the end of year stage is 1,479.25 feet, and the minimum stage during the year is 1479.19 feet (10.81 feet below 1,490.0 feet). During a wet year (2016 model year), the start of year elevation is 1489.90 feet, the end of year elevation is 1,488.74 feet, and the minimum elevation is 1,487.20 feet (2.80 feet below 1,490.0 feet).

The report for the model is available in **Attachment 5** and was also previously filed with the FLA ([Accession #20230818-5221](#), Appendix E-28). The model files cannot be e-Filed via the Commission's website because they are macro-enabled spreadsheets. Therefore, the spreadsheets for the model have been made available on NSPW's relicensing website at: <https://hydrorelicensing.com/gile-flowage/> (FLA-Appendix E-28).

## 7. Requested Study Modifications and Requested New Studies

Under 18 CFR § 5.15(d), any proposal to modify an ongoing study must demonstrate that (1) the approved study was not conducted as described in the approved RSP, or (2) that it was conducted under anomalous environmental conditions, or that environmental conditions have changed in a material way since the study plan's approval.

Under 18 CFR § 5.15(e), any proposal for new information gathering or studies must include an appropriate statement explaining (1) any material changes in the law or regulations applicable to the information request, (2) why the study's goals and objectives cannot be met via the approved study's methodology, (3) why the request was not made earlier, (4) significant changes in the proposal or significant new information has become available that affects the study, and (5) why the study request meets the criteria of 18 CFR 5.9(b).

## 7.1 Proposed Study Modifications

NSPW is not proposing any modifications to the approved study plans based upon the results of the studies conducted.

## 7.2 Requested New Studies

NSPW is not proposing any new studies based upon the results of the studies conducted and included herein.

## 8. References

FERC (Federal Energy Regulatory Commission). 2021 Scoping Document 2 for the Gile Flowage Storage Reservoir Project, Letter dated April 1, 2021.

FERC (Federal Energy Regulatory Commission). Study Plan Determination for the Gile Flowage Storage Reservoir Project, Letter dated September 24, 2021.

FERC (Federal Energy Regulatory Commission). Comments on the Initial Study Report Meeting Summary for the Gile Flowage Storage Reservoir Project, Letter dated November 21, 2022.

FERC (Federal Energy Regulatory Commission). Determination on Requests for Study Modifications for the Gile Flowage Storage Reservoir Project, Letter dated January 13, 2023.

NSPW (Northern States Power Company-a Wisconsin corporation). 2020. Pre-Application Document. eFiled November 17, 2020.

NSPW (Northern States Power Company-a Wisconsin corporation). 2021. Proposed Study Plan. eFiled April 30, 2021.

NSPW (Northern States Power Company-a Wisconsin corporation). 2021. Revised Study Plan. eFiled August 30, 2021.

NSPW (Northern States Power Company-a Wisconsin corporation). 2022. Response to comments on the Initial Study Report. eFiled December 27, 2022.

NSPW (Northern States Power Company-a Wisconsin corporation). 2023. Draft License Application. eFiled August 18, 2023.

NSPW (Northern States Power Company-a Wisconsin corporation). 2023. Final License Application. eFiled August 18, 2023.