Gile Flowage Storage Reservoir Project
FERC No. 15055

Initial Study Report

2022 Study Season

Prepared for

Northern States Power Company
a Wisconsin Corporation

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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
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 Initial Study Report (ISR) for the Gile Flowage Storage Reservoir Project (Project), Federal Energy Regulatory Commission (FERC or Commission) Project No. 15055. Northern States Power Company of Wisconsin (NSPW) owns, operates and maintains the Project. The ISR describes NSPW's overall progress in implementing its relicensing study plan and schedule, provides an explanation of variances, and proposes modifications from the study plans and schedules outlined in the Revised Study Plan (RSP). The RSP was filed by NSPW on August 30, 2021 and approved by FERC in its September 24, 2021, study determination letter.

Appendices 2 through 11 of this ISR contain the individual reports for the ten studies identified in the RSP. A summary of the studies and the status of each is provided in **Table 1**.

Table 1. Summary of studies included in this ISR

Study	Study Consultant(s)	Study Status
Aquatic and Terrestrial Invasive Species Study	GAI Consultants	Study complete.
Cultural Resources Study	TRC Environmental-Archaeological UW-Milwaukee-NRHP Evaluation	Both studies complete.
Minimum Flow Habitat Evaluation Study	Great Lakes Environmental Center	36 cfs evaluation complete. Requesting variance to evaluate 12 cfs and 24 cfs releases.
Mussel Study	EnviroScience	Study complete.
Recreation Study	EA Engineering, Science and Technology	Recreation Surveys completed January through September. Requesting variance to complete October surveys in 2022 and report September and October results in Updated Study Report (USR).
Shoreline Stability	Great Lakes Environmental Center	Study complete.
Whitewater Recreation Flow Study	Mead & Hunt	Study complete.
Water Quality Monitoring Study	Great Lakes Environmental Center	Study complete.
Wood Turtle Study	GAI Consultants	Study complete.
Reservoir/Flow Routing Model	Mead & Hunt	Requesting a variance to complete in USR.

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 licensing the Gile Flowage Storage Reservoir 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 on May 20, 2021 according to 18 CFR § 5.8(b)(3)(viii). Following the meeting, 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, 30 days within 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).

Study	Staff Recommendation(s)	Recommended Modification(s)
		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	Approved	None
Whitewater Recreation Flow Study	Approved with modifications to study plan	• 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. • 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. • 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. • Examine egress options downstream between Kimball Falls Park and the confluence and describe the formal and informal access. • Conduct the Level 3 assessment with a minimum of 10 boaters.
Water Quality Monitoring Study	Approved	None
Wood Turtle Study	Approved	None
Reservoir/Flow Routing Model	Approved with modifications to study plan	• 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. • Power generation and spillage resulting from simulated Project operations should be predicted separately for Saxon Falls and Superior Falls.

2.3 Study Reporting Timeline through Updated Study Report Meeting

Consistent with the requirements under 18 CFR § 5.15, NSPW will hold a meeting with agencies, other interested parties and Commission staff within 15 days of filing the ISR to discuss the 2021 study results and plans for completing the study program. **NSPW has scheduled the ISR meeting for October 6 at 9:00 a.m. The meeting will be held virtually.**

Pursuant to 18 CFR § 5.15(c)(3), within 15 days following the ISR meeting (i.e., October 22, 2022), NSPW will file a meeting summary. Per 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 issuance or by November 22, 2022. 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 December 23, 2022, to respond to any disagreements. Within 30 days of NSPW's response, or by January 23, 2023, 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 described in the approved RSP 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).

Following the Commission's resolution of any disagreements, the second study season, if necessary, will commence and an Updated Study Report (USR) will be filed with the Commission by September 28, 2023.

Following submittal of the USR and consistent with requirements under 18 CFR § 5.15(c)(2), NSPW will, within 15 days following the filing of the USR, hold a meeting with agencies and other interested parties and Commission staff to discuss the 2022 study results reported in the USR.

Under 18 CFR § 5.15(c)(3), within 15 days following the USR meeting or by October 28, 2023, NSPW will file a meeting summary. Under 18 CFR § 5.15(c)(4), FERC staff or any agency and other interested party may file a disagreement concerning NSPW's meeting summary within 30 days of its issuance 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 to respond to any disagreements by December 27, 2023. Within 30 days of NSPW's response or by January 26, 2024, under 18 CFR § 5.15(c)(6), any remaining disagreements will be resolved by the Commission, and the study plan will be amended as appropriate.

The proposed timeline for study reporting, i.e., the filing of the ISR and USR, is presented in **Table 3**.

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

Activity or Information Sharing	Commission Deadline
File ISR	September 28, 2022
Hold ISR meeting (meeting on study results and any proposals to modify study plan)	October 6, 2022
File Study Results Meeting Summary	October 21, 2022
File Meeting Summary Disagreements	November 21, 2022
File Responses to Disagreements	December 21, 2022
Commission Resolution of Disagreements	January 20, 2023
File USR	September 28, 2023
Hold USR meeting (meeting on study results and any proposals to modify study plan)	October 13, 2023
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. Study Variances

Under 18 CFR § 5.15(c), the ISR must include "an explanation of any variance from the study plan and schedule."

As noted in **Table 1**, study season one studies are complete except for the variances in the schedule for the Recreation Study (September and October 2022 results), the 12 cfs and 24 cfs evaluations for the Minimum Flow Habitat Evaluation Study and the development of the Reservoir/Flow Routing Model. There are no non-schedule or methodology variances for any studies.

Aquatic and Terrestrial Invasive Species Study

The Aquatic and Terrestrial Invasive Species Study was completed in accordance with the RSP and as approved by the Commission staff in the SPD. No variances were necessary to complete the study. The study report is available in **Appendix 2**.

Cultural Resources Study

The Cultural Resources Study was completed in accordance with the RSP and as approved by the Commission staff in the SPD. No variances were necessary to complete the study. The study reports are available in **Appendix 3 and 4**.

Minimum Flow Habitat Evaluation Study

The Minimum Flow Habitat Evaluation Study for 36 cfs was completed in accordance with the RSP and as approved by the Commission staff in the SPD. NSPW is requesting a variance to the schedule to complete this study as discussed below.

On August 30, 2022, NSPW attempted to release 12 cfs (current minimum flow) for the first habitat evaluation by closing the sluice gate (minimum flow gate) according to past practice. During the process of verifying the flow downstream, NSPW's consultant measured the flow at approximately 36 cfs (average measurement was 35.25 cfs). NSPW subsequently verified the sluice gate was closed to its normal position per visible height indicators (the gate opening itself is submerged and not visible from the surface) for the 12 cfs flow release. NSPW was unable to close the sluice gate further and therefore the additional study flows could not be released for downstream analysis.

Upon further inspection the following week, NSPW determined that it was plausible that the current minimum flow setting could actually be releasing approximately 36 cfs. However, in order to evaluate the other study flows, NSPW will either have to develop an alternative means of releasing the water or determine how to further close the sluice gate. As a result, NSPW is requesting a variance to evaluate the 12 and 24 cfs flows in the final study season. The initial study report evaluating the 36 cfs minimum flow release is available in **Appendix 5**.[1]

Mussel Study

The Mussel Study was completed in accordance with the RSP and as modified by the Commission staff in the SPD. No variances were necessary to complete the study. The study report is available in **Appendix 6**.

Recreation Study

The Recreation Study was completed in accordance with the RSP and as approved by the Commission staff in the SPD, with the exception of the October 2022 recreation surveys which are pending. Upon receipt of the Commission's September 24, 2022 determination letter, NSPW had insufficient time to complete the recreation surveys on two randomly selected weekdays and two randomly selected weekends in October of 2021. As such, NSPW is required to request a variance to complete the October surveys in 2022 instead of 2021. Additionally, NSPW was unable to include the September 2022 survey data in the initial study report in time for production.

Recreation survey results for September and October of 2022 will be incorporated into the Draft License Application (DLA) and an updated report will be filed with the USR.

The current study report, with results through August 2022, is available in **Appendix 7**.

[1] The report contained in Appendix 4 is a combined report for both the Minimum Flow Habitat Evaluation Study and the Shoreline Stability Study.

Shoreline Stability Study

The Shoreline Stability Study was completed in accordance with the RSP and as approved by the Commission staff in the SPD. No variances were necessary to complete the study. The study report is provided in **Appendix 5**.

Water Quality Monitoring Study

The Water Quality Monitoring Study was completed in accordance with the RSP and as approved by the Commission staff in the SPD. No variances were necessary to complete the study which is included as **Appendix 8**.

Whitewater Recreation Flow Study

The Whitewater Recreation Flow Study was completed in accordance with the RSP and as modified by the Commission staff in the SPD. No variances were necessary to complete the study. The study report is included as **Appendix 9**.

Wood Turtle Study

The Wood Turtle Study was completed in accordance with the RSP, as approved by the Commission staff in the SPD. No variances were necessary to complete the study. The study report is included as **Appendix 10**.

Reservoir/Flow Routing Model

During the Minimum Flow Habitat Evaluation Study, NSPW encountered an unanticipated result when attempting to verify the 12 cfs flow release downstream. The 12 cfs release from the sluice gate was actually measured as approximately 36 cfs on August 30, 2022. As of the filing of this report, NSPW has been unable to determine the cause of the discrepancy in flows. Upon further inspection, NSPW determined it was plausible for the existing 12 cfs gate setting to actually be releasing approximately 36 cfs.

Since the sluice gate is submerged, NSPW has been unable to determine the cause of the unexpected higher flows as measured downstream. It is necessary for NSPW to determine the discrepancy in the 12 cfs sluice gate setting and the significantly higher flow as measured downstream because, as of now, the historic daily flow release values that are needed to verify the Reservoir/Flow Routing Model appear to be inaccurate for an undetermined period of time.

It is possible, that if the sluice gate is actually passing 36 cfs at the 12 cfs gate position, the current gate rating curve is incorrect. This would mean that the majority of the daily flow values contained in the 1994 to 2020 dataset would also be incorrect and the entire dataset would need to be revised with a corrected gate rating curve.

If the gate rating curve is correct, and the concrete gate sill has eroded over time thereby creating a larger orifice to pass water, a determination will need to be made as to when orifice size increased and at what rate. Once the determination is made, the affected portion of the historical dataset could either be disregarded or adjusted accordingly.

It is also possible that debris could have become lodged in the sluice gate opening thereby preventing it from closing to the actual 12 cfs gate setting. In that case, it would have to be determined when the debris became lodged. Once the determination is made, the affected portion of the historical dataset could either be disregarded or adjusted accordingly.

NSPW will need to design and fabricate a means for isolating and dewatering the gate. It will also have to design and fabricate a way to pass the minimum flow further downstream to avoid a backwater condition in the immediate tailwater area. Design and fabrication efforts are expected to occur during the upcoming fall and winter season. NSPW anticipates that it will be able to complete an inspection of the gate and sill after spring runoff 2023.

For the reasons stated above, NSPW is requesting a variance to the approved schedule for the Reservoir/Flow Routing Model, as modified by the Commission staff in the SPD, until the final study season. The routing model will be made available in a spreadsheet-based format as part of the USR. Accompanying the model will be a comprehensive discussion that provides a complete understanding of the model, simulation, and modeling results. The discussion will also provide a detailed description of the methodology used to evaluate the effects of reservoir levels and minimum flow releases on downstream generation, how the model handles flow that varies within the time-period being analyzed, including flows that vary within a 24-hour time-period, the model's capabilities, and the model's limitations. A discussion that includes project operations used in the simulation and modeled results will be a product of the study results contained in this ISR and any comments received on the study results and the model itself.

4. Study Summaries

4.1 Aquatic and Terrestrial Invasive Species Study

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.

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. This 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.

Although lab results for zebra mussels are pending and will be included in the DLA the sediment surveys did not identify the presence of Asian clams, or any other invasive macroinvertebrates.

The ATIS report is included in **Appendix 2**.

4.2 Cultural Resources Study

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 is available in **Appendix 3**.

The effort to identify historical properties within the APE identified one historic structure; however, it was determined as ineligible for the National Register of Historic Places. The report is available in **Appendix 4**.

4.3 Minimum Flow Habitat Evaluation Study

The Minimum Flow Habitat Evaluation Study evaluated whether the existing minimum flow at the Project is sufficient to protect aquatic resources in the West Fork downstream of the Gile Dam. The Minimum Flow Habitat Evaluation Study was first proposed by NSPW as part of the PSP, was not modified for the RSP, and was approved as proposed in the SPD.

The study involved the survey of two representative reaches (stations) downstream of the Gile Dam. Data outlined in the WDNR's Guidelines for Evaluating Habitat of Wadable Streams was collected at each station at a flow of 36 cfs as discharged from the dam. Under a requested variance, the 12 cfs and 24 cfs evaluation will be completed in 2023 and filed with the USR as previously discussed.

Both study reaches contained a mix of riffle, run, and pool habitat dominated by a hard substrate (boulder, cobble, and gravel). At a flow of 36 cfs, maximum transect depths typically ranged from 35 to 60 cm, with shallow water and soft substrates rarely encountered. Average water velocities ranged from 30 cm/sec to 36 cm/sec. Slack water areas were rarely observed.

Overall, the 36 cfs study flow provided a relatively high depth and velocity suitability for the ten most common fish species present. Overall, suitability values for 9 of the 10 species exceeded 40%. The highest overall suitability was for the creek chub (90.5%) and the lowest was for the pumpkinseed (9.39%).

When the habitat data was entered into the WDNR fish habitat scoring worksheet for streams greater than 10 meters wide, both study reaches scored in the “good” range. Study reach A received a score of 69 and study reach B received a score of 61. Deductions from the top score of 100 were due primarily to shallow depths and a lack of bends or other stream complexes which add to the overall diversity of the stream structure.

The Minimum Flow Habitat study report, that includes only the 36 cfs study flow, is available in **Appendix 5**.

4.4 Mussel Study

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 is available in **Appendix 6**.

4.5 Recreation Study

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 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 associated with the Gile Dam Canoe Portage and Sucker Hole landing. Both needed maintenance regarding a lack of directional signage for certain features.

Gile Park produced slightly more recreational user interviews than the County Highway C Landing while the fewest interviews were conducted at Gile Dam Canoe Portage. By month, the most interviews were conducted in May, which 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 than 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 bank fishing.

The study report is available in **Appendix 7** and includes results through August 2022.

4.6 Shoreline Stability Study

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 warrants further investigation. The small area of interest in the tailrace adjacent to the dam's west wingwall is currently scheduled for mitigation.

The study report is available in **Appendix 5**.

4.7 Water Quality Monitoring Study

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 is available in **Appendix 8**.

4.8 Whitewater Recreation Flow Study

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 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 is available in **Appendix 9**.

4.9 Wood Turtle Study

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 report is available in **Appendix 10**.

4.10 Reservoir/Flow Routing Model

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

The objective of the Reservoir/Flow Routing Model is to simulate project flows and reservoir levels that vary in frequency and duration (hourly, daily, weekly, monthly, and seasonally). It also predicts Project reservoir levels, flow in the West Fork Montreal and Montreal Rivers, and the amount of flow the Saxon Falls Project and Superior Falls Project used for power generation. It also predicts the amount of water that exceeds the hydraulic capacity of each downstream project's powerhouse (lost generation).

The Reservoir/Flow Routing Model will be included in the 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 for the USR. Additional data that is not yet available for this ISR report will be included in the DLA, if possible, and the USR. The DLA is required to be filed by March 21, 2023, whereas the USR is required to be filed after the DLA by October 28, 2023.

6. 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).

6.1 Proposed Study Modifications

NSPW is not proposing any study modifications to the approved study plans based upon the results of the studies conducted in the initial study period and included herein.

6.2 Requested New Studies

Based upon the results of the studies conducted in the initial study period, and contained in this document, NSPW is not proposing any new studies.

7. Statement of License Application

The relicensing studies outlined in the ISR will provide the information necessary for determining and characterizing Project impacts and identifying appropriate protection, mitigation, and enhancement measures relevant to those impacts. An assessment of Project impacts will be presented in the DLA. The DLA will be filed with FERC no later than March 21, 2023 and will refine its presentation of information on impacts and its application. This includes proposed mitigation enhancement measures, in the Final License Application, which must be filed no later than August 18, 2023.

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.

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.

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Appendix 1: Virtual Meeting Agenda

Agenda for Gile Flowage Storage Reservoir Initial Study Report Meeting

Meeting Date / Time: Thursday, October 6 (9:00 AM to 12:00 PM CDT)
Note: Meeting will be conducted virtually and recorded.

To be forwarded an invitation to the meeting, please email Jen Schuetz at Jen.Schuetz@MeadHunt.com

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Thursday, October 6, 2022: 9:00 AM to 12:00 PM CDT

A. 9:00 to 9:15 AM: Welcome – NSPW and Mead & Hunt

1. Introductions - Northern States Power Company, a Wisconsin corporation (NSPW)
2. Purpose of Meeting - Discuss Study Results and Modifications (Mead & Hunt)
3. Two Schedule Variances (Mead & Hunt)
4. No Proposed Modifications by NSPW (Mead & Hunt)
    a. 15-Day Meeting Summary
    b. 30-Day Disagreement Response Period (requires good cause)
    c. 30-Day Response to Disagreements
    d. 30-Day Commission Disagreement Resolution
    e. Approved if no disagreement on meeting summary filed

B. 9:15 to 9:30 AM: Aquatic and Terrestrial Invasive Species Study – Mead & Hunt

C. 9:30 to 9:45 AM: Cultural Resources Study – Mead & Hunt

D. 9:45 to 10:00 AM: Minimum Flow Habitat Evaluation Study (Variance) – Mead & Hunt

E. 10:00 to 10:15 AM: Mussel Study – Mead & Hunt

F. 10:15 to 10:30 AM: Recreation Study – Mead & Hunt

G. 10:30 to 10:45 AM: Break

H. 10:45 to 11:00 AM: Shoreline Stability Study – Mead & Hunt

I. 11:00 to 11:15 AM: Water Quality Monitoring Study – Mead & Hunt

J. 11:15 to 11:30 AM: Whitewater Recreation Flow Study – Mead & Hunt

K. 11:30 to 11:45 AM: Wood Turtle Study – Mead & Hunt

L. 11:45 to 12:00 PM: Reservoir / Flow Routing Model (Variance) – Mead & Hunt

M. 12:00 PM: Adjourn

If topics are discussed in a shorter time frame than listed in the agenda, the meeting will move forward to the next agenda topic.

Appendix 2: Aquatic and Terrestrial Invasive Species Study Report

The Appendix has been eFiled as a separate file.

Appendix 3: Archaeological Shoreline Report

The Appendix has been eFiled as a separate file.

Appendix 4: National Register of Historic Places Evaluation Report

The Appendix has been eFiled as a separate file.

Appendix 5: Minimum Flow Habitat Study and Shoreline Stabilization Report

The Appendix has been eFiled as a separate file.

Appendix 6: Mussel Study Report

The Appendix has been eFiled as a separate file.

Appendix 7: Recreation Study Report

The Appendix has been eFiled as a separate file.

Appendix 8: Water Quality Monitoring Study Report

The Appendix has been eFiled as a separate file.

Appendix 9: Whitewater Recreation Flow Study Report

The Appendix has been eFiled as a separate file.

Appendix 10: Wood Turtle Study Report

The Appendix has been eFiled as a separate file.